UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 8-K

CURRENT REPORT
PURSUANT TO SECTION 13 OR 15(d) OF THE
SECURITIES EXCHANGE ACT OF 1934

Date of Report (Date of earliest event reported) February 15, 2023

ALBEMARLE CORPORATION

(Exact name of Registrant as specified in charter)

Virginia	**001-12658**	**54-1692118**
(State or other jurisdiction of incorporation)	**(Commission file number)**	**(IRS employer identification no.)**

4250 Congress Street, Suite 900
Charlotte, North Carolina 28209
(Address of principal executive offices) (Zip Code)

Registrant's telephone number, including area code
(980) 299-5700

Not applicable
(Former name or former address, if changed since last report)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions (see General Instruction A.2. below):

☐ Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)

☐ Soliciting material pursuant to Rule 14a- 12 under the Exchange Act (17 CFR 240.14a-12)

☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))

☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 (17 CFR 230.405) or Rule 12b-2 of the Securities Exchange Act of 1934 (17 CFR 240.12b-2)
Emerging growth company ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol	Name of each exchange on which registered
COMMON STOCK, $.01 Par Value	**ALB**	**New York Stock Exchange**

Section 8 - Other Events

Item 8.01. Other Events.

Technical Report Summaries

Albemarle Corporation ("Albemarle" or the "Company") is filing this Current Report on Form 8-K to provide the Technical Report Summaries ("TRS") relating to the lithium mineral resources and reserves at the Company's Greenbushes property, Salar de Atacama property and Silver Peak property, its bromine mineral resources and reserves at the Company's Jordan Bromine Operation and Magnolia properties, and the related qualified person consents. The TRS and related qualified person consents filed as exhibits hereto will be incorporated into the Company's Annual Report on Form 10-K for the year ended December 31, 2022 by reference to this filing.

Description of Common Stock

The Company is also filing this Current Report on Form 8-K for the purpose of updating the description of its common stock contained in its Registration Statement on Form 10/A (No. 1-12658) filed with the Securities and Exchange Commission (the "SEC") on February 11, 1994. In accordance with the interpretation of the staff of the Division of Corporation Finance of the Securities and Exchange Commission (the "Division") set forth in Questions 123.07 and 126.23 of the Division's Securities Act Forms Compliance and Disclosure Interpretations, the Company intends to incorporate this description by reference into certain of its filings with the SEC, including registration statements on Form S-3 or Form S-8.

Description of Common Stock Registered Pursuant to Section 12(b) of the Securities Exchange Act of 1934, as amended.

The following is a description of the capital stock of Albemarle. This description is based on Albemarle's amended and restated articles of incorporation and amended and restated bylaws (together, the "Albemarle organizational documents") and is subject in all respects to the Virginia Stock Corporation Act (the "VSCA") and applicable Virginia law. This description is a summary and is qualified in its entirety by reference to the Albemarle organizational documents.

Authorized Shares of Capital Stock

Albemarle's amended and restated articles of incorporation authorize the issuance of 150,000,000 shares of common stock, $0.01 par value per share, and 15,000,000 shares of preferred stock. As of December 31, 2022, Albemarle had one class of securities, common stock, registered under Section 12 of the Securities Exchange Act of 1934, as amended.

Common Stock

Common Stock Outstanding. The outstanding shares of the common stock are duly authorized, validly issued, fully paid and nonassessable.

Voting Rights. Each holder of Albemarle common stock is entitled to one vote per share on all matters voted on generally by shareholders, including the election of directors. Albemarle's amended and restated articles of incorporation do not provide for cumulative voting for the election of directors. Except as otherwise required by law or with respect to any outstanding class or series of Albemarle preferred stock, the holders of Albemarle common stock possess all voting power.

Under Albemarle's amended and restated articles of incorporation, shareholder action is generally effective if the votes cast in favor of the action exceed the votes cast against the action. The election of directors requires a plurality of the votes cast by Albemarle shareholders at a meeting at which a quorum is present. Albemarle's amended and restated articles of incorporation require the affirmative vote of at least a majority of the outstanding shares of Albemarle common stock for the approval of mergers, statutory share exchanges, sales or other dispositions of all or substantially all of Albemarle's assets outside the usual and regular course of business, or dissolution of Albemarle, except that the affirmative vote of 75% of the outstanding shares of Albemarle common stock is required for approval of an affiliated transaction, as defined in Section 13.1-725 of the VSCA. An affiliated transaction generally is defined by the VSCA as any of the following transactions:

- a merger with any interested shareholder (defined as any holder of more than 10% of any class of outstanding voting shares of a corporation), or with a corporation that would, immediately after the merger, be an affiliate of an interested shareholder immediately before the merger;
- a share exchange in which any interested shareholder acquires one or more classes or series of a corporation's voting shares;

- certain dispositions of corporate assets not in the ordinary course of business, to or with an interested shareholder, or any guarantee of any indebtedness of any interested shareholder in an amount greater than 5% of a corporation's consolidated net worth as of the date of a corporation's most recently available financial statements;
- certain sales or other dispositions to an interested shareholder of voting shares of a corporation or any of its subsidiaries having an aggregate fair market value greater than 5% of the aggregate fair market value of all outstanding voting shares;
- any dissolution, domestication or conversion of a corporation proposed by or on behalf of an interested shareholder; or
- any reclassification of securities, including reverse stock splits, recapitalizations or mergers of the corporation with any of its subsidiaries, or any distribution or other transaction (whether or not involving an interested shareholder) that increases the percentage of the outstanding voting shares of the corporation or any of its subsidiaries, owned beneficially by any interested shareholder by more than 5%.

The supermajority voting requirement does not apply to a transaction with a shareholder who, together with his or her affiliates and associates, has been the beneficial owner of more than 10% of any class of Albemarle outstanding voting shares as of the later of (i) the close of business on February 28, 1994, the date of the distribution by Ethyl Corporation to its shareholders of all of the outstanding shares of Albemarle common stock, or (ii) the date such person became an interested shareholder with the prior approval of the disinterested directors of Albemarle.

Further, the affirmative vote of the holders of 75% of the voting power of Albemarle's outstanding shares must approve an amendment to provisions in Albemarle's amended and restated articles of incorporation relating to the supermajority voting requirement for affiliated transactions.

Exclusive Forum. Albemarle's amended and restated bylaws provide that unless Albemarle consents in writing to the selection of an alternative forum, the United States District Court for the Eastern District of Virginia, Alexandria Division, or in the event that court lacks jurisdiction to hear such action, the Circuit Court of the County of Fairfax, Virginia, will be the sole and exclusive forum for any derivative action brought on behalf of Albemarle, any action asserting a claim of breach of a legal duty owed by any current or former director, officer or other employee or agent of Albemarle to Albemarle or Albemarle shareholders, any action arising pursuant to the VSCA or Albemarle's organizational documents or any action asserting a claim governed by the internal affairs doctrine.

Dividend Rights; Rights Upon Liquidation. Subject to any preferential rights of holders of any shares of Albemarle preferred stock that may be outstanding, holders of shares of Albemarle common stock are entitled to receive dividends and other distributions on their shares of common stock out of assets legally available for distribution when, as and if authorized and declared by the Albemarle board of directors, and to share ratably in Albemarle's assets legally available for distribution to its shareholders in the event of its liquidation, dissolution or winding-up.

Other Rights. Holders of Albemarle common stock have no preferences or preemptive, conversion, exchange, redemption or sinking fund rights. Shares of Albemarle common stock will not be liable for further calls or assessments by Albemarle, and the holders of Albemarle common stock will not be liable for any of Albemarle's liabilities.

Listing. Albemarle's common stock is listed on the New York Stock Exchange under the symbol "ALB."

Transfer Agent and Registrar. EQ Shareowner Services is the transfer agent and registrar for Albemarle common stock.

Anti-Takeover Provisions

Albemarle Organizational Documents. The Albemarle organizational documents and the VSCA contain provisions that may have the effect of impeding, delaying or discouraging the acquisition of control of Albemarle by means of a tender or exchange offer, proxy fight, merger or share exchange, open market purchases or otherwise in a transaction not approved by the Albemarle board of directors. These provisions are designed to reduce, or have the effect of reducing, Albemarle's vulnerability to an unsolicited proposal for the restructuring or sale of all or substantially all of Albemarle's assets or an unsolicited takeover attempt that the Albemarle board of directors does not believe is in the best interests of its shareholders.

Undesignated Preferred Stock. Under Albemarle's amended and restated articles of incorporation, the Albemarle board of directors has the authority, without further shareholder approval, to issue preferred stock in classes or series and to fix the designations, voting power, preferences and rights of the shares of each class or series and any qualifications, limitations or restrictions with respect to that class or series. Under this authority, the Albemarle board of directors could create and issue a class or series of preferred stock with rights, preferences or restrictions that have the effect of discriminating against an existing or prospective holder of Albemarle's capital stock as a result of such holder beneficially owning or commencing a tender offer for a substantial amount of Albemarle common stock. One of the effects of authorized but unissued and unreserved shares of preferred stock may be to render it more difficult for, or discourage an attempt by, a potential acquiror to obtain control of Albemarle by means of a merger, share exchange, tender or exchange offer, proxy contest or otherwise, and thereby protect the continuity of Albemarle's management. The issuance of shares of preferred stock may have the effect of delaying, deferring or preventing a change in control of Albemarle without any further action by Albemarle shareholders.

Additional Provisions. Other provisions of the Albemarle organizational documents that may make replacing the Albemarle board of directors more difficult include:

- 75% supermajority voting requirements to approve affiliated transactions or an amendment to the provisions in Albemarle's amended and restated articles of incorporation relating to this supermajority voting requirement;
- only the chief executive officer, president, chairman of the board, or a majority of the Albemarle board, and not shareholders, are able to call a special meeting of shareholders;
- inability of shareholders to act by less-than-unanimous written consent;
- requirements for advance notice for proposing business or making director nominations at shareholder meetings;
- requirements for advance notice for proposing business or making director nominations at shareholder meetings;
- removal of directors only for cause; and
- ability of the Albemarle board of directors to increase the size of the board of directors and fill vacancies on the board of directors.

Affiliated Transactions Statute

The VSCA contains provisions governing affiliated transactions. In general, these provisions prohibit a Virginia corporation from engaging in affiliated transactions with any holder of more than 10% of any class of its outstanding voting shares, or an interested shareholder, for a period of three years following the date that such person became an interested shareholder unless:

- a majority of (but not fewer than two) disinterested directors on the board of directors of the corporation and the holders of two-thirds of the voting shares, other than the shares beneficially owned by the interested shareholder, approve the affiliated transaction; or
- before the date the person became an interested shareholder, a majority of the disinterested directors on the board of directors approved the transaction that resulted in the shareholder becoming an interested shareholder.

After three years, any such transaction must satisfy certain fair price requirements in the statute or be approved by the holders of two-thirds of the voting shares, other than the shares beneficially owned by the interested shareholder. For a description of the affiliated transactions subject to this approval requirement, see "— Common Stock — Voting Rights."

Control Share Acquisitions Statute

The VSCA also contains provisions relating to control share acquisitions, which are transactions causing the voting power of any person acquiring beneficial ownership of shares of a Virginia public corporation to meet or exceed certain threshold percentages (20%, 33 1/3% or 50%) of the total votes entitled to be cast for the election of directors. Shares acquired in a control share acquisition have no voting rights unless:

- the voting rights are granted by a majority vote of all outstanding shares other than those held by the acquiring person or any officer or employee director of the corporation; or
- the articles of incorporation or bylaws of the corporation provide that these Virginia law provisions do not apply to acquisitions of its shares.

The acquiring person may require that a special meeting of the shareholders be held to consider the grant of voting rights to the shares acquired in the control share acquisition.

As permitted by Virginia law, the Albemarle board of directors has adopted a bylaw providing that the control share acquisition provisions of Virginia law do not apply to the acquisition of its shares.

Section 9 - Financial Statements and Exhibits

Item 9.01. Financial Statements and Exhibits.

(d) *Exhibits.*

Exhibit Number	Exhibit
*23.1	Consent of SRK Consulting (U.S), Inc. regarding lithium reserves and resources
*23.2	Consent of Fastmarkets regarding market studies for lithium reserves and resources
*23.3	Consent of RPS Energy Canada Ltd regarding bromine reserves and resources
*23.4	Consent of RESPEC regarding bromine reserves and resources
*96.1	SEC Technical Report Summary Pre-Feasibility Study Greenbushes Mine Western Australia, prepared by SRK Consulting (U.S), Inc., dated February 14, 2023
*96.2	SEC Technical Report Summary, Pre-Feasibility Study, Salar de Atacama Region II, Chile, prepared by SRK Consulting (U.S), Inc., dated February 14, 2023
*96.3	SEC Technical Report Summary, Pre-Feasibility Study, Silver Peak Lithium Operation, Nevada, USA, prepared by SRK Consulting (U.S), Inc., dated February 14, 2023
*96.4	SEC Technical Report Summary for Jordan Bromine Operation, prepared by RPS Energy Canada Ltd and RESPEC Consulting Inc., dated February 15, 2023
*96.5	SEC Technical Report Summary for Magnolia Field Bromine Reserves, prepared by RPS Energy Canada Ltd, dated February 15, 2023
104	Cover Page Interactive Data File (embedded within the Inline XBRL document)

* Included with this filing.

SIGNATURE

Pursuant to the requirements of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned hereunto duly authorized.

Date: February 15, 2023

ALBEMARLE CORPORATION

By: /s/ Kristin M. Coleman

Kristin M. Coleman

Executive Vice President, General Counsel and Corporate Secretary

Exhibit 23.1

February 15, 2023

CONSENT OF QUALIFIED PERSON

SRK Consulting (U.S.), Inc. (“SRK”), in connection with Albemarle Corporation’s Annual Report on Form 10-K for the year ended December 31, 2022 (the “Form 10-K”), consents to:

- the public filing by the Company and use of:

  1. the technical report titled “Technical Report Summary Pre-Feasibility Study Greenbushes Mine Western Australia” (the “Greenbushes Technical Report Summary”), with an effective date of December 31, 2022 and dated February 14, 2023;

  2. the technical report titled “SEC Technical Report Summary Pre-Feasibility Study Salar de Atacama Region II, Chile” (the “Salar de Atacama Technical Report Summary”), with an effective date of August 31, 2022 and dated February 14, 2023; and

  3. the technical report titled “SEC Technical Report Summary Pre-Feasibility Study Silver Peak Lithium Operation Nevada, USA” (the “Silver Peak Technical Report Summary”), with an effective date of September 30, 2022 and dated February 14, 2023; and

  4. the technical report titled “SEC Technical Report Summary Initial Assessment Wodgina Western Australia” (the “Wodgina Technical Report Summary” and together with the Greenbushes Technical Report Summary, the Salar de Atacama Technical Report Summary and the Silver Peak Technical Report Summary, the "Technical Report Summaries"), with an effective date of September 30, 2020 and dated December 31, 2021, as amended December 16, 2022

  that were prepared in accordance with Subpart 1300 of Regulation S-K promulgated by the U.S. Securities and Exchange Commission and filed as exhibits to this Current Report on Form 8-K (the “Form 8-K”) (with the exception of the Wodgina Technical Report Summary, which was filed as an exhibit to Amendment No. 2 to Albemarle Corporation's Annual Report on Form 10-K for the year ended December 31, 2021, filed on January 26, 2023) and referenced in the Form 10-K.

- the incorporation by reference of the Market Studies Reports into the Company’s Registration Statements on Form S-8 (Nos. 333-150694, 333-166828, 333-188599 and 333-223167) (collectively, the “Registration Statements”);

- the use of and references to our name, including our status as an expert or “qualified person” (as defined in Subpart 1300 of Regulation S-K promulgated by the U.S. Securities and Exchange Commission), in connection with the Form 10-K, the Form 8-K, the Registration Statements and the Market Studies Reports; and

- any extracts from or a summary of the Market Studies Reports in the Form 10-K and incorporated by reference in the Registration Statements and the use of any information derived, summarized, quoted, or referenced from the Market Studies Reports, or portions thereof, that was prepared by us, that we supervised the preparation of, and/or that was reviewed and approved by us, that is included or incorporated by reference in the Form 10-K and Registration Statements.

SRK is responsible for authoring, and this consent pertains to, the Technical Report Summary. SRK certifies that it has read the Form 10-K and that it fairly and accurately represents the information in the Technical Report Summary for which it is responsible.

/s/ SRK Consulting (U.S.), Inc.

SRK Consulting (U.S.), Inc.

February 15, 2023

CONSENT OF QUALIFIED PERSON

Fastmarkets Group Limited (“Fastmarkets”), in connection with Albemarle Corporation’s Annual Report on Form 10-K for the year ended December 31, 2022 (the “Form 10-K”), consents to:

- the public filing by the Company and use of:

  1. the technical report titled “SEC Technical Report Summary Pre-Feasibility Study Salar de Atacama Region II, Chile” (the “Technical Report Summary”), which contains Fastmarkets’ report on market studies in Section 16 thereof (the “Salar Market Studies Report”) with an effective date of August 31, 2022 and dated February 14, 2023;

  2. the technical report titled “SEC Technical Report Summary Pre-Feasibility Study Silver Peak Lithium Operation Nevada, USA”, which contains Fastmarkets’ report on market studies in Section 16 thereof (the “Silver Peak Market Studies Report”) with an effective date of August 31, 2022 and dated February 14, 2023; and

  3. the technical report titled “Technical Report Summary Pre-Feasibility Study Greenbushes Mine Western Australia”, which contains Fastmarkets’ report on market studies in Section 16 thereof (the “Greenbushes Market Studies Report”, and, together with the Salar Market Studies Report and the Silver Peak Market Report, the “Market Studies Reports”) with an effective date of December 31, 2022 and dated February 14, 2023

  that were prepared in accordance with Subpart 1300 of Regulation S-K promulgated by the U.S. Securities and Exchange Commission, as exhibits to this Current Report on Form 8-K (the “Form 8-K”) and referenced in the Form 10-K.

- the incorporation by reference of the Market Studies Reports into the Company’s Registration Statements on Form S-8 (Nos. 333-150694, 333-166828, 333-188599 and 333-223167) (collectively, the “Registration Statements”);

- the use of and references to our name, including our status as an expert or “qualified person” (as defined in Subpart 1300 of Regulation S-K promulgated by the U.S. Securities and Exchange Commission), in connection with the Form 10-K, the Form 8-K, the Registration Statements and the Market Studies Reports; and

- any extracts from or a summary of the Market Studies Reports in the Form 10-K and incorporated by reference in the Registration Statements and the use of any information derived, summarized, quoted, or referenced from the Market Studies Reports, or portions thereof, that was prepared by us, that we supervised the preparation of, and/or that was reviewed and approved by us, that is included or incorporated by reference in the Form 10-K and Registration Statements.

Fastmarkets is responsible for authoring, and this consent pertains to, the Market Studies Reports. Fastmarkets certifies that it has read the Form 10-K and that it fairly and accurately represents the information in the Market Studies Reports for which it is responsible.

Fastmarkets

/s/ Fastmarkets
8 Bouverie Street
London
EC4Y 8AX

February 15, 2023

CONSENT OF QUALIFIED PERSON

RPS Energy Canada Ltd. (“RPS”), in connection with Albemarle Corporation’s Annual Report on Form 10-K for the year ended December 31, 2022 (the “Form 10-K”), consents to:

- the public filing by the Company and use of the Technical Report Summaries prepared by RPS on certain bromine reserves and resources controlled by Albemarle Corporation (the “Technical Report Summaries”), with an effective date of December 31, 2022 and dated February 15, 2023, that were prepared in accordance with Subpart 1300 of Regulation S-K promulgated by the U.S. Securities and Exchange Commission, as an exhibit to this Current Report on Form 8-K (the “Form 8-K”) and referenced in the Form 10-K;

- the incorporation by reference of the Technical Report Summaries into the Company’s Registration Statements on Form S-8 (Nos. 333-150694, 333-166828, 333-188599 and 333-223167) (collectively, the “Registration Statements”);

- the use of and references to our name, including our status as an expert or “qualified person” (as defined in Subpart 1300 of Regulation S-K promulgated by the U.S. Securities and Exchange Commission), in connection with the Form 10-K, the Form 8-K, the Registration Statements and the Technical Report Summaries; and

- any extracts from or a summary of the Technical Report Summaries in the Form 10-K and incorporated by reference in the Registration Statements and the use of any information derived, summarized, quoted, or referenced from the Technical Report Summaries, or portions thereof, that was prepared by us, that we supervised the preparation of, and/or that was reviewed and approved by us, that is included or incorporated by reference in the Form 10-K and the Registration Statements.

RPS is responsible for authoring, and this consent pertains to, the Technical Report Summaries. RPS certifies that it has read the Form 10-K and that it fairly and accurately represents the information in the Technical Report Summaries for which it is responsible.

RPS Energy Canada Ltd.

By: /s/ Michael Gallup

Name: Michael Gallup
Title: Technical Director - Engineering

Exhibit 23.4

February 15, 2023

CONSENT OF QUALIFIED PERSON

RESPEC, in connection with Albemarle Corporation's Annual Report on Form 10-K for the year ended December 31, 2022 (the "Form 10-K"), consents to:

- the public filing by the Company and use of the Technical Report Summaries prepared by RESPEC on certain bromine reserves and resources controlled by Albemarle Corporation (the "Technical Report Summaries"), with an effective date of December 31, 2022 and dated February 15, 2023, that were prepared in accordance with Subpart 1300 of Regulation S-K promulgated by the U.S. Securities and Exchange Commission, as an exhibit to this Current Report on Form 8-K (the "Form 8-K") and referenced in the Form 10-K;

- the incorporation by reference of the Technical Report Summaries into the Company's Registration Statements on Form S-8 (Nos. 333-150694, 333-166828, 333-188599 and 333-223167) (collectively, the "Registration Statements");

- the use of and references to our name, including our status as an expert or "qualified person" (as defined in Subpart 1300 of Regulation S-K promulgated by the U.S. Securities and Exchange Commission), in connection with the Form 10-K, the Form 8-K, the Registration Statements and the Technical Report Summaries; and

- any extracts from or a summary of the Technical Report Summaries in the Form 10-K and incorporated by reference in the Registration Statements and the use of any information derived, summarized, quoted, or referenced from the Technical Report Summaries, or portions thereof, that was prepared by us, that we supervised the preparation of, and/or that was reviewed and approved by us, that is included or incorporated by reference in the Form 10-K and the Registration Statements.

RESPEC is responsible for authoring, and this consent pertains to, the Technical Report Summaries. RESPEC certifies that it has read the Form 10-K and that it fairly and accurately represents the information in the Technical Report Summaries for which it is responsible.

RESPEC

By: /s/ Edmundo J. Laporte

Name: Edmundo J. Laporte
Title: Director of International Business Division / Principal Consultant

Exhibit 96.1

SEC Technical Report Summary
Pre-Feasibility Study
Greenbushes Mine
Western Australia

Effective Date: December 31, 2022
Report Date: February 14, 2023

Report Prepared for

Albemarle Corporation

4350 Congress Street
Suite 700
Charlotte, North Carolina 28209

Report Prepared by

SRK Consulting (U.S.), Inc.
999 Seventeenth Street, Suite 400
Denver, CO 80202

SRK Project Number: USPR000574

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List of Abbreviations

The metric system has been used throughout this report. Tonnes are metric of 1,000 kg, or 2,204.6 lb. All currency is in U.S. dollars (US$) unless otherwise stated.

Abbreviation	Unit or Term
A	ampere
AA	atomic absorption
A/m^2	amperes per square meter
ANFO	ammonium nitrate fuel oil
Ag	silver
Au	gold
AuEq	gold equivalent grade
°C	degrees Centigrade
CCD	counter-current decantation
CIF	cost-insurance-freight
CIL	carbon-in-leach
CoG	cut-off grade
cm	centimeter
cm^2	square centimeter
cm^3	cubic centimeter
cfm	cubic feet per minute
ConfC	confidence code
CRec	core recovery
CSS	closed-side setting
CTW	calculated true width
°	degree (degrees)
dia.	diameter
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
FA	fire assay
FOS	fine ore stockpile
FoS	factor of safety
ft	foot (feet)
ft^2	square foot (feet)
ft^3	cubic foot (feet)
g	gram
gal	gallon
g/L	gram per liter
g-mol	gram-mole
gpm	gallons per minute
g/t	grams per tonne
ha	hectares
HDPE	Height Density Polyethylene
hp	horsepower
HTW	horizontal true width
ICP	induced couple plasma
ID2	inverse-distance squared
ID3	inverse-distance cubed
IFC	International Finance Corporation
ILS	Intermediate Leach Solution
kA	kiloamperes
kg	kilograms
km	kilometer
km^2	square kilometer
koz	thousand troy ounce
kt	thousand tonnes
kt/d	thousand tonnes per day

kt/y	thousand tonnes per year
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hour
kWh/t	kilowatt-hour per metric tonne
L	liter
LCE	Lithium Carbonate Equivalent
L/s	liters per second
L/s/m	liters per second per meter
lb	pound
LHD	Long-Haul Dump truck
LLDDP	Linear Low Density Polyethylene Plastic
LOI	Loss On Ignition
LoM	Life-of-Mine
m	meter
m^2	square meter
m^3	cubic meter
masl	meters above sea level
MARN	Ministry of the Environment and Natural Resources
mg/L	milligrams/liter
mm	millimeter
mm^2	square millimeter
mm^3	cubic millimeter
MME	Mine & Mill Engineering
Moz	million troy ounces
Mt	million tonnes
MTW	measured true width
MW	million watts
m.y.	million years
NGO	non-governmental organization
NI 43-101	Canadian National Instrument 43-101
OSC	Ontario Securities Commission
oz	troy ounce
%	percent
PLC	Programmable Logic Controller
PLS	Pregnant Leach Solution
PMF	probable maximum flood
ppb	parts per billion
ppm	parts per million
QA/QC	Quality Assurance/Quality Control
RC	rotary circulation drilling
RoM	Run-of-Mine
RQD	Rock Quality Description
SEC	U.S. Securities & Exchange Commission
sec	second
SG	specific gravity
SPT	standard penetration testing
st	short ton (2,000 pounds)
t	tonne (metric ton) (2,204.6 pounds)
t/h	tonnes per hour
t/d	tonnes per day
t/y	tonnes per year
TSF	tailings storage facility
TSP	total suspended particulates
µm	micron or microns
V	volts
VFD	variable frequency drive
W	watt
XRD	x-ray diffraction
y	year

1 Executive Summary

This report was prepared as a Prefeasibility-level Technical Report Summary in accordance with the Securities and Exchange Commission (SEC) S-K regulations (Title 17, Part 229, Items 601 and 1300 until 1305) for Albemarle Corporation (Albemarle) by SRK Consulting (U.S.), Inc. (SRK) on the Greenbushes Mine (Greenbushes). This report is an update of the previous report titled "SEC Technical Report Summary, Pre-Feasibility Study, Greenbushes Mine Western Australia. Amended Date December 16, 2022".

Greenbushes is held within the operating entity, Talison Lithium Australia Pty Ltd (Talison), of which Albemarle is a 49% owner with the remaining 51% ownership controlled by a Joint Venture (Tianqi/IGO JV) between Tianqi Lithium (Tianqi) and IGO Ltd (IGO) with ownership of 26.01% and 24.99%respectively.

SRK's reserve estimate is based on the production of chemical grade spodumene concentrate from three existing processing facilities, the two existing chemical grade plants (CGP1 and CGP2) as well as the existing technical grade (TGP) spodumene plant, and the expansion chemical grade plants (CGP3 and CGP4). Talison's future production from the technical grade plant is planned to target technical grade spodumene products. However, classification of resource applicable for processing as technical grade product does not occur until the grade-control drilling stage and therefore adequate data is not available to characterize production from this plant as technical grade for this reserve estimate. Instead, production from this plant has been assumed as lower value (on average) chemical grade product.

Talison is operating a processing facility to recover lithium from historic tailings (tailings retreatment plant or TRP). SRK has excluded the TRP from its reserve estimate due to limited materiality and technical data underlying the resource.

1.1 Property Description (Including Mineral Rights) and Ownership

The Greenbushes property is a large mining operation located in Western Australia extracting lithium and tantalum products from a pegmatite orebody. In addition to being the longest continuously operated mine in Western Australia, the Greenbushes pegmatite is one of the largest known spodumene pegmatite resources in the world. The Greenbushes Lithium Operations property area is approximately 2,000 ha, which is a smaller subset of a larger 10,067 ha land package controlled by Talison. Talison holds 100% of 10,067 ha of mineral tenements which cover the Greenbushes Lithium Operations area and surrounding exploration areas.

1.2 Geology and Mineralization

The Greenbushes pegmatite deposit consists of a primary pegmatite intrusion (Central Lode) with a smaller, sub-parallel pegmatite to the east (Kapanga). The primary intrusion and its subsidiary dikes and pods are concentrated within shear zones within a metamorphic belt consisting of granofels, ultramafic schists and amphibolites. The pegmatites are crosscut by mafic dolerite dikes. The Central Lode pegmatite is over 3 kilometers (km) long (north by northwest), up to 300 meters (m) wide (normal to dip), strikes north to north-west and dips moderately to steeply west to south-west. The Kapanga deposit sits approximately 300 m to the east of the Central Lode deposit with strike length of 1.8 km, thickness averaging 150 m and dips between 40° and 60° toward the west. Current drilling has defined the Kapanga deposit to approximately 450 m depth below surface.

Overall, the Greenbushes pegmatite averages approximately 2% Li_2O. Major minerals are quartz, spodumene, albite, and K-feldspar. Primary lithium-bearing minerals are spodumene, $LiAlSi_2O_6$ (approximately 8% Li_2O) and spodumene varieties kunzite and hiddenite. Minor lithium minerals include lepidolite (mica), amblygonite and lithiophilite (phosphates).

1.3 Status of Exploration, Development and Operations

SRK notes that the property is an active mining operation with a long history of tin, tantalum, and lithium mining. The results and interpretation from exploration data is supported by extensive drilling and active mining exposure of the orebody in multiple pits on the property. The area around the current Greenbushes Lithium Operations has been extensively mapped, sampled, and drilled over several decades of exploration work. For the purposes of this report, the active mining, drilling, and in-pit mapping are considered robust for exploration work to support the current mineral resource estimation.

1.4 Mineral Resource and Mineral Reserve Estimates

1.4.1 Mineral Resources

The Mineral Resource disclosed are based on a property-wide resource block model comprised of the 2020 Central Lode and the 2020 Kapanga deposit models combined during 2021. Changes from the previous resource statement include the inclusion of Kapanga mineral resources, depletion of the Central Lode model due to mining activities during the calendar year 2022, and revised pit optimization and cut-off grade (CoG) parameters. The mineral resource statement disclosed in this TRS has an effective date of December 31, 2022. These reflect adjustments in property topography, economics, or other factors which have not modified the underlying data such as drilling, geology models, or block models.

Mineral resources have been estimated by SRK and are based on a spodumene concentrate sales price of US$1,650 CIF China, which is US$1,523/t of concentrate at the mine gate after deducting for transportation and government royalty. The applied resource CoG used reflects current operational practices at 0.7% Li_2O. All resources are categorized in a manner consistent with SEC definitions. Mineral resources have been reported using an optimized pit shape, based on economic and mining assumptions to support the reasonable prospects for economic extraction of the resource. Current mineral resources, exclusive of reserves, are summarized in Table 1-1.

Table 1-1: Greenbushes Summary Mineral Resources Exclusive of Mineral Reserves as of December 31, 2022- Based on US$1,523/t of Concentrate at Mine Gate– SRK Consulting (U.S.), Inc.

Area	Category	100% Tonnes (Mt)	Attributable Tonnes (Mt)	Li_2O (%)	Cut-Off (% Li_2O)	Mass Yield	100% Concentrate Tonnes at 6.0% Li_2O (Mt)	Attributable Concentrate Tonnes at 6% Li_2O (Mt)	100% Li Metal in Concentrate (Kt)	Attributable Li Metal in Concentrate (Kt)
Resource Pit 2022	Indicated	44.4	21.8	1.53	0.7	16.4	7.3	3.6	203.0	99.5
	Inferred	57.7	28.3	1.15	0.7	11.3	6.5	3.2	181.1	88.7

Source: SRK, 2023

- Albemarle's attributable portion of mineral resources is 49%.
- Mineral resources are reported exclusive of mineral reserves. Mineral resources are not mineral reserves and do not have demonstrated economic viability.
- Resources have been reported as in situ (hard rock within an optimized pit shell).
- Resources have been categorized subject to the opinion of a QP based on the quality of informing data for the estimate, consistency of geological/grade distribution, data quality, and have been validated against long term mine reconciliation.
- Resources which are contained within the mineral reserve pit design may be excluded from reserves due to an Inferred classification.
- All stockpiled resources have been converted to mineral reserves.
- Mineral resources tonnage and contained metal have been rounded to reflect the accuracy of the estimate, and numbers may not add due to rounding.
  - The mass yield for resources processed through the chemical grade plants is estimated based on Greenbushes' mass yield formula, which is Yield%=9.362*(Li_2O %)^1.319, subject to a 97% recovery limitation when the Li_2O grade exceeds 5.5%.
  - Derivation of economic CoG for resources is based on the mine gate pricing of US$1,523/t of 6% Li_2O concentrate. The mine gate price is based on US$1,650/t-conc CIF less US$127/t-conc for government royalty and transportation to China.
  - Costs estimated in Australian Dollars were converted to U.S. dollars based on an exchange rate of 1.00AU$:0.72US$.
  - The economic CoG calculation is based on US$2.79/t-ore incremental ore mining cost, US$23.35/t-ore processing cost, US$3.57/t-ore G&A cost, and US$1.88/t-ore sustaining capital cost. Incremental ore mining costs are the costs associated with the RoM loader, stockpile rehandling, grade control assays and rockbreaker.
  - The price, cost and mass yield parameters produce a calculated resource economic CoG of 0.319% Li_2O. However, due to the internal constraints of the current operations, an elevated resource CoG of 0.7% Li_2O has been applied. SRK notes actual economic CoG is lower, but it is the QP's opinion to use a 0.7% Li_2O CoG to align with current site practices.
  - An overall 42° (east side) and 46° (west side) pit slope angle, 0% mining dilution, and 100% mining recovery.
  - Resources were reported above the assigned 0.7% Li_2O CoG and are constrained by an optimized 0.95 revenue factor pit shell.
  - No infrastructure movement capital costs have been added to the optimization.
- Mineral resources tonnage and contained metal have been rounded to reflect the accuracy of the estimate, and numbers may not add due to rounding.
- SRK Consulting (U.S.) Inc. is responsible for the mineral resources with an effective date: December 31, 2022.

1.4.2 Mineral Reserve Estimate

The conversion of mineral resources to mineral reserves has been completed in accordance with United States Security and Exchange Commission (SEC) regulations CFR 17, Part 229 (S-K 1300). Mineral reserves were determined based on a spodumene concentrate sales price of US$1,500/t of concentrate CIF China (or US$1,381/t of concentrate at the mine gate after deducting for transportation and government royalty). The mineral reserves are based on PFS level study as defined in §229.1300 *et seq*.

The mineral reserve calculations for the Greenbushes Central Lode lithium deposit have been carried out by a Qualified Person as defined in §229.1300 et seq. SRK Consulting (U.S.) Inc. is responsible for the mineral reserves reported herein. Table 1-2 shows the Greenbushes mineral reserves with an effective date of December 31, 2022.

Table 1-2: Greenbushes Summary Mineral Reserves at December 31, 2022 Based on US$1,381/t of Concentrate Mine Gate – SRK Consulting (U.S.), Inc.

Classification	Type	100% Tonnes (Mt)	Attributable Tonnes (Mt)	Li_2O%	Mass Yield (%)	100% Concentrate (Mt)	Attributable Concentrate (Mt)	100% Li Metal in Concentrate (Kt)	Attributable Li Metal in Concentrate (Kt)
Probable Mineral Reserves	In situ	153.1	75.0	1.91	22.2	34.0	16.7	947.8	464.4
	Stockpiles	4.0	2.0	1.99	22.2	0.9	0.4	24.4	11.9
	In situ + Stockpiles	157.1	77.0	1.91	22.2	34.9	17.1	972.2	476.4

Source: SRK, 2022
Notes to Accompany Mineral Reserve Table:

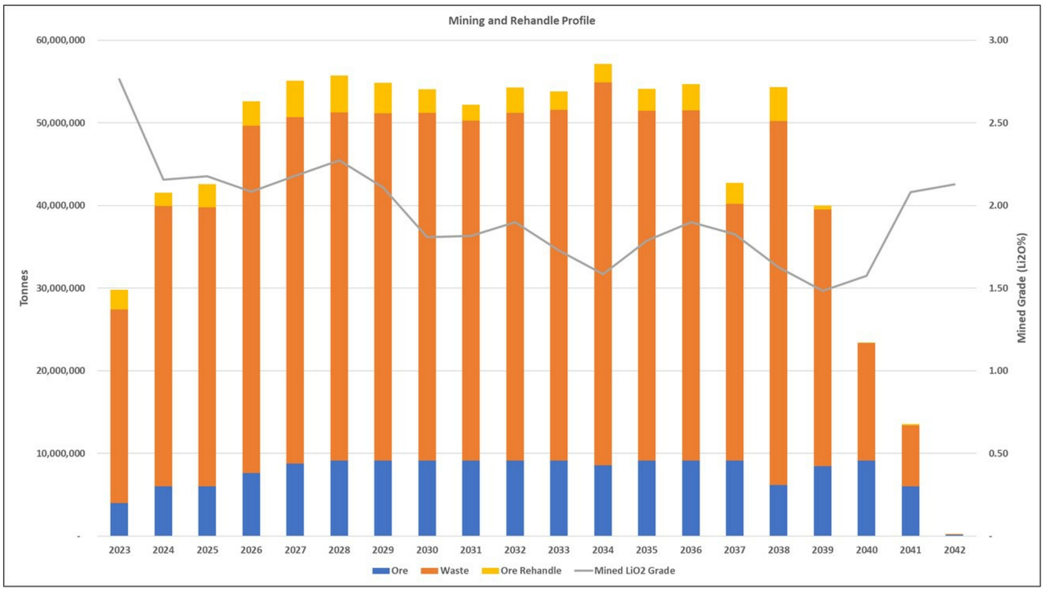
- Albemarle's attributable portion of mineral resources and reserves is 49%.
- Mineral reserves are reported exclusive of mineral resources.
- Indicated in situ resources have been converted to Probable reserves.
- Measured and Indicated stockpile resources have been converted to Probable mineral reserves.
- Mineral reserves are reported considering a nominal set of assumptions for reporting purposes:
  - Mineral reserves are based on a mine gate price of US$1,381/t of chemical grade concentrate (6% Li_2O).
  - Mineral reserves assume 93% global mining recovery.
  - Mineral reserves are diluted at approximately 5% at zero grade for all mineral reserve blocks in addition to internal dilution built into the resource model (2.7% with the assumed selective mining unit of 5 m x 5 m x 5 m).
  - The MY for reserves processed through the chemical grade plants is estimated based on Greenbushes' mass yield formula, which is Yield%=9.362*(Li_2O %)^1.319, subject to a 97% recovery limitation when the Li_2O grade exceeds 5.5%. The average LoM mass yield for the chemical grade plants is 22.2%.
  - The MY for reserves processed through the technical grade plant is estimated based on Greenbushes' mass yield formula, which is Yield%=(31.792* Li_2O %)–80.809. There is approximately 3.2 Mt of technical grade plant feed at 3.7% Li_2O. The average LoM mass yield for the technical grade plant is 37.5%.
  - Although Greenbushes produces a technical grade product from the current operation, it is assumed that the reserves reported herein will be sold as a chemical grade product. This assumption is necessary because feed for the technical grade plant is currently only defined at the grade control or blasting level. Therefore, it is conservatively assumed that concentrate produced by the technical grade plant will be sold at the chemical grade product price
  - Derivation of economic CoG for reserves is based on mine gate pricing of US$1,381/t of 6% Li_2O concentrate. The mine gate price is based on US$1,500/t-conc CIF less US$119/t-conc for government royalty and transportation to China.
  - Costs estimated in Australian Dollars were converted to U.S. dollars based on an exchange rate of 1.00AU$:0.72US$.
  - The economic CoG calculation is based on US$2.79/t-ore incremental ore mining cost, US$23.35/t-ore processing cost, US$3.57/t-ore G&A cost, and US$1.88/t-ore sustaining capital cost. Incremental ore mining costs are the costs associated with the RoM loader, stockpile rehandling, grade control assays and rockbreaker.
  - The price, cost and mass yield parameters produce a calculated economic CoG of 0.344% Li_2O. However, due to the internal constraints of the current operations, an elevated mineral reserves CoG of 0.7% Li_2O has been applied.
  - The CoG of 0.7% Li_2O was applied to reserves that are constrained by the ultimate pit design and are detailed in a yearly mine schedule.
  - Stockpile reserves have been previously mined and are reported at a 0.7% Li_2O CoG.
- Waste tonnage within the reserve pit is 701.5 Mt at a strip ratio of 4.58:1 (waste to ore – not including reserve stockpiles)
- Mineral reserve tonnage, grade and mass yield have been rounded to reflect the accuracy of the estimate, and numbers may not add due to rounding:
  - Mt = millions of metric tonnes
  - Reserve tonnes are rounded to the nearest hundred thousand tonnes
  - SRK Consulting (U.S.) Inc. is responsible for the mineral reserves with an effective date: December 31, 2022.

1.5 Mining Operations

Greenbushes is an operating mine using conventional open pit mining methods to extract mineral reserves containing economic quantifies of Li_2O to produce both chemical and technical grade spodumene concentrates. Drilling, blasting, and load and haul activities are performed by contractors. Grade control is performed with reverse circulation (RC) drills that sample on 2.5 m intervals. In ore areas, mining occurs on 5 m benches and in waste areas, 10 m benches are used. Ore is hauled to the run-of-mine (RoM) pad or to long-term ore stockpiles. Waste rock is hauled to a waste dump adjacent to the open pit.

The pit design has been checked for geotechnical stability. Rock mass parameters based on characterization work have been input according to structural domain into a limit equilibrium stability analysis. Results of the stability analyses indicate that all slopes meet the minimum acceptability criteria of factor of safety greater than 1.3.

The life-of-mine (LoM) production profile is shown in Figure 1-1. The peak annual material movement is approximately 56 Mt and mining spans approximately 19 years. The LoM average strip ratio (w:o) is 5.48.



Source: SRK, 2023

Figure 1-1: Mine Production Profile

1.6 Mineral Processing and Metallurgical Testing

SRK notes that Greenbushes Chemical Grade Plant -1 (CGP1) is a mature operation and was used as basis for design of Greenbushes new Chemical Grade Plant-2 (CGP2) CGP2 processes ore from the same orebody using essentially the same flowsheet as CGP1. As a result, incorporation of process improvements at CGP2 is based on opportunities identified by Greenbushes during operation of CGP1, rather than on new fundamental metallurgical testing. SRK is of the opinion that this is an adequate basis for CGP2 design given that the CGP2 process flowsheet is based on the CGP1 flowsheet and that CGP2 would process ore from the same orebody as CGP1. SRK notes that Greenbushes did conduct metallurgical testwork to support a change to the comminution circuit that incorporates high pressure grinding rolls (HPGR) in CGP2, instead of the ball mill grinding circuit used in CGP1. This work resulted in the development of a yield model that estimates incrementally higher lithium recovery in CGP2, which is attributed to HPGR comminution instead of ball mill grinding as practiced in CGP1. This additional lithium recovery has not yet been demonstrated during CGP2 commissioning and initial operations.

1.7 Processing and Recovery Methods

Greenbushes currently has two ore crushing facilities (CR1 and CR2) and three ore processing plants which include a technical grade plant (TGP), chemical grade plant-1 (CGP1) and chemical grade plant-2 (CGP2) with a nominal capacity of 4.5 Mt/y of pegmatite feed to produce a nominal 1.3 Mt/y of spodumene concentrate from all three plants combined. TGP is a relatively small plant that processes approximately 350,000 t/y of ore at an average grade of about 3.8% Li_2O and produces about 150,000 t of spodumene concentrate products. TGP produces a variety of product grades identified as SC7.2, SC6.8, SC5.5 and SC5.0.

During 2022 TGP processed (Table 14-2) 370,893 t of ore at an average grade of 3.94% Li_2O and recovered 72.5% of the contained lithium into six separate products (SC7.2-Standard, SC7.2-Premium, SC6.8, SC6.5, SC6.0 and SC5.0).

CGP1 and CGP2 process spodumene ore into lithium concentrates containing a minimum of 6% Li_2O and a maximum iron content of 1% iron oxide (Fe_2O_3). The process flowsheets utilized by both CGP1 and CGP2 are similar and include the following major unit operations to produce chemical grade spodumene concentrates:

- Crushing
- Grinding and classification
- Heavy media separation
- Wet high intensity magnetic separation (WHIMS)
- Coarse mineral flotation
- Regrinding
- Regrind coarse mineral flotation
- Fine mineral flotation
- Concentrate filtration
- Final tailings thickening and storage at the tailing storage facility

During 2022 CGP1 processed 1.79 Mt of ore at an average grade of 2.69% Li_2O and recovered 72.1% of the contained lithium into concentrates averaging 6.06% Li_2O, representing a mass yield of 32%.

CGP2 commissioning began during September 2019 and continued through April 2020 and was then shut down and put on care and maintenance during the period from March 2020 to April 2021 due to market demand considerations. CGP2 was then put back into production during May 2021.

During 2021 (May to December), CGP2 processed 1,387,985 t of ore at an average grade of 1.97% Li_2O and recovered 50.5% of the lithium (versus a predicted recovery of 73%) into 229,521 t of concentrate at an average grade of 5.88% Li_2O. Concentrate yield for this period averaged 16.5% versus the model yield projection of 24.5%. Although, product quality specifications were generally achieved, lithium recovery and concentrate yield were substantially below target.

During 2022 CGP2 processed 1,999,006 t of ore at an average grade of 1.96% Li_2O and recovered 64.0% of the lithium (versus a predicted recovery of 74.3%) into 419,246 t of concentrate at an average grade of 5.98% Li_2O. CGP2 performance improved steadily during 2022 with significant improvement during the fourth quarter. During the fourth quarter of 2022 lithium recovery averaged 68.2% versus a predicted recovery of 75.4%. The improved plant performance is attributed to improved operating availability, steady-state operation and ongoing efforts to improve performance of individual unit operations. As part of this effort, Greenbushes retained MinSol Engineering to undertake a performance assessment of CGP2 and identify areas where improvements in the plant could be made to increase lithium recovery. MinSol identified and coordinated process plant improvements which resulted in increasing lithium recovery from about 50% reported for 2021 to the Q4 2022 average of 68%. This represents an 18% increase in recovery.

Lithium recovery remains about 8% less than the design recovery and MinSol has identified additional process improvements for CGP2 that could be implemented during 2023 in an effort to achieve the original design lithium recovery.

SRK notes that that CGP2 and CGP1 flowsheets are similar and both plants process ore from the same mining operation, as such, SRK believes that it is reasonable to expect that CGP2 will eventually achieve performance similar to CGP1. SRK is of the opinion that the incrementally higher lithium recovery included in Greenbushes CGP2 yield model (attributed to the inclusion of the HPGR in CGP2's comminution circuit) is not warranted as it has been determined that the HPGR results in higher unrecoverable lithium slimes production than had been anticipated. SRK recommends that Greenbushes CGP1 yield model be used for both for CGP1 and CGP2 for resource and reserve modeling to provide estimates of mass yield and lithium recovery at various ore grades in the mine plan.

Greenbushes is currently constructing Chemical Grade Plant-3 (CGP3), which will be identical to CGP2 with a capacity of 2.4 Mt/y. CGP3 is scheduled to come on-line during Q2 2025. Greenbushes also has plans to construct Chemical Grade Plant-4 (CGP4), which will also be based CGP2. CGP4 is currently planned to commence production during Q1 2027. For purposes of resource and reserve mine planning SRK recommends that Greenbushes' yield model for CGP1 be used to estimate future production from CGP3 and CGP4.

1.8 Infrastructure

Greenbushes is a mature operating lithium hard rock open pit mining and concentration project that produces lithium carbonate. Access to the site is by paved highway off of a major Western Australian highway. Employees travel to the project from various communities in the region. The established facilities on the site include security fencing and guard house access, communications systems, access roads and interior site roads, administrative and other offices, change houses, existing mine services area (MSA), warehousing, shops, crushing plants, processing plants (CGP1/CGP2/TGP/TRP), tailings facilities, new explosives storage facilities, water supply and distribution system with associated storage dams, power supply and distribution system, laboratory, fuel storage and delivery system, reverse-osmosis water treatment plant, health-safety-training offices, mine rescue area, storage sheds, mine waste storage area, miscellaneous waste storage facilities, and engineering offices. The concentrate is shipped by truck to port facilities located at Bunbury 90 km to the east of the Project. These facilities are in place and functional. An abandoned rail line is present north of the project but not currently used.

Several modifications to the infrastructure are currently in construction or planned. An upgraded 132 kV power line will be placed in service by 2023. A new Mine Service Area (MSA) will be constructed and operating in mid-2023 to provide mine heavy and light equipment maintenance facilities and technical services offices as the existing MSA will be impacted by the planned pit progression. A mine access road will be added to reduce truck traffic through Greenbushes. The warehouse and laboratories are planned to be expanded. The tailings facilities are being expanded with the addition of a new two cell facility known as TSF4 located adjacent to and south of the existing TSF2 and TSF1 facilities. TSF1 will be expanded late in the mine life to meet tailings storage needs. The waste rock facilities will continue to expand on the west side of the pit toward the highway and south toward the permit boundary adjacent to TSF4. A new mine village will be constructed starting in 2023 to provide additional housing. It is expected to be completed in Q1 2024.

1.9 Environmental Studies, Permitting, and Plans, Negotiations, or Agreements with Local Individuals or Groups

The Project has been in operation as a hard rock mine since 1983 and is fully permitted for its current operations. The Project is in the process of obtaining further approvals for expansion; however, consideration of the expansion has been excluded from this evaluation, as detailed assessment information is not yet available. Talison holds the mining rights to lithium at the Project and Global Advanced Metals (GAM) holds the rights to non-lithium minerals. GAM processes tantalum and tin extracted by Talison during mining activities within the Project area under their own operating license and GAM are, therefore, responsible for the environmental management of their premises. Under agreement, Talison provides services to GAM consisting of laboratory analyses and environmental reporting, and shared use of some water circuit infrastructure.

<u>Environmental Study Results</u>

The Project is in the southwest of Western Australia in the Shire of Bridgetown-Greenbushes. The town of Greenbushes is located on the northern boundary of the mine. The majority of the Project is within the Greenbushes Class A State Forest (State Forest 20) which covers 6,088 ha and is managed by the Department of Biodiversity, Conservation and Attractions (DBCA) as public reserve land under the Conservation and Land Management Act 1984 (CALM Act). The DBCA manages State Forest 20 in accordance with the Forest Management Plan 2014-2023, that aims to maintain the overall area of native forest and plantation available for forest produce, including biodiversity and ecological integrity. The remaining land in the Project area is privately owned.

During development and subsequent modifications to the mine, environmental studies and impact assessments have been completed to support project approval applications, including studies related to:

- Flora and vegetation
- Terrestrial and aquatic fauna
- Surface water and groundwater
- Material characterization (geochemistry)
- Air quality and greenhouse gas assessment
- Noise, vibration and visual amenity
- Cultural Heritage

Environmental Management and Monitoring

The Project operates under approvals that contain conditions for environmental management that include waste and tailings disposal, site monitoring, and water management. Primary approvals are authorized under the federal Environment Protection and Biodiversity and Conservation Act of 1999 (EPBC Act), the Environmental Protection Act of 1986 (EP Act) including the environmental impact assessment approval for the proposed mine expansion (Ministerial Statement 1111), the operation of a prescribed premises (License L4247/1991/13), approval for the construction and commissioning of a prescribed premises for the proposed mine expansion (W6283/2019/1), and under the Mining Act of 1978, under an approved Mine Closure Plan (Reg ID 60857) and several Mining Proposals (section 17.3) conditions.

Specific requirements for compliance and ambient monitoring are defined in the License (L4247/1991/13) and Works Approval (W6283/2019/1). The monitoring results must be reported to the regulators (DWER and DMIRS) on an annual basis and include point source emissions to surface water, including discharge and seepage locations, process water monitoring, permitted emission points for waste discharge to surface water, ambient surface water quality and ambient groundwater quality monitoring, ambient surface water flow and each spring, complete an ecological assessment of four sites upstream and six sites downstream of the Norilup Dam.

Project Permitting Requirements

Australia has a robust and well-developed legislative framework for the management of the environmental impacts from mining activities. Primary environmental approvals are governed by the federal EPBC Act and the environmental impact assessment process in Western Australia is administered under Part IV of the EP Act. Additional approvals in Western Australia are principally governed by Part V of the EP Act and by the Mining Act, as well as several other regulatory instruments. Primary and other key approvals are discussed in Section 17.

Environmental Compliance

The Project has not incurred any significant environmental incidents (EPA, 2020). Through the end of 2022 there were 14 non-conformance events reported to regulators.

The Project is responsible for contamination of five sites due to hydrocarbons and metals in soil, and elevated concentrations of metals in groundwater and surface water (Site IDs 34013, 73571, 73572, 75019, and 75017). These sites are classified as “Contaminated – Restricted use” and only permit commercial and industrial uses. This will need to be reviewed for final land use options for closure.

Local Individuals and Groups

The mining tenure for the Project was granted in 1983 and, therefore, is not a future act as defined under the Native Title Act of 1993 (a 'future act' is an act done after the January 1, 1994, which affects Native Title). The Project is, therefore, not required to have obtained agreements with the local native title claimant groups.

The Project lies immediately south of the town of Greenbushes and maintains an active stakeholder engagement program and information sessions to groups such as the “Grow Greenbushes.” Senior mine management reside in the town. Talison promotes local education (the Greenbushes Primary School and tertiary sponsorships) and provides support community groups with money and services (allocated in the Environmental and Community budget).

Talison has two agreements in place with local groups:

- Blackwood Basin Group (BBG) Incorporated – offset management agreement whereby BBG have agreed to manage and improve the condition of native vegetation for the purpose of the Black Cockatoo offset requirements.
- Tonebridge Grazing Pty Ltd. – site conservation agreement for the protection and improvement of native vegetation to protect Black Cockatoo habitat.

Mine Closure

Talison has a mine closure plan submitted and approved by DMIRS on 23 February 2017, with their costs updated in October 2016.

Western Australia does not require a company to post performance or reclamation bonds. All tenement holders in Western Australia are required to annually report disturbance and to make contributions to a pooled fund based on the type and extent of disturbance under the Mining Rehabilitation Fund Act of 2012 (MRF Act). The pooled fund can be used by the Department of Mines, Industry Regulation and Safety (DMIRS) to rehabilitate mines where the tenement holder/operator has failed to meet their rehabilitation obligations and finances have not been able to be recovered. The interest earned on the pooled fund is used for administration and to rehabilitate legacy abandoned mine sites.

A cost estimate for immediate (unplanned) closure of Greenbushes has been prepared by Talison using the Victorian Government Rehabilitation bond calculator (dpi-bond-calculator-24-feb-2011) as a template to assist them in identifying and costing the rehabilitation, decommissioning, and monitoring requirements for the Greenbushes site. The Victorian Government bond calculator uses predefined third-party unit rates based on the typical current market ‘third party rates’ as of July 2010, which may overestimate or underestimate closure costs for Western Australia. Talison has been escalating these unit rates since 2013.

The latest version of the closure cost estimate available for review was the 2020 draft estimate. It only includes the facilities that were on site at that time and does not include any future expansions. Changes to the site during 2020, and any future plans, are not included. This closure cost estimate totals AU$37,232,334 for Talison’s portion of the operation. GAM is responsible for closure for the remainder of the site. SRK understands that an updated model has been submitted to the authorities but as it has not been approved it is not reviewed as part of this report.

The Victorian Government model used by Talison to estimate closure costs was designed in 2011 using 2010 rates. It does not use site-specific rates as is good industry practice. There is no documentation on the basis of the unit rates used in the Victorian model and the government of Victoria was unable to provide any information regarding the accuracy of the rates. Because of this, SRK cannot validate any of the unit rates used in the model or the overall closure cost estimate.

Furthermore, because closure of the site is not expected until 2056, the closure cost estimate represents future costs based on current site conditions. In all probability, site conditions at closure will be different than currently expected and, therefore, the current estimate of closure costs is unlikely to reflect the actual closure cost that will be incurred in the future.

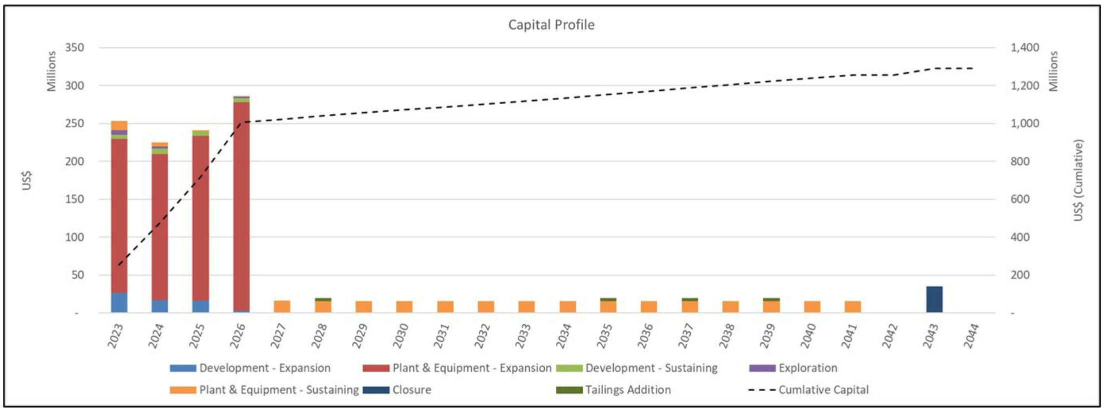
Currently, the site must treat mine water collecting in the Southampton and Cowan Brook Dams prior to discharge due to elevated levels of arsenic and lithium in the water. The sources of elevated lithium and arsenic in the mine water circuit include dewatering water from the open pit. However, there has been no study to determine if water that will eventually collect in the pit or from any other point source and discharge will meet discharge water quality standards. Therefore, no assessment of the probability that post-closure water management or water treatment has been performed.

Additionally, contaminated seepage from TSF2 has recently been observed in the alluvial aquifer and is now being collected via French drains constructed along the toe of the embankment and conveyed to the water treatment plant. At this time, no studies have been conducted to determine the cause of the current seepage, the likelihood and duration of continued seepage, or the possibility that additional seepage could occur from the other TSF facilities.

If perpetual, or even long-term, treatment of water is required to comply with discharge requirements, the closure cost estimate provided by Talison could be materially deficient.

1.10 Summary Capital and Operating Cost Estimates

Capital cost forecasts were developed in Australian dollars. The cost associated with the sustaining capital at the operation are presented in Figure 1-2. The total sustaining capital spend over life of mine is forecast at US$1.29 billion.



Source: SRK

Figure 1-2: Sustaining Capital Profile (Tabular data in Table 19-12)

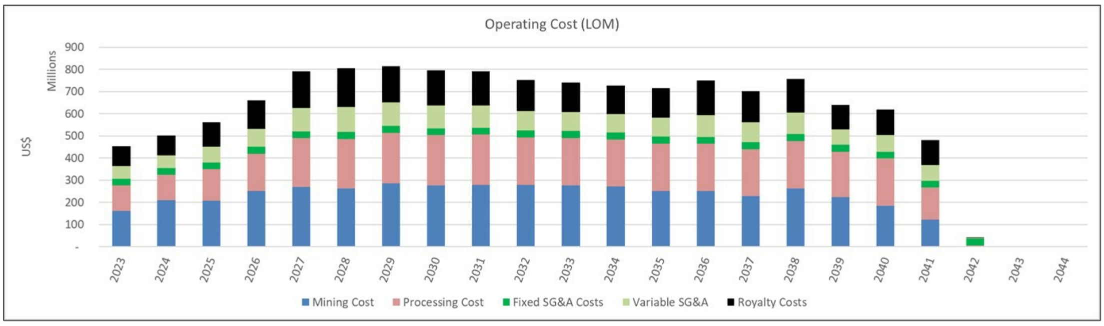
Operating costs were forecast in Australian dollars and are categorized as mining, processing and SG&A costs. Mining costs include the costs to move the ore and waste material to waste dumps, stockpiles or plant feed locations. Processing costs include the costs to process the ore into a concentrate. SG&A costs include the general and administrative costs of running the operation and the selling expenses associated with the concentrate product. A summary of the life of mine average for mining, processing and SG&A costs is presented in Table 1-3.

Table 1-3: Life of Mine Operating Cost Averages

Category	Unit	Value
Mining Cost	US$/t mined	5.33
Processing Cost	US$/t processed	23.69
SG&A Cost	US$/t concentrate	64.70

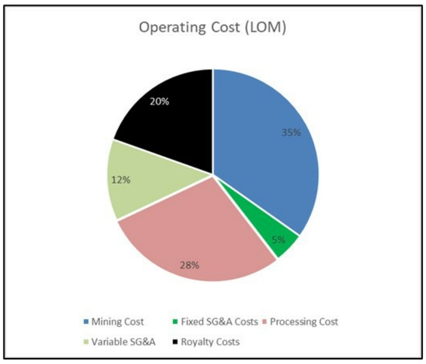
Source: SRK, 2023

These costs are typically broken out into fixed and variable costs. A life of mine summary of the operating cost breakdown is presented in Figure 1-3 and Figure 1-4.



Source: SRK, 2023

Figure 1-3: Life of Mine Operating Cost Profile (Tabular data in Table 19-12)



Source: SRK

Figure 1-4: Life of Mine Operating Cost Summary

1.11 Economics

Economic analysis, including estimation of capital and operating costs is inherently a forward-looking exercise. These estimates rely upon a range of assumptions and forecasts that are subject to change depending upon macroeconomic conditions, operating strategy and new data collected through future operations and therefore actual economic outcomes often deviate significantly from forecasts.

The Greenbushes operation consists of an open pit mine and several processing facilities fed primarily by the open pit mine. The operation is expected to have a 20 year life.

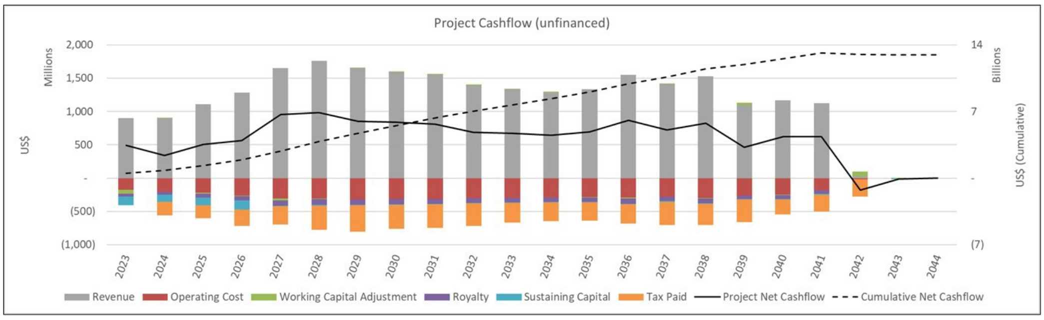
The economic analysis metrics are prepared on annual after tax basis in US$. The results of the analysis are presented in Table 1-4. The results indicate that, at a CIF China chemical grade concentrate price of US$1,500/t, the operation returns an after-tax NPV at 8% of US$13.2 billion (US$6.5 billion attributable to Albemarle). Note, that because the mine is in operation and is valued on a total project basis with prior costs treated as sunk, IRR and payback period analysis are not relevant metrics.

Table 1-4: Indicative Economic Results (Albemarle)

LoM Cash Flow (Unfinanced)	Units	Value
Total Revenue	**US$ million**	**25,653**
Total Opex	**US$ million**	**(5,162)**
Operating Margin	US$ million	20,490
Operating Margin Ratio	%	80%
Taxes Paid	US$ million	(5,631)
Free Cashflow	US$ million	12,972
Before Tax		
Free Cash Flow	US$ million	18,603
NPV at 8%	US$ million	9,048
After Tax		
Free Cash Flow	US$ million	12,972
NPV at 8%	US$ million	6,455

Source: SRK

A summary of the cashflow on an annual basis is presented in Figure 1-5.



Source: SRK

Figure 1-5: Annual Cashflow Summary (Albemarle) (Tabular data in Table 19-12)

1.12 Conclusions and Recommendations

1.12.1 Property Description and Ownership

The property is well known in terms of descriptive factors and ownership, and there are no additional recommendations at this time.

1.12.2 Geology and Mineralization

Geology and mineralization are well understood through decades of active mining, and there are no additional recommendations at this time.

1.12.3 Status of Exploration, Development and Operations

The status of exploration, development, and operations is advanced and active. Assuming that exploration and mining continue at Greenbushes using the current mining method, there are no additional recommendations at this time.

1.12.4 Mineral Resource

SRK recommends updating the property-wide geological and resource block model from a first principles perspective to generate a continuous geological interpretation across the Central Lode and Kapanga deposits as well as incorporating all recent geological data. Generation of a 3D structural wireframe model will aid in the geological interpretation and understanding of structural influence on local uncertainties in the pegmatite. Lastly, SRK recommends annual exploration and condemnation drilling to continue to assess the property for additional pegmatite resources.

1.12.5 Reserves and Mining Methods

SRK has reported mineral reserves that are appropriate for public disclosure. The mine plan, which is based on the mineral reserves, spans approximately 19 years. Annual material movement requirements are reasonable, with a peak annual material movement of approximately 56 Mt. Over the life of the project, approximately 701.5 Mt of waste will be mined from the open pit. A feasible surface waste dump design exists to accommodate 63% of the LoM waste quantity; the remaining waste tonnage will have to be dumped back into the southern portion of the Central Lode pit and the Kapanga pit after all ore has been mined from those areas. SRK recommends that Greenbushes closely monitor the mining sequence as mining progresses to ensure timely availability of in-pit dumps.

1.12.6 Processing and Recovery Methods

A comparison of the CGP1 yield model with actual CGP1 plant performance shows that the CGP1 yield model is generally a good predictor of CGP1 plant performance. However, a comparison of the CGP2 yield model with actual CGP2 plant performance during commissioning shows that CGP2 has significantly underperformed the CGP2 yield model.

Greenbushes retained MinSol Engineering to undertake a performance assessment of CGP2 and identify areas where improvements in the plant could be made to increase lithium recovery. MinSol identified and coordinated process plant improvements which resulted in increasing lithium recovery from about 50% reported for 2021 to the Q4 2022 average of 68%. This represents an 18% increase in recovery.

Lithium recovery remains about 8% less than the design recovery and MinSol has identified additional process improvements for CGP2 that could be implemented during 2023 in an effort to achieve the original design lithium recovery.

SRK notes that that CGP2 and CGP1 flowsheets are similar and both plants process ore from the same mining operation, as such, SRK believes that it is reasonable to expect that CGP2 will eventually achieve performance similar to CGP1. SRK is of the opinion that the incrementally higher lithium recovery included in Greenbushes CGP2 yield model (attributed to the inclusion of the HPGR in CGP2's comminution circuit) is not warranted as it has been determined that the HPGR results in higher unrecoverable lithium slimes production than had been anticipated. SRK recommends that Greenbushes CGP1 yield model be used for both for CGP1 and CGP2 for resource and reserve modeling to provide estimates of mass yield and lithium recovery at various ore grades in the mine plan.

Greenbushes is currently constructing Chemical Grade Plant-3 (CGP3), which will be identical to CGP2 with a capacity of 2.4 Mt/y. CGP3 is scheduled to come on-line during Q2 2025. Greenbushes also has plans to construct Chemical Grade Plant-4 (CGP4), which will also be based CGP2. CGP4 is currently planned to commence production during Q1 2027. For purposes of resource and reserve mine planning SRK recommends that Greenbushes' yield model for CGP1 be used to estimate future production from CGP3 and CGP4.

1.12.7 Infrastructure

The infrastructure at Greenbushes is installed and functional. Expansion projects have been identified and are at the appropriate level of design depending on their expected timing of the future expansion. Tailings and waste rock are flagged as risks due to the potential for future expansion and location of future resources that are in development. SRK recommends a detailed review of long-term storage options for both tailings and waste rock to allow timely planning and identification of alternative storage options for future accelerated expansion if needed.

1.12.8 Environmental Studies, Permitting, and Plans, Negotiations, or Agreements with Local Individuals or Groups

The Project has been in operation as a hard rock mine since 1983 and is fully permitted for its current operations. The Project is in the process of obtaining further approvals for expansion; however, consideration of the expansion has been excluded from this evaluation as detailed assessment information is not yet available.

During development and subsequent modifications to the mine, environmental studies and impact assessments have been completed to support project approval applications. Many of these studies are currently being updated as part of the current expansion efforts; as such, the most up-to-date information was not readily available. Some of the key findings from previous studies include:

- No Threatened Ecological Communities, Priority Ecological Communities or threatened flora have been reported in the vicinity of the mine site.
- There have been seven conservation significant fauna species recorded in the mine development area.
- Surface water drains through tributaries of the Blackwood River which is registered as a significant Aboriginal site that must be protected under the Aboriginal Heritage Act 1972.

- Groundwater is not a resource in the local area due to the low permeability of the basement rock.
- Earlier studies indicated that the pits would overflow approximately 300 years after mine closure; however, more recent modeling suggests that water levels will stabilize in approximately 500 to 900 years and remain 20 m below the pit rims (i.e., no overflow).
- Background groundwater quality data are limited due to a lack of monitoring wells upgradient of the mine, and as monitoring wells are located close to the TSFs and/or in the historically dredged channels; some of these wells have been impacted by seepage and are under investigation and remediation efforts.
- Waste rock is not typically acid generating, though some potentially acid generating (PAG) granofels (metasediments) do occur in the footwall of the orebody. Significant acid neutralizing capacity (ANC) has been shown to exist in waste rock and pit walls.
- Studies into the potential for radionuclides has consistently returned results that are below trigger values.
- There are no other cultural sites listed within the mining development area.

The Project operates under approvals that contain conditions for environmental management that include waste and tailings disposal, site monitoring, and water management. The Project has not incurred any significant environmental incidents (EPA, 2021).

There has been no predictive modeling of the pit lake quality as far as SRK is aware, and this is recommended to inform closure management strategies. There is potential for site water management to be required post-closure until seepage from TSF2 attenuates.

The Project has contaminated five sites listed which encompass the entire mine area due to known or suspected contaminated site due to hydrocarbons and metals in soil, and elevated concentrations of metals in groundwater and surface water. These sites are classified as “Contaminated – Restricted use” and only permit commercial and industrial uses. This will need to be reviewed for final land use options for closure.

Talison has agreements in place with two local groups.

Although Greenbushes has a closure plan prepared in accordance with applicable regulations, this plan should be updated to include all closure activities necessary to properly closure all of the project facilities that are part of the current mine plan including future expansions and facilities. This update should be prepared in accordance with applicable regulatory requirements and commitments included in the approved closure plan. It should also be prepared in sufficient detail that a proper PFS-level closure cost estimate can be prepared.

1.12.9 Summary Capital and Operating Cost Estimates

Greenbushes cost forecasts are based on mature mine budgets that have historical accounting data to support the cost basis and forward looking mine plans as a basis for future operating costs as well as forward looking capital estimates based on engineered estimates for expansion capital and historically driven sustaining capital costs. Forecast costs were provided in AU$. In SRK’s opinion, the estimates are reasonable in the context of the current reserve and mine plan.

1.12.10 Economics

The operation is forecast to generate positive cashflow over the life of the reserves with the exception of the final year of operations where minimal material is processed, based on the assumptions detailed in this report. This estimated cashflow is inherently forward-looking and dependent upon numerous assumptions and forecasts, such as macroeconomic conditions, mine plans and operating strategy, that are subject to change.

As modeled for this analysis, the operation is forecast to produce 34.9 Mt of spodumene concentrate to be sold at a CIF price of US$1,500/t. This yields an after-tax project NPV at 8% of US$13.2 billion, of which, US$6.5 billion is attributable to Albemarle.

The analysis performed for this report indicates that the operation's NPV is most sensitive to variations in the grade of ore mined, the commodity price received and plant performance.

2 Introduction

This Technical Report Summary was prepared in accordance with the Securities and Exchange Commission (SEC) S-K regulations (Title 17, Part 229, Items 601 and 1300 through 1305) for Albemarle Corporation (Albemarle) by SRK Consulting (U.S.), Inc. (SRK) on the Greenbushes Mine (Greenbushes). Greenbushes is held within the operating entity, Talison Lithium Australia Pty Ltd (Talison), of which Albemarle is a 49% owner with the remaining 51% ownership controlled by Tianqi/IGO JV.

2.1 Terms of Reference and Purpose of the Report

The quality of information, conclusions, and estimates contained herein are consistent with the level of effort involved in SRK's services, based on i) information available at the time of preparation and ii) the assumptions, conditions, and qualifications set forth in this report. This report is intended for use by Albemarle subject to the terms and conditions of its contract with SRK and relevant securities legislation. The contract permits Albemarle to file this report as a Technical Report Summary with American securities regulatory authorities pursuant to the SEC S-K regulations, more specifically Title 17, Subpart 229.600, item 601(b)(96) - Technical Report Summary and Title 17, Subpart 229.1300 - Disclosure by Registrants Engaged in Mining Operations. Any other uses of this report by any third party are at that party's sole risk. The responsibility for this disclosure remains with Albemarle.

The Greenbushes property consists of two spodumene-bearing pegmatite dike areas: the actively mined Central Lode deposit and the undeveloped Kapanga deposit located immediately east of the Central Lode. The on-site Greenbushes facilities produce a range of spodumene concentrate products that are sold into technical and chemical lithium markets. However, for the purposes of developing the reserve estimate herein, SRK has based its economic analysis on the sale of only chemical grade spodumene concentrate. This is because Talison's ability to predict lithium production for technical grade product at a level that meets the standard of uncertainty for a reserve requires grade control drilling. Therefore, instead of assuming sale of technical grade concentrates, SRK has assumed that all product is sold into chemical markets. In SRK's opinion, from a geological standpoint this is a reasonable assumption as any material that is appropriate to feed technical grade production can also be used for chemical grade feed.

Greenbushes has developed and is operating a Tailings Reprocessing Plant (TRP) to reprocess tailings from Tailings Storage Area 1 (TSF1). In SRK's opinion, due to the high level of inherent variability in mineral contained in a tailings storage facility, establishing geological, processing and production data to adequately meet the standard of uncertainty required to support an estimate of reserves is difficult. Further, the quantify of potential production from TSF1 is minimal in the context of the overall Greenbushes reserve. Therefore, the potential spodumene concentrate production from the reprocessing effort has not been included in the reserve estimate.

Further discussion and reference information for completeness on the TGP, TRP is provided in Chapter 21.

The purpose of this Technical Report Summary is to report mineral resources and mineral reserves. This report is an update of the previous report titled "SEC Technical Report Summary, Pre-Feasibility Study, Greenbushes Mine Western Australia. Amended Date December 16, 2022".

The effective date of this report is December 31, 2022.

2.2 Sources of Information

This report is based in part on internal Company technical reports, previous feasibility studies, maps, published government reports, company letters and memoranda, and public information as cited throughout this report and listed in the References Section 24.

Reliance upon information provided by the registrant is listed in the Section 25 when applicable.

2.3 Details of Inspection

Table 2-1 summarizes the details of the personal inspections on the property by each qualified person or, if applicable, the reason why a personal inspection has not been completed.

Table 2-1: Site Visits

Expertise	Date(s) of Visit	Details of Inspection	Reason Why a Personal Inspection Has Not Been Completed
Environmental/ Closure	August 19-20, 2020	Day 1: Site overview presentation with Craig Dawson (General Manager – Operations) and meeting with Site Environmental Team. Proceeded to Cornwall Pit, which is currently used for water capture, followed on to C1/C2/C3 Open pit lookout, inspection of the progressive rehabilitation at Floyds WRL, Tailings retreatment plant and finished with a tour of the technical and chemical grade processing plants. Day 2: Inspection of the rehabilitation at TSF3, then to the seepage collection point just below Tin Shed Dam. Inspection of the buttress at TSF 2 and corresponding rehab of buttress, together with the new under drainage on the west side of TSF 2 to capture seepage. Visited Cowen Brook Dam. Overview of the WTP to be commissioned in September 2020 and visited the storage dams Clearwater, Austins and Southhampton. Finished the tour with a visit to the 3 year old rehab to the west of Maranup Ford Road.	
Resource/Geology	October 12-14, 2022	Site overview meeting, met with resource/geology team, pit tour and review of core, site laboratory tour.	
Mining/Reserves	October 12-14, 2022	Site overview meeting, meetings with mining / reserves team and review of process/procedures, site mine-wide tour including pit and area infrastructure.	
Metallurgy/Process	October 12-14, 2022	Site overview meeting, meetings with process personnel, tour of CGP1, CGP2, TRP, Tailings area, meetings with capital projects lead and projects overview.	
Infrastructure/Tailings	October 12-14, 2022	Site overview meeting, meetings with process personnel, tour of CGP1, CGP2, TRP, tailings, overall site tour including infrastructure, pit, waste dump areas, meetings with capital projects lead and projects overview, meeting with infrastructure lead and review of infrastructure.	

2.4 Report Version Update

The user of this document should ensure that this is the most recent Technical Report Summary for the property.

This Technical Report Summary is an update of a previously filed Technical Report Summary. This Technical report is an update of the previous report titled "SEC Technical Report Summary, Pre-Feasibility Study, Greenbushes Mine Western Australia. Amended Date December 16, 2022”.

2.5 Qualified Person

This report was prepared by SRK Consulting (U.S.), Inc., a third-party firm comprising mining experts in accordance with § 229.1302(b)(1). The marketing section of the report, (Chapter 16) was prepared by Fastmarkets, a third-party firm with lithium market expertise in accordance with § 229.1302(b)(1). Albemarle has determined that SRK and Fastmarkets meet the qualifications specified under the definition of qualified person in § 229.1300. References to the Qualified Person (QP) in this report are references to SRK Consulting (U.S.), Inc. and Fastmarkets respectively and not to any individual.

3 Property Description

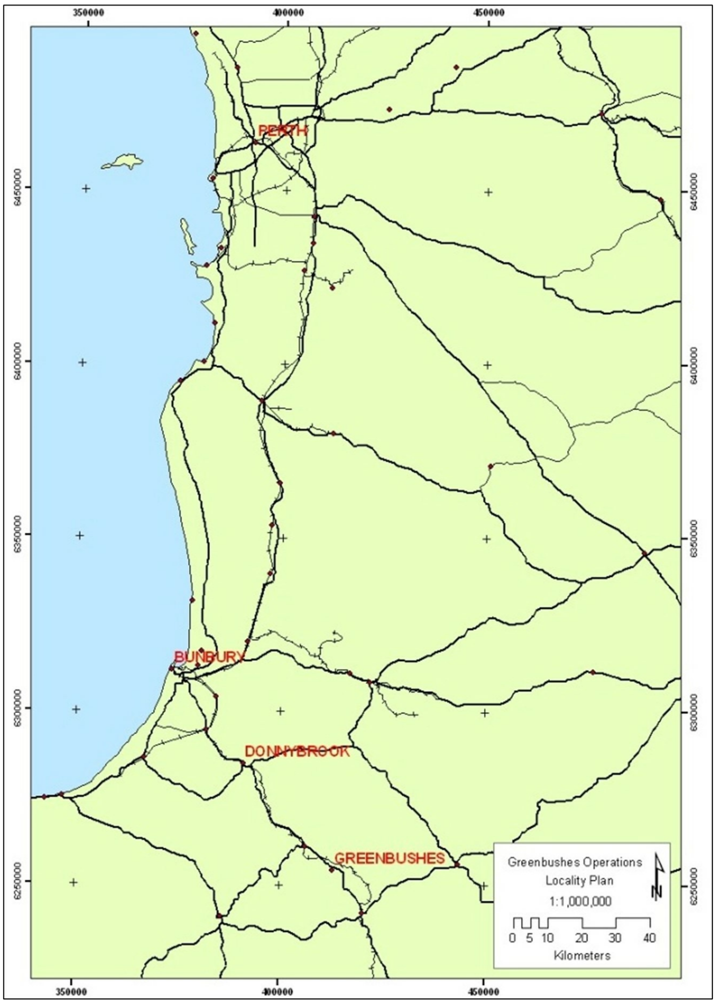
The Greenbushes property is a large mining operation located in Western Australia (Figure 3-1) extracting lithium and tantalum products from the Central Lode pegmatite deposit with the adjacent, undeveloped Kapanga pegmatite deposit located just east of the Central Lode. Historically, the operation also produced tin. Active mining of tin began in 1888, with tantalum production commencing in 1942, and lithium production beginning in 1983. In addition to being the longest continuously operated mine in Western Australia, the Greenbushes pegmatite is one of the largest known spodumene pegmatite resources in the world.

3.1 Property Location

Greenbushes is located directly south of and immediately adjacent to the town of Greenbushes (Figure 3-2) approximately 250 kilometers (km) south of Perth, at latitude 33° 52´S and longitude 116° 04´ E, and 90 km south-east of the Port of Bunbury, a major bulk handling port in the southwest of Western Australia (WA). It is situated approximately 300 meters (m) above mean sea level (AMSL).

Source: Talison, 2018

Figure 3-1: General Location Map, Greenbushes Mine

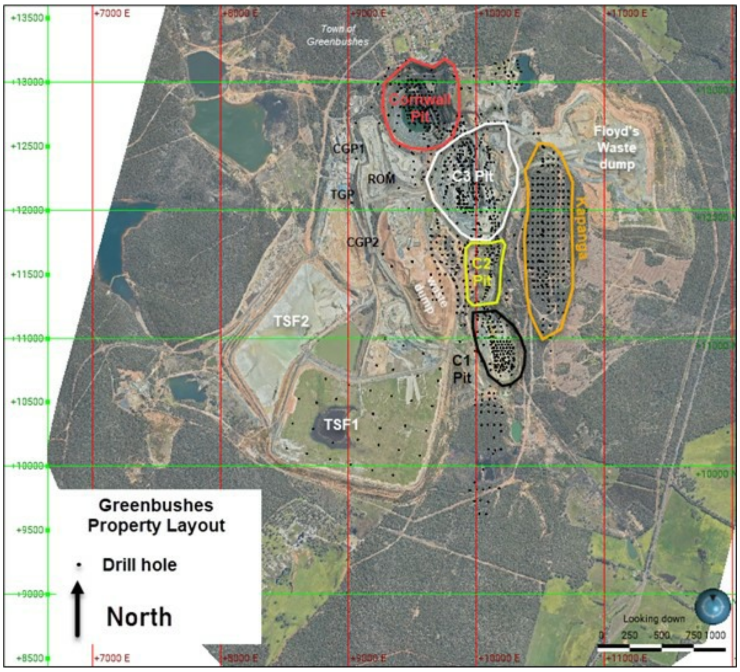


Source: Talison, 2018

Figure 3-2: Greenbushes Regional Location Map

3.2 Property Area

The Greenbushes property area is approximately 2,000 ha, which is a smaller subset of a larger 10,067 ha land package controlled by Talison. A general layout of the operating property utilizing a 2017 aerial photo is shown in Figure 3-3, along with drilling collars used for exploration of the primary pegmatite bodies discussed herein. Mineralized pegmatites occur over the property area, generally trending north – south.



Source: SRK, 2023

Figure 3-3: Property Area Layout with Drilling Collars

3.3 Mineral Title

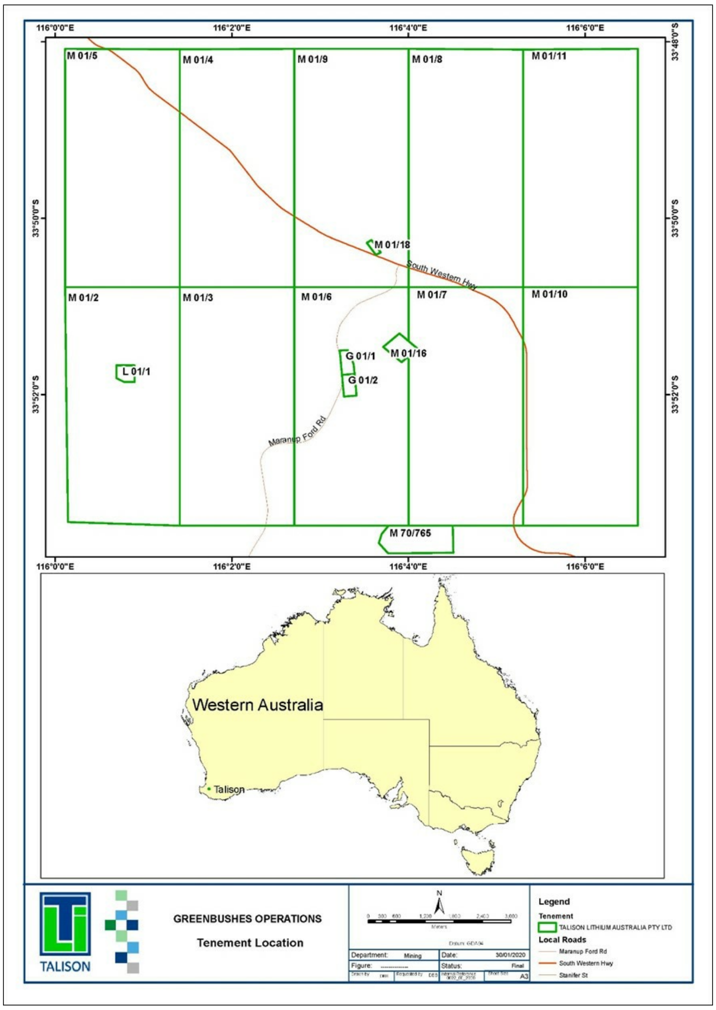
Talison holds 10,067 Ha of mineral tenements which cover the Greenbushes area and surrounding exploration areas. As noted in Table 3-1, some types of title are noted as general purpose leases, while others are discrete mining leases. Active mining and exploration are completely contained within mining leases or other licenses as appropriate. SRK notes that the entirety of the mineral resources and mineral reserves disclosed herein are contained within titles 100% controlled by

Talison and summarized in Table 3-1. The layout of the relevant property boundaries is shown in Figure 3-4.

Table 3-1: Land Tenure Table

Claim ID	Owner(s)	As Reported Type	Status	Date Granted	Expiry Date	Source As Of Date	Area (Ha)
G 01/1	Talison Lithium Australia Pty Ltd	General Purpose Lease	Active/ Granted	11/14/1986	6/5/2028	11/30/2020	10
G 01/2	Talison Lithium Australia Pty Ltd	General Purpose Lease	Active/ Granted	11/14/1986	6/5/2028	11/30/2020	10
L 01/1	Talison Lithium Australia Pty Ltd	Miscellaneous License	Active/ Granted	3/19/1986	12/27/2026	11/30/2020	9
M 01/6	Talison Lithium Australia Pty Ltd	Mining Lease	Active/ Granted	12/28/1984	12/27/2026	11/30/2020	985
M 01/5	Talison Lithium Australia Pty Ltd	Mining Lease	Active/ Granted	12/28/1984	12/27/2026	11/30/2020	999
M 70/765	Talison Lithium Australia Pty Ltd	Mining Lease	Active/ Granted	6/15/1994	6/19/2036	11/30/2020	71
M 01/3	Talison Lithium Australia Pty Ltd	Mining Lease	Active/ Granted	12/28/1984	12/27/2026	11/30/2020	1,000
M 01/7	Talison Lithium Australia Pty Ltd	Mining Lease	Active/ Granted	12/28/1984	12/27/2026	11/30/2020	998
M 01/4	Talison Lithium Australia Pty Ltd	Mining Lease	Active/ Granted	12/28/1984	12/27/2026	11/30/2020	999
M 01/8	Talison Lithium Australia Pty Ltd	Mining Lease	Active/ Granted	12/28/1984	12/27/2026	11/30/2020	999
M 01/10	Talison Lithium Australia Pty Ltd	Mining Lease	Active/ Granted	12/28/1984	12/27/2026	11/30/2020	1,000
M 01/11	Talison Lithium Australia Pty Ltd	Mining Lease	Active/ Granted	12/28/1984	12/27/2026	11/30/2020	999
M 01/16	Talison Lithium Australia Pty Ltd	Mining Lease	Active/ Granted	6/3/1986	6/5/2028	11/30/2020	19
M 01/9	Talison Lithium Australia Pty Ltd	Mining Lease	Active/ Granted	12/28/1984	12/27/2026	11/30/2020	997
M 01/18	Talison Lithium Australia Pty Ltd	Mining Lease	Active/ Granted	9/16/1994	9/27/2036	11/30/2020	3
M 01/2	Talison Lithium Australia Pty Ltd	Mining Lease	Active/ Granted	12/28/1984	12/27/2026	11/30/2020	969

Source: Department of Mines and Petroleum (W. Australia), 2020



Source: Talison, 2020
Generalized Greenbushes operations area shown in red box.

Figure 3-4: Greenbushes Land Tenure Map

Mining leases entitle the tenement holder to work and mine the land. The operating mine and processing plant area covers a total area of about 3,500 Ha and generally sits on mining leases M01/06, M01/07 and M01/16. Talison holds the mining rights for all lithium minerals on these tenements, while Global Advanced Metals (GAM) holds the mining rights to all minerals other than lithium through a reserved mineral rights agreement dated November 13, 2009.

All tenements are registered with the mining registrars located in the State of WA. They have been surveyed and constituted under the Mining Act 1978 (WA) (BDA, 2012). Talison continues to review and renew all tenements on an annual basis and ensures compliance with relevant regulatory requirements and fees for maintenance of these tenements.

3.4 Encumbrances

SRK is not aware of any material encumbrances that would impact the current resource or reserve disclosure as presented herein. Infrastructure movement or modifications which could be related to further expansion or development of the current mineral resource or mineral reserve are detailed in section 15 of this report.

3.5 Royalties or Similar Interest

In WA, a royalty of 5% of the value of lithium concentrate sales is payable for lithium mineral production as prescribed under the Mining Act. The royalty value is the difference between the gross invoice value of the sale and the allowable deductions on the sale. The gross invoice value of the sale is the Australian dollar value obtained by multiplying the amount of the mineral sold by the price of the mineral as shown in the invoice. Allowable deductions are any costs in Australian dollars incurred for transport of the mineral quantity by the seller after the shipment date. For minerals exported from Australia, the shipment date is deemed to be the date on which the ship or aircraft transporting the minerals first leaves port in WA (BDA, 2012).

3.6 Other Significant Factors and Risks

SRK is not aware of any other significant factors or risk that may affect access, title, or the right or ability to perform work on the property.

4 Accessibility, Climate, Local Resources, Infrastructure and Physiography

4.1 Topography, Elevation and Vegetation

Excerpted from BDA, 2012.

The Greenbushes site is situated approximately 300 m AMSL. The operations area lies on the Darling Plateau and is dominated by a broad ridgeline which runs from the Greenbushes township (310 m) towards the south-east (270 m) with the open pits located along this ridgeline (300 m). The current operating waste rock dump is located on an east facing hill slope which descends to 266 m and adjoins the South Western Highway, while the process plant area is located on the west facing hill slope which descends to 245 m. The tailings storage areas are located south of the mining and plant areas at 265 m.

4.2 Means of Access

Access to the property is via the paved major South Western Highway between Bunbury and Bridgetown to the Greenbushes Township, and via Maranup Ford Road to the mine. A major international airport is located in Perth, WA, approximately 250 km north of the mine area (BDA, 2012).

4.3 Climate and Length of Operating Season

Excerpted from BDA, 2012.

The Greenbushes area has a temperate climate that is described as mild Mediterranean, with distinct summer and winter seasons. The mean minimum temperatures range from 4°C to 12°C, while the mean maximum temperatures range from 16°C to 30°C. The hottest month is January (mean maximum temperature 30ºC), while the coldest month is August (mean minimum temperature 4ºC). There is a distinct rainfall pattern for winter, with most of the rain occurring between May and October. The area averages about 970 mm per annum with a range of about 610 mm to 1,680 mm per annum. The evaporation rate for the area is calculated at approximately 1,190 mm per annum. The area is surrounded by vegetation broadly described as open Jarrah/Marri forest with a comparatively open understorey.

Mining and processing operations at Greenbushes operate throughout the year.

4.4 Infrastructure Availability and Sources

4.4.1 Water

Water is currently supplied from developed surface water impoundments for capture of precipitation runoff, pumping from sumps within the mining excavations and recycled from multiple TSFs. No mine water is sourced directly from groundwater aquifers through production or dewatering wells. The majority of these water sources and impoundments are linked through constructed surface pumps and conveyance.

4.4.2 Electricity

Power is provided by utility line power from existing Western Power transmission that runs along the east side of the deposit. 22 kV transmission lines feed off the Western power transmission line from both the north and south to form a loop configuration. The 22 kV transmission then feeds local power distribution to the various loads on the project.

4.4.3 Personnel

The mine and processing facilities are located about 3 km south of the community of Greenbushes part of Bridgetown-Greenbushes Shire and the community of Greenbushes is the closest community to the site. Personnel working at the project typically live within a thirty-minute drive of the project. A number of local communities are within 30 minutes of the site. Skilled labor is available in the region and Talison has an established work force with skilled labor. The current labor levels are approximately 1,300 people.

4.4.4 Supplies

Supplies are readily available from established vendors and services from the local communities and from the regional capital Perth located 250 km to the north.

5 History

Mining in the Greenbushes area has continued since tin was first discovered at Greenbushes in 1886. Greenbushes is recognized as the longest continuously operated mine in WA (BDA, 2012).

5.1 Previous Operations

Excerpted from BDA, 2012.

5.1.1 Tin

Since it was first discovered at Greenbushes in 1886, tin has been mined almost continuously in the Greenbushes area, although in more recent times lower tin prices and the emergence of lithium and tantalum as major revenue earners have relegated tin to the position of a by-product. Tin was first mined at Greenbushes by the Bunbury Tin Mining Co in 1888. However, there was a gradual decline in tin production between 1914 and 1930. Vultan Mines carried out sluicing operations of the weathered tin oxides between 1935 and 1943, while between 1945 and 1956 modern earth moving equipment was introduced and tin dredging commenced. Greenbushes Tin NL was formed in 1964 and open cut mining of the softer oxidized rock commenced in 1969.

5.1.2 Tantalum

Tantalum mining at Greenbushes commenced in the 1940s with the advancement in electronics. Tantalum hard-rock operations started in 1992 with an ore processing capacity of 800,000 t/y. By the late 1990s demand for tantalum reached all-time highs and the existing high grade Cornwall Pit was nearing completion. In order to meet increasing demand a decision was made to expand the mill capacity to 4 Mt/y and develop an underground mine, to provide higher grade ore for blending with the lower grade ore from the Central Lode pits. An underground operation was commenced at the base of the Cornwall Pit in April 2001 to access high grade ore prior to the completion of the available open pit high-grade resource.

In 2002, the tantalum market collapsed due to a slow-down in the electronics industry and subsequently the underground operation was placed on care and maintenance. The underground operation was restarted in 2004 due to increased demand but again placed on care and maintenance the following year. The lithium open pit operation has continued throughout recent times and mining is now focused on the Central Lode zone. Only lithium minerals are currently mined from the open pits. The tantalum mining operation and processing plants have been on care and maintenance since 2005.

5.1.3 Lithium Minerals

The mining of lithium minerals is a relatively recent event in the history of mining at Greenbushes with Greenbushes Limited commencing production of lithium minerals in 1983 and commissioned at 30,000 t/y lithium mineral concentrator two years later in 1984 and 1985. The lithium assets were acquired by Lithium Australia Ltd in 1987 and Sons of Gwalia in 1989. Production capacity was increased to 100,000 t/y of lithium concentrate in the early 1990s and to 150,000 t/y of lithium concentrate by 1997, which included the capacity to produce a lithium concentrate for the lithium chemical converter market.

The Talison Minerals Group was incorporated in 2007 for the purpose of acquiring the assets of the Advanced Minerals Division of Sons of Gwalia by a consortium of US private equity companies led by Resource Capital Funds. The Talison Mineral Group's assets included the Wodgina tantalum mine located about 1,500 km north of Perth and 120 km south of Port Hedland in the Pilbara region of WA as well as the Greenbushes Lithium Operations. Upon completion of the reorganization of the Talison Minerals Group in 2010, Talison acquired the Greenbushes Lithium Operations, and the remainder of the assets were acquired by GAM.

There are two lithium processing plants that recover and upgrade the spodumene mineral using gravity, heavy media, flotation, and magnetic processes into a range of products for bulk or bagged shipment. In the period of 2005 to 2008, demand from the Chinese chemical producers was satisfied by using the Greenbushes primary tantalum plant which had been on care and maintenance. Products from that plant had a lower grade than preferred by the Chinese customers and were supplied as a temporary measure until Talison's lithium concentrate production capacity was increased.

In 2009, Talison's processing plants were upgraded to total nominal capacity of approximately 260,000 t/y of lithium concentrates and in late 2010 capacity was increased to 700,000 t/y of ore feed yielding approximately 315,000 t/y of lithium concentrates.

5.2 Exploration and Development of Previous Owners or Operators

As noted above, the Greenbushes property is the longest continuously operating mine in WA and features an extensive exploration and operational history. Exploration work was conducted by previous owners and operators through the various commodities focuses as described in Section 5.1, including drilling (rotary, reverse circulation, and diamond core), surface sampling, geological mapping, trenching, geophysics.

Development work has generally included construction activities related to both open-pit and underground mining, as well as waste dumps, tailings facilities, surface water management infrastructure and more.

6 Geological Setting, Mineralization, and Deposit

6.1 Regional Geology

As stated by G. A. Partington (1990), the Greenbushes pegmatite in WA is intruded into rocks of the Balingup Metamorphic Belt (BMB), which is part of the Southwest Gneiss Terranes of the Yilgarn Craton. The Greenbushes pegmatite lies within, and is geometrically controlled by, the Donnybrook-Bridgetown Shear Zone. It appears to have been emplaced during the orogeny as is evidenced by the relatively fine grain size of the pegmatites as well as noted internal deformation which may be consistent with syn-deformation emplacement. The pegmatites are Archaean and dated at approximately 2,525 million years (Ma). Pegmatites are hosted by a 15 to 20 km wide, north to north-west trending sequence of sheared gneiss, orthogneiss, amphibolite and migmatite which outcrop along the trace of the lineament. A series of syn-tectonic granitoid intrusives occur within the BMB, elongated along the Donnybrook-Bridgetown Shear Zone. The pegmatites have been further affected by subsequent deformation and/or hydrothermal recrystallization, the last episode dated at around 1,100 Ma. Figure 6-1 shows the regional geology.

Source: Talison Lithium Limited

Figure 6-1: Regional Geology Map

6.2 Local Geology

The Greenbushes pegmatite deposits consists of a primary pegmatite intrusion with numerous smaller, generally parallel pegmatite dikes and pods to the east (Figure 6-2 and Figure 6-3). For the purposes of this report, the term Greenbushes pegmatite deposits relate to the property-scale pegmatites. Central Lode refers to the primary pegmatite area which has been the focus of mining activity while the Kapanga deposit refers to the area of sub-parallel pegmatite located to the east of the Central Lode. The primary Central Lode deposit intrusion and the subsidiary Kapanga deposit dikes and pods are concentrated within shear zones on the boundaries of granofels, ultramafic schists and amphibolites. The pegmatites are crosscut by mafic dolerite dikes. The broader pegmatite body is over 3 km long (north by northwest), up to 300 m wide (normal to dip), strikes north to north-west and dips moderately to steeply west to south-west. The syn-tectonic development of the pegmatite has given rise to mylonitic fabrics, particularly along host rock contacts.

The Greenbushes pegmatite is mineralogically segregated into five primary zones. Internally, the Greenbushes pegmatite consists of the Contact Zone, Potassium Feldspar (Potassium) Zone, Albite (Sodium) Zone, Mixed Zone and Spodumene (Lithium) Zone (Figure 6-5). The zones differ from many other rare-metal pegmatites in that they do not appear concentric, but are lenticular in nature, with inter-fingering along strike and down dip. They do not have a quartz core. The mine sequence was later subjected to the transgressive east-west dike and conformable sill dolerite intrusions.

The highest concentrations of primary Li-bearing minerals are found in specific mineralogical zones or assemblages within the pegmatite. The Lithium Zone within the main pegmatite body exhibit variable dips from 80 to 20° towards the west and south-west. Tantalum (tantalite) and tin (cassiterite) mineralization is concentrated in the Sodium Zone which is characterized by albite (Na-plagioclase), tourmaline and mica (muscovite). The Lithium Zone is enriched in the lithium bearing silicate spodumene. The mixed zone contains lower concentrations of tantalum and lithium. The final major zone is the potassium feldspar microcline which is not considered currently economic.

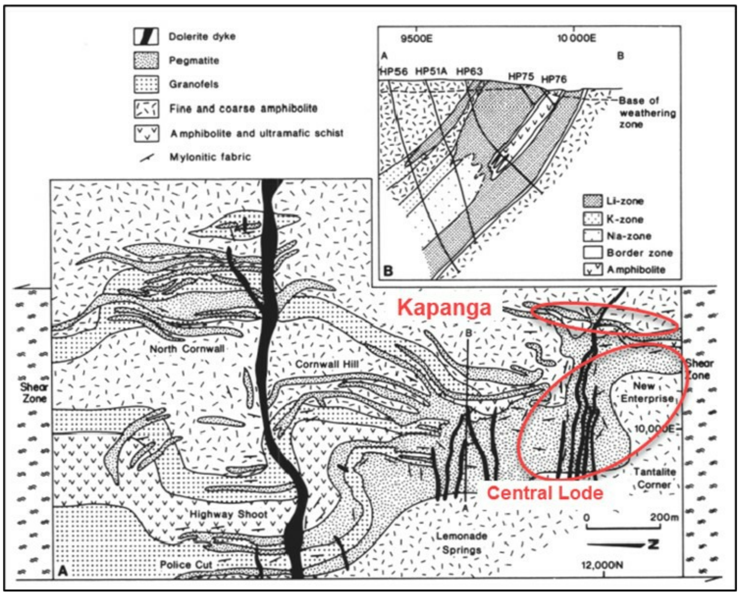
The predominant rock units on the Greenbushes property are a package of Archean amphibolite and metasediments above the basement Bridgetown Gneiss (Figure 6-4). Locally, this is present as the hanging wall Amphibolite and Footwall Granofels. Numerous Archean granitoid intrusions are present, all of which are cut by the Donnybrook-Bridgetown Shear zone represented onsite as the roughly N – S trending shear-zone gneiss. Pegmatite intrusions which host Li mineralization have intruded this package of Archean rocks. Post-mineralization dolerite dikes intrude older units, dated at approximately 1.1 Ga. Lastly, recent cover material of lateritic conglomerates, older alluvium, and recent alluvium are present as shallow cover. A simplified stratigraphic column is presented in Figure 6-2. Weathering and erosion of the pegmatites has produced adjacent alluvial deposits in ancient drainage systems. These are generally enriched in cassiterite. All rocks have been extensively lateritized during Tertiary peneplain formation; the laterite profile locally reaches depths in excess of 40 m below the original surface.

The Central Lode lithium deposit occurs within a large (250 m wide) lithium enriched pegmatite. Spodumene in the Lithium ore zone can make up more than 50% of the rock with the remainder being largely quartz. Toward the northern end of C3 pit (Figure 6-5), a highly felspathic (K-feldspar) zone separates the high-grade lithium zone from the hanging wall amphibolite and the dolerite sill. Tantalum/tin and lithium ore body mineralization are conformable with the trends of the pegmatites both along strike and down dip.

Between C3 and C1 is the mining area referred to as C2. The pegmatite in this area dips approximately 40° west and has an intermediate composition with moderate lithium oxide Li_2O values and moderate tantalum pentoxide (Ta_2O_5) values. This is in contrast to C1 and C3 which have large distinct zones of separate Li_2O and Ta_2O_5 high grade.

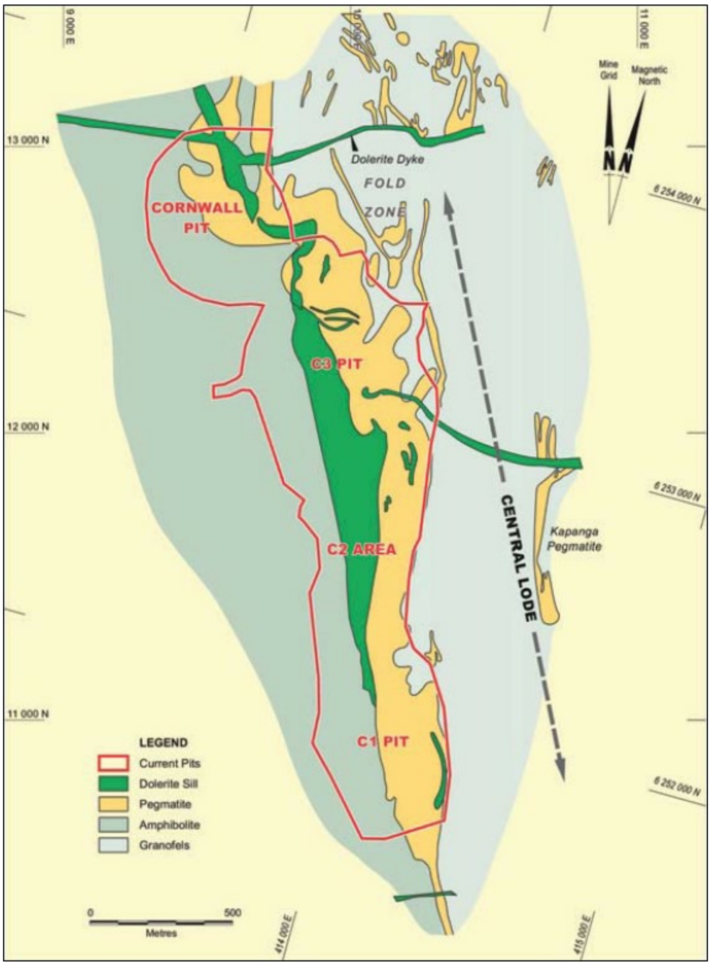
At the southern end of the Central Lode pits is the C1 pit area. It contains the next largest concentration of high grade spodumene lithium mineralization after C3. The eastern footwall contact in the south of the C1 area dips 35°west steepening toward the north and with depth. The internal grade domains in C1 parallel the eastern footwall contact. The immediate footwall is enriched in tantalum with typical accessory minerals tourmaline and apatite visible. Weathering has locally resulted in argillic alteration of pegmatites near-surface, although this has only limited effects on current operations with the depth of current mining. Moving north the dip of the pegmatite shallows and the lithium domain at more than 1% Li_2O is discontinuous.

The Kapanga deposit sits approximately 300 m east as a sub-parallel pegmatite to the Central Lode deposit (Figure 6-2). and represents a thinner zone of spodumene mineralization, near-surface, but with reduced volume compared to the Central Lode. It has been interpreted over a northerly strike length of approximately 1.8 km. The pegmatite intrusives within Kapanga typically dip at 40 to 50 with some steepening to 60 toward the southern end of the deposit. The pegmatite has been interpreted as several sub-parallel stacked lodes of varying thickness and length, as well as numerous smaller pods, with an overall thickens of approximately 150 m. Current drilling has identified depth continuity to approximately 450 m below surface.



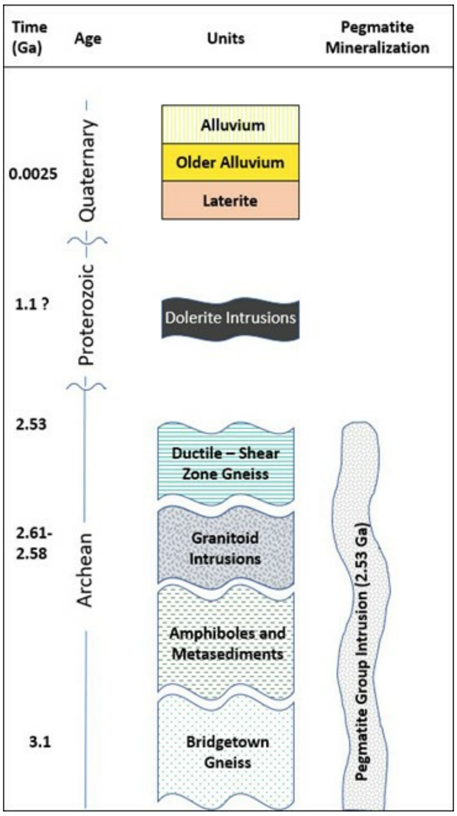
Source: Partington, 1990 modified by SRK, 2022

Figure 6-2: Greenbushes Area Generalized Geology Map with Inset Cross Section



Source: BDA, 2022

Figure 6-3: Greenbushes Property Geology Map



Source: SRK, 2022

Figure 6-4: Simplified Stratigraphic Column

6.2.1 Structure

Shear structures in the pegmatites are most strongly developed at margins and in albite rich zones. The orientation of shear fabrics is sub-parallel to the regional Donnybrook–Bridgetown Shear Zone indicating pegmatite intrusion was synchronous with this deformational event. Folding postdates mylonization of the albite zone yet predates or is synchronous with later stages of crystallization. Dilatant zones formed in footwall albite zones during folding and were infiltrated by late-stage Sn-Ta-

Niobium (Nb) rich fluids which may be the sites for a second stage of high-grade mineralization. Later stage discordant structures have also been interpreted, the most obvious being the "Footwall Fault", a sub-vertical structure striking north-south across the deposit. Faulted zones vary in structural intensity from heavily jointed to disintegrated rock greater than 30 m in width.

6.2.2 Mineralogy

Internally, the Greenbushes pegmatite displays up to five distinct mineralogically-defined zones (Figure 6-5); the Contact Zone, K-Feldspar (Potassium) Zone, Albite (Sodium) Zone, Mixed Zone and Spodumene (Lithium) Zone. Zones generally relate to multiple phases of intrusion and crystallization of the pegmatites.

The bulk of the lithium is contained within the Spodumene Zone. In the Central Lode deposit, this is typically located within the central part of the pegmatite. For the Kapanga deposit, the elevated spodumene concentrations in the individual lodes are generally located near the footwall contact, and to a lesser extent, near the hangingwall contact, with the core regions being largely barren. Differences between the spodumene concentration in the individual lodes are also evident, with the higher concentrations generally in the upper part of the sequence.

The mineralogical zones occur as a series of thick layers commonly with a lithium zone on the hanging wall or footwall, K-feldspar towards the hanging wall and a number of central albite zones. High-grade tantalum mineralization (more than 420 grams per tonne (g/t)) is generally confined to the Albite zone within the deposit. The Spodumene and K-Feldspar Zones typically have tantalum-tin grades of less than 100 ppm.

Table 6-1 summarizes the main minerals associated with the historically economic elements Tantalum (Ta), Tin (Sn), and Lithium (Li) at Greenbushes. Currently, only Lithium minerals are exploited and processed at Greenbushes.

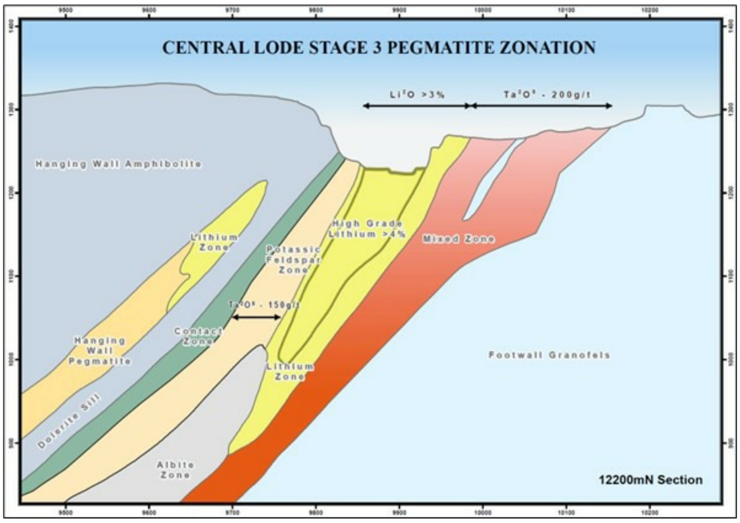
Table 6-1: Major Lithium and Tantalum Ore Minerals

Tantalum	Composition	Lithium	Composition
Columbo Tantalite	$(Fe,Mn)(Nb,Ta)_2O_6$	Spodumene	$LiAlSi_2O_6$
Stibio Tantalite	$(Nb,Ta)SbO_4$	Varieties	
Microlite	$((Na,Ca)_2Ta_2O_6(O,OH,F))$	Spodumene – White	
Ta – Rutile (Struverite)	$(Ti,Ta,Fe^{3+})_3O_6$	Hiddenite – Green	(Fe,Cr)
Wodginite	$(Ta,Nb,Sn,Mn,Fe)_{16}O_{32}$	Kunzite – Pink	(Mn)
Ixiolite	$(Ta,Fe,Sn,Nb,Mn)_4O_8$	Other Lithium Minerals	
Tapiolites	$(Fe,Mn)(Ta,Nb)_2O_6$	Lithiophilite	$Li(Mn^{2+},Fe^{2+})PO_4$
Holite	$Al_6(Ta,Sb,Li)[(Si,As)O_4]_3(BO_3)(O,OH)_3$	Amblygonite	$(Li,Na)Al\ PO_4(F,OH)$
Tin		Holmquisite	$Li(Mg,Fe^{2+})_3Al_2Si_8O_{22}(OH)_2$
Cassiterite	SnO_2	Lepidolite	$K(Li,Al)_3(Si,Al)_4O_{10}(OH)_2$

Source: Talison, 2018

Major minerals hosted in the pegmatites are quartz, spodumene, albite, and K-feldspar. Primary lithium minerals are spodumene, $LiAlSi_2O_6$ (approximately 8% Li_2O) and spodumene varieties kunzite and hiddenite. Minor lithium minerals include lepidolite (mica), amblygonite and lithiophilite (phosphates). Spodumene is hard (6.5 to 7) with an SG of 3.1-3.2. Highest concentrations (50%) of Spodumene occur in the C1 and C3 pits.

When spodumene-bearing pegmatite is weathered and oxidized, the contained lithium ions can become mobilized resulting in depleted zones of lithium concentration, alteration of spodumene to clay products, increased relative silica percentage, and uneconomic lithium grades.”. Oxidation of the pegmatites has generally occurred in near-surface weathering or along selected structures internal to the pegmatites. Only the near-surface weathering is considered to materially affect the pegmatite from a process mineralogy standpoint.



Source: Modified from BDA, 2012
Section looking north.

Figure 6-5: Cross Section Showing Generalized Stratigraphy and Greenbushes Pegmatite Mineral Zoning

7 Exploration

7.1 Exploration Work (Other Than Drilling)

The primary method of exploration on the property has been drilling for the past 40 years. While other means of exploration such as geological mapping, surface geochemical sampling, and limited geophysics have been considered or applied over the years, weathering and associated leaching of the near-surface pegmatites results in economic lithium mineralization not commonly being recognized via surface investigations (BDA, 2012).

It is SRK's opinion that the current practices of active mining, exploration drilling, and in-pit mapping provide the most relevant and robust data supporting mineral resource estimation. In-pit mapping of the pegmatite and waste rocks is the most critical of the non-drilling exploration methods applied to this model and mineral resource estimation, as detailed in Section 11 of this report.

The area around the current Greenbushes Lithium Operations has been mapped and sampled over several decades of modern exploration work. While other nearby exploration targets have been identified and developed over the years, they are not included in the mineral resources disclosed herein and are not relevant to this report.

7.1.1 Significant Results and Interpretation

SRK notes that the Greenbushes property is not at an early stage of exploration, and that results and interpretation from exploration data is generally supported in more detail by extensive drilling and by active mining exposure of the orebody in multiple pits within the Central Lode deposit. The Kapanga deposit, to the east of the Central Lode has no historical or active mining but contains significant drilling in support of resources. Drilling at Kapanga occurred more recently with initial drilling in 1991 and the majority of drill evaluation occurring since 2012.

7.2 Exploration Drilling

Drilling on the Greenbushes property has been ongoing for over forty years with the majority of historical drilling focused on the Central Lode deposit. The drilling data presented in this section represent data used in the geological and resource models. SRK recognizes that drilling has been performed since model updates in 2020 for Central Lode and Kapanga and recommends recent drilling be incorporated and interpreted as models are updated.

7.2.1 Holes by Type Included in the 2020 Resource Block Model Drilling Surveys

Resource drillholes contained in the Greenbushes database date back to 1979. More recent (post-2000) down hole surveys used Eastman Single Shot cameras, while the later reverse circulation (RC) programs (since hole RC214) utilized either a gyroscopic or a reflex electronic tool. Eastman down-hole surveys were recorded at 25 m down hole and thereafter every 30 m to a minimum of 10 m from the final depth. The geologist checks the driller's dip and azimuth written recordings by viewing all single shot photographic discs prior to data entry into the database.

Prior to 2000, surveys were based on a variety of industry standard methods that cannot be verified but, in SRK's opinion, can be relied upon. Checks of surveys within the database, by comparing overlapping data between older and post 2000 drillholes, support the opinion that the surveying is reliable. Some of the RC holes drilled before 2002 were apparently not down-hole surveyed and were instead given linear design parameters based on collar orientations in the database. Also, some of the older vertical diamond holes were not down-hole surveyed. In SRK's opinion, this is not a material issue given the relatively shallow drilling depths and tendency of vertical holes to not significantly drift.

The location of recent surface drillhole collars is surveyed by the mine surveyors using a differential global positioning system (dGPS) accurate to less than 1 m. Historical collars were surveyed using industry standard equipment available at the time and are considered acceptable for resource calculations in SRK's opinion. Environmental rehabilitation programs to relocate historical collars using their coordinates and a handheld GPS have been successful and acts as a validation of historical collar surveys.

7.2.2 Sampling Methods and Sample Quality

The Greenbushes pegmatite is sampled by a combination of RC and diamond drilling programs. The drill patterns, collar spacing, and hole diameter are guided by geological and geostatistical understanding for reliability of geological continuity, interpretation, and for confidence of estimation in mineral resource block models.

Drill core samples provide intact geological contact relationships, mineralogical associations and structural conditions, while RC drill sampling provides mixed samples from which mineral proportions are estimated by visual examination.

A sample interval of 1 m is used as the maximum default length in RC and diamond drilling. Analysis of the deposit characteristics has been used to determine the appropriate sample interval in drillholes.

Distinguishing rock types in drill samples is considered robust given the dark internal and country waste rock and the lighter colored pegmatites. Where unaffected by shearing, the geological contacts are abrupt, often regular, and intact. Although contact relationships are masked in RC chips, the pegmatite/waste contact positions are inferred within the sample length. Both diamond drill and RC drillholes are distributed throughout the lithium deposits (Talison, 2020).

7.2.3 Diamond Drilling Sampling

In SRK's opinion, diamond drillholes (DDH) are considered to be authoritative and representative of subsurface materials. Diamond core is collected in trays marked with hole identification and down hole depths at the end of each core run. Pegmatite zones are selected while logging and intervals are marked up for cutting and sampling. All pegmatite intersections are sampled for assay and waste sampling generally extends several meters on either side of a pegmatite intersection. Internal waste zones separating pegmatite intersections are routinely sampled, although in a small proportion of holes drilled prior to 2000, some waste zones separating pegmatite lenses have not been assayed.

Core recovery is generally above 95%. A line of symmetry is drawn on the core and the core is cut by diamond saw. Historically BQ and NQ core has been half core sampled with more recent HQ core quarter cut and sampled. The typical core sampling interval for assay is 1 m, but shorter intervals are sampled to honor geological boundaries and mineralogical variations.

It is SRK's opinion that diamond core recovery and sampling is unbiased and suitable for the purposes of mineral resource estimation.

7.2.4 RC Drilling Sampling

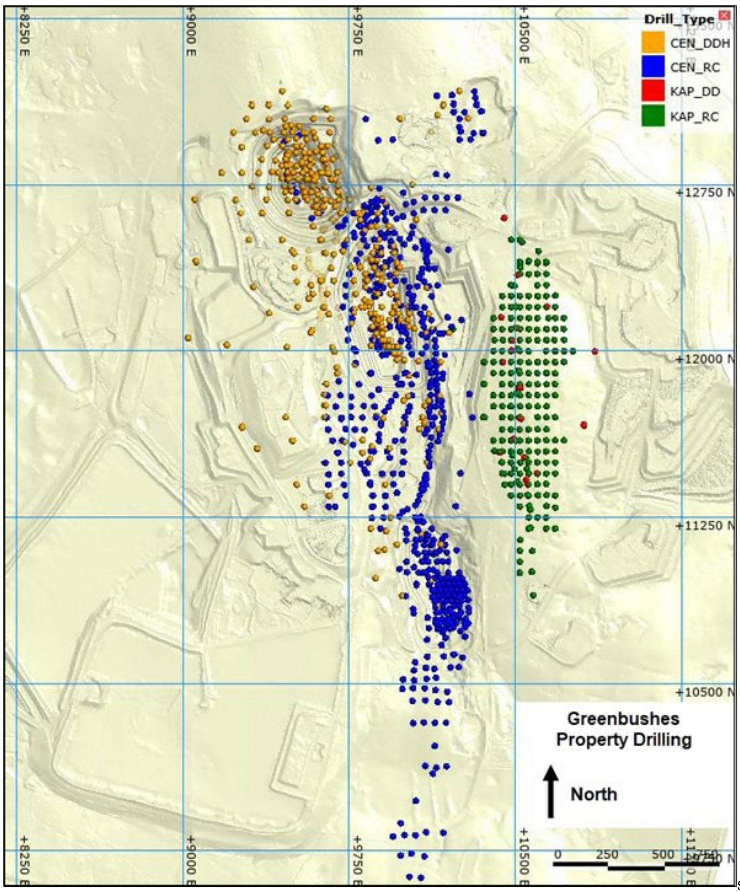
RC samples are collected by face sampling hammer for every meter drilled over the full length of the hole via a cyclone attached to the rig and split at the rig by the drilling contractor using either a riffle splitter, rotating cone splitter, or stationary cone splitter. A sample of approximately 3 to 4 kg is submitted to the laboratory. In some older RC holes, the regular sampling length was 2 m. Field duplicates are collected every 20 m and submitted to the laboratory for quality assurance and quality control (QA/QC) purposes. RC drillhole bit size is normally approximately 4.5 inches or 5.25 inches. The drilling conducted since the last resource update were all drilled using a 5.25-inch bit size.

All pegmatite intersections are submitted for assay. The sections sampled will normally extend several meters into the waste rock hosting the pegmatite. As with diamond drilling, internal waste zones separating pegmatite intersections are also sampled, although in some old holes some of this internal waste sampling is incomplete. Pegmatite intersections are visually distinguishable from waste zones in drill chips during drilling.

Drill cutting reject piles are reviewed by site geologists when geological logging and intervals with poor recoveries are recorded. The drill samples are almost invariably dry, and recoveries are consistently high (Talison, 2020).

7.2.5 Drilling Type and Extent

The drilling on the Greenbushes property is comprised of RC and DDH which extends across the property given the long history of site development and evaluation (Figure 7-1). The holes are drilled in a variety of orientations, primarily vertically or perpendicular to the pegmatite intrusive dikes with a total of approximately 1,189,895 m of resource drilling across the property. Holes are spread relatively uniformly throughout the Central Lode and Kapanga deposits, and mineralization is generally defined by exploration drilling at 25 to 50 m drill spacings for exploration purposes. More detailed grade control drilling is conducted in the Central Lode deposit in near-term production planning areas, as are detailed blastholes during production. There are no blastholes in Kapanga due to no active mining activities.



Source: SRK, 2023

Figure 7-1: Greenbushes Property Drilling Type and Extents

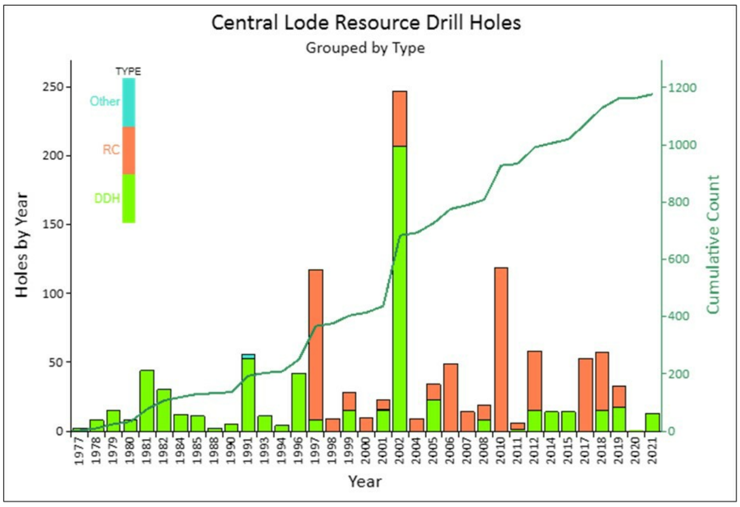
Central Lode Deposit Drilling

The Central Lode dataset contains a total of 1,177 drillholes, equating to over 194 km of drilling. A tabulation of the drill quantities by type is presented in Table 7-1. The current drilling database used for resources includes historical RC drilling back to 1977 with drilling though to 2020.Drilling campaigns have been conducted by over 25 different contracting companies over the long history of evaluation. Figure 7-2 and Figure 7-3 illustrate Central Lode-focused drilling by year, drill method, and total length.

Table 7-1: Drilling in the Central Lode Deposit.

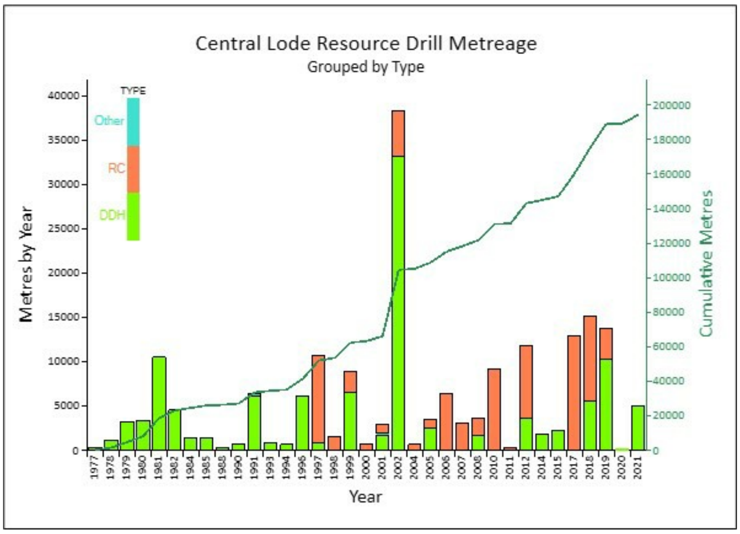
Hole Type	Holes	Meters
Diamond Core (DDH)	599	111,410
Reverse Circulation (RC)	560	77,565
RC/DDH	14	4,904
Trench	1	186
Not specified	3	310
Total	**1,177**	**194,375**

Source: SRK, 2020



Source: SRK, 2020

Figure 7-2: Central Lode Resource Model Drilling by Drilling Method



Source: SRK, 2020

Figure 7-3: Central Lode Resource Model Drilling by Meterage

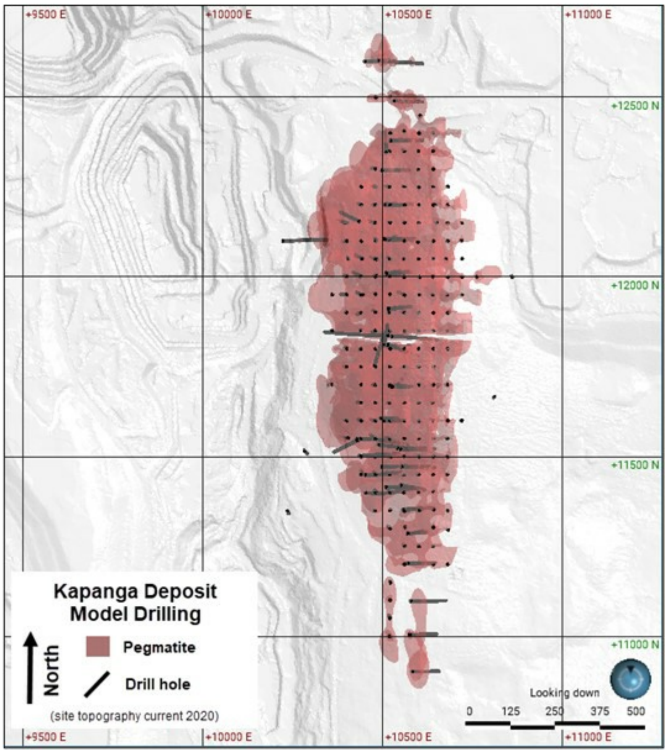
Kapanga Deposit Drilling

The Kapanga deposit modeling and resources utilized 240 drillholes, representing over 47 km. The majority of the holes were drilled in the past five years due to the more recent discovery of Kapanga. The modeled drilling database contains 23 DDH and 217 RC holes (Table 7-2). Drilling at Kapanga was performed on a regular grid pattern with nominal spacing of 40 m along west to east sections and 50 m between section lines (Figure 7-4). Approximately 80% of Kapanga drillholes are vertical, with the remaining 20% angled between 60° and 75° to the east.

Table 7-2: Kapanga Deposit Drilling by Type

Year	Diamond Core (DDH)		Reverse Circulation (RC)		RC and DDH		All Drilling	
	Holes	Meters	Holes	Meters	Holes	Meters	Holes	Meters
1991	1	105					1	105
2012			4	744			4	744
2017			10	2668			10	2668
2018	5	1466	25	4973	1	247	31	6686
2019	11	1903	85	13260			96	15163
2020	3	816	92	20756			95	21572
2021	3	282					3	282
Total	23	4572	216	42401	1	247	240	47220

Source: SRK, 2021



Source: SRK, 2022

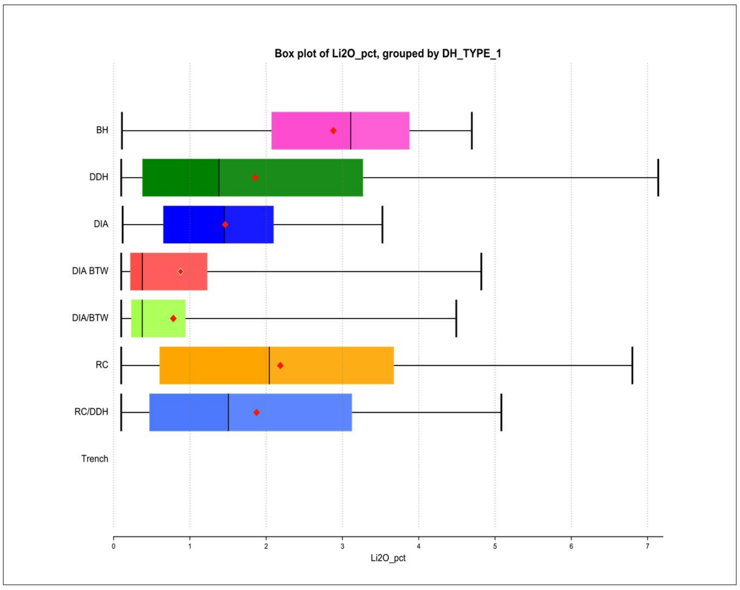
Figure 7-4: Drilling at the Kapanga Deposit

7.2.6 Drilling Type and Extents Drilling, Sampling, or Recovery Factors

To evaluate the various types of drilling, SRK compared overall mean Li_2O grades of multiple drilling types on a global and local basis. Global comparisons for drill types are shown in Figure 7-5, and demonstrate that the different types feature different mean Li_2O values. In SRK's opinion, the spatial component of where the specific type of drilling occurred is the source of variance in the means at a global comparison scale. For example, it is natural that the blasthole data or the RC data (which features closely spaced grade control drilling) would be higher grade on average than the DDH drilling, which is sparser, exploration focused (i.e., determining extents of mineralization and waste dilution), and less likely to be located in the higher-grade portions of the pegmatite.

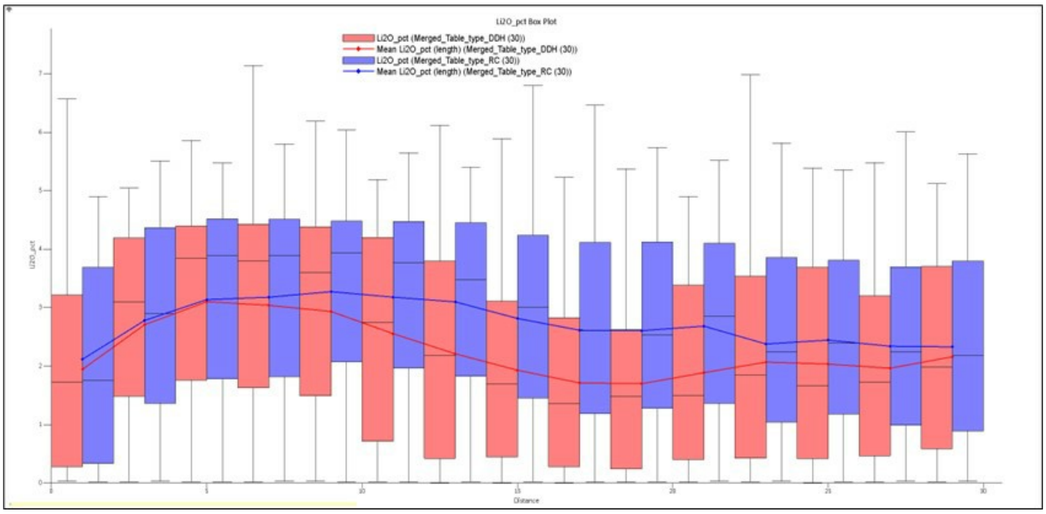
SRK notes that only DDH and RC drilling are considered for the mineral resource estimation with exclusion of blasthole data. These data types were compared on a local basis as well.

To do this, RC samples were compared against paired closely spaced DDH samples based on the distance between the two, and SRK noted similar trends in grade distribution between the two data types as shown in Figure 7-6. These comparisons feature excellent comparison of RC and DDH sample grades at close spacings, with differences occurring at distances greater than approximately 10 m. In SRK's opinion, this likely reflects inherent geologic variability or variability of grade within the pegmatites rather than a consistent bias in drilling methodology. SRK also notes that, as distances between samples increase to more global populations, that the inherent spatial bias of the RC grade control drilling (preferentially located within the ore zones of the pegmatite) likely influences overall global comparisons to favor the RC drilling with a higher mean Li_2O.



Source: SRK, 2020
BH = Blastholes, DDH = Diamond Drillhole, DIA = Diamond Drillhole, DIA/BTW = Diamond Drilling Thin Wall, RC = Reverse Circulation, RC/DDH = Reverse Circulation with Diamond Drill "Tail"

Figure 7-5: Box and Whisker Plot – Li_2O by Drilling Type



Source: SRK, 2020
Only RC vs. DDH drilling shown.

Figure 7-6: Drilling Type Mean Comparison – By Average Separation Distance

To consider the possible impact of drilling recovery (only noted in DDH drilling) SRK reviewed recovery information for those holes where recovery was logged.

Recovery logs are made of all diamond drill core as a part of the standard logging procedure which includes collection of geological, mineralogical, and structural information. Core recoveries within the fresh pegmatite range from 95% to 100%. SRK noted no bias in Li_2O or relationship with recovery in those samples where both are noted.

Mass measurements are made of RC samples from selected holes to understand potential impacts with recovery in RC drilling but are not quantitative due to the drilling method. Site geologists also inspect the size of the cutting piles, and intervals differing from average mass or moisture content are noted on drill logs. RC sample recovery generally has been assumed to be excellent.

SRK is not aware of any additional material factors to the drilling that would affect the results.

7.2.7 Drilling Results and Interpretation

Geological logging from DDH and RC drilling along with pit mapping is used to construct 3D geological models utilizing implicit and explicit modeling practices. When blasthole data is available in the Central Lode deposit, this close-spaced data is used in aid in guiding geological contacts and general lithological interpretations. No analytical data from blastholes is used for resource estimation purposes.

Analytical data from drill sampling for Li_2O and other elements is interpolated in 3D to develop geochemically distinct domains within the geological model and were driven by structural or interpreted grade continuity models.

7.3 Hydrogeology

SRK reviewed the previous groundwater and surface water studies at Greenbushes, including water balance and groundwater modeling.

The hydrogeologic data collected indicate that the mineral resource is overlain by a relatively low permeability groundwater system consisting of lateritic caprocks and well developed saprolitic clays which yield very little water. Beneath these weathering products, exists a sharp to gradual transition into the fractured bedrock. Within this transition zone the variably weathered bedrock and remnant fractures form the highest yielding groundwater due to the enhanced permeability. Deeper within the bedrock, localized faults and fractures may result in enhanced permeabilities. Based on testing completed, hydraulic conductivity (K) for the weathered bedrock zone ranges from 0.01 m/d to 1 m/d, while the bedrock (pegmatite/greenstone) has a K of 3.0 x 10-4 m/d to 6.0 x 10-3 m/d (GHD, 2019a), although it should be noted that these values are based on bulk averages within a fracture bedrock groundwater system.

Local aquifers are hosted within the surficial alluvial sediments (where present), at the interface between the saprolitic profile and the underlying basement rocks, and within the deep fracture basement rocks. In general, the alluvial aquifers received most of the recharge from precipitation, with limited vertical migration through the lower clay-rich sediments, to the bedrock contact zone and deeper. Any impacts from TSF seepage would be limited to the alluvial aquifer, with only minimal probability of infiltration to deeper groundwaters.

In SRK's opinion, the completed hydrogeologic studies, collected data, and subsequent analysis is appropriate for the overall low hydraulic conductivity of the local hydrogeologic system.

7.4 Geotechnical Data, Testing and Analysis

A geotechnical study for the Central Lode LoM pit for the Greenbushes operations was conducted by PSM Consult (2020). The Central pit is currently in operation, and they have good experience with slope and bench performance. In SRK's opinion, the geotechnical data collected has sufficient coverage around the pits to demonstrate knowledge of pit sector characterization and strength properties of the rock mass. SRK has not conducted any new field geotechnical work for this report. Rather we have reviewed and rely on the work conducted by PSM.

Data Collection

The characterization data comprised geotechnical borehole logging, televiewer interpretation, oriented core logging, geotechnical mapping, photogrammetry, piezometer and laboratory testing data from historical and recent site investigation programs. The data collected from the 2018/2019 investigation represents a substantial increase in the available geotechnical data for Greenbushes.

Geology and Structure

The Greenbushes Pegmatite Group is situated within the regional-scale Donnybrook-Bridgetown Shear Zone. On a mine-scale, the geology consists of amphibolites and granofels which host the pegmatite intrusions, and late mafic dolerite dikes and sills which intrude the entire sequence. A weathering profile extends to about 30 m below the surface (up to 60 m in places).

Major geologic structures are at or nearby major lithologic contacts and faults/shears that are typically steeply to moderately dipping to the west. Two primary fault zones will impact slope stability. The Northern Dolerite Sill Fault Corridor is exposed in the current Cornwall and C3 pits. The Pegmatite Shear Zone (PSZ) consists of soil to low strength rock material located behind the northern portion of the west wall. The orientation of the PSZ dips favorably into the wall, has a thickness of 20 to 50 m and the spatial extent appears to be limited by the lack of exposure in the Cornwall Pit and boreholes south of 12,000N.

Structural Domains

Eleven (11) structural domains were identified from televiewer and photogrammetry data. The west wall has steeply dipping structures with variability from north to south and within the Dolerite lithologies. The Pegmatite is separated into two domains with the main set steeply to moderately dipping to the west.

Discontinuity shear strengths were assessed from direct shear tests and using typical joint characteristics from logging. The shear strength ranged from 36° to 41° friction with assumed zero cohesion. The estimated strengths also considered lithology, defect shape and roughness characteristics.

Rock Mass Strength

The rock mass was separated into 14 units based on weathering, lithology and strength characteristics. Below the near-surface upper weathered zone the rock masses are high strength with UCS values from 50 to 190 MPa, with the exception of the PSZ which is very weak rock.

Strengths were assessed using GSI values, except for the upper weathered zone where triaxial test results were used.

Hydrogeology

The impact of hydrogeology on slope stability has been limited due to insufficient data. Vibrating wire piezometers were installed during the recent field investigation. The water table is estimated to be between 30 to 60 m below surface at the base of the weathered zone. It is understood that perched aquifers form during winter from precipitation recharge; however, connectivity of the perched aquifer is uncertain.

Data Gaps

Uncertainties in the geotechnical model include the following:

- Variability in the upper weathered zone and location of the contact between the Granofels and Amphibolite behind the east wall
- The character and orientation of modeled faults, the extent of the PSZ and the length and waviness characteristics of structures
- Rock mass conditions within the PSZ and strength of Amphibolite units behind the east wall
- The pore pressure response to mining of the basement geology and the connectivity with the weathered zone

8 Sample Preparation, Analysis and Security

8.1 Sample Preparation Methods and Quality Control Measures

This section is largely quoted and modified from the 2018 Central Lode Resource Update (Talison, 2018), and discloses information about sample preparation for all drilling across the Greenbushes property, with additions supporting recent drilling used in support of resource modeling at Central Lode and Kapanga deposits.

Drill samples from RC drilling programs are collected and bagged at the rig as drilling progresses. The RC samples are collected in sequential, pre-numbered bags directly at a discharge chute on the sample splitter to which the sample bag is attached. The splitter is either fed via a closed sample collection circuit at the drillhole collar or is fed manually from a sample bagged at the cyclone.

Drill core samples are collected sequentially in pre-numbered sample bags after cutting with a diamond saw. The integrity and continuity of the core string is maintained by reassembling the core in the tray. If any apparent geological discontinuities are noted within or at the end of core runs these are resolved by the logging geologist.

All sample preparation and analytical work for the resource models is undertaken at the operation's on-site laboratory, which is ISO 9001: 2008 certified and audited in accordance with this system, most recently in June 2016. The Greenbushes laboratory provides quick and secure turn-around of geological samples using well established quality control procedures. The laboratory also services processing plant samples and samples from shipping products.

Upon submission to the laboratory, samples are entered into the laboratory sample tracking system and issued with an analytical work order and report (AWOR) number. Separate procedures have been developed for RC and diamond drill samples.

Preparation, analysis and management of geological samples are covered comprehensively in laboratory procedures. The sample preparation is summarized as follows:

- All samples are dried for 12 hours at a nominal 110ºC.
- Samples are passed through a primary crusher to reduce them to minus 10 millimeters (mm).
- Secondary crushing in a Boyd crusher to -5 mm.
- A rotary splitter is used to separate an approximate 1 kg sub-sample.
- Final grinding in a ring mill to minus 100 µm or two minutes in a tungsten carbide media in a ring mill for a "low iron" preparation procedure.

Historically, two routes have been used for the preparation of geological samples. The first utilizes standard ferrous pulverizer bowls, while the second uses a low iron preparation method with a non-ferrous tungsten bowl. A low iron preparation has been used for all samples in recent drilling programs. All resource drilling sample pulp residues are retained in storage. Coarse sample rejects are normally discarded unless specifically required for further test work. Sample preparation is carried out by trained employees of the company in the Greenbushes site laboratory following set laboratory procedures.

8.2 Sample Preparation, Assaying and Analytical Procedures

Excerpted from the 2018 Central Lode Resource Update (Talison, 2018), this section covers information about assay preparation for drilling across the Greenbushes property. SRK has supplemented additional information in support of the 2020 resource models at Central Lode and Kapanga deposits.

Given the more recent drilling which has evaluated the Kapanga deposit, all Kapanga drill samples were prepared using the tungsten carbide ring mill at the Greenbushes laboratory, which was introduced in 2011 to reduce the likelihood of Fe contamination from the preparation equipment.

Due to the long history of operations on the Greenbushes property, the meta-data regarding assaying is somewhat incomplete; however, the recording of analytical data has been at the current standard since at least 2006. All assaying of drill samples has been by XRF and Atomic Absorption Spectroscopy (AAS). The majority of samples have been analyzed for 36 elements at the Greenbushes laboratory. Sodium peroxide dissolution and AAS is used for Li_2O determination. The other elements/oxides are analyzed by XRF following fusion with lithium metaborate. The analysis of geological samples for Li_2O by AAS and other elements/oxides by XRF is documented in laboratory procedures.

Over time, the detection limits of some elements assayed at the Greenbushes laboratory have improved, as outlined in Table 8-1, with implications for the accuracy of some of the older assays in the database. This appears only to be significant for the low concentration elements and has no material effect on the resource model estimates. Current detection limits remain as listed for PW2400 (low level) June 2001. Detection limits are stored in the acQuire geological database.

Table 8-1: Greenbushes Laboratory Detection Limit History

Element	Detection Limit (%)		
	PW1400 - 1983	PW2400 – Nov 1995	PW2400 (Low Level) – June 2001
Ta_2O_5	0.005	0.005	0.001
SnO_2	0.005	0.005	0.002
Li_2O	0.010	0.010	0.010
Na_2O	0.005	0.005	0.005
K_2O	0.005	0.005	0.005
Sb_2O_3	0.005	0.005	0.002
TiO_2	0.005	0.005	0.005
As_2O_3	0.005	0.005	0.005
Nb_2O_5	0.005	0.005	0.002[1]
Fe_2O_3	0.005	0.005	0.005
U_3O_8	0.005	0.005	0.002

[1]The detection limits for June 2001 are current apart from Nb_2O_3, which reduced from 0.005% to 0.002% in 2010
Source: BDA, 2012

In 2002, a proportion of underground drill core samples from the Cornwall Pit were sent to the Ultra Trace Pty Limited Laboratory in Perth, WA, for analysis. XRF was used to analyze for Ta, Sn and other components, and ICP for Li_2O analysis.

Dry in situ bulk density (DIBD) tests were performed on a total of 2,074 samples collected from diamond core holes from the Central Lode deposit. The tests were performed using water immersion techniques and performed onsite. The samples were grouped according to the major lithology type. A statistical summary of the Central Lode DIBD data is presented in Table 8-2. No DIBD samples were collected or tested for the Kapanga deposit though mean data was used for modeling purposes due to the same major rock types in both deposits.

Table 8-2: Central Lode and Kapanga Dry In Situ Bulk Density

Lithology	Samples	Dry In situ Bulk Density (t/m^3)			
		Average	Std Dev	Minimum	Maximum
Amphibolite	254	3.03	0.13	2.38	3.98
Dolerite	198	2.98	0.15	2.53	3.71
Granofels	91	2.93	0.17	2.60	3.17
Pegmatite	1,528	2.76	0.14	1.59	3.79
Alluvial	0	-	-	-	-
Fill	0	-	-	-	-

Source: SRK, 2022

8.3 Quality Assurance and Quality Control Procedures

The majority of this summary comes from previous public reporting (BDA, 2012) and internal Talison reporting on mineral resource updates as of 2018. The processes and procedures are the same at the effective date of this report.

Quality assurance and quality control (QA/QC) systems at Greenbushes have developed over time and therefore vary for the dataset used for the 2020 Mineral Resource models at Central Lode and Kapanga deposits. Duplicate field samples are collected and analyzed for RC drillholes but not diamond core samples. Current RC drilling practice is to submit a field duplicate sample for every 20 samples submitted. These duplicates are collected in the same way as the routinely assayed samples. Results are recorded in the acQuire database software and QA/QC reports generated for each drill program.

The quality of the recent drill program was accepted for Li_2O resource estimation. QA/QC relating to all previous drilling has been completed and data accepted with each successive drill program and resource update.

8.4 Assay QA/QC

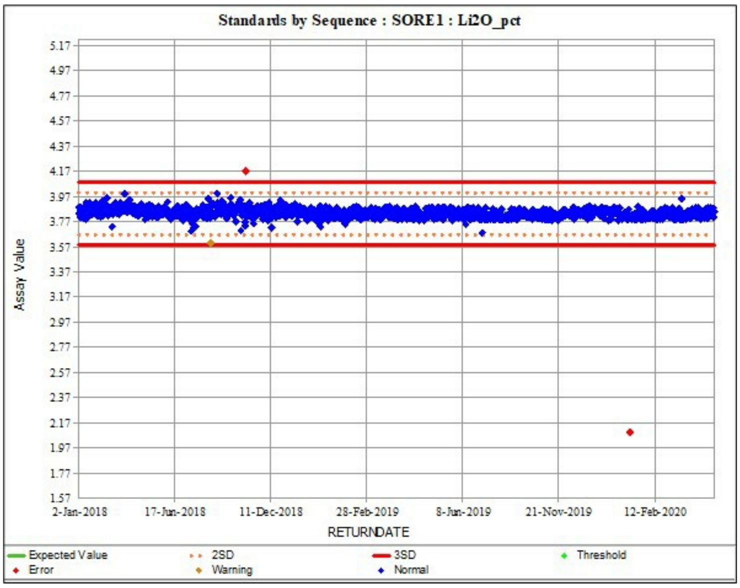
QA/QC systems have relied upon the Greenbushes laboratory's internal quality systems, which include replicate (pulp repeat) laboratory analyses and analysis of known standards by X-ray fusion (XRF), both included in each batch of drill samples. Greenbushes also has participated in round-robin reviews of analyses with other independent laboratories as checks on their internal processes. Li_2O in geological drill samples is not analyzed in replicated samples to calibrate the machine; instead, the atomic absorption (AA) machine is recalibrated before every batch of samples.

Known solution standards and blanks are embedded in each batch and the accuracy of the calibration is monitored regularly during the analysis of each batch. The results are also captured in the database. The precision of the AA analysis technique is statistically monitored using plant processing and shipping data. In SRK's opinion, the resulting precision at mining grades is of high quality and confirms the quality of the AA method employed.

In SRK's opinion, RC drill sampling results do not indicate any significant bias between the original and check sample populations as evaluated statistically using Q-Q plots. Scatter plots of original and field duplicates for Li_2O from recent RC holes show less variability than the same plot over all the RC resource holes suggesting a reduction in sample error. A scatter plot for Li_2O replicates from RC samples shows acceptable repeatability of results (Figure 8-4). Plots for half absolute relative difference (HARD) show less sampling error in recent RC data compared to the overall RC data (Figure 8-5).

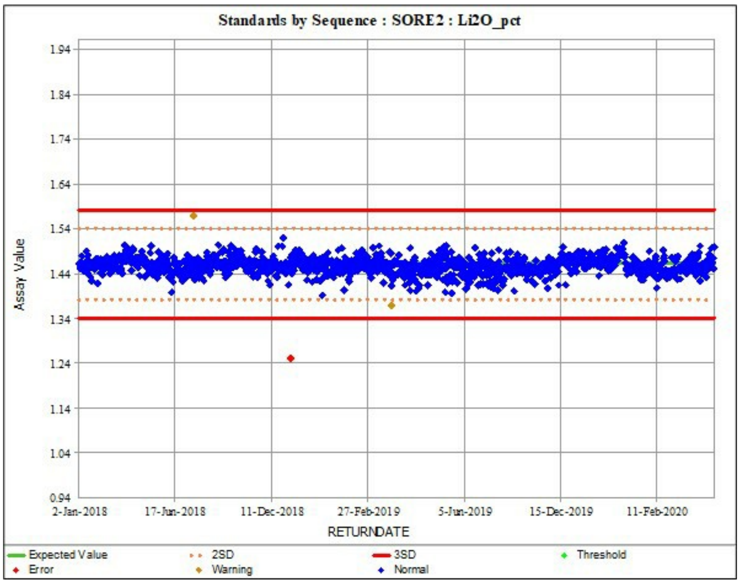
8.5 QA/QC - Recent Drilling

The post-2016 RC drilling samples were submitted to the site laboratory with the geology department submitting custom certified reference material (CRM) standards SORE1 and SORE2. The CRMs were prepared by ORE Research and Exploration Pty Ltd (ORE) in early 2014 from run of mine material having grades and matrix representative of the deposit. The custom geological standards SORE1 and SORE2 performed within two standard deviations (2SD) for Li_2O analysis in all 403 laboratory batches since January 2017. Talison has continuously evaluated and monitored the QA/QC and noted this performance for all relevant sampling, so the analytical accuracy for the database is considered acceptable for Indicated and Inferred resource reporting (Figure 8-1 and Figure 8-2) in SRK's opinion.



Source: Talison, 2020

Figure 8-1: Results for CRM SORE1



Source: Talison, 2020

Figure 8-2: Results for CRM SORE2

Approximately 5% of pegmatite samples submitted to the site laboratory are duplicated in the field. The results are first reviewed using a scatter plot (Figure 8-3) during the drilling program and duplicates with greater than 20% variation investigated. As the reliable determination level of the laboratory is 0.05% Li_2O, duplicates with Li_2O assays less than 0.2% Li_2O are ignored for monitoring. A primary sample of 0.2% Li_2O with a duplicate of 0.25% Li_2O would present as an error with half absolute relative difference (HARD) of 11%.

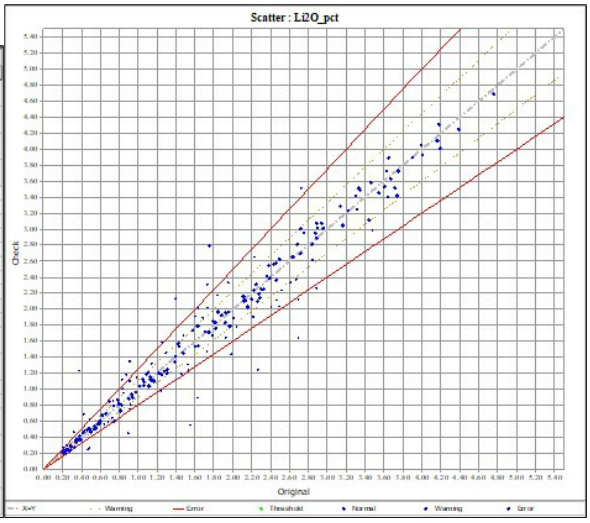
A common historical error is a similar mis-ordering of samples through the laboratory process. In recent years, barcode labelling and QR readers have greatly reduced the opportunity for sample mis-ordering in the laboratory. There are still a couple of processes such as when samples are dissolved in solution in reusable glassware that rely on good procedure and keeping things ordered. This will also offset sample location by 1 m on drillholes, on a review of the returned results a preceding or following sample will show as essentially identical to the duplicate rather than the result reported. Note that the entire 36 element suite is correlated for a sample not just the Li_2O value.

Samples are collected for every meter drilled so field duplicates not resolved by the previous two methods are typically addressed by re-splitting the bagged sample and submitting the second sample (a duplicate) for several samples around the failure. Good correlation of the additional duplicates to their samples confirms the original sample allocation on the hole is correct. Where poor correlation remains and there is no confidence in the alignment of results to the hole then the whole assay job may be re-split to get acceptable results which was the case for an assay job on RC484 which was clearly mixed up in the laboratory.

There are some failed duplicates that remain unresolved which are interpreted to be due to the natural variation within a coarse-grained variable mineralogy at the sample location. These have strong correlation between many elements in the assay suite but differ on several others. These will often occur in a mixed mafic and pegmatite mineralogy where a sample interval crosses a lithology boundary.

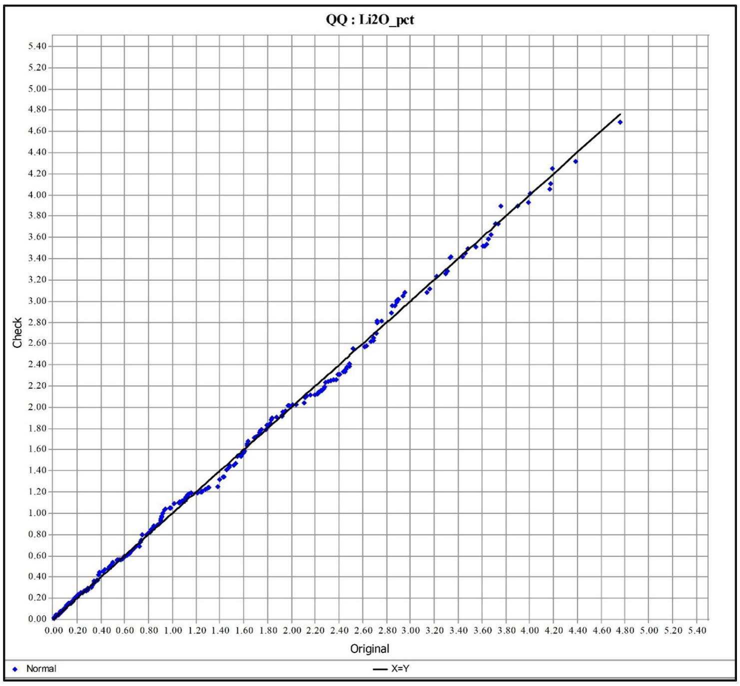
Some remaining failed duplicates are interpreted to be due to poor drilling conditions that affect a sample such as water coinciding with a duplicate position or hydraulic failure of splitter mechanisms, while others may be due to poor field practice. The simple (although time consuming) resolution of many failed duplicates to show the underlying data, in SRK's opinion, was representative and gives enough confidence in the dataset to use for MRE of Li_2O. A Q-Q plot (Figure 8-4) of field duplicates during recent drilling does not show bias between the primary and duplicate sample populations. The splitter hygiene and operation during the program is therefore interpreted as acceptable.

Statistics		
Li2O_pct	Original	Check
# of Analyses above Threshold	203	
# of Analyses below Threshold	102	
# Outside Warning Limit	67	
# Outside Error Limit	25	
Mean	1.7163	1.7073
Median	1.601	1.569
Min	0.203	0.204
Max	4.761	4.685
Range	4.558	4.481
Variance	1.1979	1.1861
Coeff. of Var.	0.6377	0.6379
Pop. Std. Dev.	1.0945	1.0891
Bias	-0.0052	
Corr. Coeff.	0.9827	
RMA Error on Y Intercept	0.0159	
RMA Error on Slope	0.0104	
RMA Error	0.3094	
Mean AMRPD	11.2942	
% of Population with AMPRD > 5%	57.1429	
% of Population with AMPRD > 10%	33.9901	
% of Population with AMPRD > 15%	23.1527	
% of Population with AMPRD > 20%	14.7783	



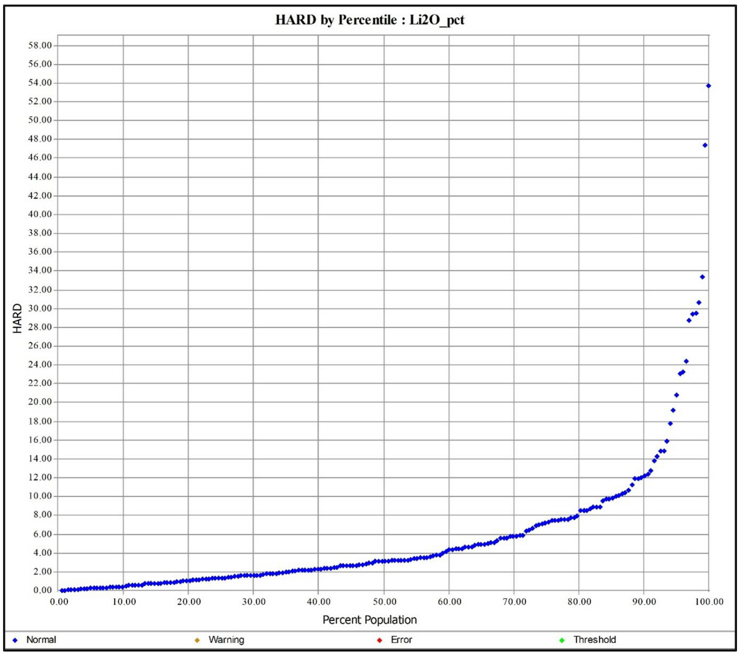
Source: Talison, 2020

Figure 8-3: Scatterplot of Recent Field Duplicates >0.2% Li_2O



Source: Talison, 2020

Figure 8-4: QQ Plot of Field Duplicates Post-January 2016



Source: Talison, 2020

Figure 8-5: HARD Plot of Field Duplicates Post January 2016

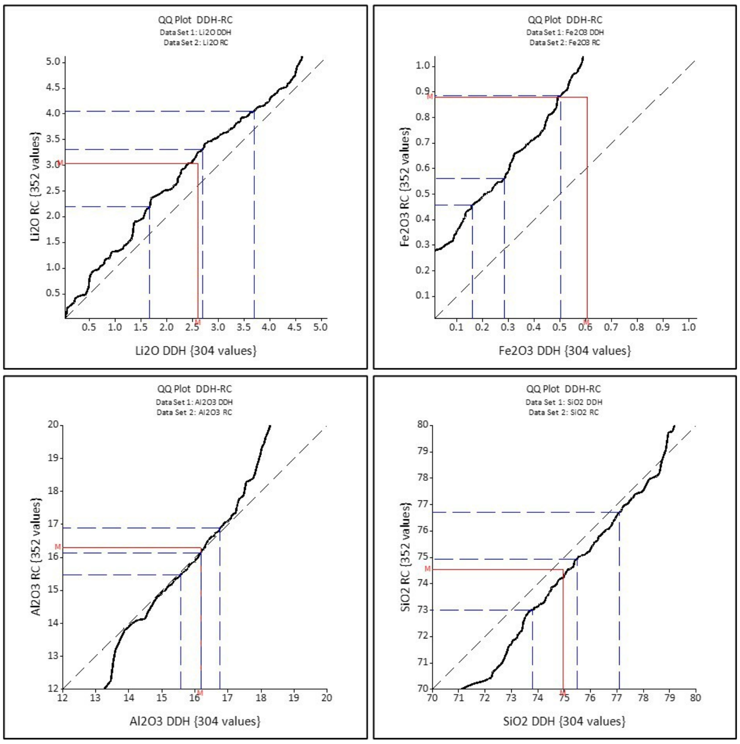
A HARD plot displays 85% of the data with Li_2O >=0.2% has a value of less than 10% which is considered by the QP as acceptable for the current level of disclosure (Figure 8-5).

8.6 Twinned Drillholes

Talison reports that twinned hole programs are not routinely conducted with the express purpose of comparing RC and DDH data. However, Talison notes sufficient overlap has occurred with holes from various drilling campaigns to enable a regional comparison to be made and reports the results to be comparable.

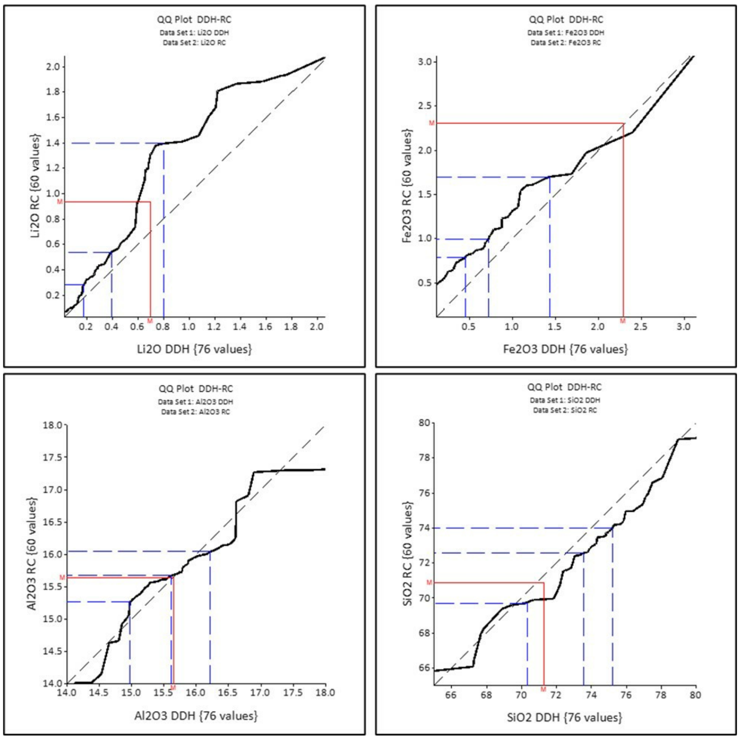
The Kapanga database contain eight sets of DDH and RC holes that had been collared within a few meters of each other. Of these, assay data were available for five of the paired sets of holes. For most paired holes, the collars are within a few meters though at depth, some of the hole pairs were up to 15 m apart and therefore not true twinned holes. It is SRK's opinion that general continuity between these nearby holes is useful for high level comparisons.

In general, the hole pairs displayed consistent grade characteristic with regards to the position and thickness of the pegmatites and the high-grade lithium intercepts. However, some apparent grade biases are evident, with the RC Li2O grades generally reporting higher than the nearby DDH grades. SiO2 appears to be biased low in the RC samples with hypothesized preferential loss of the lighter minerals from the cyclone or collar pipe. Q-Q plots comparing the DDH and RC grade distributions for pegmatite composites inside and outside of the Kapanga lithium domain are shown in Figure 8-6 and Figure 8-7 respectively. The RC sample Fe2O3 grades are biased high compared to the DDH sample grades.



Source: SRK, 2020

Figure 8-6: DDH v RC Composites QQ PLOTS for Kapanga Pegmatite Lithium Domain



Source: SRK, 2020

Figure 8-7: DDH v. RC Composites QQ Plots for Kapanga Pegmatite Low Grade

8.7 Opinion on Adequacy

SRK has reviewed the sample preparation, analytical, and QA/QC practices employed by Talison for the Central Lode and Kapanga deposits, and notes the following:

- In SRK's opinion, the current and historical analytical procedures are or were consistent with conventional industry practices at the time that they were conducted. The majority of the resource is supported by modern drilling and QA/QC, and analyses as described above.

- SRK has performed detailed verification of historical QA/QC as part of the 2020 Central Lode resource model and found results satisfactory.
- SRK has not performed a verification on QA/QC associated with the Kapanga deposit. This work was performed by Talison.
- In SRK's opinion, recent QA/QC practices are satisfactory in design and monitoring and demonstrates that the analytical process is sufficiently accurate for supporting mineral resource estimation.
- SRK has considered the historical nature of the drilling, and the limited QA/QC associated with it, in the mineral resource classification.

9 Data Verification

The Central Lode drilling database was verified by SRK as part of the 2020 resource model. Failures were investigated to ensure the error was not due to logic failures in the scripting. SRK was provided a total of 6,918 usable assay certificates the earliest of which date from 2006. More certificates in multiple formats were provided (pdf, excel, csv, paper) which cover the period prior to 2006 of which many are not material to the Central Lode area.

Through personal communications with Talison staff, the Kapanga drilling data was reviewed and verified prior to Talison completing the 2020 Kapanga resource model. SRK has not performed a verification exercise on Kapanga drilling data.

Additionally, SRK personnel have visited the Greenbushes property, inspected various aspects of data and the site laboratory, and interviewed Talison staff central to data acquisition and management.

9.1 Data Verification Procedures

The following details data verification procedures applied by SRK as part of the 2020 Central Lode resource model construction. No documentation was available regarding data verification on the Kapanga drilling data supporting the 2020 Kapanga resource model.

Verification was completed by compiling analytical information provided in the supplied certificates and cross referencing with the analytical file for the project. Analytical certificates in both Comma Separated Value (CSV) and Excel (XLS) file format were used in verification. Certificates were supplied in other formats including pdf and paper; however, verification was not attempted on those.

Verification on the on the XLS and CSV data was done using the Python scripting language to merge and compare the certificate data against the analytical file (Table 9-1). Tests were done on the string values of Li_2O geochemistry from the certificates, matched by sample ID. Assumptions for these tests in comparing the data sets are as follows:

- In cases where the merged file's value was below the detection limit, half the lower limit of detection was applied (e.g., <0.01 became 0.005 for comparison purposes)

Merged results from the comparison were imported back to Excel for comparison and analysis. Matched tests were assigned a numeric code of 1, and failures a 0. Through this analysis, SRK compared 45,408 records from the database against the original analytical data and noted a match rate of over 98.5%. Errors were likely related to the challenges in matching samples between data sets (see Section 9.2).

Values were identified for Li_2O comparison from 51.9% of the data used in the mineral resource estimation. The complete analytical file includes 87,412 samples. From the analytical certificates provided, SRK was able to identify 45,408 unique samples.

Table 9-1: 2020 Central Lode Data Verification Summary

Number of samples in the assay file for comparison	87,412
Number of samples identified in the lab certificates for comparison	45,408
Total percentage of samples compared from the assay file	**51.9%**
Number of tests compared per sample	1 (Li_2O)
Maximum number of possible matches between identified lab certificate sample and assay file samples when comparing	45,408
Actual number of matches between lab certs and assay database when comparing sample tests	44,761
Percentage of matched tests	98.5%

Source: SRK, 2020

Assay Sheet Data Quality Analytic Procedure

The sample IDs in the assay sheets contained a widely varying set of characters with little consistency. “Fuzzy” matching was attempted to correlate nomenclature across laboratories and generations of data, but mismatches in the naming is likely the source of the majority of the failed comparisons.

Example: Sample ID from certificate: UGX10362.

SRK tested the assay database for:

- UGX10362
- *GX10362
- *X10362
- *10362

If no matches are found, then there is no comparison for this sample.

Duplicate sample IDs in the assay sheets were eliminated from analysis unless all values from duplicate samples were identical.

Within the analytical certificates provided, and due to variability in the naming, formatting, and characters of the sample IDs described in the lab assay sheets, only 45,408 unique sample IDs of the 87,412 sample IDs from the digital drilling database (51.9% of the total) were able to be corresponded to sample IDs in the assay sheets across both verification phases.

Data Comparison

SRK compared Li_2O grades only for the matched assays from assay sheets and the digital database.

Of these 45,408 values in the 2020 Central Lode assay database, there were 647 mismatches between the values recorded in the assay database and the lab assay sheet resulting in an error rate of approximately 1% (1.42%) and a match rate more than 98% (98.58%) in the assay database.

Li_2O values for all corresponding sample IDs were compared and any value which did not match was failed. Only those values which matched were identified as a pass.

Errors were provided to Talison, and failures are primarily attributed to shifts in sample nomenclature which could not be dealt with through the scripted data comparison, or mis-identified duplicates as noted in previous sections.

External Review

According to BDB (2022), Talison commissioned RSC Consulting Services (RSC) to undertake a fatal-flaw level audit of the 2021 JORC Mineral Resources and Ore Reserves focused on the 2020 Central Lode and 2020 Kapanga resource models including a site visit. RSC findings concluded no fatal flaw and technical work supporting the resource models were undertaken to a high technical standard. Three findings were identified as areas of low to moderate risk that represent opportunities for improvement:

1) Potential for RC lithium grade bias noted at Kapanga.
2) Potential sensitivity of the resource model to use a 0.7% Li_2O threshold for mineralization which coincides with the applied Mineral Resource cut-off grade (CoG).
3) Geometrical consistency between composite size and block size in the resource models.

9.2 Limitations

Certificates for lab samples were given to SRK in two batches with the second batch especially difficult to identify in relation to the assay file. Many of the sample IDs in the certificates appeared to have a changing nomenclature scheme that was not reflected in the assay file. As a result, matching many of the assay samples with appropriate sample from lab certificates was challenging.

Although higher percentages for validation could be completed, the time associated with the process is prohibitive for the purposes of public reporting.

9.3 Opinion on Data Adequacy

In SRK's opinion, sampling, analyses, and management of the digital database provided by Talison is of sufficient quality to support mineral resource estimation and disclosure. Low incidents of quality control failure were noted in the comparisons made to original source data, and explanations for failures are reasonable and common amongst mining projects with extensive histories and various generations of logging styles and analytical laboratories.

SRK notes good practices in data acquisition, analyses, management, and modeling by Talison staff. Additionally, SRK's opinion is that Talison technical staff are competent, experienced, and aligned with good industry practices in support of high confidence data supporting mineral resources.

SRK recommends a data verification and review of both Central Lode and Kapanga drilling data including QA/QC upon future model updates.

10 Mineral Processing and Metallurgical Testing

Greenbushes operates their Chemical Grade Plant-1 (CGP1) to recover spodumene from ore containing about 2.5% Li_2O into lithium concentrates containing about 6% Li_2O. The CGP1 process flowsheet utilizes unit operations that are standard to the industry including: ball mill grinding, HMS, WHIMS, coarse mineral flotation and conventional fine mineral flotation. In addition, Greenbushes completed the construction of their Chemical Grade Plant-2 (CGP2) during 2019.

As part of the process design for CGP2, Greenbushes conducted an evaluation of the use of HPGR as an alternative to the ball mill grinding circuit currently used in CGP1. The HPGR was determined by Greenbushes to generate fewer non-recoverable fines (less than 45 µm) and offer the potential of improving overall lithium recovery. The results of this evaluation are documented in the report, “Chemical Grade Plant Number 2, High Pressure Grinding Roll (HPGR) Study”, April 2017. The results of this study indicated the following benefits associated with the use of a HPGR instead of ball mill grinding in CGP2:

- Reduction in over-grinding of spodumene enables a reduction in lithium losses with the slimes
- Better liberation of spodumene in coarse size fractions for improved HMS performance
- Better liberation of spodumene in the fine fractions
- Selectively grinding softer minerals than spodumene to a fine size. Iron minerals are therefore concentrated in the fine fractions where they are easier to remove in WHIMS
- HPGR is easier to adjust on-line to suit variations in ore hardness compared to a ball mill circuit.

10.1 Metallurgical Testwork and Analysis

Greenbushes evaluated ball mill grinding versus HPGR comminution by comparing samples from the CGP1 banana screen undersize with samples from closed circuit HPGR testwork. For this analysis closed circuit HPGR crushing of -38 mm feed with a 3.35 mm closing screen was compared with crushing to 12 mm followed by closed circuit ball-mill grinding. This comparison gave an indication of the wt% and Li_2O grade reporting to heavy media separation, coarse flotation, fine flotation and the potential slime losses. In order to estimate the effect that shifting the lithium distribution has on estimated plant yield and recovery, heavy liquid separation (HLS) tests were conducted on selected samples at specific gravities ranging from 2.70 to 3.32 gram per cubic centimeter (g/cc). For this evaluation, lithium reporting to HLS sink products at specific gravities greater than 2.96 g/cc were considered 100% liberated. HLS tests were conducted on plant feed prepared by ball mill grinding (CGP1), conventional crushing, low pressure HPGR comminution and high pressure HPGR comminution. The results show improved liberation with the HPGR when compared to ball mill grinding or conventional crushing. Greenbushes used a combination of size distributions, Li_2O analysis of size fractions and liberation data to estimate the yield and lithium recovery that could result by using an HPGR instead of conventional ball mill grinding in the comminution circuit.

10.2 SRK Opinion

Greenbushes Chemical Grade Plant -1 (CGP1) is a mature operation and was used as basis for design of Greenbushes new Chemical Grade Plant-2 (CGP2), which would process ore from the same orebody using essentially the same flowsheet as CGP1. As a result, the design for CGP2 was based largely on the operating experience of Greenbushes with CGP1 and incorporation of process improvements identified by Greenbushes during operation of CGP1 rather than on new fundamental metallurgical testing. SRK is of the opinion that this is an adequate basis for CGP2 design given that the CGP2 process flowsheet is based on the CGP1 flowsheet and that CGP2 would process ore from the same orebody as CGP1 even though CGP2 was designed to process ore at an average grade of 1.7% Li_2O versus 2.5% Li_2O for CGP1. SRK notes that Greenbushes did conduct metallurgical testwork to support a change to the comminution circuit that incorporates high pressure grinding rolls (HPGR) in CGP2, instead of the ball mill grinding circuit used in CGP1. As discussed in Section 14, during actual operation of CGP2, it has been found that the HPGR circuit actually generates more lithium fines than had been predicted from the metallurgical test program, which may, in part, contribute to the lower lithium recoveries reported to-date from CGP2.

11 Mineral Resource Estimates

11.1 Geological Model

Digital 3D geological models were constructed for the Central Lode and Kapanga deposits to approximate the geological features relevant to mineral resources. SRK developed the geological model for the Central Lode, in collaboration with Talison geologists and Albemarle personnel, to leverage the site-based expertise and improve the overall model consistency. The geological model for Kapanga was constructed by Talison staff in September 2020 with a July 2021 update by SRK Consulting (Australia) Pty Ltd which merged the two deposit geological models into a single property-wide model. As these models were constructed as independent deposit-scale models, SRK views the property-wide model as an interim geological model satisfactory in supporting mineral resources but recommends future updating of a consistent property-scale geological model. All geological information supporting the development of the models were collected by Talison geologists and contractors with data reviews and interpretations performed as a collaborative effort between SRK and Talison staff.

The combined site 3D geological model was developed using a combination of Leapfrog Geo and Surpac softwares. In general, model development is primarily based on lithology logging from drilling but incorporates a range of other geological information including:

- Alteration and mineralogical logging
- Geological mapping (historical and modern)
- Interpreted cross sections (historical and modern)
- Surface/downhole structural observations
- Historical drill logging (historical samples are not utilized in resource estimation)
- Interpreted geological contacts (surface and sub-surface 3D)

11.1.1 2020 Central Lode Geological Model

The 3D digital geological model utilized for calculating Mineral Resource was prepared by SRK using Leapfrog Geo software. The model was prepared using an extensive dataset that included geological logging data and geochemical data acquired from both resource definition and grade control drillhole samples, as well as pit mapping data. The model included the main lithological units, structural features, alteration zones and grade domains.

The geological model developed was designed to address the complex nature of the deposit geology. This includes an oxidation model for characterizing oxidized, transition, and fresh material, a lithology model for characterizing geological rock types present, a depletion model to address previously mined out material, and a number of numerical models to identify and segregate domains by geochemical indicators, specifically lithium.

Central Lode Lithological Model

The lithological model was prepared by interpreting the lithological logging and mapping data into the following grouped major lithological units for modeling purposes:

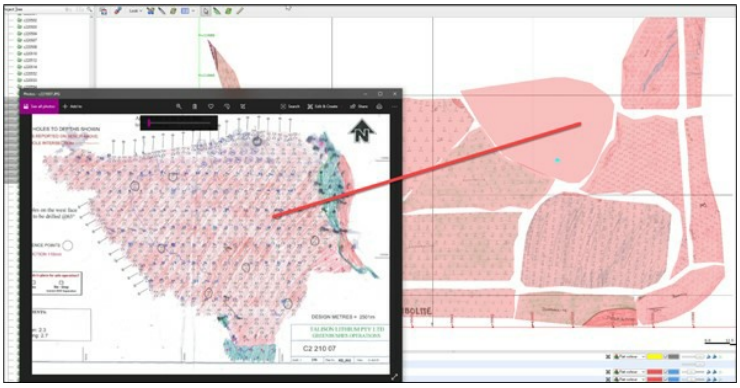
- Pegmatite (P, PC)
- Amphibolite (A)

- Dolerite (D)
- Granofels (G)
- Alluvial (ALLUV)

Granofels was set as the host or country rock with pegmatite and amphibolite modeled as intrusives within the broader granofels body. Dolerite dikes were modeled as both intrusives and veins, with alluvials modeled as an erosional unit of near surface unconsolidated or lateritic material. Backfill material (Fill) was also modeled though information was limited. A significant amount of control was added in the form of structural elements and controlling data interpreted from the drilling and mapping data. In general, the lithological contacts were snapped to the drill samples or mapped contact lines. Snapping was not used in localized areas of high data density where minor spatial inconsistencies were observed between data types. A minimum modeling thickness of 2.5 m was used for the pegmatite modeling, with any intersections less than 2.5 m ignored.

Based on field observations, amphibolite is likely under-represented in the model. SRK retained this lithological coding in the updated Central Lode model. However, prior to merging Central Lode into the combined property scale model, all granofels were recoded to amphibolite and then applied a revised and limited granofels interpretation provided by Talison personnel. This resulted in improved consistency where the Central and Kapanga models joined in the combined model. Given that the Mineral Resource is limited to pegmatite material, this change has no effect on estimated resource quantities or quality.

Of note is the integration of extensive pit mapping from individual mapping sheets, compiled into a mosaic image and draped on relevant periodic topographic surfaces to when the mapping was conducted. As shown in Figure 11-1, these sheets denoting benches or specific production areas were georeferenced and draped over topography to enable digitization of contacts for rock types at fine detail. This provides excellent geological context in addition to the dense drilling and enables the model to rely on observations made in the pit which may or may not have been as well defined by the drilling.



Source: SRK, 2020

Figure 11-1: Example of In-Pit Geological Mapping Integration for 3D Modeling

No major brittle structures were modeled as a part of this work, as structural data defining brittle faults in the pit is minimal. Talison geologists have noted that offsetting or brittle structural features are not critical to the current geological understanding, so they are not modeled given the limited data available. Structural data was incorporated as strike and dip measurements from the pit areas, as well as overall 3D interpretations on trends for pegmatites and dolerites separately. These were developed along section and in 3D views based on the mapping and drilling intervals.

The geological model is shown in plan view and cross section in Figure 11-2 and Figure 11-3.

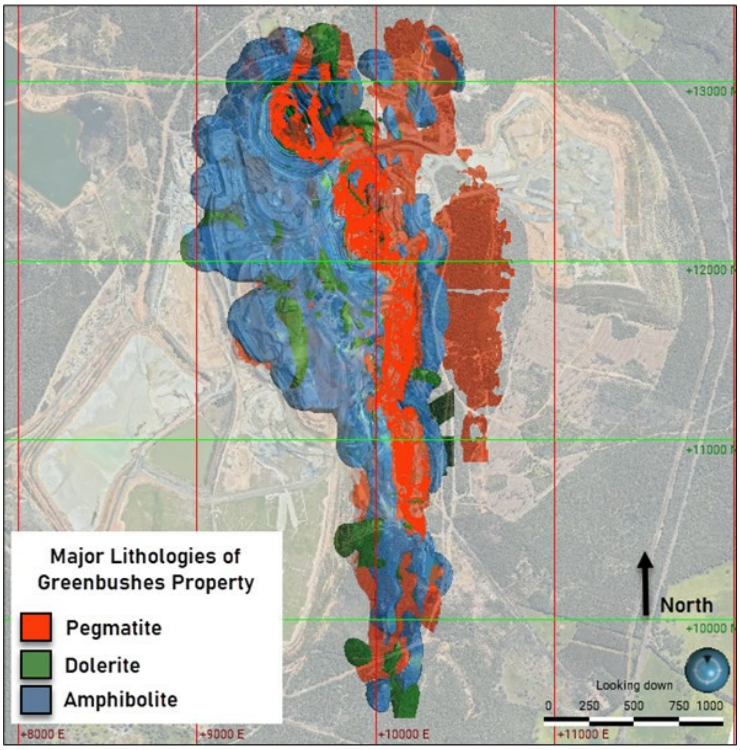
In SRK's opinion, the level of data and information collected during both the historical and modern exploration efforts is sufficient to support the geological model and mineral resources.

To examine the relative accuracy of the modeling process against the reality of the logging, SRK examined the overall percentages of logged rock types contained within the modeled pegmatites, and vice versa (Table 11-1). SRK notes that the pegmatite model features an internal dilution of 3.15%, with the majority of dilutive material being associated with internal dolerite dikes for the pegmatite. SRK notes that, given the local internal complexity of the pegmatites and the waste rocks, that this type of internal dilution for a geological model is considered reasonable.

Table 11-1: 2020 Central Lode Model vs. Drilling Comparison

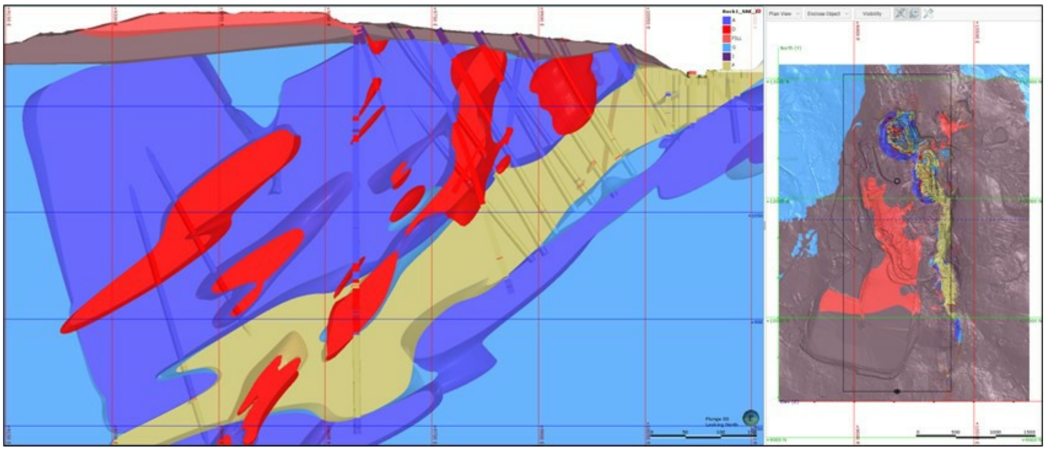
	Model Values Matching Drilling Pegmatite	
Model Lithology	**Model Length (m)**	**Percent Length**
Pegmatite	109,891	96.85%
Dolerites	2,578	2.27%
Surface (Alluvial)	570	0.50%
Granofels	304	0.27%
Amphibolites	121	0.11%
	Model Values Matching Drilling Amphibolites	
Model Lithology	**Model Length (m)**	**Percent Length**
Amphibolites	39,930	98.17%
Pegmatite	219	0.54%
Granofels	204	0.50%
Dolerites	180	0.44%
Surface (Alluvial)	141	0.35%
	Model Values Matching Drilling Dolerites	
Model Lithology	**Model Length (m)**	**Percent Length**
Dolerites	14,793	94.25%
Pegmatite	571	3.64%
Surface (Alluvial)	124	0.79%
Granofels	124	0.79%
Amphibolites	85	0.54%
	Model Values Matching Drilling Granofels	
Model Lithology	**Model Length (m)**	**Percent Length**
Granofels	17,226	95.74%
Dolerites	361	2.01%
Pegmatite	274	1.52%
Surface (Alluvial)	99	0.55%
Amphibolites	32	0.18%

Source: SRK, 2020



Source: SRK, 2023
Granofels and surface/alluvial material removed.

Figure 11-2: Plan View of 3D Lithology Model

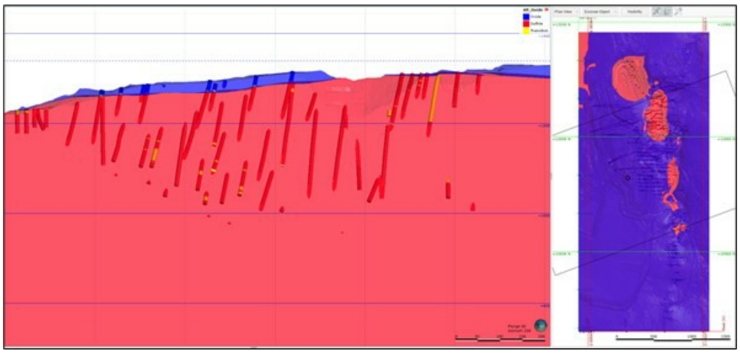


Source: SRK, 2020
Looking North and section width +/- 50 m

Figure 11-3: Cross-Section View of Geological Model

Central Lode Oxidation Model

The oxidation model (Figure 11-4) was developed by grouping coding within the geologic logging into three categories. The original data provided by Greenbushes has five subjective categories on the degree of relative oxidation: extreme (e), high (h), moderate (m), weak (w), and fresh (f). The general grouping used by SRK, grouped extremely and highly oxidized material as "Oxide" (e and h) and non-oxidized or "Fresh" rock (m, w, f). SRK considered the moderately oxidized or transition material, where logged, as a part of the overall fresh rock zone. A small quantity of codes was subjectively changed to produce a more geologically acceptable model. Though the original assignment of oxidation values was subjective and varied from logger to logger, the broad categories used were suggested by Greenbushes personnel and are considered acceptable in SRK's opinion.



Source: SRK, 2020
Section looking southwest
Logged transition intervals are incorporated into fresh rock for the purposes of simplifying the model.

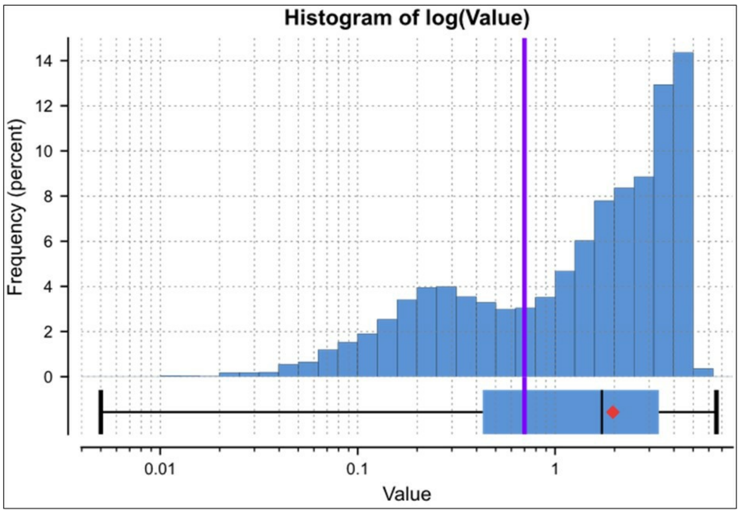
Figure 11-4: Cross Section View of Oxidation Model

Central Lode Mineralization Model

Historically, the pegmatite geological model has been separated into spodumene-dominant pegmatite and pegmatites which may feature less spodumene or be more tin-tantalum rich. Talison has found in previous years that a 0.7% Li_2O cut-off for analyses tends to define this spodumene-rich pegmatite domain well. SRK conducted some initial exploratory data analysis on the Li_2O assays within the pegmatite geological model, and notes that there is a distinct bimodal population in a histogram of the Li_2O as shown in Figure 11-5. Visualizing these intervals on section and 3D above and below the 0.7% Li_2O CoG (Figure 11-6) show that these >=0.7% assays do define a relatively contiguous and spatially discrete area of the pegmatite that corresponds to interpretation of higher spodumene pegmatite.

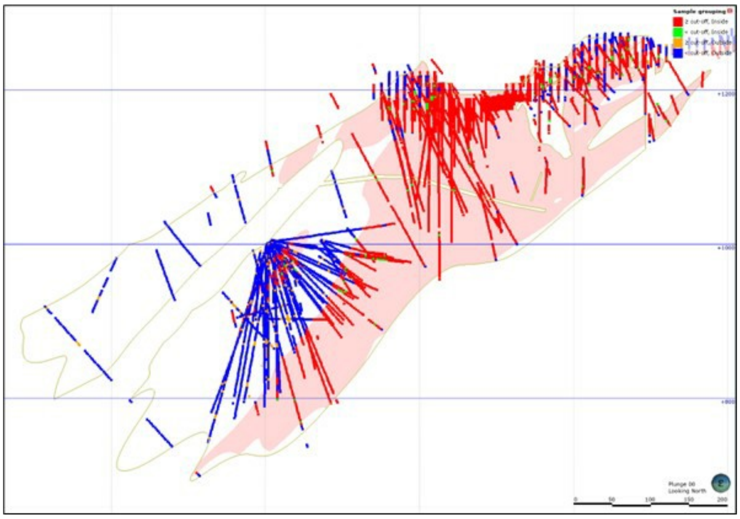
SRK elected to model the spodumene-rich portions of the pegmatite using an indicator interpolation approach, bound by the pegmatite itself but considering the overall internal structural trends as defined by the pegmatites. The indicator modeling process was conducted also using Leapfrog Geo, compositing the samples to a 3 m nominal length, with a probability factor for the indicator of 50%. SRK reviewed this probability factor (as well as a suite of threshold grades) in the context of geological continuity defined by the continuous Li_2O variable, relative dilution of intervals below the threshold, and exclusion of those intervals above the threshold, and comparison to the geological volumes as shown in Table 11-2. Tables like this were produced for every scenario and reviewed along with the wireframe itself with Talison geological staff for reasonability with interpretation. The resulting shape comprises about 36% of the overall pegmatite body, generally in the upper portions (although it does plunge in the northern areas under C3). Lithium does occur external to this shape, but as noted in the statistics for the model, approximately 4% of samples above the threshold is excluded. Internal to the indicator model, approximately 4% of total samples are included which are below the threshold.

SRK utilized the >0.7% Li_2O indicator volume internal to the pegmatite as the higher-grade domain for estimation, and remaining pegmatite as the lower grade domain for estimation (Figure 11-7).



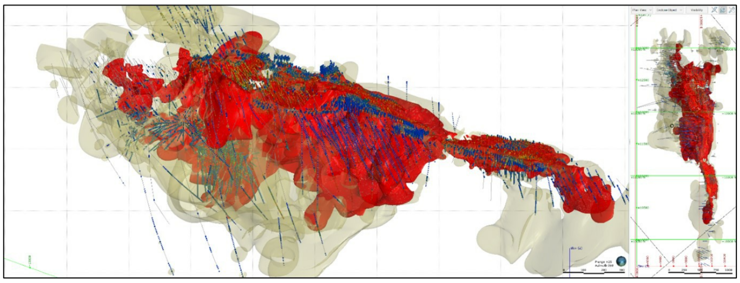
Source: SRK, 2020

Figure 11-5: Li_2O Histogram of Raw Assays Internal to Pegmatite



Source: SRK, 2020

Figure 11-6: Pegmatite Distribution of Composited Li_2O Assays Around 0.7% Li_2O



Source: SRK, 2020
>0.7% Li_2O = Red, <0.7% Li_2O = Yellow

Figure 11-7: Perspective View of 0.7% Li_2O Spodumene Pegmatite

Table 11-2: Statistics for Li_2O Indicator Model

Indicator Statistics		**Li_2O - Pegmatite**
Total Number of Composites		**46,960**
Cut-Off Value		**0.7**
	≥ cut-off	**< cut-off**
Number of points	32,177	14,783
Percentage	0.69	0.31
Mean value	2.73	0.28
Minimum value	0.70	0.01
Maximum value	6.56	0.70
Standard deviation	1.23	0.17
Coefficient of variance	0.45	0.61
Variance	1.50	0.03
Output Volume Statistics		
Resolution		6.00
Iso-value		0.50
	Inside	**Outside**
≥ Cut-Off		
Number of samples	30,812.00	1,365.00
Percentage	66%	0.3%
< Cut-Off		
Number of samples	1,317.00	13,466.00
Percentage	0.3%	29%
All points	Li_2O	
Mean value	2.70	0.36
Minimum value	0.04	0.01
Maximum value	6.56	4.99
Standard deviation	1.27	0.41
Coefficient of variance	0.47	1.12
Variance	1.62	0.16
Volume	83,768,607	-
Number of parts	1	418
Dilution	4.1%	
Exclusion	4.2%	
Pegmatite Volume % Diff	230,100,000	36%

Source: SRK, 2020

1.1.1 2020 Kapanga Geological Model

The 3D digital geological model for Kapanga was prepared by Talison in September 2020, using Leapfrog Geo software. Since completion of this model, Talison had revised the geological model from six additional drillholes. Talison requested that SRK refine and update the geological model for use in estimation and could be merged with the Central Lode model into a single Surpac model file. The geological model was constrained by topography. Due to no active mining at this deposit, the topography is assumed to be original and unmodified by development activities.

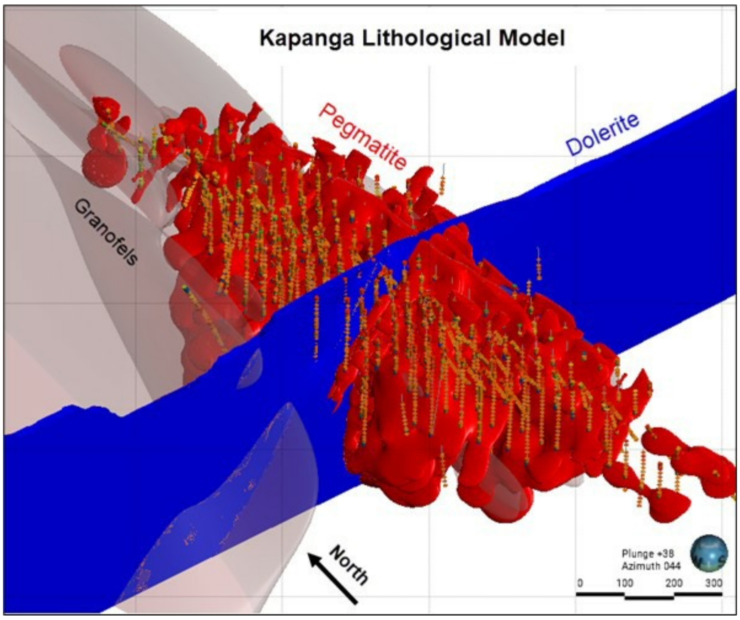
Kapanga Lithological Model

The lithological model (Figure 11-8) was prepared by assigning and recoding the lithological logging into the following major lithological units, similar to the Central Lode:

- Pegmatite (P, PC)
- Amphibolite (A)
- Dolerite (D)

- Granofels (G).

Amphibolite was set as the host or country rock lithology with pegmatite and granofels modeled as intrusives within the broader amphibolite body. A single dolerite dike comprises a single cross-cutting dike, was modeled as a vein. Control was added in the form of structural elements and controlling contacts interpreted from the drilling. In general, the lithological contacts were snapped to the drill samples or mapped contact lines. A minimum modeling thickness of 2.5 m was used for the pegmatite modeling, with any intersections less than 2.5 m ignored.



Source: SRK, 2022

Figure 11-8 : Oblique View of the Kapanga Lithological Model and Drilling

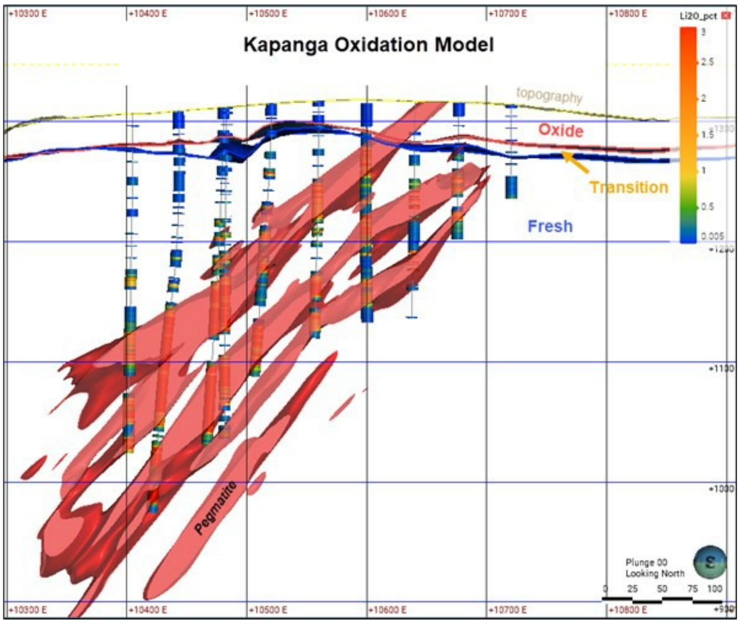
Kapanga Oxidation Model

The degree of weathering has a significant impact on lithium deposits because of the high mobility of both lithium and iron, and limited mobility of tantalum and tin. Weathering logging codes from drilling were interpreted and modeled into the following three general categories:

- Oxide (extremely and highly weathered)
- Transition (moderately weathered)

- Fresh (weakly weathered and fresh)

The 3D interpretations of these three weathering codes were used to model the approximate degree of weathering in Leapfrog Geo as an erosional model used to define the oxide and transition zone materials at Kapanga (Figure 11-9).



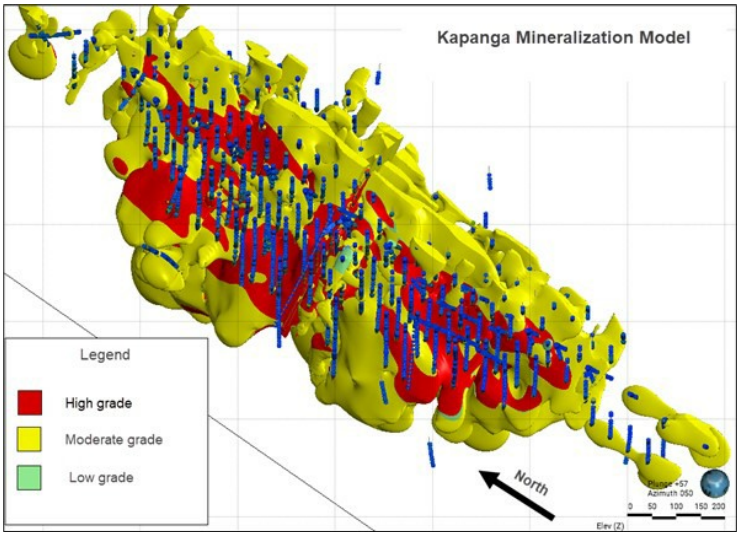
Source: SRK, 2022

Figure 11-9: Kapanga Oxidation Model with Drilling and Pegmatite

Kapanga Mineralization Model

The pegmatite is observed to have zones that contain elevated concentrations of lithium, tantalum, or tin. Talison used a 0.7% Li_2O threshold to delineate spodumene-rich zones within the pegmatite, with the zones above this threshold defined as an intrusion model. Similar domains were defined for Ta2O5 and SnO2 using threshold grades of 200 ppm and 400 ppm respectively (Figure 11-10). SRK conducted independent assessments of the pegmatite assay data and concluded that these thresholds were appropriate.

The lithology, oxidation, and mineralization models were used to assign codes to the drillhole samples and model cells. These codes were combined to define a set of domain codes that were used for estimation control. A summary of the coding is presented in Table 11-3.



Source: SRK, 2022

Figure 11-10: Kapanga Mineralization Model

Table 11-3: Kapanga Mineralization Domain Definitions and Coding

Type	Code_N	Code_A	Description
LCODE	1	AIR	Air
	10	AMPH	Amphibolite (host lithology)
	20	GRAN	Granofels
	30	PEG	Pegmatite
	40	DYKE	Dolerite
	50	FILL	Fill
WCODE	1	BOCO	Oxide
	5	TRAN	Transition
	9	FRESH	Fresh (host weathering)
li_dom	1,0		Inside, outside lithium domain
sn_dom	1,0		Inside, outside tin domain
ta_dom	1,0		Inside, outside tantalum domain
EDOM_LI	Variable		Lithium estimation domains #VALUE!
EDOM_SN	Variable		Tin estimation domains #VALUE!
EDOM_TA	Variable		Tantalum estimation domains #VALUE!

Source: SRK (AU), 2021

11.2 Exploratory Data Analysis

SRK conducted detailed exploratory data analysis (EDA) on a wide range of elements within each domain for both the Central Lode and Kapanga models. Of note were elements of potential economic interest, including Li_2O, Fe_2O_3, SnO_2 and Ta_2O_5. Additional elements for the purposes of density assignment or materials type characterization include MnO, Na_2O, P_2O_5 and SiO_2. Data was split on the basis of the resource development exploration drilling (RDEX) and the grade control (GC) drilling for this analysis, primarily due to the spatial distributions of each dataset (Figure 11-11). Raw sample statistics for the elements of interest, as well as specific gravity (SG) within the pegmatite are summarized in Table 11-4.

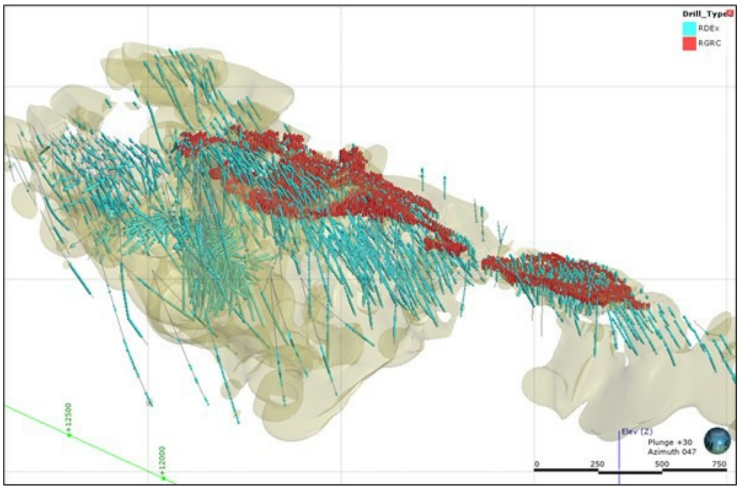
SRK had the following observations of the analyses within the pegmatite domains between the two data types:

- The GC drilling is consistently higher in average Li_2O content, due to the nature of it being almost entirely in the active mining areas. Other elements are generally similar.
- Elements are relatively consistently accounted for across the drilling types, with Mn and SiO_2 being the least-assayed-for amongst the elements of interest.
- The GC dataset, due to being isolated and clustered in the production areas, does show significant differences in internal variance of Li_2O (measured by the CV) and other elements.
- Other elements such as Sn or Ta are generally of low quantities in the pegmatite, and do not occur in high enough concentrations to warrant consideration in the mineral resource.
- Fe_2O_3 is also relatively low but is affected significantly by the contributions of limited waste samples from dolerite or amphibolite. Greenbushes geologists generally do not consider estimated Fe_2O_3 grades in the resource as definitive characteristics for materials typing or reporting, and instead rely on a calculated Fe variable from other elements.

Table 11-4: Descriptive Statistics for Raw Sample Data – RDEX vs. GC within the Central Lode Pegmatite

Name		Count	Length	Mean	Standard Deviation	Coefficient of Variation	Variance	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
RDEx		66825	78,219									
	Fe_2O_3_pct	63818	73,639	1.29	1.90	1.47	3.62	0.01	0.51	0.79	1.28	60.71
	Li_2O_pct	62591	72,117	1.46	1.40	0.96	1.96	0.00	0.26	0.95	2.40	7.14
	MnO_pct	54604	58,217	0.10	0.14	1.43	0.02	0.00	0.04	0.06	0.10	3.81
	Na_2O_pct	63880	73,713	3.28	2.25	0.69	5.08	0.00	1.51	2.78	4.64	20.78
	P_2O_5_pct	62066	71,185	0.38	0.56	1.46	0.31	0.00	0.15	0.24	0.37	10.56
	SG_d	1528	1,387	2.76	0.14	0.05	0.02	1.59	2.66	2.75	2.87	3.79
	SiO_2_pct	54604	58,217	72.22	5.68	0.08	32.25	18.51	69.86	72.96	75.35	97.39
	SnO_2_pct	64809	74,879	0.05	0.07	1.52	0.00	0.00	0.01	0.03	0.05	3.53
	Ta_2O_5_pct	66318	77,329	0.02	0.02	1.12	0.00	0.00	0.01	0.01	0.02	1.14
RGRC		30804	70,419									
	Fe_2O_3_pct	29292	66,747	1.53	3.35	2.19	11.22	0.03	0.24	0.41	0.78	29.41
	Li_2O_pct	29292	66,749	2.55	1.58	0.62	2.50	0.02	1.10	2.72	4.01	6.43
	MnO_pct	29292	66,747	0.05	0.06	1.04	0.00	0.00	0.03	0.04	0.06	2.03
	Na_2O_pct	29292	66,747	1.72	1.32	0.77	1.75	0.03	0.70	1.37	2.38	10.33
	P_2O_5_pct	29292	66,747	0.19	0.16	0.82	0.03	0.00	0.09	0.16	0.26	6.65
	SG_d	0	-									
	SiO_2_pct	29292	66,747	72.20	5.95	0.08	35.36	33.99	71.38	73.90	75.56	93.61
	SnO_2_pct	29292	66,747	0.02	0.03	1.68	0.00	(0.00)	0.01	0.01	0.02	1.75
	Ta_2O_5_pct	29292	66,747	0.01	0.02	2.00	0.00	0.00	0.00	0.01	0.01	3.19

Source: SRK, 2020
Statistics are length-weighted and reported inside pegmatite geologic wireframe. Intervals may have been split for the purposes of statistical reporting across model domains.



Source: SRK, 2020
Red holes are RC grade control, Blue are exploration (mixed RC/DDH)

Figure 11-11: Spatial Relationship of RDEX and GC Drilling in the Central Lode Deposit

Based on these observations, SRK elected to only utilize the RDEX dataset for the purposes of estimation for the resource at the Central Lode deposit. Due to the extensive RDEX dataset which is far more spatially representative than the GC dataset, there are no material gains to be had from using the GC data for long term resource estimation purposes, and possible risk due to the clustered nature of the drilling and the observed bias in the GC sampling.

Considering then only the RDEX data, statistics were again reviewed for the data inside the 0.7% Li_2O pegmatite domain, and outside, as shown in Table 11-5. Other than expected increases in the Li_2O means, and relative decreases in Fe_2O_3, SRK notes that there also is far more SG data located in the higher-grade domains than the lower. Sn and Ta tend to increase in the low-grade domain, consistent with observations of the Li-bearing pegmatites being broadly discrete from the Sn/Ta pegmatites. In general, the statistics support the domaining process by showing them to be geochemically and mineralogically distinct.

Table 11-5: RDEX Drilling Statistics, by Central Lode Pegmatite Resource Domain

Name		Count	Length	Mean	Standard Deviation	Coefficient of Variation	Variance	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
High Grade		36,998	43,052									
	Fe_2O_3_pct	35,345	40,292	1.02	1.59	1.57	2.54	0.01	0.46	0.67	1.00	32.35
	Li_2O_pct	35,646	40,793	2.32	1.28	0.55	1.64	0.00	1.28	2.14	3.38	7.14
	MnO_pct	29,482	30,289	0.07	0.09	1.37	0.01	0.00	0.03	0.05	0.07	3.13
	Na_2O_pct	35,326	40,259	2.29	1.53	0.67	2.35	0.04	1.08	2.04	3.23	20.78
	P_2O_5_pct	34,484	39,096	0.26	0.30	1.16	0.09	0.00	0.12	0.20	0.29	8.78
	SG_d	1,213	1,109	2.79	0.13	0.05	0.02	1.59	2.71	2.79	2.89	3.62
	SiO_2_pct	29,482	30,289	73.15	3.90	0.05	15.22	45.06	71.83	73.71	75.45	95.09
	SnO_2_pct	35,143	39,776	0.03	0.03	1.20	0.00	0.00	0.01	0.02	0.03	1.16
	Ta_2O_5_pct	36,358	41,779	0.01	0.01	1.05	0.00	0.00	0.01	0.01	0.02	1.14
Low Grade		31,068	37,427									
	Fe_2O_3_pct	28,582	33,458	1.66	2.24	1.35	5.00	0.01	0.62	0.99	1.69	60.71
	Li_2O_pct	27,053	31,433	0.35	0.40	1.16	0.16	0.00	0.14	0.24	0.40	4.40
	MnO_pct	25,226	28,030	0.13	0.17	1.31	0.03	0.00	0.05	0.08	0.15	3.81
	Na_2O_pct	28,663	33,565	4.47	2.40	0.54	5.75	0.00	2.41	4.29	6.45	11.60
	P_2O_5_pct	27,691	32,200	0.54	0.73	1.37	0.54	0.00	0.20	0.30	0.53	10.56
	SG_d	322	283	2.65	0.12	0.04	0.01	2.28	2.60	2.63	2.67	3.79
	SiO_2_pct	25,226	28,030	71.16	7.03	0.10	49.41	18.51	67.70	71.36	75.07	97.39
	SnO_2_pct	29,775	35,214	0.07	0.09	1.34	0.01	0.00	0.02	0.05	0.08	3.53
	Ta_2O_5_pct	30,070	35,662	0.02	0.03	1.03	0.00	0.00	0.01	0.02	0.03	0.59

Source: SRK, 2020
Statistics are length-weighted and reported inside 0.7% Li_2O pegmatite shape, and outside. Intervals may have been split for the purposes of statistical reporting across model domains.

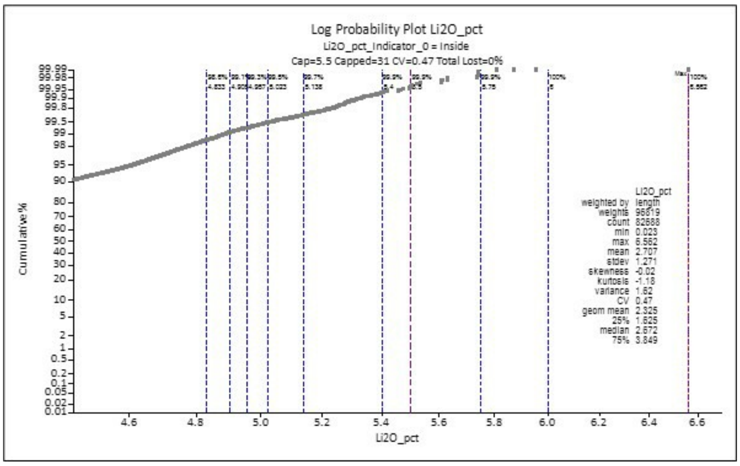
11.2.1 Outliers and Compositing

SRK and Talison assessed the drilling data for the presence and potential impact of high yield outlier data in the Central Lode and Kapanga models respectively. Additionally, prior to block estimation drilling data is composited into point data thus requiring a composite length analysis to assess potential dilution and consistent sample support for estimation reliability. Details of these procedures and assumptions by deposit model are outlined below.

Central Lode Outlier Analysis

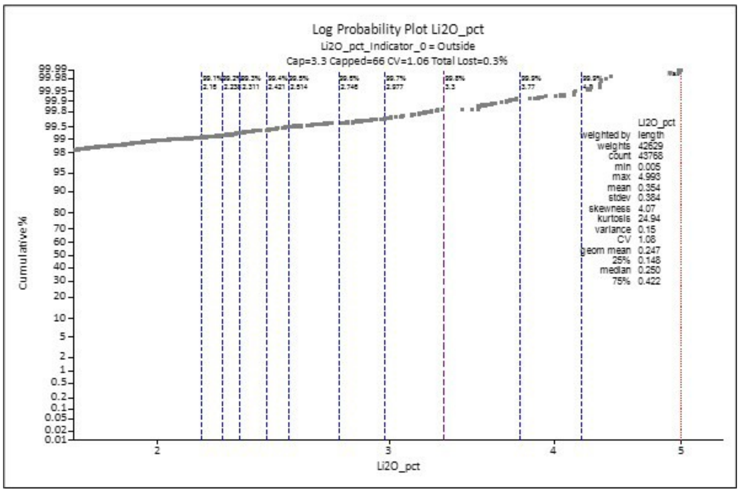
SRK evaluated the populations of data split between the high- and low-grade domains utilizing log probability plots and a matrix comparison of multiple potential caps to consider impacts on the coefficient of variation, mean, and total lost grade due to capping. The log probability plots, as shown in Figure 11-12 and Figure 11-13 show stable and consistently increasing populations of grade above the 90th percentile, with breaks in the distribution occurring around 5.4 to 5.6% Li_2O for the higher grade population, and around 3.3% Li_2O for the lower grade population. To examine the potential impact of these outliers on the overall estimation, SRK reviewed the grade populations at higher limits to determine if there were consistent groupings or clusters of higher-grade data which may need sub-domaining and noted that this was not the case. Higher grades at or above these limits are sparse and scattered throughout the deposit (although generally isolated to the larger higher-grade core of the deposit). SRK reviewed outlier impact tables for each domain as well, reviewing the impacts to the overall variance and mean metrics, and noted very limited impact to the Li_2O in either case (Table 11-6 and Table 11-7).

SRK selected nominal points of outlier restriction at 5.5% and 3.3% Li_2O for the high- and low-grade populations respectively. SRK did not “cap” or limit the input dataset prior for estimation, but instead applied outlier restrictions on the estimate itself as described in Section 11.1.



Source: SRK, 2020

Figure 11-12: Log Probability Plot – Li_2O% Central Lode High Grade Domain



Source: SRK, 2020

Figure 11-13: Log Probability Plot – Li_2O% Central Lode Low Grade Domain

Table 11-6: Outlier Impact Evaluation – Central Lode High Grade Domain

Column	Cap	Capped	Percentile	Capped%	Lost Total%	CV%	Count	Weight	Min	Max	Mean	Total	Variance	CV
Li_2O_pct							82688	96819	0.023	6.562	2.707	262049	1.62	0.47
Li_2O_pct	6.56	0	100%	0%	0%	0%	82688	96819	0.023	6.562	2.707	262049	1.62	0.47
Li_2O_pct	6.00	2	100%	0%	0%	0%	82688	96819	0.023	6	2.707	262047	1.62	0.47
Li_2O_pct	5.75	9	99.90%	0.01%	0%	0.01%	82688	96819	0.023	5.75	2.707	262045	1.62	0.47
Li_2O_pct	5.50	31	99.90%	0.04%	0%	0.02%	82688	96819	0.023	5.5	2.706	262039	1.62	0.47
Li_2O_pct	5.40	45	99.80%	0.10%	0.01%	0.02%	82688	96819	0.023	5.4	2.706	262034	1.61	0.47
Li_2O_pct	5.14	202	99.70%	0.20%	0.02%	0.07%	82688	96819	0.023	5.138	2.706	261993	1.61	0.47
Li_2O_pct	5.02	343	99.50%	0.40%	0.04%	0.10%	82688	96819	0.023	5.023	2.706	261949	1.61	0.47
Li_2O_pct	4.96	480	99.30%	0.60%	0.05%	0.20%	82688	96819	0.023	4.957	2.705	261910	1.61	0.47
Li_2O_pct	4.91	618	99.10%	0.70%	0.07%	0.20%	82688	96819	0.023	4.905	2.705	261871	1.61	0.47
Li_2O_pct	4.83	966	98.60%	1.20%	0.10%	0.30%	82688	96819	0.023	4.833	2.704	261791	1.6	0.47
Li_2O_pct	Li_2O_pct > 5.5						31	42.6	5.501	6.562	5.727	243.9	0.08	0.05
Li_2O_pct	Li_2O_pct <= 5.5						82657	96777	0.023	5.497	2.705	261805	1.61	0.47

Source: SRK, 2020

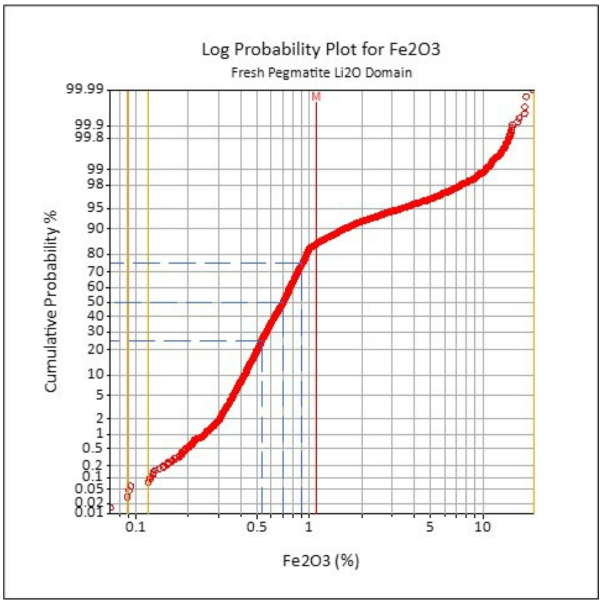
Table 11-7: Outlier Impact Evaluation – Central Lode Low Grade Domain

Column	Cap	Capped	Percentile	Capped%	Lost Total%	CV%	Count	Weight	Min	Max	Mean	Total	Variance	CV
Li_2O_pct							43768	42629	0.005	4.993	0.354	15092	0.15	1.08
Li_2O_pct	4.20	17	99.90%	0.04%	0.05%	0.40%	43768	42629	0.005	4.2	0.354	15085	0.15	1.08
Li_2O_pct	3.77	32	99.90%	0.10%	0.10%	1.10%	43768	42629	0.005	3.77	0.354	15072	0.14	1.07
Li_2O_pct	3.30	66	99.80%	0.20%	0.30%	2.30%	43768	42629	0.005	3.3	0.353	15044	0.14	1.06
Li_2O_pct	2.98	115	99.70%	0.30%	0.50%	3.60%	43768	42629	0.005	2.977	0.352	15012	0.14	1.04
Li_2O_pct	2.75	166	99.60%	0.40%	0.80%	4.90%	43768	42629	0.005	2.746	0.351	14977	0.13	1.03
Li_2O_pct	2.51	217	99.50%	0.50%	1.10%	6.30%	43768	42629	0.005	2.514	0.35	14933	0.13	1.02
Li_2O_pct	2.42	260	99.40%	0.60%	1.20%	7%	43768	42629	0.005	2.421	0.35	14911	0.12	1.01
Li_2O_pct	2.31	304	99.30%	0.70%	1.40%	7.80%	43768	42629	0.005	2.311	0.349	14882	0.12	1
Li_2O_pct	2.24	352	99.20%	0.80%	1.50%	8.50%	43768	42629	0.005	2.238	0.349	14858	0.12	0.99
Li_2O_pct	2.16	410	99.10%	0.90%	1.70%	9.30%	43768	42629	0.005	2.16	0.348	14829	0.12	0.98
Li_2O_pct	Li_2O_pct >3.3						66	74.95	3.405	4.993	3.938	295.1	0.21	0.12
Li_2O_pct	Li_2O_pct <=3.3						43702	42554	0.005	3.291	0.348	14797	0.12	1.01

Source: SRK, 2020

Kapanga Outlier Analysis

No high yield capping was performed on lithium data at the Kapanga deposit. SRK notes that iron grades were assessed showing outlier samples that may represent isolated xenolith material within the mineralized pegmatites. Outliers were assessed using log probability plots (Figure 11-14). Instead of applying a straight capping to high yield iron data, SRK has applied a distance restriction to Fe2O3 grades that report above 1.5%, thus limited the high yield data's influence on block estimation.



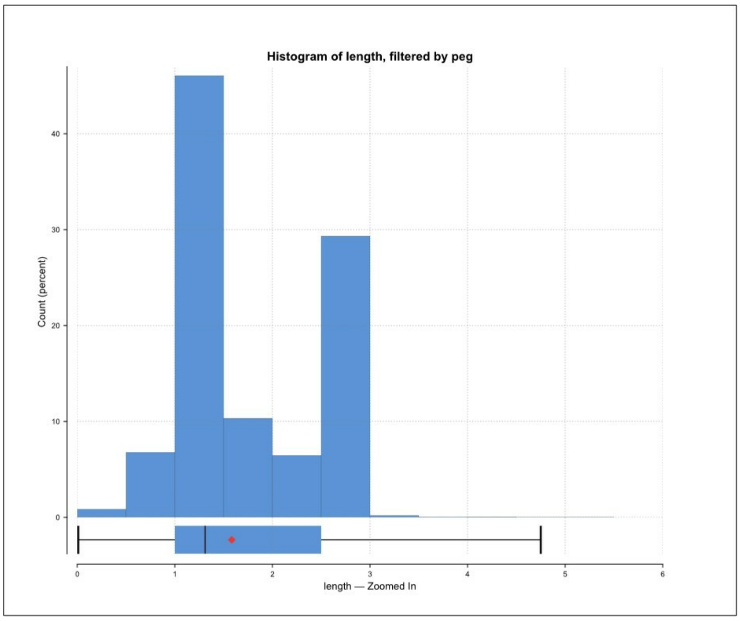
Source: SRK, 2021

Figure 11-14: Log Probability Plot of Fe_2O_3 Distribution in Fresh Pegmatite at the Kapanga Deposit

Central Lode Compositing

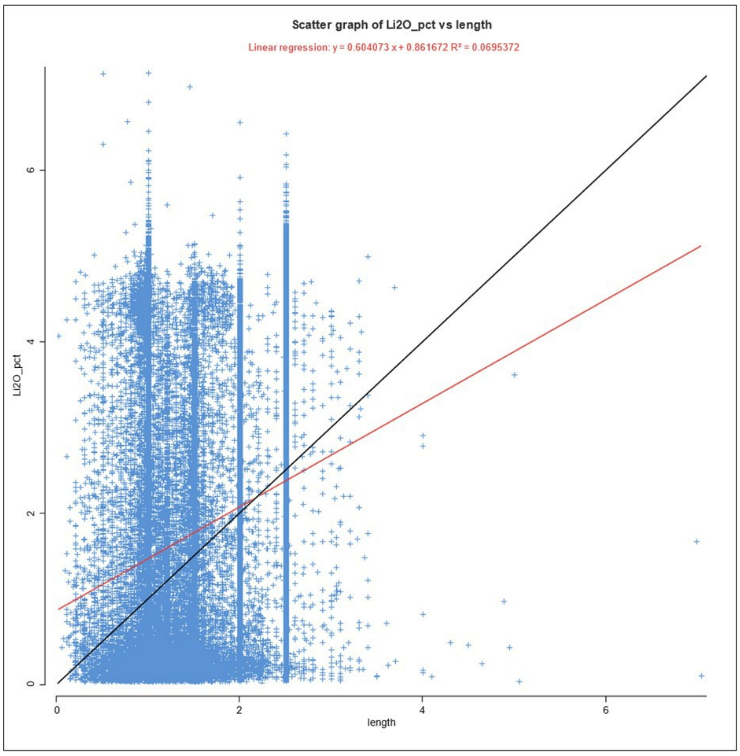
Drilled sample length within the pegmatites was considered for the purposes of understanding the variability of the sample size. Nominally, samples have been collected at 1.5 m intervals for the majority (46.5%) of exploration and development drilling. A comparatively smaller set of samples were collected at intervals between 2.5 m and 3 m (about 30%), with the remaining percentages of samples collected at lengths between or below these populations. An immaterial number of samples are collected at lengths longer than 3 m. The histogram distribution of samples within the pegmatite is shown in Figure 11-15. In addition to the distribution of the sample lengths, SRK reviewed the overall relationship between the Li_2O grades and the sample length and noted no bias which would insinuate nominally higher grades associated with shorter samples (Figure 11-16).

In order to make the sample support more consistent for the purposes of estimation, as well as to begin scaling up the sample size to approximate a mining unit, SRK elected to composite the drilling to a length of 3 m. A comparison of the distribution of Li_2O% in original samples vs. composited data is shown in Figure 11-17. In general, compositing results in a reduction of the overall sample population from 112,336 samples to 57,603 composites, with an incremental decrease in the CV from 0.92 to 0.88.



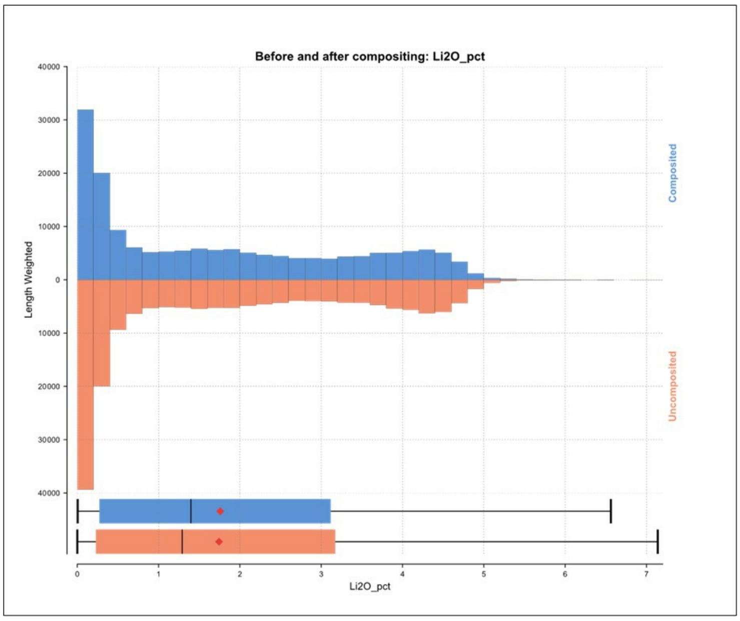
Source: SRK,2020

Figure 11-15: Histogram of Sample Length within Central Lode Pegmatite



Source: SRK, 2020

Figure 11-16: Scatter Plot Li_2O% and Sample Length – Central Lode



Source: SRK,2020

Figure 11-17: Compositing Comparisons – Li_2O% Grades in Central Lode Model

Kapanga Compositing

Kapanga pegmatite drill samples were downhole composited to a nominal interval length of 1 m. This was selected as corresponding to the interval length over which the majority of the samples had been collected. The composites were terminated at domain boundaries and the composite length was adjusted slightly to prevent residuals near domain boundaries. No significant grade relationships were observed between sample length and Li_2O grade. The composite grades were checked against the sample grades in each domain to confirm that the compositing process had performed as intended. Table 11-8 shows a comparison between the sample and composite grades in the lithium domain.

Table 11-8: Kapanga Sample versus Composites Summary Statistics

Type	Analyte	Li_Dom	Count	Min	Max	Mean	StDev	CV	Median
Sample	Fe_2O_3	1	6,582.00	0.05	20.81	1.12	1.75	1.56	0.71
Composite	Fe_2O_3	1	6,518.00	0.07	20.81	1.11	1.72	1.54	0.71
Sample	Li_2O	1	6,588.00	0.02	6.80	2.09	1.18	0.56	1.98
Composite	Li_2O	1	6,532.00	0.02	6.80	2.10	1.18	0.56	1.98
Sample	Sn_d	1	6,588.00	8	4726	193	171	0.89	151
Composite	Sn_d	1	6,532.00	8	4726	193	171	0.88	151
Sample	Ta_2O_5	1	6,588.00	0.00	0.33	0.01	0.01	1.02	0.01
Composite	Ta_2O_5	1	6,532.00	0.00	0.33	0.01	0.01	1.02	0.01
Sample	Fe_2O_3	0	20,674.00	0.11	110.62	10.26	7.14	0.70	11.89
Composite	Fe_2O_3	0	20,443.00	0.11	110.62	10.30	7.15	0.69	11.89
Sample	Li_2O	0	20,690.00	0.01	6.06	0.28	0.47	1.71	0.13
Composite	Li_2O	0	20,464.00	0.01	6.06	0.27	0.47	1.72	0.13
Sample	Sn_d	0	20,686.00	8	16225	128	323	2.52	8
Composite	Sn_d	0	20,460.00	8	16225	126	315	2.5	8
Sample	Ta_2O_5	0	20,691.00	0.00	0.71	0.01	0.01	2.06	0.00
Composite	Ta_2O_5	0	20,465.00	0.00	0.71	0.01	0.01	2.05	0.00

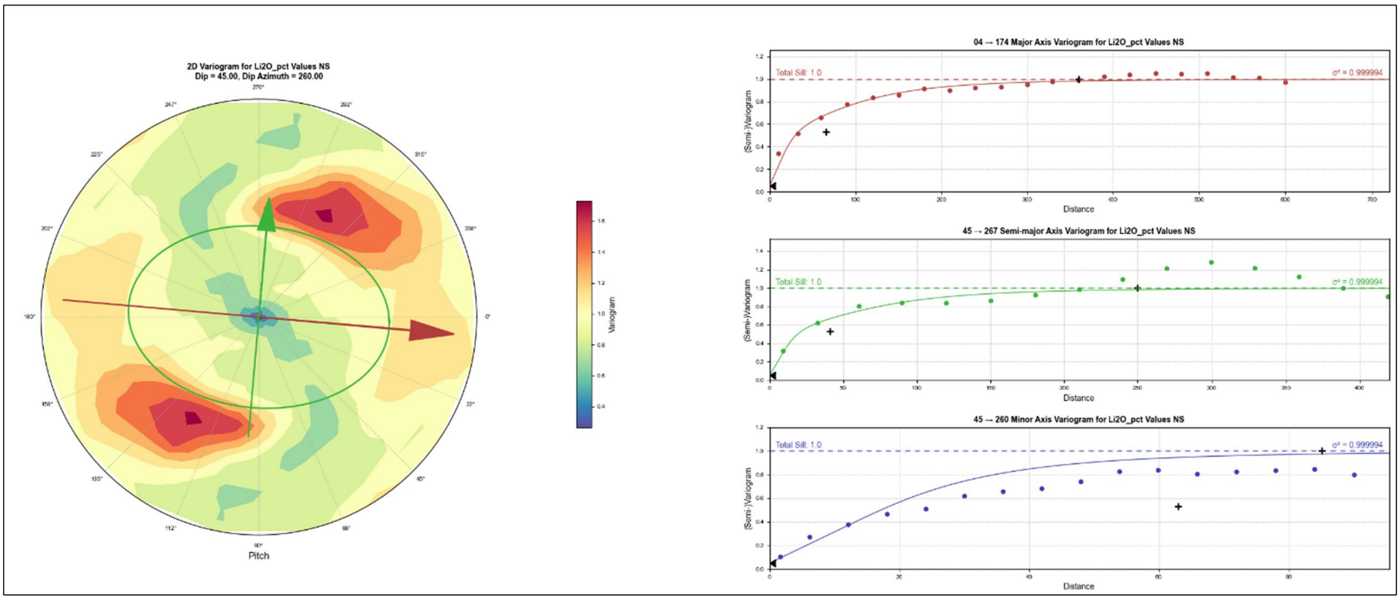
Source: SRK (AU), 2021

11.2.2 Continuity Analysis

SRK performed continuity analyses via variography to determine dominant direction and distances of grade relationships for utilization in estimation. A continuity analysis of the composited Li_2O grades within the separate resource domains was conducted on both deposits. Although other elements were estimated and utilized geostatistical estimators, only Li_2O is relevant for the long-term mineral resource reporting and will be described herein. Other elements which are estimated are utilized for internal conceptual materials typing and are not considered for resource reporting. Continuity analysis was calculated through the use of conventional semi-variogram calculation using normal scores transform of the input data and was generated in Snowden Supervisor software for import and review to Leapfrog EDGE. Orientations were determined based on 3D visualization of the trends of mineralization along with variogram maps showing relative orientations of "best" continuity. Variograms were back transformed from the normal scores for use in Leapfrog EDGE for estimation purposes.

Central Lode - High Grade Domain Variography

The high-grade domain featured robust variography, with low nugget effects modeled using the down-hole variogram, and stable experimental variograms to ranges of 250 to 360 m in the semi-major and major directions respectively. Given the relatively tabular nature of the pegmatite intrusion, the minor variogram range is considerably shorter, with a range of about 80 m. This defines an ellipsoid which is generally flattened and oriented along the strike and down dip of the overall pegmatite domain. Individual variograms for the high-grade domain are shown in Figure 11-18.

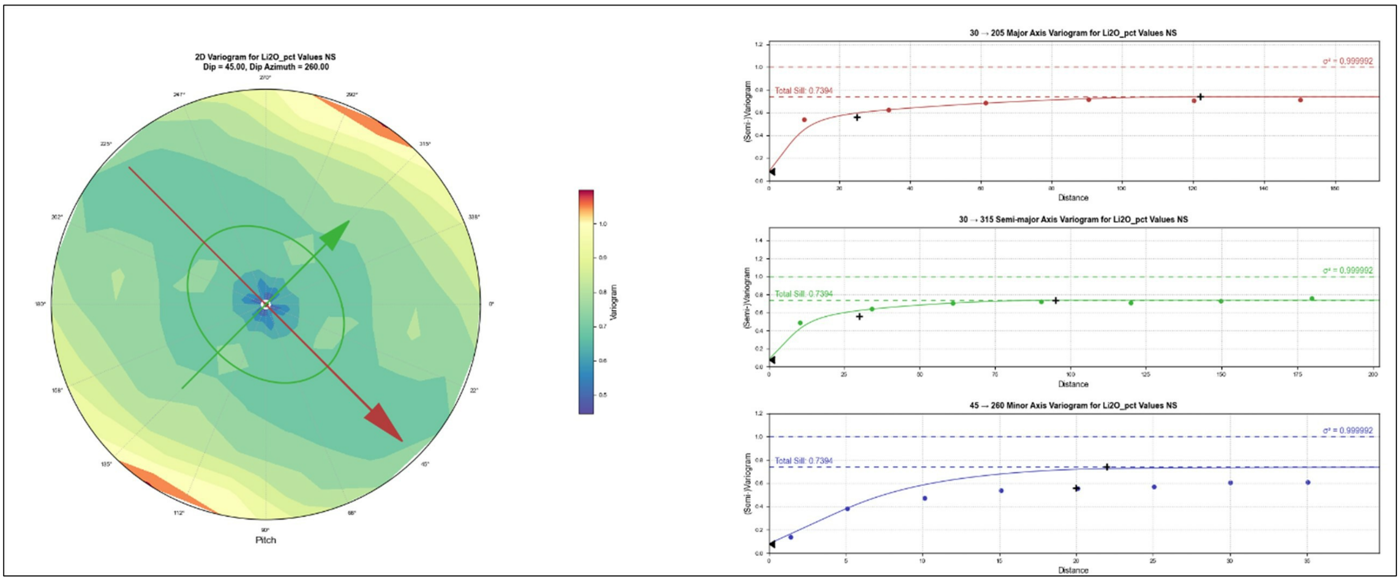


Source: SRK, 2020

Figure 11-18: Modeled Variograms – Li_2O% - High Grade Domain

Central Lode - Low Grade Domain Variography

The lower grade domain featured comparably less robust variography. Low nugget effects modeled using the down-hole variogram, and stable experimental variograms out to ranges of 90 to 125 m in the semi-major and major directions respectively. Given the relatively tabular nature of the pegmatite, the minor variogram range is considerably shorter, with a range of about 20 to 25 m. This defines an ellipsoid which is flat and oriented along the strike and down dip of the overall pegmatite domain. Directional variography for the high-grade domain is shown in Figure 11-19. In general, SRK notes that the continuity analysis for both domains is reasonable and is consistent with the geological orientations and expectations of continuity. Variogram outputs for the two domains as utilized in the kriging estimators in EDGE are summarized in Table 11-9.



Source: SRK,2020

Figure 11-19: Modeled Variograms – Li_2O% - Low Grade Domain

Table 11-9: Li_2O Variogram Models

General			Direction					Structure 1						Structure 2			
Variogram Name	Dip	Dip Azimuth	Pitch	Model Space	Variance	Nugget	Sill	Structure	Alpha	Major	Semi-Major	Minor	Sill	Structure	Alpha	Major	Semi-Major
Li_2O_pct HG: Transformed Variogram Model Li_2O HG	45	260	5	Normal score	1	0.05	0.48	Spheroidal	3	66	41	63	0.47	Spheroidal	3	360	250	85
Li_2O_pct LG: Transformed Variogram Model Li_2O LG	45	260	45	Normal score	1	0.08	0.4794	Spheroidal	3	25	30	20	0.18	Spherical		122.1	95	22

Source: SRK,2020

Kapanga Variography

A variography study was conducted to quantify the grade continuity of the selected analytes in each estimation domain at Kapanga. Supervisor software was used to generate the experimental variograms and to fit the theoretical models. The variography was undertaken using normal score transforms of the 1 m composite grades within each domain. Back transforms were applied to the theoretical models, which were imported into Studio RM for use in the estimation process.

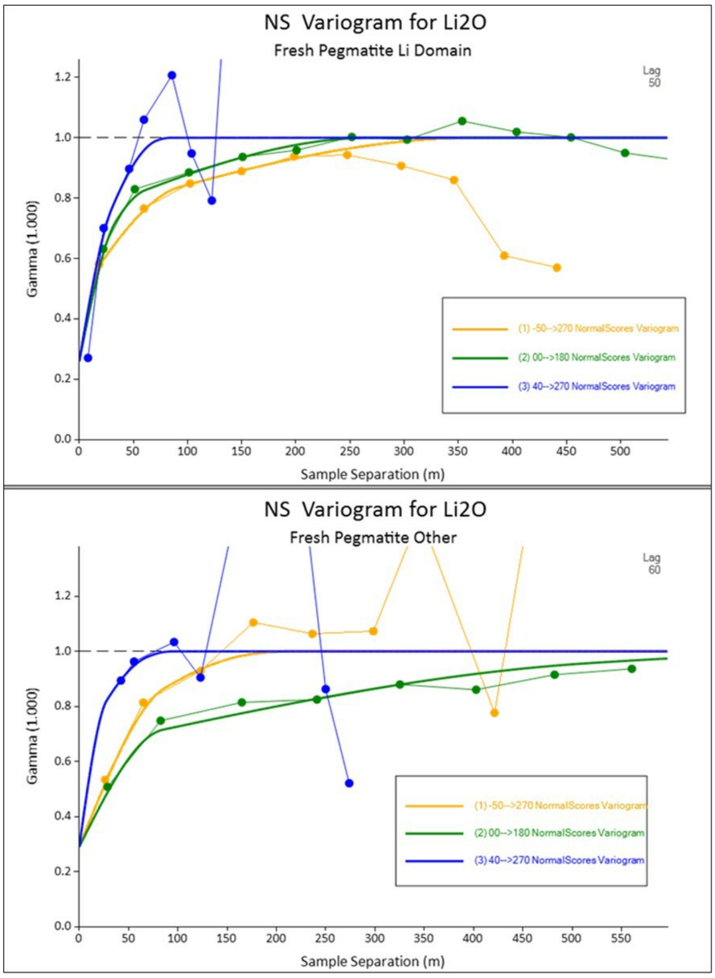
To ensure that any grade relationships existing in the dataset were adequately reproduced in the model, the Li_2O variogram model was used for all analytes, in line with the approach applied at the Central Lode deposit.

Li_2O variogram definition was observed to be acceptable in most domains, with a nugget value of approximately 20%, a practical range of approximately 100 m (80% of the sill), and a total range of approximately 350 m. For the main mineralised domain, the variography is quite similar to that for the equivalent domain in Central Lode. The nugget value is significantly lower for Central Lode, which is likely due to the larger composite length. Some of the oxide domains contained too few samples to enable variograms to be modeled, and the fresh domain equivalents were used for estimation in these domains. The theoretical variogram model parameters are shown in Table 11-10. Examples of the experimental variograms and fitted model are shown in Figure 11-20.

Table 11-10: Li_2O Modeled Variography at the Kapanga Deposit

Domain	Direction (Major, Mid, Minor)			Nugget	Structure 1 a1 a2 a3 C1				Structure 2 a1 a2 a3 C2				Structure 3 a1 a2 a3 C3			
101	00/000	00/270	90/000	0.21	37	72	21	0.27	211	218	38	0.21	814	243	40	0.31
109	00/000	-35/270	55/270	0.18	31	26	5	0.40	92	81	43	0.16	533	508	50	0.27
201	00/000	-65/270	25/270	0.16	51	148	28	0.14	423	158	32	0.23	424	226	57	0.48
209	00/000	-65/270	25/270	0.16	51	148	28	0.14	423	158	32	0.23	424	226	57	0.48
301	00/000	00/270	90/000	0.35	79	12	8	0.25	345	26	41	0.06	346	105	47	0.35
309	-50/270	00/180	40/270	0.36	87	85	28	0.38	174	512	68	0.11	215	855	94	0.15
319	-50/270	00/180	40/270	0.27	21	33	30	0.22	93	61	72	0.26	367	270	85	0.25
401	55/090	-35/090	00/000	0.33	90	28	11	0.18	425	44	34	0.30	514	233	141	0.19
409	55/090	-35/090	00/000	0.33	90	28	11	0.18	425	44	34	0.30	514	233	141	0.19
501	00/000	00/270	90/000	0.21	37	72	21	0.27	211	218	38	0.21	814	243	40	0.31

Source: SRK (AU), 2021



Source: SRK, 2021

Figure 11-20: Kapanga Modeled Variography for Li2O

11.3 Mineral Resources Estimates

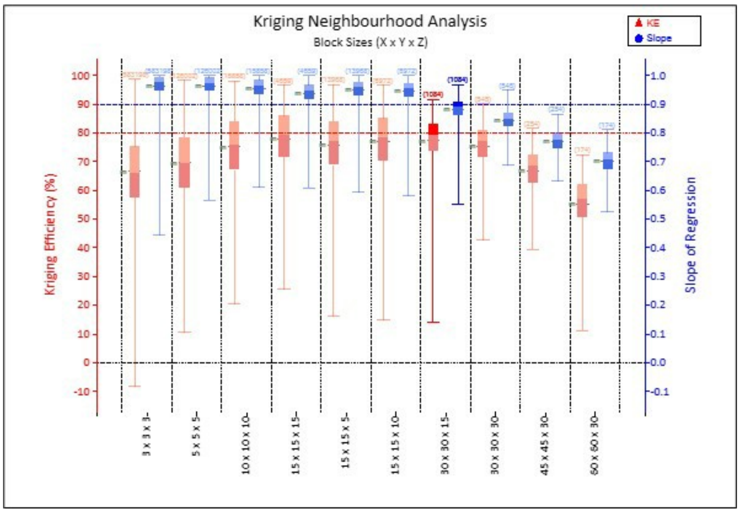
The geological model and block model used in the mineral resource estimate is based on the 2021 Greenbushes property model, which combined the Central Lode and Kapanga deposits. Differences from the prior TRS are due to 1) addition of mineral resources in the Kapanga deposit, and 2) mining depletion during the 2022 calendar year. SRK notes that limited additional drilling has been performed on the Greenbushes property in the subsequent 12 months and thus the resource block models were not updated during 2022.

11.3.1 Quantitative Kriging Neighborhood Analysis (QKNA)

QKNA was utilized at the Central Lode model to assess potential impacts and sensitivity of estimation parameters such as block size, sample selection, and search distances. QKNA was reviewed at Kapanga during model construction by Talison, but final block model parameters were driven primarily to align the model with the Central Lode block model.

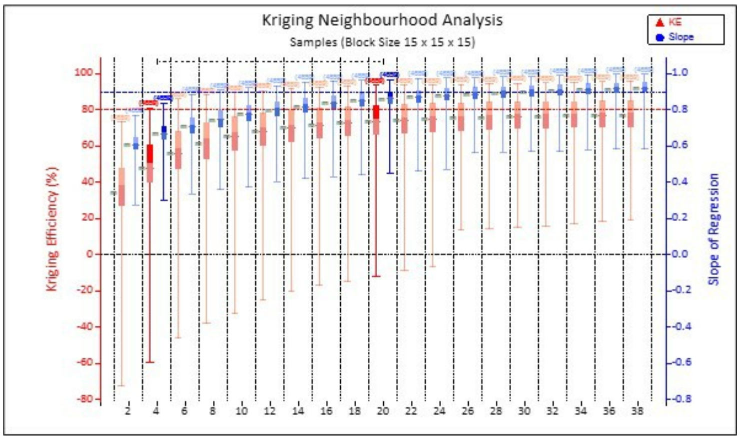
While QKNA is not the definitive measure of what parameters must be, it is a useful data point in gauging the potential sensitivity of the estimation to these parameters. In general, QKNA evaluates the impact of varying parameters, but bases the sensitivity on outputs to the kriging efficiency (KE) and slope of regression (SoR) averages for the estimate. KE and SoR are commonly referred to as measures of the relative quality of the estimate and are dependent on the input variogram. SRK evaluated the impacts to the KE and SoR for multiple scenarios evaluating block size, sample selection, and search range as shown in Figure 11-21, Figure 11-22, and Figure 11-23 respectively.

In general, SRK notes that the QKNA suggests an optimum block size (of those tested) of 15 x 15 x 15 m, sample selection criteria of between 4 and 20 samples, and effectively a negligible impact to estimation quality based on the search ranges tested. Search ranges considered were done in +/-25% increments oscillating around a base case of the high-grade total variogram range.



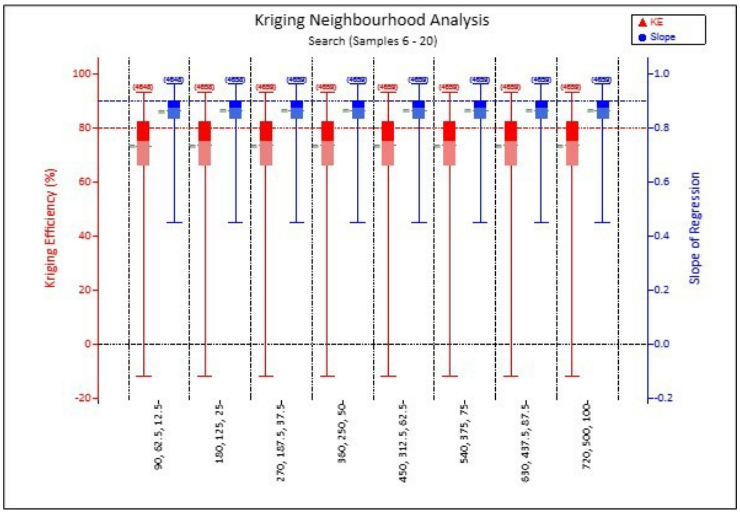
Source: SRK,2020

Figure 11-21: QKNA Block Size Sensitivity



Source: SRK,2020

Figure 11-22: QKNA Sample Selection Sensitivity



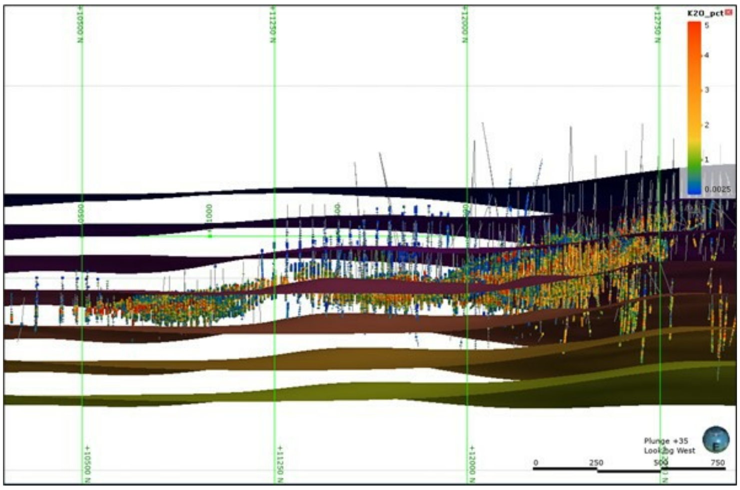
Source: SRK,2020

Figure 11-23: QKNA Search Range Sensitivity

11.3.2 Central Lode Variable Orientation Modeling

Despite the need to calculate and model continuity analysis using variography, which are oriented in a specific direction, it is clear from geological modeling and previous mining that the Central Lode pegmatite anastomoses and changes orientation at small scales. Due to the relatively uniform geometry and dip of the Kapanga pegmatite domain, SRK determined that variable orientation modeling was not necessary.

To incorporate this geological variance into the estimation and producing a more accurate estimate, SRK incorporated a number of geological features from the 3D model into a variable orientation model. This effectively calculates an orientation to be used for estimation searches from the input wireframes. Wireframes in this case are based on the interpolated structural data for overall pegmatite trends, as shown in Figure 11-24. Outputs from this process are individual search orientations for each block based on the relative proximity of the block itself to the surfaces. Blocks which are external to the modeled surfaces take on the overall variogram orientation from continuity analysis. The search ellipse is also re-oriented for blocks based on the variable orientation model.



Source: SRK, 2020

Figure 11-24: Structural Planes Utilized for Variable Orientation Modeling

11.3.3 Block Models

Central Lode Block Model

The Central Lode resource block model was generated in Leapfrog Geo software. As shown in Figure 11-24, the block model encompasses the geological model for the Central Lode deposit. The model is sub-blocked, with parent blocks at a 20 m x 20 m x 20 m block divided into a minimum sub-block size of 2.5 m^3 along geological or topographic (pit) boundaries.

Kapanga Block Model

In 2020, Talison created a block model for the Kapanga deposit. The model extents and parameters are presented in Table 11-11. When choosing appropriate model block dimensions, consideration was given to the drill spacing and sampling interval, the interpreted geometry and thickness of the lithological units. Consideration was given to the end-user requirements that the model could be merged with the Central Lode model to form a single Surpac combined model.

Table 11-11: Kapanga Block Model Parameters

Parameter	Value
Model origin	East: **8,650. North: 9,350. Elevation: 1,400 m.**
Model extents	East: 3,800 m. North: 5,600 m. Elevation: 1,340 m.
Parent cell size	East: 20 m. North: 20 m. Elevation: 20 m.
Sub-celling	East: 5 m. North: 5 m. Elevation: 5 m.
Rotation	None. Orthogonal to the MGA94 UTM – WGS Zone 50 grid.

Source: SRK, 2021

Greenbushes Property-Scale Block Model

During 2021, SRK (Australia), in collaboration with Talison, performed a block model merging exercise to generate a combined block model representing the combined Central Lode and Kapanga models. When merging the Central Lode and Kapanga models, SRK (Australia) modified the original model parameters such that the models could be merged. A smaller sub-cell size was used for the combined model to enable the models to be added. This required SRK (Australia) to modify the variables for a consistent set of names and data types. All variables that Talison identified as being mandatory were included. Because of the differences in the input data, modeling approach, and parameters, some of the variables that were specific to individual models have not been retained in the combined model.

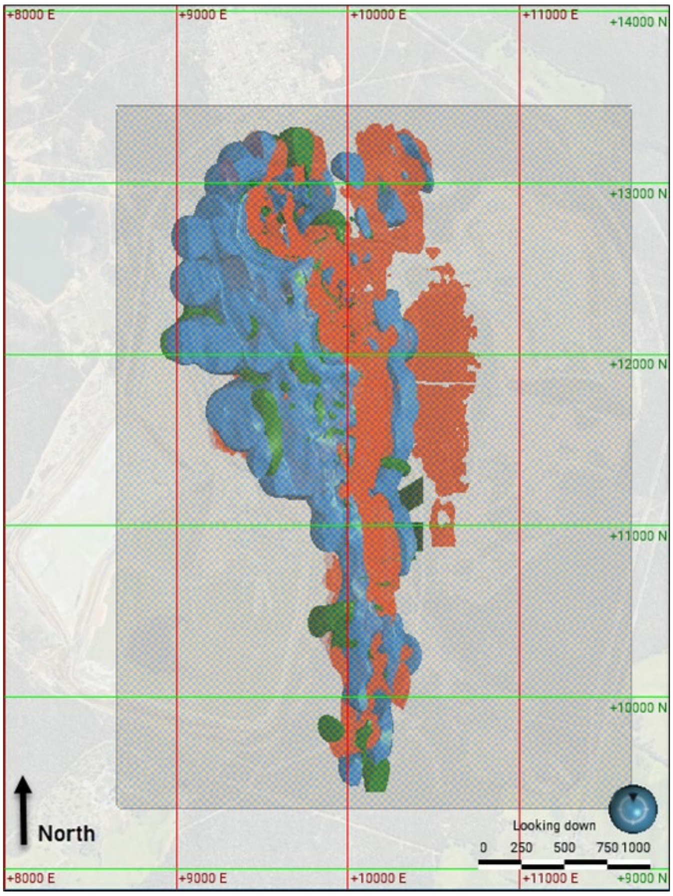
The combined block model details are presented in Table 11-12 with the aerial extents presented in Figure 11-25. The underlying key parameters and assumptions of the individual Central Lode and Kapanga deposit scale models remain and are incorporated in the broader Greenbushes model for use in reporting and mine planning purposes.

Table 11-12: Greenbushes Property-Scale Block Model Details

Base point:	8650, 9350, 1400
Parent block size (m):	20 × 20 × 20
Dip:	0°
Azimuth:	0°
Boundary size:	3000 × 4100 × 900
Sub-blocking (m):	2.5 × 2.5 × 2.5
Total Blocks	**1,383,750**

Source: SRK, 2023

SRK considers the combined Greenbushes property scale block model to be interim in nature due to the modifications required for merging. The Greenbushes property-scale model is considered appropriate for use in mine planning and calculation of mineral resources, but SRK recommends a geologically continuous, property scale model be constructed from first principals at the Greenbushes property to standardize the procedures, process, and parameters for each the Central Lode and Kapanga deposits.



Source: SRK, 2023

Figure 11-25: Block Model Extents in Plan View

11.3.4 Grade Interpolation

Central Lode Block Estimation

Grades were interpolated from the composited Central Lode drilling data for Li_2O using Leapfrog EDGE. A nested two-pass estimation was designed to accomplish estimation in a first pass from more sampling, at higher data densities, with more restrictions on estimation methodology in the initial passes. Ordinary kriging (OK) was utilized for interpolation of grade. Estimation parameters are based on overall Li_2O variogram ranges within the high-grade domain, with ranges in the first pass being approximately 50% of the total range (80% of the total variance) and the second pass being the full range of the variogram at 100% variance. Other estimation parameters were selected based on initial assessments from the QKNA results and were refined based on model validation. Summary neighborhood parameters are presented in Table 11-13.

Orientations for searches are variable using the variable orientation modeling parameters as noted in Section 11.3.2. Outliers are addressed through the use of the “clamping” modifier in EDGE. This limits the extent to which an outlier grade is utilized over a smaller range than the actual search (defined as a percentage of the ellipsoid ranges). SRK utilized a 5.5% Li_2O and 3.3%Li_2O threshold over 5% of the search distance for each pass. SRK also utilized sector limitations (quadrants) for the first pass of estimation to ensure that data was pulled from multiple locations rather than clustered from groups of closely spaced data. To further ensure this, a restriction of a maximum of two samples per hole was utilized. This, combined with the five-sample minimum for the first pass, resulted in the first estimation pass using no fewer than three drillholes. The second estimation pass significantly reduces the overall restrictions by expanding the search, reducing the overall minimum of samples, and eliminating the sector requirements.

Table 11-13: Central Lode Li_2O Estimation Parameters

General			Ellipsoid Ranges (m)			Variable Orientation	Number of Samples			Outlier Restrictions		Sector Search			Drillhole Limit, Max Samples per Hole
Name	Domain	Values	Maximum	Intermediate	Minimum		Minimum	Maximum	Method	Distance	Threshold	Method	Max Samples	Max Empty Sectors	
Kr, Li_2O_pct HG P1 RDEX	Li_2O_pct Indicator 0.7 100 0.50: Inside	Li_2O_pct	180	150	25	VO_Li_PEG	5	15	Clamp	5	5.55	Quadrant	5	1	2
Kr, Li_2O_pct HG P2 RDEX	Li_2O_pct Indicator 0.7 100 0.50: Inside	Li_2O_pct	360	250	50	VO_Li_PEG	1	15	Clamp	2.5	5.55				2
Kr, Li_2O_pct LG P1 RDEX	Li_2O_pct Indicator 0.7 100 0.50: Outside	Li_2O_pct	180	125	25	VO_Li_PEG	5	15	Clamp	5	3.3	Quadrant	5	1	2
Kr, Li_2O_pct LG P2 RDEX	Li_2O_pct Indicator 0.7 100 0.50: Outside	Li_2O_pct	360	250	50	VO_Li_PEG	1	15	Clamp	2.5	3.3				2

Source: SRK, 2020

Kapanga Block Estimation

Grades were estimated into the Kapanga block model for the following variables:

Li_2O, Fe2O3, Sn, Ta2O5, Al2O3, SiO2, CaO, and MgO

The estimates were performed using Datamine Studio RM software. Local grades were estimated for all domains, but the detailed assessment and selection of parameters were largely limited to the mineralized domains. The unmineralized domains were included for completeness and to assist with dilution studies.

Ordinary kriging was used to estimate into discretized (3 × 3 × 3) parent blocks. The estimation parameters were largely based on the Li_2O variography results. All domain contacts were treated as hard boundary constraints.

A three-pass search strategy was used, with larger search distances and less-restrictive sample selection criteria used for the second and third pass. The first pass search distances approximately corresponding to the distance at which 80% of the variogram sills were reached in each direction, with factors of 2 and 3 used for the second and third pass respectively. The search ellipsoid was oriented parallel to the general orientation of the lithology units. A summary of the estimation parameters is presented in Table 11-14.

Table 11-14: Kapanga Estimation Neighborhood Parameters

Domain	Rotation			S1 Distance			S1 Samples		S2 Samples		S3 Samples		Samples per Hole
	Z	X	Z	Main	Mid	Minor	Min	Max	Min	Max	Min	Max	
101	0	0	-90	150	150	30	4	15	3	15	2	15	2
109	-90	35	0	150	150	30	4	15	3	15	2	15	2
201	0	0	-90	150	150	30	4	15	3	15	2	15	2
209	-90	65	0	150	150	30	4	15	3	15	2	15	2
301	0	0	-90	100	100	20	4	15	3	15	2	15	2
309	-90	50	-90	100	100	20	8	20	7	20	2	15	3
319	-90	50	-90	100	100	20	8	20	7	20	2	15	3
401	0	90	55	150	150	30	4	15	3	15	2	15	2
409	0	90	55	150	150	30	4	15	3	15	2	15	2
501	0	0	-90	150	150	30	4	15	3	15	2	15	2
999	-90	50	-90	30	30	5	1	1	1	1	1	1	3

Source: SRK, 2021

A distance constraint was applied to limit the influence of Fe_2O_3 grades exceeding 1.5% in the pegmatite domains. Based on its mining experience with Central Lode, Talison consider that most of the elevated Fe_2O_3 grades are due to small slivers of mafic material that have become entrained in the pegmatite. Talison has observed from reconciliation data that applying a distance restriction to these grades effectively moderates them during estimation. SRK observed that most of the Kapanga drillholes contain at least one pegmatite intersection that exceeds the Fe_2O_3 threshold. For this reason, a constraint distance of just over the nominal drill spacings (30 m) was chosen to better ensure that the relative frequency of occurrences in the model match those in the dataset.

Default grades equivalent to the estimation datasets averages were assigned to model blocks that did not receive an interpolated grade. These blocks were assigned a search pass number of 4 (LIVOL = 4) such that they could be identified in the model and considered in the resource classification.

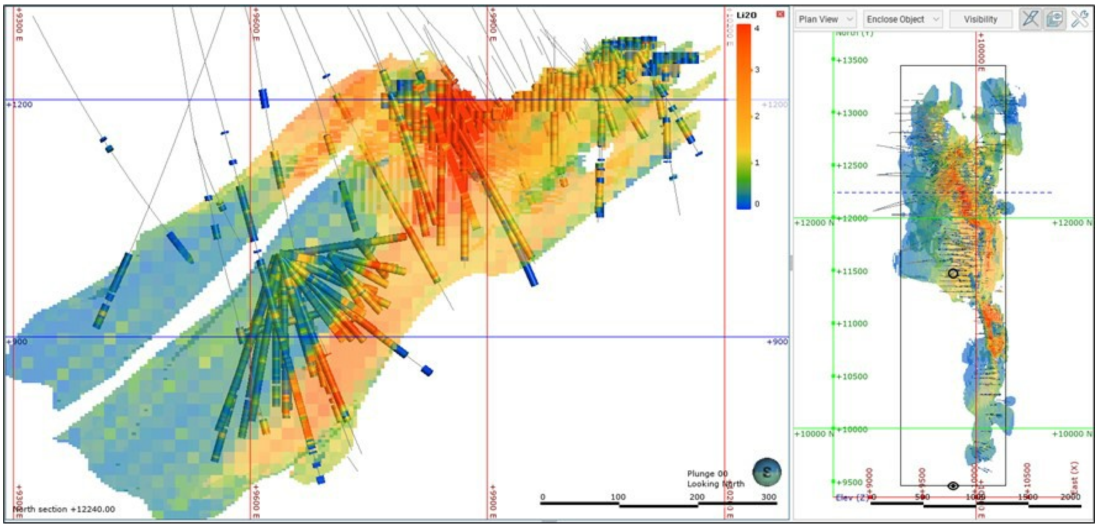
Dry bulk densities were assigned to each model cell using the same approach and values used for Central Lode.

11.3.5 Block Model Validation

The interpolation of grade was validated in each the Central Lode and Kapanga models through a series of checks on the visual and statistical distribution of grades compared to the input composite data. Visual grade distribution on section and level plans was reviewed carefully across the entire estimate to ensure that grades compared well to composite date and that the geological trends were being honored.

Central Lode Block Model Validation

The Central Lode model was validated using a combination of visual, statistical, and comparative analysis to production data. An example of the visual validation is shown in Figure 11-26. Statistical comparison of the individual domain estimates to the input composite data shows satisfactory agreement globally (Table 11-15 and Table 11-16). To evaluate a localized statistical comparison, SRK produced swath plots. These plots evaluate the means of blocks and composites along swaths or slices through the model oriented along the NS, EW, and elevation axes. In general, these plots show excellent local agreement of the composites and blocks along slices, an example of which is shown in Figure 11-27. These plots were created for each axis in each domain.



Source: SRK, 2020

Figure 11-26: Visual Comparison of Li_2O Distribution – Central Lode

Table 11-15: Statistical Comparison Li_2O% – Central Lode High Grade Domain

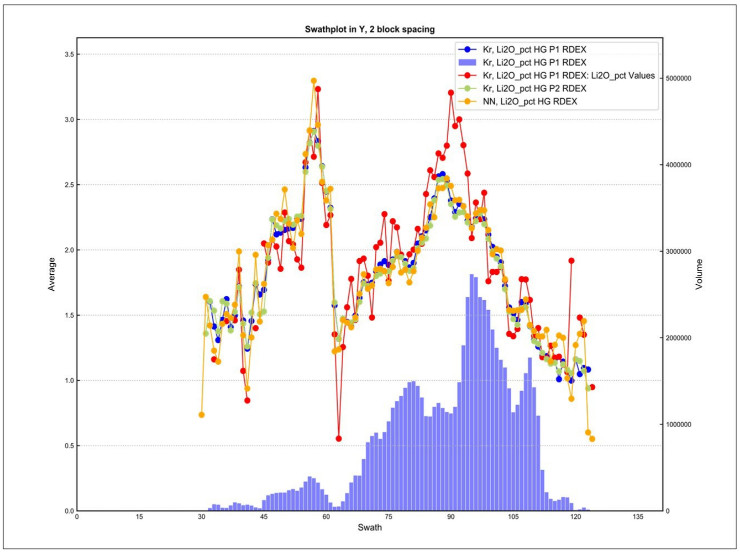
	Composites	Blocks
Count	50,937	425,803
Length	46,649	71,063,325
Mean	2.09	1.99
SD	1.26	0.85
CV	0.60	0.43
Variance	1.59	0.73
Minimum	0.02	0.14
Q1	1.08	1.34
Q2	1.90	1.83
Q3	3.04	2.53
Maximum	6.56	4.89

Source: SRK, 2020

Table 11-16: Statistical Comparison Li_2O% – Central Lode Low Grade Domain

	Composites	Blocks
Count	43,267	276,735
Length	38,180	55,880,325
Mean	0.55	0.45
SD	0.65	0.33
CV	1.18	0.72
Variance	0.42	0.11
Minimum	0.01	0.03
Q1	0.18	0.23
Q2	0.30	0.35
Q3	0.62	0.58
Maximum	4.94	2.97

Source: SRK, 2020



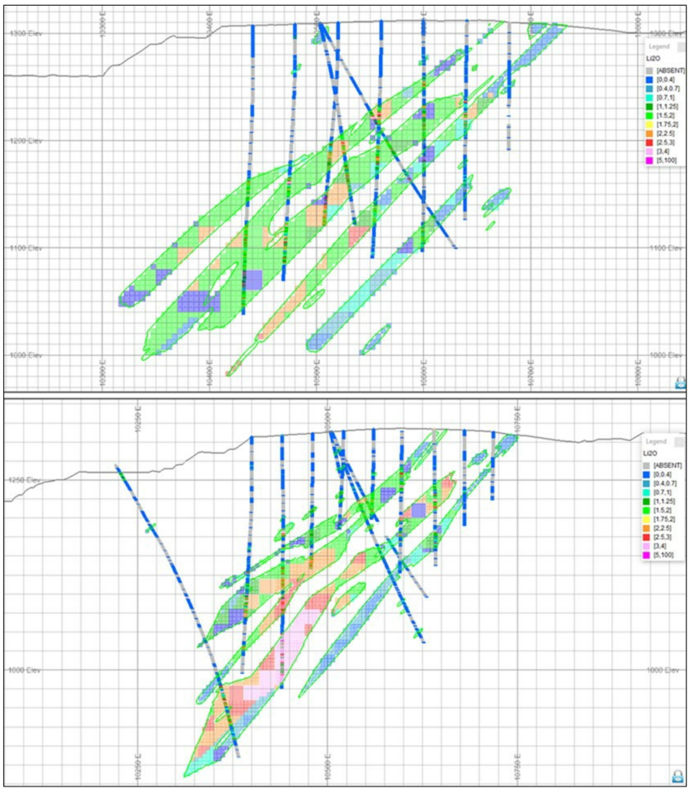
Source: SRK, 2020

Figure 11-27: Swath Plot – Li_2O% – Central Lode High Grade Domain

Kapanga Block Model Validation

The estimated Kapanga block model was validated through a combination of visual and statistical comparisons with composited data. As no development has occurred at this deposit, production data is not available for validation purposes.

Interpolated cell grades were visually compared to the drillhole sample grades to ensure that the cell grade estimates appeared consistent with the drillhole data. Satisfactory correlation between the estimated block grades and the composite grades was observed. No significant issues were identified, with the local grade characteristics in the sample data being adequately reproduced in the model. Example section plots showing the sample grades superimposed on the model cell grades are presented in Figure 11-28.



Source: SRK, 2021
Top image is 12,200N and bottom image is 12,100N.

Figure 11-28: Visual Validation of Lithium Grades to Original Drilling Data at the Kapanga Deposit

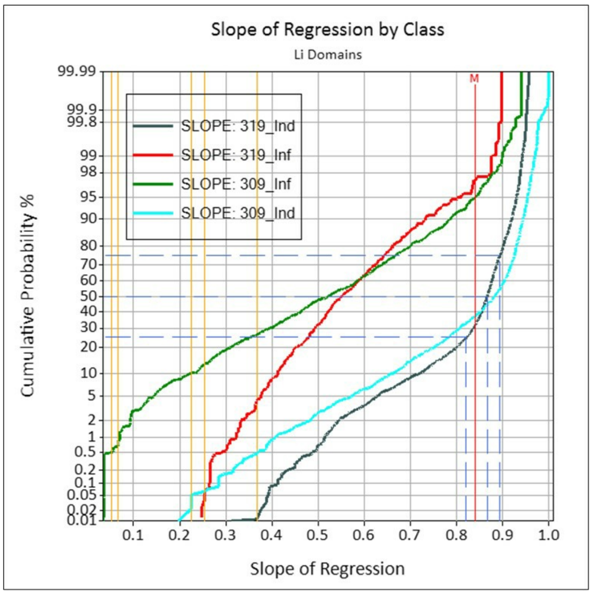
The estimation performance data at Kapanga were assessed to confirm that the model blocks were estimated using an adequate number of samples. A summary of the percentage of model blocks estimated in each search pass and the average number of samples used for estimation, is presented in Table 11-17. These results are based on the Li_2O estimates; however, they should be similar for most of the other variables, given that a similar dataset and the same estimation parameters were used. The summaries indicate that almost all of the Indicated Mineral Resource model blocks were estimated using the first search pass using at least 10 samples.

Cumulative probability plots showing the slope of regression (SoR) distributions for the Li_2O estimates for blocks in the Indicated and Inferred regions in the fresh Li_2O domains are presented in Figure 11-29. The plots indicate acceptable estimation performance, with approximately 95% of the Indicated blocks and approximately 40% of the Inferred blocks reporting an SoR exceeding 0.60.

Table 11-17: Estimation Performance of Li_2O Grades in the Kapanga Block Model

Indicated	% Resource Estimated in each Pass				Average Number of Samples		
	Pass 1	Pass 2	Pass 3	Default	Pass 1	Pass 2	Pass 3
301	91.21	8.79	0.00	0.00	11	15	0
309	91.32	8.67	0.01	0.00	17	20	14
319	97.57	2.43	0.00	0.00	18	20	15
Inferred	**% Resource Estimated in each Pass**				**Average Number of Samples**		
	Pass 1	**Pass 2**	**Pass 3**	**Default**	**Pass 1**	**Pass 2**	**Pass 3**
301	60.63	39.37	0.00	0.00	6	11	0
309	15.27	80.51	4.22	0.00	10	17	15
319	28.76	64.54	6.70	0.00	10	19	15

Source: SRK, 2021



Source: SRK, 2021

Figure 11-29: Li_2O Slope of Regression Distribution at Kapanga

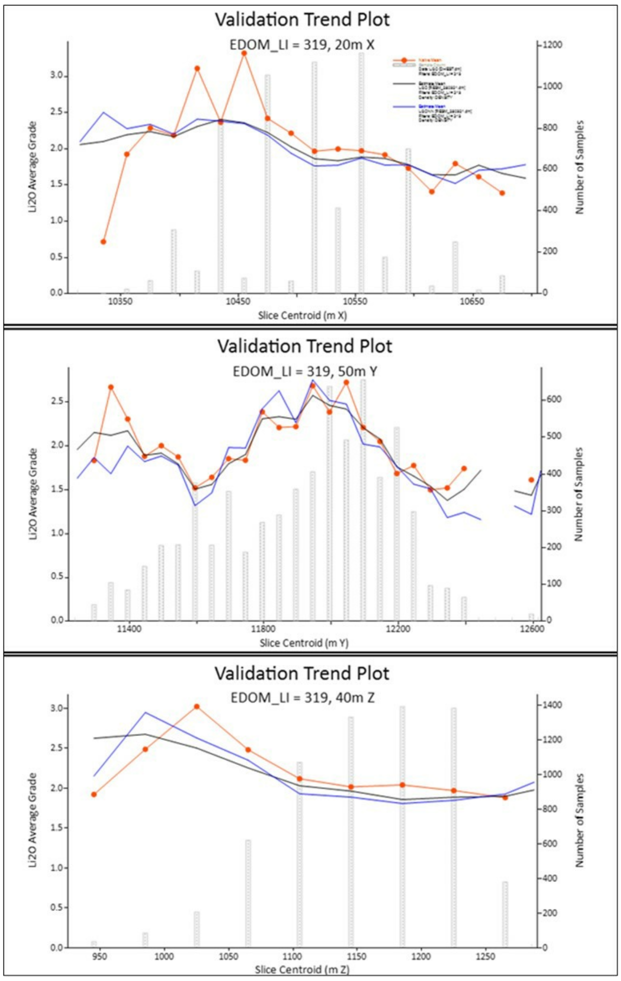
Statistical comparisons were conducted between the interpolated block model grades and the sample composite grades. The summaries indicate satisfactory correlation between the model and sample grades. Some differences are expected because the sample data spacings are not uniform in the sub-regions. Satisfactory agreement is evident for Li_2O, Ta2O5, and Sn in the lithium tantalum and tin domains respectively. The impact of the distance restriction on Fe2O3 is evident in this comparison. The composite and model grade comparison for Li_2O is presented in Table 11-18.

Table 11-18: Statistical Validation - Kapanga Composites to Block Grades

Domain	Variable	Code	Min	Max	Mean	Min	Max	Mean	Rel Diff
Li_Dom	Al_2O_3	301	6.43	38.93	19.87	12.23	34.60	19.16	3.57
	CaO	301	0.00	8.69	0.54	0.01	4.58	0.69	-27.22
	Fe_2O_3	301	0.21	34.59	4.88	0.72	18.52	2.68	45.11
	Li_2O	301	0.01	3.91	0.12	0.01	1.15	0.15	-22.58
	MgO	301	0.03	23.73	0.80	0.13	8.93	1.07	-33.13
	SiO_2	301	21.73	82.45	62.90	34.10	75.68	63.47	-0.91
	Sn_d	301	8	2237	256	8	1058	228	10.94
	Ta_2O_5_d	301	5	1020	97	5	652	102	-5.20
	Al_2O_3	309	1.31	23.76	15.50	9.63	18.77	15.54	-0.28
	CaO	309	0.01	16.47	1.22	0.13	8.16	1.60	-30.82
	Fe_2O_3	309	0.13	18.92	2.09	0.52	10.50	1.45	30.46
	Li_2O	309	0.01	6.06	0.60	0.03	3.94	0.58	3.35
	MgO	309	0.00	20.79	0.84	0.10	8.88	1.05	-24.32
	SiO_2	309	43.11	98.50	71.93	55.55	78.80	70.90	1.43
	Sn_d	309	8	14099	312	62	3206	295	5.18
	Ta_2O_5_d	309	5	7110	124	21	1407	108	12.86
	Al_2O_3	319	2.17	25.47	16.03	12.45	18.88	16.01	0.12
	CaO	319	0.02	16.36	0.60	0.08	6.15	0.82	-37.10
	Fe_2O_3	319	0.07	19.60	1.10	0.41	8.20	1.01	8.42
	Li_2O	319	0.02	6.80	2.10	0.50	4.21	2.00	4.71
	MgO	319	0.00	16.69	0.37	0.07	3.68	0.51	-38.65
	SiO_2	319	46.06	97.31	73.76	62.97	79.81	73.19	0.77
	Sn_d	319	8	4726	193	60	1963	207	-7.06
	Ta_2O_5_d	319	5	3283	87	23	929	92	-6.41
Ta_Dom	Ta_2O_5_d	301	5	623	93	5	258	98	-5.18
	Ta_2O_5_d	309	5	7110	98	21	1407	99	-1.72
	Ta_2O_5_d	319	50	1550	357	39	688	361	-1.34
Sn_Dom	Sn_d	301	8	2237	203	8	582	196	3.42
	Sn_d	309	8	14099	211	60	3206	233	-10.52
	Sn_d	319	8	5222	731	286	2291	688	5.85

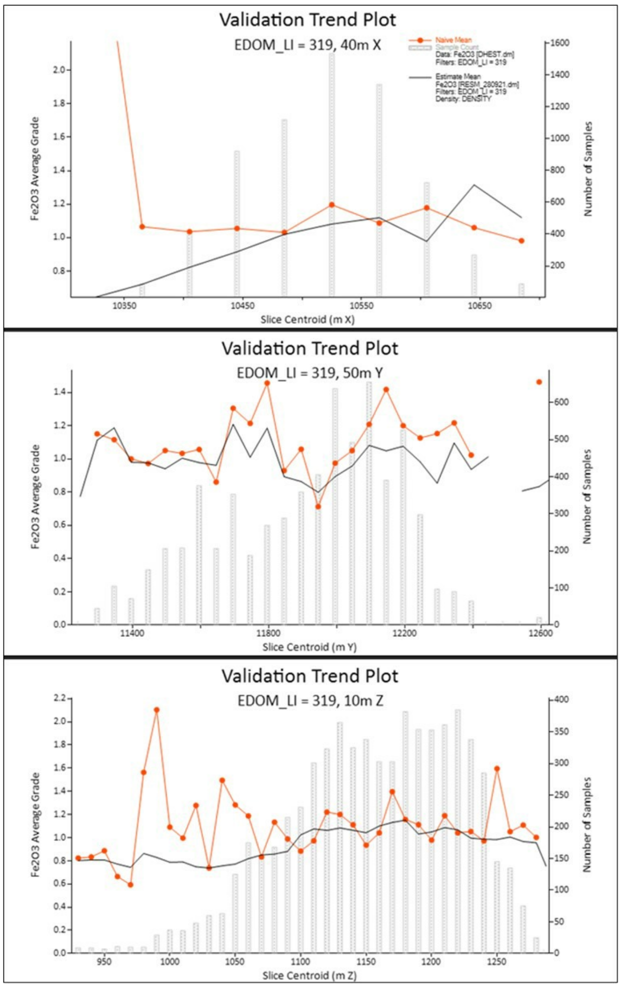
Source: SRK, 2021

Easting, northing, and elevation swath plots were calculated to compare the average grades for the composites (red line), with the kriged estimates (black line). In general, satisfactory correlation is observed, with the grade trends evident in the composite data adequately reproduced in the block model. The nearest neighbor estimates (blue line) are also shown on the Li_2O plots to demonstrate that the apparent biases in the easting and elevation plots are likely due to variation in the volumes influenced by individual samples (due to pinching and swelling, variable extrapolation distances, and minor data clustering). Example swath plots for Li_2O and Fe_2O_3 estimates are presented in Figure 11-30 and Figure 11-31.



Source: SRK, 2021

Figure 11-30: Kapanga Swath (Trend) Plots for Li_2O – Fresh Lithium Domain



Source: SRK, 2021

Figure 11-31: Kapanga Swath (Trend) Plots for Fe_2O_3 – Fresh Lithium Domain

11.3.6 2022 Depletion

For annual depletion of mineral resources, SRK calculated the volumetric differences between the 2021 end-of-year (eoy) topographic surface and the 2022 eoy, as provided by Talison. The booleaned volumetric difference was applied to the property scale Greenbushes model to determine the tonnage of mineral resources depleated during the time period, and thus the remaining tonnes and grade of mineral resource as of 31 December 2022. Mining activites during calendar year 2022 were solely focused on the Central Lode deposit with no extraction from Kapanga.

As part of the open-pit mining depletion, SRK used surveyed underground voids from the previous tantalum mining operation at depth in the northern C3 area (Figure 11-32) to exclude these volumes in the calculation of mineral resource. This was done via a 1 m distance buffer around a combined void wireframe to account for potential inaccuracy in the survey of the wireframes, and due to closure/consistency issues in the survey wireframes themselves. This underground depletion affects density assignment in blocks for both the mineral resource and the mineral reserve, although overall impacts are minimal.

Additionally, the stockpile inventory of material greater than the 0.7% Li_2O CoG is managed onsite by Talison staff. This material is classified appropriately and included for use in mineral resource and mineral reserve calculations. For the 2022 eoy mineral resources, all stockpiled material which exceeded 0.7% Li_2O was classified as Indicated and thus fully utilized in mineral reserve calculations. As mineral resources are reported exclusive of mineral reserve, no stockpiled material are stated as resources.

Source: SRK, 2020
Shown are June 30, 2020 mine topography (yellow) and 1 m distance buffer around underground mining/development (red).

Figure 11-32: Underground Void Wireframes

11.3.7 Bulk Density

During block model construction in 2020, SRK was provided with specific gravity data (SG) from 2,074 samples collected from pegmatite, amphibolite, granofels, and dolerite rock types. Descriptive statistics for the SG from these rock types is shown in Table 11-19. To assign bulk density into the Central Lode and Kapanga block models, mean SG was coded into the waste rocks based on the data provided. Alluvial and fill material were assigned a nominal density of 1.8 g/cm^3 and 1.5 g/cm^3 based on reasonable average densities for these unconsolidated material types. For the pegmatite, Talison has previously utilized a regression analysis of the Li_2O content to accurately calculate bulk density. This is developed from the pegmatite SG sampling and the extensive production history of the mine. The calculation of density for pegmatite is shown below:

Density (Pegmatite) = 0.071 * (Li_2O) + 2.59

Bulk densities were assigned to the block model based on the values in Table 11-19. SRK considers the assignment of mean densities of the waste rocks reasonable, and the determination of the regression analysis for the Li_2O - SG relationship satisfactory given its reliable use in production tracking and reporting as stated by Talison. All bulk densities are assumed to relate equally to SG for this study, with assumption of negligible moisture content in the hard rock at the time of blasting and mining.

Table 11-19: Specific Gravity Data by Rock Type – Bulk Density Assignment

	Model Bulk Density (g/cm^3)	Count	Length	Mean SG	Standard Deviation	Coefficient of Variation	Variance	Minimum	Maximum
Rock Type		2074	1,819.44	2.81	0.17	0.06	0.03	1.59	3.98
A	3.03	254	206.97	3.03	0.13	0.04	0.02	2.38	3.98
D	2.98	198	149.31	2.98	0.15	0.05	0.02	2.53	3.71
G	2.93	91	73.32	2.93	0.17	0.06	0.03	2.60	3.17
P	Variable	1528	1,387.20	2.76	0.14	0.05	0.02	1.59	3.79
Alluvial	1.8	NA							
Fill	1.5	NA							

Source: SRK, 2020

The 31 December 2022 stockpile inventory are based on the surveyed volume multiplied by stockpile bulk density on 31 December. Mass calculations are based on crusher weightometer throughput (tonnes), truck count movements, and the distribution of oversize which is allocated an average bulk density of 1.8 g/cm^3. SRK notes all stockpiles are utilized in the mineral reserve statement.

11.3.8 Reconciliation

The reconciliation of production data is utilized by SRK as validation against the volumetric depletion exercise. SRK compares the tonnes and grades estimated in the resource block model to annual production for the time period. Talison produces annual end of year pit surfaces which were used to flag the production periods in the block model and compare against the documented production from those periods. This comparison is generally dependent on the quality of the reconciliation done by site, and can be influenced by materials handling, stockpile movement, and operational challenges which locally may make the comparisons challenging.

11.3.9 Resource Classification and Criteria

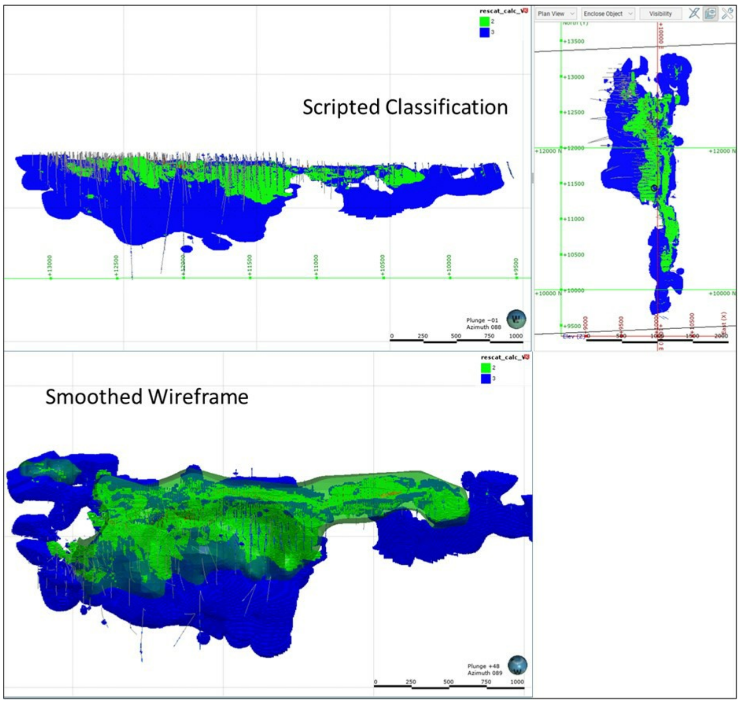
SRK has made reasonable efforts to model the geological complexity and estimate the mineral resources at a high level of detail, but the uncertainty of geological complexity and its effect on mining and processing of pegmatites is better assessed at the grade-control scale through short-range modeling. The mineral resources at the deposit scale are reported as Indicated and Inferred categories to convey the confidence in the geological continuity and grade consistency in the pegmatite. The largest source of uncertainty in the Central Lode and Kapanga models is the reliability of the local estimates and the accuracy of the lithological interpretation, both of which are influenced by drillhole spacing.

To assess this relative confidence, SRK considered a number of factors in the classification scheme. SRK considered:

- The geological complexity within the pegmatites
- The number of drillholes used in the estimate
- The average distances to the informing composites
- The slope of regression (SoR) for Li_2O estimates as a measure of relative accuracy of the estimate as inputs to a script-based classification of the resource
- Final QP spatial review, manual digitizing of polylines, and modification of final classification

To classify the Central Lode deposit, SRK digitized polylines and generated smoothed classification wireframes which addressed the edge effects and artifacts of scripted classification. The general criteria for defining Indicated blocks in the Central Lode block model script is shown below. A graphical example of this process is shown in Figure 11-33. All resources estimated within the pegmatite which were not categorized as Indicated were assigned an Inferred category:

- Indicated resources – Central Lode Deposit:
  - High Grade Domain:
    - >=Three Drillholes
    - Average Distance of <= 180 m
    - SoR >= 0.5
  - Low Grade Domain:
    - >=Three Drillholes
    - Average Distance of <= 40 m
    - SoR >= 0.2



Source: SRK, 2020

Figure 11-33: Central Lode Resource Classification

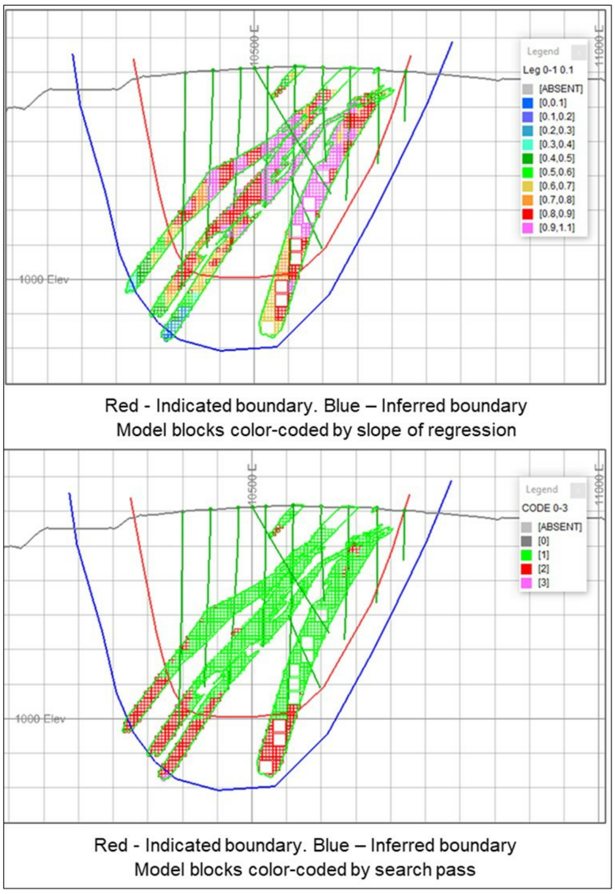
At the Kapanga deposit, Talison and SRK consider that the level of uncertainty enables Indicated and Inferred Resources to be defined but precludes the delineation of Measured Resources. Indicated and Inferred resource definition is defined as follow:

- Indicated resources – Kapanga Deposit:
  - Pegmatite Domain:
    - >=Three Drillholes
    - Pass 1 estimate
    - Extrapolated Distance of <= 30 m
    - SoR >= 0.6

- Inferred resources – Kapanga Deposit:
  - Pegmatite Domain:
    - Within manual controlled boundary
    - Extrapolated Distance of <= 50 m

An Indicated boundary was defined by delineating strings around areas where the drill spacing was regular, the majority of the blocks had been estimated using the first search pass, and the slope of regression exceeded 0.6. Extrapolation distances beyond the drilling was limited to approximately 20 to 30 m.

The Inferred boundary was generally interpreted approximately 20 to 50 m beyond the Indicated boundary, and in most places captured all of the modeled pegmatite. The Indicated and Inferred strings were linked to form wireframe surfaces that were used to assigned classification cells to the model cells. Figure 11-34 presents an example cross section showing the classification boundaries superimposed on the drillholes and the model cells color coded by slope of regression and search pass.



Red - Indicated boundary. Blue – Inferred boundary
Model blocks color-coded by slope of regression

Red - Indicated boundary. Blue – Inferred boundary
Model blocks color-coded by search pass

Source: SRK, 2021

Figure 11-34: Kapanga Resource Classification - Section 11,600N

11.4 Resource Cut-Off Grades Estimates

The mineral resource cut-off grade determination is based on assumptions and actual performance of the Greenbushes operation. SRK has utilized a mineral resource CoG of 0.7% which is elevated from a calculated resource economic CoG. SRK has decided to utilize the 0.7% Li_2O CoG to align with current site practices.

Concentrate attributes and production cost inputs to the cut-off calculation are presented in Table 11-20. Recovery of a 6% Li_2O concentrate is based on weight recovery calculations from actual operational data.

Pricing was assumed based on a review of historical price trends for the product (spodumene concentrate) supported by a market study (Chapter 16) and a strategy of utilizing an optimistic and longer-term resource price projection for the 20+ year mine life. This pricing was discussed with Albemarle and is consistent with resource pricing scenarios developed for other spodumene concentrate operations. It is the QP's opinion that the selected pricing is reasonable for the purpose of declaring the mineral resources. Mineral resources have been calculated by SRK and are based on a spodumene concentrate sales price of US$1,650 CIF China, which is US$1,523/t of concentrate at the mine gate after deducting for transportation and government royalty.

SRK has utilized a mineral resource CoG of 0.7% which is elevated from an economic CoG. SRK has decided to utilize the 0.7% Li_2O CoG to align with current site practices.

Table 11-20: Mineral Resource Economic Cut-Off Grade Calculation

Revenue	Units	Value
Cut-Off Grade	Li_2O%	0.319
Mass Yield	T of 6% Li_2O concentrate	0.02074
Price at Mine Gate	US$/t of 6% Li_2O Concentrate	1,523
Total Revenue	**US$/t-RoM**	31.59
Costs		
Incremental Ore Mining	US$/t-RoM	2.79
Processing	US$/t-RoM	23.35
G&A	US$/t- RoM	3.57
Sustaining Capital	US$/t-RoM	1.88
Total Cost	**US$/t-RoM**	**31.59**

Source: SRK, 2022
Notes:
- The Greenbushes mass yield equation varies based on the Li_2O % grade and is subject to a 97% recovery limitation when the lithium oxide grade exceeds 5.5%. Mass yield varies as a function of grade and may be reported herein at lower mass yields than the chemical grade plant average.
- Incremental ore mining costs include RoM loader, rehandle from long-term stockpiles, grade control assays, and rock breaker. Full mining costs, including drilling, blasting, loading, hauling and overheads are not included in the CoG calculation but were included in the pit optimization. In the QP's opinion this methodology for the cut-off grade calculation is appropriate because the pit limits have been established by economic pit optimization.
- Based on the internal constraints of the current operations, a nominal 0.7% Li_2O CoG was utilized to report mineral resources.

11.5 Reasonable Prospects for Economic Extraction (RPEE)

It is SRK's opinion that the Greenbushes mineral resource is amenable to open pit mining based on the historical mining completed on the property to date. SRK constrained the mineral resources to material above the resource CoG of 0.7% Li_2O within an optimized economic pit shell produced using Maptek Vulcan software using the internal Lerch-Grossman (LG) algorithm. The optimized pit shell is designed to consider the ability of the resource tonnes to pay for the waste tonnes based on the input economics. The result is a surface or volume which constrains the resources but provides RPEE at the resource pricing revenue factor while utilizing the current pricing for overall inputs. Pit optimization inputs are noted as follows:

- Mine gate resource price assumption = US$1,523/t Li_2O at 6% concentrate pricing.
- CGP1 weight recovery (mass yield) is based on Greenbushes' mass yield formula. Mass yield varies as a function of grade and may be reported herein at lower mass yields than the CGP1 average.
- Pit slope (46 on the west wall and 42 on the east wall)
- 0% mining dilution, 100% mining recovery
- US$4.54/t mining cost (average life-of-mine for ore and waste), US$23.35/t processing cost, US$3.57/t G&A cost, and US$1.88/t sustaining capital cost.

The resource pit is then used as a reporting constraint to exclude all mineralized tonnes from resource reporting which are external to this pit volume. SRK notes that the mineral reserves (Section 12) are constrained by a reserve pit. The reserve pit generally sits within the resource pit, although it locally extends beyond the limits of the resource pit due to more stringent design constraints such as ramps and subject to reserve economics. SRK also notes that the optimized pit for resource reporting is not limited by boundaries for mining infrastructure, and that no capital costs for movement or replacement of this infrastructure are assumed.

11.6 Uncertainty

As a baseline consideration for uncertainty and how it is discussed in this report, SRK notes that Greenbushes is an operating mine with a long history and extensive experience with the exploration, definition, and conversion of mineral resources to reserves which have been mined profitably. SRK has assessed the relative uncertainty in the quantity and quality of mineral resources for Greenbushes and mineral resource classification based on this assessment.

SRK considered multiple factors of uncertainty in the classification of resources on the Greenbushes property. Most importantly, there are no Measured resources stated despite the long production history and extensive detailed drilling and mapping. Reasons for this are as follows:

- The geological and inherent local variability of grade within the pegmatite body is highly variable in localized areas, and difficult to characterize to a Measured degree of certainty for a mineral resource.
- There is potential for dolerite dikes and internal waste rock to be incorporated into the pegmatite resulting in mine dilution. These geological features represent small-scale features which are not modeled at the deposit scale and have the potential to contaminate the pegmatite with iron (Fe_2O_3) that may deleteriously affect the recoverability and concentration of final product.
- There is a lack of long-term confidence in the definition of mineralization appropriate to produce higher value products such as technical grade concentrates. Greenbushes consistently produces technical grade concentrates, which on average, sell at a higher price than chemical grade concentrate and features a separate recovery facility. However, the

detail needed to define and predict this material happens at the blasthole scale and is thus not reported in the long-term through the resource block model.

These geological factors are relevant to the overall confidence in the distribution of the quality and quantity of pegmatites and does not satisfy the definition of Measured resources at a long-term scale as reported herein. Greenbushes accounts for this variability operationally through detailed grade control drilling in near-term production areas, logging, and sampling of blastholes for integration into short range planning, selective mining of the deposit, and ore-sorting at the crusher to limit inputs from waste rock.

Indicated resources are those which are defined at a sufficient level of confidence to assume geological and grade continuity between points of observation. SRK notes that this characterizes the majority of the detailed drilling and sampling at Greenbushes, and that the modeling effort has been designed to incorporate all relevant geological information which supports these assumptions. Confidence assumptions built into the designation of Indicated mineral resources are based on geological consistency as noted through cross section and level plan view reviews, 3D observations of the modeling, similarity in drilling characteristics and thicknesses, model validation, and estimation quality metrics.

Uncertainty regarding lack of evidence for geological or grade continuity at the levels of the Indicated mineral resources is dealt with by categorizing this material as Inferred. In general, this typically suggests lack of continuity from at least two drillholes, extrapolated mineralization, high internal variance of Li_2O grades (as determined through estimation quality metrics), or other factors. In short, there is sufficient evidence to imply geological or grade continuity for this material, but insufficient to verify this continuity. Inferred resources do not convert to mineral reserves during the reserve estimation process and are treated as waste in mine scheduling and reserve economic calculations.

Economic uncertainty associated with the resources is mitigated to a large degree by the nature of the Greenbushes mine functioning for many years, as well as the reasonable application of both a pit optimization and CoG assumptions for reporting. SRK has provided sensitivity tables and graphs for the mineral resources in the next section as grade tonnage curves.

11.7 Summary Mineral Resources

The Greenbushes mineral resource statement is based on the property-scale model comprised of the Central Lode and Kapanga deposit-scale models. This model has been updated to reflect revised pit optimization parameters for the December 31, 2022 effective date. These may reflect adjustments in economics, pit slope angles, or other factors which have not modified the June 30, 2020 input data such as drilling, geology models, or block models. All mineral resource statement calculations were performed using Leapfrog Geo software. The Greenbushes Mineral Resources are stated as in situ and exclusive of Mineral Reserves. (hard rock within an economic pit shell and above the assigned CoG). Table 11-21 shows the SEC defined mineral resources, exclusive of reserves. Resources are contained within the resource pit shell and include material above the Li_2O CoG of 0.7% Li_2O. The stockpile material is classified as Indicated and reports to mineral reserves.

SRK notes that this is not a multiple commodity resource. The only relevant commodity of interest for Albemarle is Li_2O in the form of spodumene concentrate. Although, other elements have been estimated for the purposes of downstream materials characterization, in the opinion of the QP, none are considered deleterious to the point of exclusion from the mineral resources, and none are considered to be a co-product with economic value for the purposes of reporting.

Table 11-21Error! No sequence specified.: Greenbushes Summary Mineral Resources Exclusive of Mineral Reserves as of December 31, 2022 Based on US$1,523/t of Concentrate at Mine Gate– SRK Consulting (U.S.), Inc.

Area	Category	100% Tonnes (Mt)	Attributable Tonnes (Mt)	Li_2O (%)	Cut-Off (% Li_2O)	Mass Yield	100% Concentrate Tonnes at 6.0% Li_2O (Mt)	Attributable Concentrate Tonnes at 6% Li_2O (Mt)	100% Li Metal in Concentrate (Kt)	Attributable Li Metal in Concentrate (Kt)
Resource Pit 2022	Indicated	44.4	21.8	1.53	0.7	16.4	7.3	3.6	203.0	99.5
	Inferred	57.7	28.3	1.15	0.7	11.3	6.5	3.2	181.1	88.7

Source: SRK, 2023

- Albemarle's attributable portion of mineral resources is 49%.
- Mineral resources are reported exclusive of mineral reserves. Mineral resources are not mineral reserves and do not have demonstrated economic viability.
- Resources have been reported as in situ (hard rock within an optimized pit shell).
- Resources have been categorized subject to the opinion of a QP based on the quality of informing data for the estimate, consistency of geological/grade distribution, data quality, and have been validated against long term mine reconciliation.
- Resources which are contained within the mineral reserve pit design may be excluded from reserves due to an Inferred classification.
- All stockpiled resources have been converted to mineral reserves.
- Mineral resources are reported considering a nominal set of assumptions for reporting purposes:
  - The mass yield for resources processed through the chemical grade plants is estimated based on Greenbushes' mass yield formula, which is Yield%=9.362*(Li_2O %)^1.319, subject to a 97% recovery limitation when the Li_2O grade exceeds 5.5%.
  - Derivation of economic CoG for resources is based on the mine gate pricing of US$1,523/t of 6% Li_2O concentrate. The mine gate price is based on US$1,650/t-conc CIF less US$127/t-conc for government royalty and transportation to China.
  - Costs estimated in Australian Dollars were converted to U.S. dollars based on an exchange rate of 1.00AU$:0.72US$.
  - The economic CoG calculation is based on US$2.79/t-ore incremental ore mining cost, US$23.35/t-ore processing cost, US$3.57/t-ore G&A cost, and US$1.88/t-ore sustaining capital cost. Incremental ore mining costs are the costs associated with the RoM loader, stockpile rehandling, grade control assays and rockbreaker.
  - The price, cost and mass yield parameters produce a calculated resource economic CoG of 0.319% Li_2O. However, due to the internal constraints of the current operations, an elevated resource CoG of 0.7% Li_2O has been applied. SRK notes actual economic CoG is lower, but it is the QP's opinion to use a 0.7% Li_2O CoG to align with current site practices
  - An overall 42° (east side) and 46° (west side) pit slope angle, 0% mining dilution, and 100% mining recovery.
  - Resources were reported above the assigned 0.7% Li_2O CoG and are constrained by an optimized 0.95 revenue factor pit shell.
  - No infrastructure movement capital costs have been added to the optimization.
- Mineral resources tonnage and contained metal have been rounded to reflect the accuracy of the estimate, and numbers may not add due to rounding.
- SRK Consulting (U.S.) Inc. is responsible for the mineral resources with an effective date: December 31, 2022.

11.7.1 Mineral Resource Breakdowns and Sensitivity

This section provides additional transparency and demonstrates resource sensitivity on the Greenbushes property. Given the 2022 inclusion of both the Central Lode and Kapanga deposits in the disclosure of mineral resources, Table 11-22 provides the relative breakdown of contributing resources by deposit on the Greenbushes property. As shown, the Central Lode comprises the majority of resource tonnage on the Greenbushes property.

Table 11-22: Deposit Contribution to Mineral Resources

Greenbushes Deposits	Resource Classification	100% Tonnes (Mt)	Contribution (%)	Li_2O (%)
Kapanga	Indicated	7.1	16%	1.78
	Inferred	3.7	6%	1.96
Central Lode	Indicated	37.2	84%	1.48
	Inferred	53.9	93%	1.09
Total Property	Indicated	44.4		1.53
	Inferred	57.7		1.15

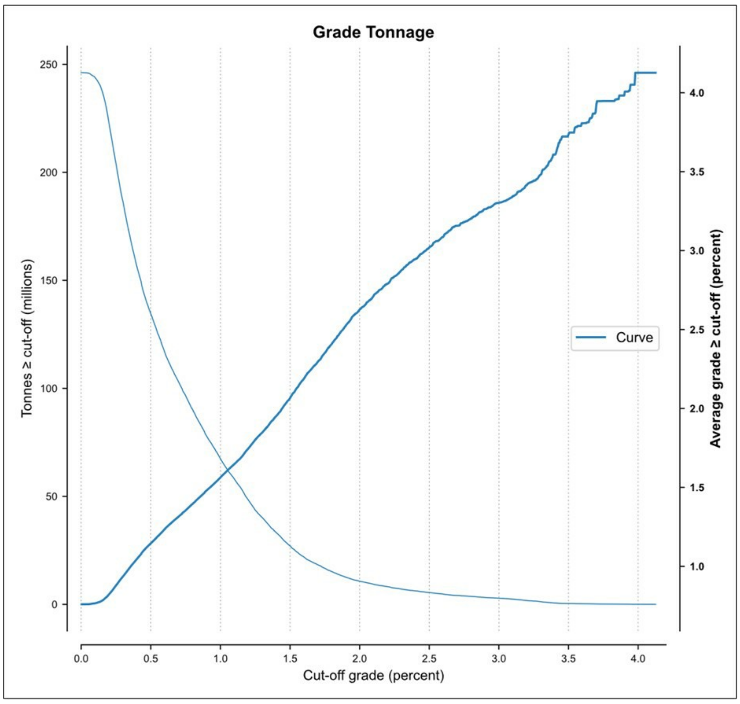
Source: SRK, 2022

To evaluate the sensitivity of the mineral resources to modification of the CoG, SRK generated a grade-tonnage curve and accompanying table (Table 11-23). This sensitivity to changes in the CoG is shown graphically in Figure 11-35.

Table 11-23: Grade Tonnage Sensitivities – Pit-Constrained Mineral Resources Exclusive of Reserves

Cut-off grade Li_2O (%)	Tonnes ≥ cut-off (Mt)	Average Li_2O grade ≥ cut-off (%)
0.0	245.0	0.8
0.1	242.8	0.8
0.2	221.6	0.8
0.3	185.5	0.9
0.4	155.3	1.0
0.5	133.6	1.1
0.6	115.8	1.2
0.7	102.1	1.3
0.8	89.5	1.4
0.9	77.4	1.5
1.0	66.7	1.6
1.1	57.4	1.6
1.2	47.7	1.7
1.3	39.7	1.8
1.4	32.9	2.0
1.5	26.7	2.1
1.6	21.6	2.2
1.7	18.1	2.3
1.8	15.0	2.4
1.9	12.5	2.5
2.0	10.6	2.6

Source: SRK, 2023
Mineral resources are reported exclusive of mineral reserves.



Source: SRK, 2023

Figure 11-35: Grade-Tonnage Curve for Mineral Resources.

11.8 Opinion on Influence for Economic Extraction

SRK notes that the influence of the pit shell on the resource is significant, as mineralized material exists external to the shell. It is SRK's opinion that additional resources may be developed with realization of additional confidence in material through additional technical evaluation work, higher commodities pricing, and lower costs. No boundaries or limitations were placed on the resource pit optimization scenario to account for infrastructure movement or other surface disturbance considerations, as these are considered modifying factors which are relevant to the mineral reserves. SRK is of the opinion that all relevant factors to the RPEE of mineral resources have been considered as a part of this study.

12 Mineral Reserve Estimates

The conversion of mineral resources to mineral reserves has been completed in accordance with SEC regulations CFR 17, Part 229 (S-K 1300). Mineral reserves were estimated based on a spodumene concentrate sales price of US$1,500/t of concentrate CIF China (or US$1,381/t of concentrate at the mine gate). The mineral reserves are based on PFS level study as defined in §229.1300 *et seq.*

The mineral reserve calculations for the Greenbushes Central Lode and Kapanga lithium deposits have been carried out by a Qualified Person as defined in §229.1300 et seq. SRK is responsible for the mineral reserves reported herein.

Greenbushes is an operating mine that uses conventional open pit methods to extract mineral reserves containing economic quantifies of Li_2O to produce both chemical and technical grade spodumene concentrates.

12.1 Key Assumptions, Parameters, and Methods Used

The key mine design assumptions, parameters and methods are summarized as follows.

12.1.1 Resource Model and Selective Mining Unit

The in situ mineral resources used to define the mineral reserves are based on the SRK block model as described in Section 11 of this report. The block model is depleted to December 31, 2022. The SRK block model was used without modification, as the subblock size in the model matches the selective mining unit (SMU) size that was adopted for mine planning purposes.

12.1.2 Pit Optimization

The mineral reserves are reported within an ultimate pit design that was guided by pit optimization (Lerch-Grossman algorithm). The pit optimization considered only Indicated mineral resources as there are no in situ Measured resources in the SRK block model. Inferred resource blocks were assigned a Li_2O% grade of zero prior to pit optimization and were treated as waste.

The overall pit slopes used for pit optimization are based on operational level geotechnical studies and range from 27° to 50°. This includes a 5° allowance for ramps and geotechnical catch benches.

Pit optimization parameters are shown in Table 12-1.

Table 12-1: Pit Optimization Parameters

Parameter	Unit	Value
Mining Cost	US$/t-mined	Variable based on depth and material type (Average is US$5.49/t mined)
Processing Cost	US$/t ore	23.35
G&A Cost	US$/t ore	3.57
Sustaining Capital Cost	US$/t ore	1.88
Mass Yield	%	Variable based on Li_2O grade (Average is 23.0%)
Gross Sales Price (CIF China)	US$/t of 6% Li_2O Conc	1,500
Shipping, Transportation and Royalty	US$/t of 6% Li_2O Conc	119
Net Sales Price (mine gate)	US$/t of 6% Li_2O Conc	1,381
Discount Rate	%	8.0

Source: SRK, 2022
The Greenbushes mass yield equation is subject to a 97% recovery limitation when the Li_2O grade exceeds 5.5%. The MS Excel equation used for pit optimization is "=IF(Li2O%>5.5,Li2O%/6*97%,9.362*Li2O%^1.319/100).

The mine planning process begins with pit optimization using preliminary estimates of costs, recoveries, and other input parameters. At the conclusion of the pit optimization, an economic pit shell is selected to guide the design of the final reserves pit. In this case, the revenue factor (RF) 0.30 pit shell was selected, which corresponds to a mine gate price of US$414/t of 6% Li_2O. The mining schedule for the final reserves pit is then generated. Detailed mining costs (both operating expenditures and capital expenditures) are then calculated from the reserves mining schedule. Provided that the detailed mining costs are not materially different from the preliminary mining costs used for pit optimization, the pit optimization results are typically considered to be valid.

In this instance, the average preliminary mining cost used for pit optimization was US$5.49/t mined (this is the average corresponding to the RF 0.30 pit shell). The preliminary mining cost was estimated based on established mining, drilling and blasting contractor rates, along with estimates for mining overheads. We note that the mining cost applied to each block in the block model is variable depending on the depth of the block (i.e., deep blocks have longer haul pathways than shallow blocks and therefore the haulage cost for deep blocks is higher). Also, the mining costs vary depending on whether the material is ore, soft rock waste (which doesn't require blasting), or hard rock waste (which does require blasting).

The average mining cost used in the Technical Economic Model (TEM) is AU$7.40/t. This cost was calculated from the final mining schedule and is shown in Table 18-5. Based on the modeled exchange rate (Table 19-2), this equates to US$5.33/t-mined (Table 19-5). In SRK's opinion, the average preliminary mining cost of US$5.49/t-mined used for pit optimization is sufficiently close to the average final mining cost used in the TEM of US$5.33/t-mined. SRK notes that the preliminary average mining cost will never exactly match the final average mining cost used in the TEM because the mining planning process is iterative (i.e., changing the input parameters changes the pit shells, which changes the final pit design, which changes the schedule, which changes the detailed cost estimate). Also, the quantities (and ratios) of ore and waste in the final designed reserves pit are different from the quantities in the optimized pit shell because the final pit design includes ramps and other practical mine design features.

A LoM sustaining capital allowance of US$1.88 per tonne of ore was used for the purposes of pit optimization and cut-off grade calculation. Because pit optimization is performed as a first step in the mine planning process, SRK typically relies on the most recent information that is available at the time when the pit optimization process commences. In this instance, SRK used the estimate of LoM annual sustaining capital costs for Greenbushes that was included in the 2023 budget provided by the Company. The budgetary estimate of average annual sustaining capital costs for Greenbushes in such budget was AU$21.6 M/y, or AU$2.62 per tonne of ore based on the LoM average 8.26 Mt/y processing rate. This cost was then converted to US$1.88 per tonne of ore based on an assumed exchange rate of 0.72 US$:AU$. SRK reviewed the budgetary projection of the sustaining capital costs for Greenbushes and determined that it was reasonable to rely thereon for the purposes of pit optimization and cut-off grade calculation.

Subsequent to pit optimization, design and scheduling, a detailed estimate of LoM sustaining capital costs was prepared as discussed in Section 18 of this report. The detailed estimate based on the final reserves was used in the TEM in Section 19.

It is noted that the other preliminary cost parameters used for pit optimization (processing cost, site G&A cost) may differ slightly from the final estimated costs used in the technical economic model (TEM) discussed in Sections 18 and 19 of this report. The differences in costs are not considered material.

The summary pit optimization results are shown in Table 12-2. The RF 0.30 pit shell was selected to guide the design of the ultimate reserves pit. This pit shell is highlighted as “Pit 3” in Table 12-2. The RF 0.30 pit corresponds to a mine gate price of US$414/t of 6% Li_2O concentrate (i.e., 30% of the mine gate reserves price of US$1,381/t of 6% Li_2O concentrate).

The reason that a relatively low revenue factor pit shell was selected to guide the design of the ultimate reserves pit is because of infrastructure and land ownership constraints that currently exist at the Greenbushes operation. If such constraints are removed at some point in the future, the Company will have the option selecting a higher revenue factor optimized pit shell, which would result in a larger ultimate reserves pit. In the QP’s opinion, the selection of a relatively low revenue factor pit shell (RF 0.30) is conservative and helps to de-risk the mine design because it results in a lower strip ratio than would otherwise be required for a higher revenue factor pit.

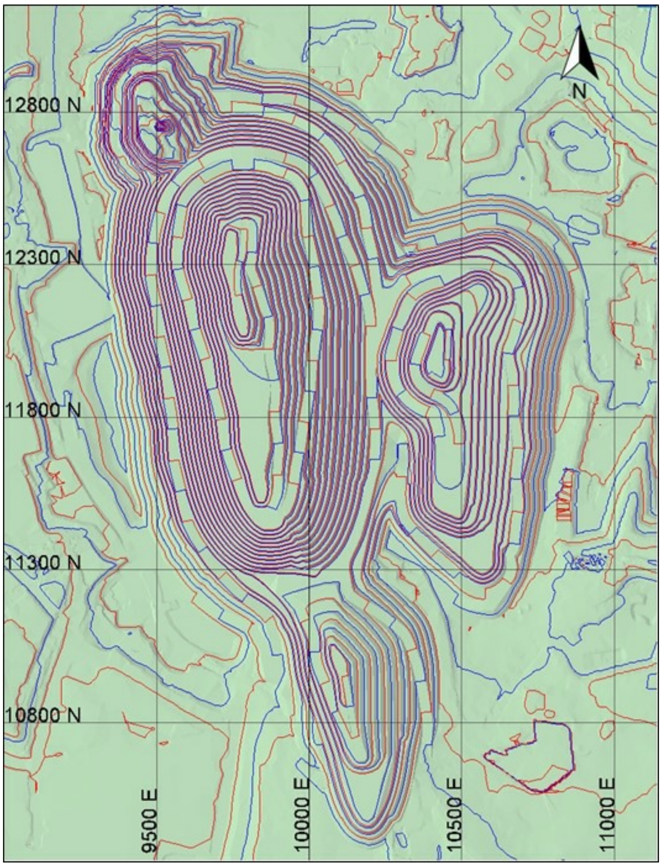
Table 12-2: Summary Pit Optimization Results

Pit Shell	Revenue Factor	Mine Gate Selling Price (US$/t-conc)	Strip Ratio (w:o)	Total Ore + Waste (Mt)	Ore (Mt)	Waste (Mt)	6% Li_2O Concentrate (Mt)	Mass Yield (%)	Diluted Grade (Li_2O%)
1	0.20	276	2.50	332.3	95.1	237.2	24.8	26.1	2.14
2	0.25	345	2.93	481.5	122.6	358.9	30.0	24.4	2.03
3	0.30	414	3.55	703.4	154.6	548.8	35.6	23.0	1.94
4	0.35	483	3.84	798.5	165.0	633.5	37.4	22.6	1.91
5	0.40	552	4.03	879.0	174.6	704.3	38.7	22.2	1.88
6	0.45	621	4.20	934.8	179.8	755.0	39.5	21.9	1.86
7	0.50	691	4.45	1,014.3	186.3	828.0	40.4	21.7	1.85
8	0.55	760	4.62	1,066.2	189.7	876.5	40.9	21.6	1.84
9	0.60	829	4.83	1,134.8	194.5	940.3	41.5	21.3	1.82
10	0.65	898	4.94	1,166.0	196.4	969.6	41.8	21.3	1.82
11	0.70	967	5.04	1,197.1	198.1	999.0	42.0	21.2	1.81
12	0.75	1,036	5.25	1,255.9	200.8	1,055.1	42.4	21.1	1.81
13	0.80	1,105	5.44	1,303.4	202.4	1,101.0	42.6	21.1	1.80
14	0.85	1,174	5.50	1,320.5	203.2	1,117.3	42.7	21.0	1.80
15	0.90	1,243	5.57	1,338.2	203.8	1,134.4	42.8	21.0	1.80
16	0.95	1,312	5.62	1,352.7	204.5	1,148.3	42.9	21.0	1.80
17	1.00	1,381	5.66	1,364.6	205.0	1,159.6	42.9	20.9	1.80
18	1.05	1,450	5.71	1,379.0	205.5	1,173.5	43.0	20.9	1.80
19	1.10	1,519	5.73	1,384.5	205.6	1,178.8	43.0	20.9	1.80
20	1.15	1,588	5.84	1,410.6	206.2	1,204.5	43.1	20.9	1.80
21	1.20	1,657	5.86	1,415.2	206.3	1,208.9	43.1	20.9	1.79
22	1.25	1,726	5.88	1,419.5	206.4	1,213.1	43.1	20.9	1.79
23	1.30	1,795	5.88	1,421.2	206.5	1,214.7	43.2	20.9	1.79

Source: SRK 2022
Optimized Pit 3 (the revenue factor 0.30 pit) was selected to guide the design of the final reserves pit.

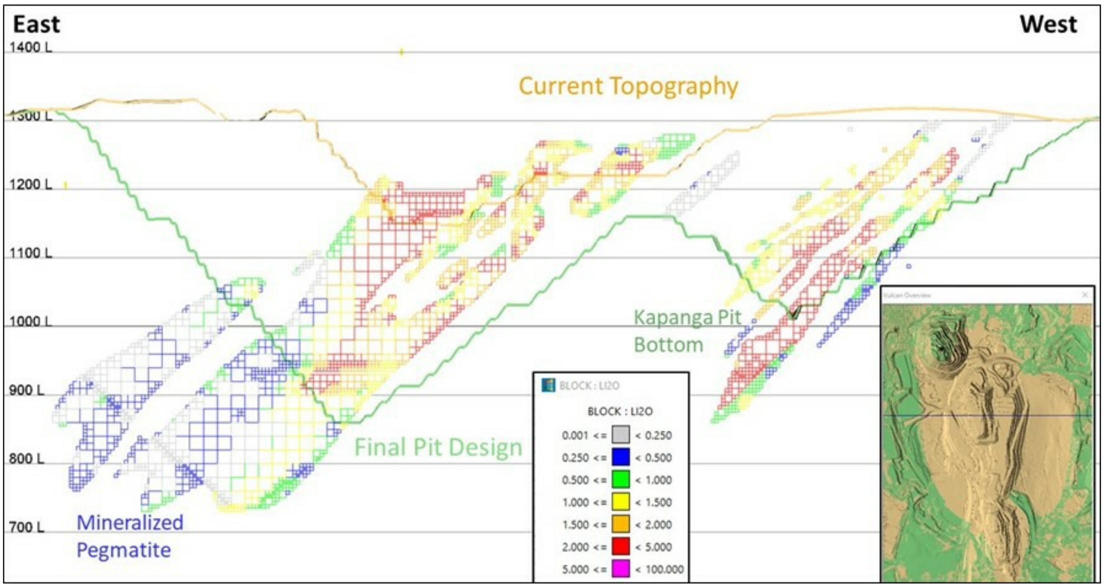
12.1.3 Ultimate Pit and Phase Design

A 3D mine design based on optimized Pit 3 (RF 0.30) was completed using Vulcan software and is the basis for the in situ mineral reserves. The reserves pit has been designed with 10 m benches, variable bench widths, variable face angles and overall wall angles of between 27° and 50°. Local berm angles vary with local ground conditions and in some areas a double bench is applied (20 m bench height with zero catch bench). Ramp width is 20 m for single-way and 32 m for two-way traffic. The ramp gradient is 1:10. The ultimate pit floor is designed at 860 mRL, with a maximum wall height of approximately 480 m. The pit has been designed with a dual ramp system with exits on both the east and west walls. Figure 12-1 is a plan view of the final pit design that was used for mineral reserves, and Figure 12-2 is a section view through the middle part of the final design pit.



Source: SRK, 2022

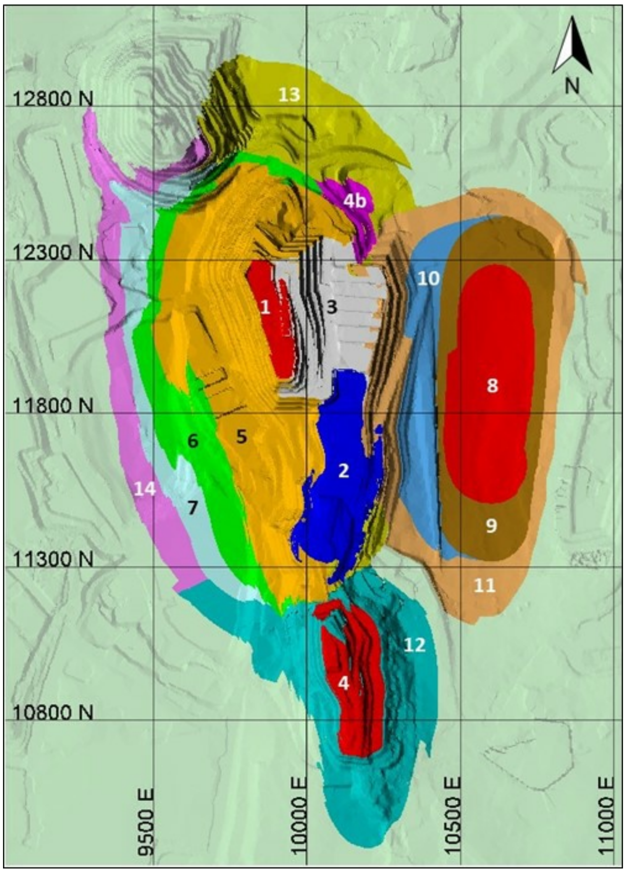
Figure 12-1: Plan View of the Ultimate Pit Design



Source: SRK, 2022

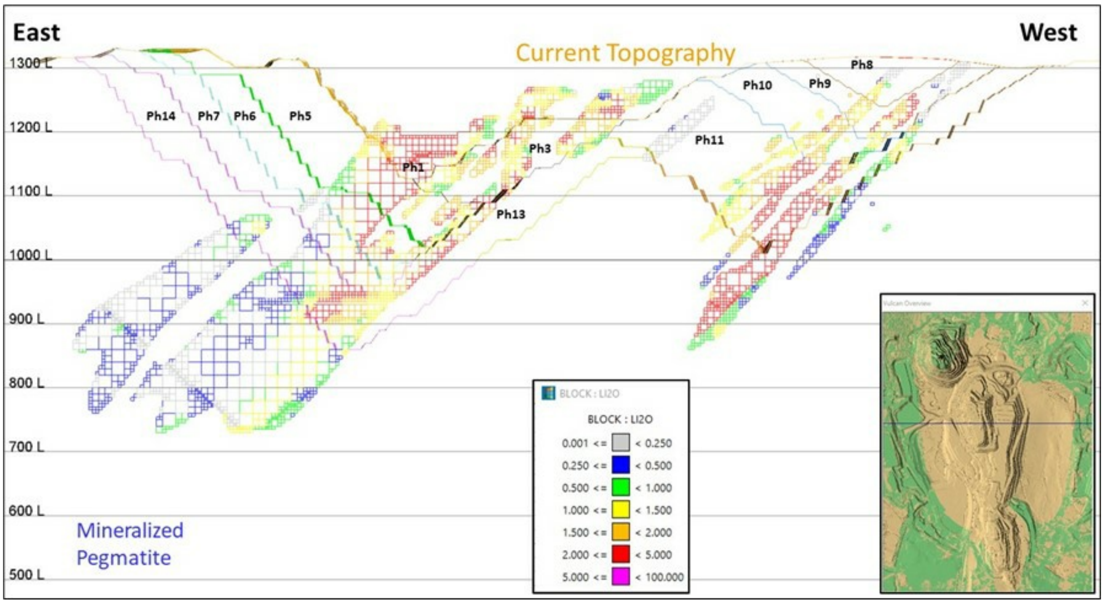
Figure 12-2: Section View of Ultimate Pit Design (12,100N) – Central Lode and Kapanga

Phase design resulted in a total of fourteen phases being designed, with the ultimate reserves pit representing the fourteenth and final phase. Figure 12-3 shows the location of the fourteen pit phases in plan view. Figure 12-4 is a sectional view though the northern part of the ultimate pit showing multiple nested phases. Figure 12-5 is a plan view of the ultimate pit and the final waste rock dumps.



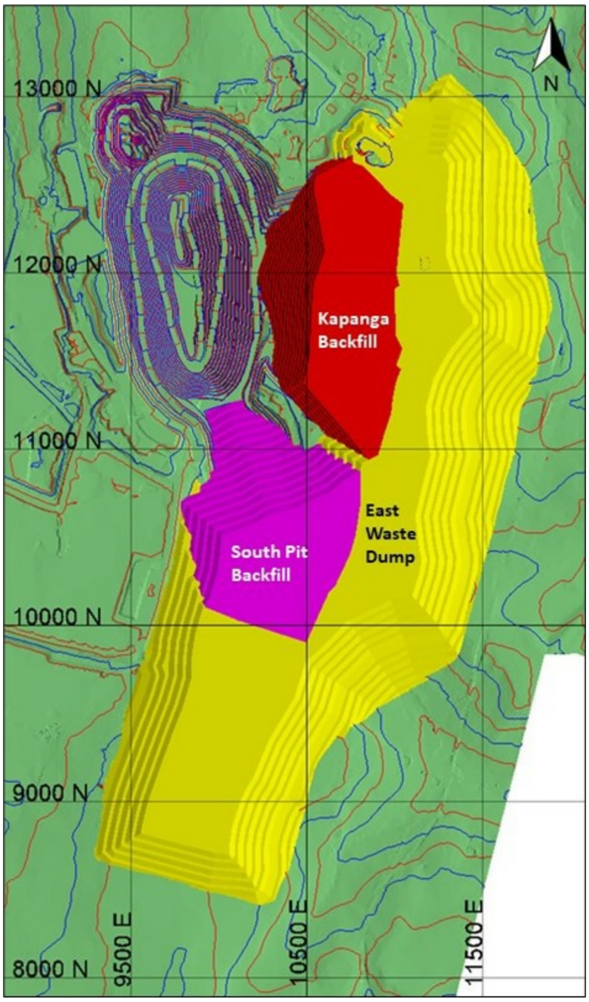
Source: SRK, 2022

Figure 12-3: Plan View of Phase Design (14 Phases)



Source: SRK, 2022

Figure 12-4: Section View of Phase Design (12,100N) – Central Lode and Kapanga



Source: SRK, 2022

Figure 12-5: Greenbushes Final Pit and Waste Dump Design in Plan View

12.2 Modifying Factors

Modifying factors are the factors that are applied to Indicated and Measured mineral resources to establish the economic viability of mineral reserves. For Greenbushes, the modifying factors include mining dilution, mining recovery, processing recovery (mass yield), and application of a cut-off grade (CoG). The CoG incorporates processing recovery and operating costs (mining, processing, G&A) and is applied to the diluted grade of each Indicated and Measured block inside the reserves pit. Each of the modifying factors is discussed below.

12.2.1 Mining Dilution and Mining Recovery

Based on reconciliation data for prior resource block models, the Greenbushes operation has historically applied a 95% grade factor and 100% mining recovery to the mineral reserves. The 95% grade factor was intended to account for, among other things, external dilution introduced by the mining process. SRK is of the opinion that this 95% grade factor should be applied to all ore blocks and, accordingly, the year-end 2022 mineral reserves adopt this historical factor.

The SRK resource block model includes 2.7% internal dilution for all Indicated resource subblocks (5 m by 5 m by 5 m) inside the reserves pit. Including this internal dilution, the total block dilution is 7.7% (5% + 2.7%) for all blocks. The global mining recovery applied is 93%. The mining recovery is applied by targeting edge blocks that have greater than 2.3% Fe_2O_3. Any blocks above 2.3% Fe_2O_3 are removed from the ore reserves estimation. This results in the removal of approximately 11.4 Mt of edge blocks with high iron content (high iron content in the mill feed is detrimental to processing plant performance).

SRK is of the opinion that these mining dilution and mining recovery adjustments are appropriate for the conversion of Indicated mineral resources to Probable mineral reserves.

12.2.2 Processing Recovery

Processing recovery is discussed in Section 14 of this report. For the purposes of converting mineral resources to mineral reserves, two mass yield (MY) equations were applied.

- For reserves that will be processed through the technical grade plant, the mass yield of concentrate was determined at the block level by applying the Greenbushes mass yield equation. (LoM MY is 37.5%).
- For reserves that will be processed through the chemical grade plants, the mass yield (MY) of concentrate was determined by applying the Greenbushes mass yield equation. (LoM MY is 22.2%). Where the lithium oxide grade is greater than 5.5%, a maximum recovery of 97% is applied.

Although Greenbushes produces a technical grade product from the current operation, it is assumed that the reserves reported herein will be sold as a chemical grade product. This assumption is necessary because feed for the technical grade plant is currently only defined at the grade control or blasting level. Therefore, it is conservatively assumed that concentrate produced by the technical grade plant will be sold at the chemical grade product price (US$1,381/t of 6% Li_2O concentrate at the mine gate).

12.2.3 Reserves Cut-Off Grade Estimate

The CoG estimation is based on assumptions and actual performance of the Greenbushes operation. Concentrate attributes and production cost inputs to the cut-off calculation are presented in Table 12-3. Recovery of a 6% Li_2O concentrate is based on the previously noted weight recovery calculations from actual operational data.

The basis for the reserves price forecast is discussed in Section 16 of this report. Considering forecast operating costs, predicted mass yield and the forecast sales price, SRK calculated an economic CoG of 0.344% Li_2O. However, based on the internal constraints of the current operations, a nominal 0.7% Li_2O CoG was utilized to report mineral reserves.

Drilling, blasting, loading, hauling and mining overhead costs are excluded from the CoG calculation for in situ material because the pit design was guided by economic pit optimization. I.e., only incremental ore mining costs (RoM loader, rehandle from long-term stockpiles, grade control assays, and rock breaking) were considered in the decision whether to send material to the waste dump or to the processing plant. Because an incremental ore mining cost is used in the cut-off grade calculation, the value in Table 12-3 (US$2.79 per tonne of ore) is different from the average full mining cost shown in Table 19-5 (US$5.33 per tonne of ore and waste mined).

The processing recovery is discussed in Section 14 of this report and is summarized in Section 12.2.2 in the text that precedes Table 12-3. The mass yield equation used in the cut-off grade calculation is dependent on the LiO_2% grade as follows:

Mass yield % =IF(Li_2O%>5.5,Li_2O%/6*97%,9.362*Li_2O%^1.319/100)

Pursuant to this equation, where the lithium oxide grade is greater than 5.5%, a maximum recovery of 97% is applied This CoG was applied to both in situ and stockpile material, although SRK notes that stockpiles are generally used to augment other material types for processing during active mining.

It is important to note that the pit optimization process determines the economic potential of the reserves pit, given the costs involved in moving every block inside the optimized pit shell to some location, either a waste dump in the case of a waste block or an ore stockpile in the case of an ore block. For this reason, the mining cost used in the cut-off grade calculation is an incremental ore mining cost rather than the full mining cost.

Table 12-3: Reserves Economic Cut-Off Grade Calculation

Revenue	Units	Value
Cut-Off Grade	Li_2O%	0.344
Mass Yield	t of 6% Li_2O Concentrate	0.02287
Price at Mine Gate	US$/t of 6% Li_2O Concentrate	1,381.00
Total Revenue	US$/t-RoM	31.59
Costs		
Incremental Ore Mining	US$/t-RoM	2.79
Processing	US$/t-RoM	23.35
G&A	US$/t- RoM	3.57
Sustaining Capital	US$/t-RoM	1.88
Total Cost	**US$/t-RoM**	**31.59**

Source: SRK, 2022

- The Greenbushes mass yield equation varies based on the Li_2O% grade and is subject to a 97% recovery limitation when the lithium oxide grade exceeds 5.5%. Mass yield varies as a function of grade and may be reported herein at lower mass yields than the chemical grade plant average.
- Incremental ore mining costs include RoM loader, rehandle from long-term stockpiles, grade control assays, and rock breaker. Full mining costs, including drilling, blasting, loading, hauling and overheads are not included in the CoG calculation but were included in the pit optimization and technical economic model. In the QP's opinion this methodology for the cut-off grade calculation is appropriate because the pit limits have been established by economic pit optimization.
- Based on the internal constraints of the current operations, a nominal 0.7% Li_2O CoG was utilized to report mineral reserves.
- RoM denotes material that is designated as process plant feed.

12.2.4 Material Risks Associated with the Modifying Factors

In the opinion of SRK as the QP, the material risks associated with the modifying factors are:

- Product Sales Price:
  - The price achieved for sales of spodumene concentrates is forecast based on predicted supply and demand changes for the lithium market on the whole. There is considerable uncertainty about how future supply and demand will change which will materially impact future spodumene concentrate prices. The reserve estimate is sensitive to the potential significant changes in revenue associated with changes in spodumene concentrate prices.
- Mining Dilution and Mining Recovery:
  - The mining dilution estimate depends on the accuracy of the resource model as it relates to internal waste dilution/dikes identification. Due to the spacing of the resource drillholes, it is not possible to identify all of the waste dikes the operation will encounter in the future. SRK studied the historical dilution factors and applied a 3D dilution halo around ore and waste contact blocks. This is accurate as long as the resource model identifies all the waste dikes; however, it is known that this is not always possible with the resource drilling. If an increased number of waste dikes are found in future mining activities, the dilution may be greater than estimated because there will be more ore blocks in contact with waste blocks. This would potentially introduce more waste into the plant feed, which would decrease the feed grade, slow down the throughput and reduce the metallurgical recovery. A potential mitigation would be to mine more selectively around the waste dikes, although this would result in reduced mining recovery.
- Impact of Currency Exchange Rates on Production Cost:
  - The operating costs are modeled in Australian dollars (AU$) and converted to US$ within the cash flow model. The foreign exchange rate assumption for the cash flow model was

provided by Albemarle. If the AU$ strengthens, the cash cost to produce concentrate would increase in US$ terms and this could potentially reduce the mineral reserves estimates.

- Geotechnical Parameters:
  - Geotechnical parameters used to estimate the mineral reserves can change as mining progresses. Local slope failures could force the operation to adapt to a lower slope angle which would cause the strip ratio to increase and the economics of the pit to change.
- Processing Plant Throughput and Mass Yields:
  - The forecast cost structure assumes that the technical grade plant and the two existing chemical grade plants remain fully operational and that the estimated mass yield assumptions are achieved. Moreover, it is assumed that two additional chemical grade plants will be constructed in the future. If one or more of the plants does not operate in the future, the cost structure of the operation will increase. If the targeted mass yield is not achieved, concentrate production will be lower. Both of these outcomes would adversely impact the mineral reserves.

12.3 Summary Mineral Reserves

The conversion of Indicated mineral resources to Probable mineral reserves has been completed in accordance with CFR 17, Part 229 (S-K 1300). Mineral reserves were estimated based on a spodumene concentrate (6% Li_2O) price of US$1,500/t of concentrate CIF China or US$1,381/t of concentrate at the mine gate. The reserves are based on a reserves pit that was guided by pit optimization. Appropriate modifying factors have been applied as previously discussed. The positive economics of the mineral reserves have been confirmed by LoM production scheduling and cash flow modeling as discussed in sections 13 and 19 of this report, respectively.

Table 12-4 shows the Greenbushes mineral reserves as of December 31, 2022.

Table 12-4: Greenbushes Summary Mineral Reserves at December 31, 2022 Based on US$1,381/t of Concentrate Mine Gate – SRK Consulting (U.S.), Inc.

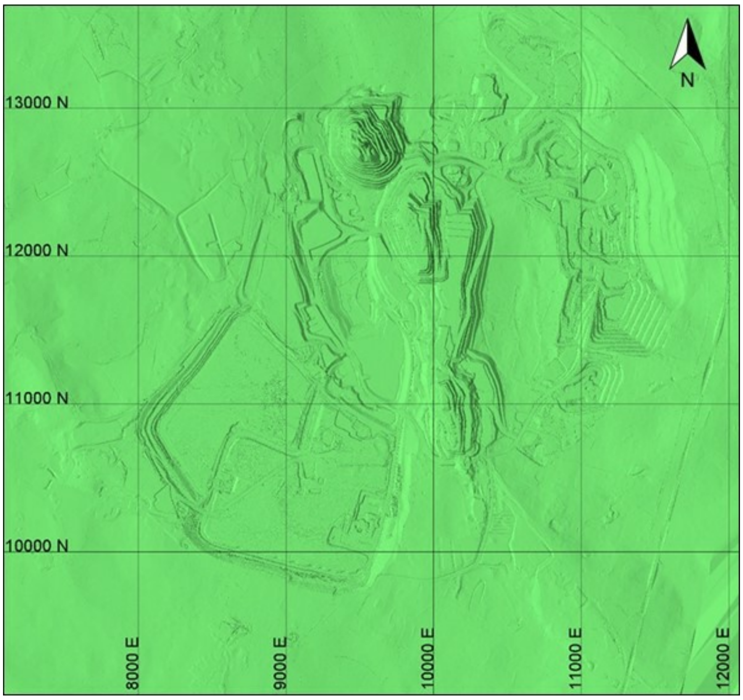
Classification	Type	100% Tonnes (Mt)	Attributable Tonnes (Mt)	Li_2O%	Mass Yield (%)	Attributable Concentrate (Mt)	Attributable Concentrate (Mt)	100% Li Metal in Concentrate (Kt)	Attributable Li Metal in Concentrate (Kt)
Probable Mineral Reserves	In situ	153.1	75	1.91	22.2%	34.0	16.7	947.8	464.4
	Stockpiles	4.0	2.0	1.99	22.2%	0.9	0.4	24.4	11.9
	In situ + Stockpiles	157.1	77.0	1.91	22.2%	34.9	17.1	972.2	476.4

Source: SRK, 2022
Notes to Accompany Mineral Reserve Table
- Albemarle's attributable portion of mineral resources and reserves is 49%.
- Mineral reserves are reported exclusive of mineral resources.
- Indicated in situ resources have been converted to Probable reserves.
- Measured and Indicated stockpile resources have been converted to Probable mineral reserves.
- Mineral reserves are reported considering a nominal set of assumptions for reporting purposes:
  - Mineral reserves are based on a mine gate price of US$1,381/t of chemical grade concentrate (6% Li_2O).
  - Mineral reserves assume 93% global mining recovery.
  - Mineral reserves are diluted at approximately 5% at zero grade for all mineral reserve blocks in addition to internal dilution built into the resource model (2.7% with the assumed selective mining unit of 5 m x 5 m x 5 m).
  - The MY for reserves processed through the chemical grade plants is estimated based on Greenbushes' mass yield formula, which is Yield%=9.362*(Li_2O%)^1.319, subject to a 97% recovery limitation when the Li_2O grade exceeds 5.5%. The average LoM mass yield for the chemical grade plants is 22.2%.
  - The MY for reserves processed through the technical grade plant is estimated based on Greenbushes' mass yield formula, which is Yield%=(31.792* Li_2O %)–80.809. There is approximately 3.2 Mt of technical grade plant feed at 3.7% Li_2O. The average LoM mass yield for the technical grade plant is 37.5%.
  - Although Greenbushes produces a technical grade product from the current operation, it is assumed that the reserves reported herein will be sold as a chemical grade product. This assumption is necessary because feed for the technical grade plant is currently only defined at the grade control or blasting level. Therefore, it is conservatively assumed that concentrate produced by the technical grade plant will be sold at the chemical grade product price.
  - Derivation of economic CoG for reserves is based on mine gate pricing of US$1,381/t of 6% Li_2O concentrate. The mine gate price is based on US$1,500/t-conc CIF less US$119/t-conc for government royalty and transportation to China.
  - Costs estimated in Australian Dollars were converted to U.S. dollars based on an exchange rate of 1.00AU$:0.72US$.
  - The economic CoG calculation is based on US$2.79/t-ore incremental ore mining cost, US$23.35/t-ore processing cost, US$3.57/t-ore G&A cost, and US$1.88/t-ore sustaining capital cost. Incremental ore mining costs are the costs associated with the RoM loader, stockpile rehandling, grade control assays and rockbreaker.
  - The price, cost and mass yield parameters produce a calculated economic CoG of 0.344% Li_2O. However, due to the internal constraints of the current operations, an elevated mineral reserves CoG of 0.7% Li_2O has been applied.
  - The CoG of 0.7% Li_2O was applied to reserves that are constrained by the ultimate pit design and are detailed in a yearly mine schedule.
  - Stockpile reserves have been previously mined and are reported at a 0.7% Li_2O CoG.
- Waste tonnage within the reserve pit is 701.5 Mt at a strip ratio of 4.58:1 (waste to ore – not including reserve stockpiles)
- Mineral reserve tonnage, grade and mass yield have been rounded to reflect the accuracy of the estimate, and numbers may not add due to rounding:
  - Mt = millions of metric tonnes
  - Reserve tonnes are rounded to the nearest hundred thousand tonnes
- SRK Consulting (U.S.) Inc. is responsible for the mineral reserves with an effective date: December 31, 2022.

13 Mining Methods

Greenbushes is an operating mine that uses conventional open pit methods to extract mineral reserves containing economic quantities of Li_2O to produce both chemical and technical grade spodumene concentrates. Historically there was underground and open pit mining at Greenbushes, but the mineral reserves and LoM plan are based only on open pit mining.

Figure 13-1 illustrates the current status of the Greenbushes Central Lode open pit.



Source: SRK, 2022

Figure 13-1: Greenbushes Central Lode Pit as of December 31, 2022

13.1.1 Current Mining Methods

The material encountered at Greenbushes is a combination of weathered material within the first 20 to 40 m with a small transition zone followed by fresh rock. The weathered zone is loosely consolidated sand which can be mined without the need for drilling and blasting. Mineralization is not present in the weathered zone thus drilling for the purposes of ore control and waste classification is not necessary. Sand and historical waste dumps are mined without blasting.

Drilling and blasting are required in all hard rock (both ore and waste). Drilling and blasting services are performed by a contractor (currently Action Drilling and Blasting) with explosives supplied by Orica. Production drilling is performed with Atlas Copco T45 and D65 drills with hole diameters ranging in diameter from 115 mm to 165 mm depending on material type and application. Blasthole depth in waste is 10 m (plus subdrill) and 5 m in ore (plus subdrill). Grade control is performed by reverse circulation (RC) drills rigs that drill 137 mm diameter holes that are sampled on 2.5 m intervals.

Flitch height is variable. Waste is typically mined on a 10 m flitch. Ore is typically mined on 5 m flitches.

A contractor (SG Mining Pty Ltd) provides all necessary equipment and operating/maintenance personnel for the load and haul operations. The load and haul contractor's current main equipment fleet is shown in Table 13-1.

Table 13-1: Load and Haul Contractor Mining Fleet

Make	Model	Type	No. of Units
Komatsu	PC1250-8	Excavator	2
Caterpillar	6015B	Excavator	3
Caterpillar	988G/H/K	Loader	6
Caterpillar	992K	Loader	1
Caterpillar	777F/G	Dump Truck (90t)	16
Caterpillar	D10R/T	Dozer	3
Caterpillar	16G/H	Grader	2
Caterpillar	IT28B	Tool Carrier	1
Caterpillar	930K	Tool Carrier	1
Caterpillar	777F	Watercart	2
Caterpillar	330GC	Rockbreaker	3
Hino	-	Service Truck	2

Source: Talison, 2021

Ore is taken to the RoM pad where it is stockpiled according to ore type, mineralogical characteristics and grade. Waste is taken to the waste dump to the east of the pits.

13.2 Parameters Relevant to Mine Designs and Plans

13.2.1 Geotechnical

Slope stability and bench design analyses have been conducted by Pells Sullivan Meynink Consult Pty (PSM) on the 2019 pit design to assess the stability of pit slopes during operations. The existing slope performance is typically good with no instances of inter-ramp failures which is supported by prism data. Bench-scale instabilities and rockfall are the principal geotechnical hazards which are managed operationally. Slope stability analyses include kinematic assessments, limit equilibrium and FEM stability analyses and rockfall assessments.

The adopted slope design acceptance criteria include:

- Bench face angles of 10% to 30% probability of undercutting
- Inter-ramp slope angles of 3% to 5% probability of undercutting
- Inter-ramp slope factor of safety greater than 1.2

- Overall slope factor of safety greater than 1.5

Results of PSM's analyses showed that the 2019 pit design met the above stability acceptance criteria. PSM noted that the west hangingwall is higher risk than the east footwall because the ore plunges beneath the west wall and each push back must remain stable to recover the reserves.

Recent work by PSM (PSM2193-060R, 2/2021) reevaluated the geotechnical model with all the existing data. The result of this work was updated slope design parameters summarized in Table 13-2.

Table 13-2: Slope Design Parameters for Kapanga Pit

Slope Design Sector	Inter-Ramp Angle (°)	Bench Configuration Bench Face Angle (°)	Bench Height (m)	Berm Width (m)
Waste Dumps	12 to 14°			
Weathered Zone (< 30 m height)	40°	Single batter configuration		
Weathered Zone (> 30 m and < 50 m height)	30°	40	20	11
KEW 1	38°	50		
KEW 2	42°	55	20	8.5
KWW	55°	75		

Source: Talison, 2021

Key risks that were identified by PSM were:

- The bullnose was a stability risk. SRK has removed the bullnose in the current pit design.
- Hydrogeological conditions, particularly in relation to bench face stability due to pore pressures and dewatering. SRK has recommended additional work be done on hydrogeological conditions before the pit wall gets through the weathered zone.
- The character and orientation of the PB Geology Interpretation structures in the recent geological model in the Central Lode west and east walls have a high degree of uncertainty and may impact the slope design. SRK has recommended that as stripping begins the geologists/geotechnical engineers evaluate the consistency and orientation of these structures.

PSM recommended that additional work should be conducted on hydrogeological conditions because pore pressures will reduce wall stability, especially where structures form wedges and when large precipitation periods persist. Safety risks are focused on rockfall events because benches are only 8.5 m wide, and a high percent of loose boulders can make it to the working floor. Future monitoring should include radar such that minor events can be used to predict more major rockfall events thereby mitigating safety risks.

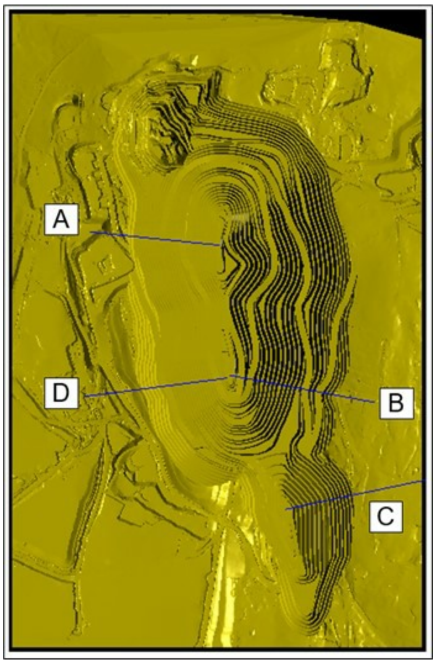
Updated Stability Analysis

SRK has reanalyzed pit slope stability with the SRK reserve pit design described in Section 12. The following is a description of the analyses input, assumptions and results.

Two-dimensional limit equilibrium stability analyses were conducted along critical cross sections of the 2020 pit design. The most recent 3D geologic solids developed in Leapfrog were imported to Vulcan as was the 3D ultimate pit shell. Cross sections were cut in Vulcan and exported as DXF files into the Rhino visualization program so that re-orientation would allow the 2D model to be in X,Y coordinates. The cross sections were imported to the RocScience Slide (2018) limit equilibrium program. Metric units were used for the analysis.

The stability solution is based on Spencers' method of slices where the slope was discretized into 50 slices and 75 iterations were used to compute the balance of forces. A non-circular search path was used with over 5000 potential failure surfaces. The results are presented as the minimum factor of safety (FoS) potential failure surface.

Material properties were taken from Table 25 in PSM for the Upper Weathered Zone (Mohr-Coulomb behavior), Kapanga Pegmatite, Granofels, Lower East Amphibolite and North West Dolerite (each Hoek-Brown behavior). The critical cross section locations for the stability analyses are identified in Figure 13-2.



Source: SRK 2021

Figure 13-2: Plan View of 3D 2020 Ultimate Pit with Slope Stability Cross Section Locations

Table 13-3 is a summary of the results. These results indicate that all the sections analyzed have a FoS greater than the minimum acceptable criteria. The reduced strength case assumed an approximate 10% strength reduction by reducing the cohesion of the Upper Weathered Zone by 10% and reducing the GSI values for the other rock units by about five points. Results of the stability analyses are provided in detail in SRK (2020).

Table 13-3: Summary of Limit Equilibrium Stability Analysis Minimum Factor of Safety

Section	Location	Average Strength		Reduced Strength	
		Global FoS	Local FoS	Global FoS	Local FoS
A	North West C3 Highwall	2.5		2.2	
B	South East C2 Highwall	3.9		3.4	
C	East C1 Wall	7.5	1.4	6.2	1.3
D	South West C2 Highwall	3.1	1.8	2.5	1.8

Source: SRK 2021

Potential Geotechnical Risks

The greatest gap appears to be hydrogeology data and analyses. Slope performance section of the PSM report has no descriptions of seeps or wet spots and slope stability analyses only considered dewatering of 10 m within bench face.

During mining, Greenbushes might encounter voids from historic workings. There is no discussion in the PSM report about whether workings are flooded, or elevation of workings compared to piezometer estimates of groundwater levels.

The weathered zone at the surface has the potential to continue to move, especially if the zone is saturated. It is essentially a soil. It will be important to monitor gradual movements and have operations occasionally clear benches, especially on the steeper west wall and during the wet season.

The 2019 proposed inter-ramp angles are more aggressive (by 5° to 7°) than previously proposed, even though no new data has been collected. Although slope factors of safety are still higher than the minimum acceptance criteria, the steeper slopes could result in increased rockfall events

The PSM geotechnical report makes no mention of current blasting practices and their impact on bench stability. Blasting practices should be reviewed.

Stability of the bullnose between the Cornwall pit and Central pit has not been examined for stability. This is important, especially because this is the area where the historic underground workings are located. These workings could have an adverse impact on the overall stability of the deeper northwest wall of the Central pit, especially if groundwater interaction is involved.

The most recent 2022 pit designs have not significantly changed from the 2020 pit slopes. In SRK's opinion the above analysis is applicable to the current design.

13.2.2 Hydrological

The low hydraulic conductivity of the resource hosting rocks, and lack of significant aquifer storage, decreases operational concerns for mine dewatering. Dewatering to date has been managed through in-pit sumps and pumping to remove passive groundwater inflow and storm event precipitation. Current passive groundwater inflow to the pit is less than 10 L/s. Due to the low hydraulic conductivity of the host rocks, pore pressure may be a concern, however this has been adequately managed to date with the installation of lateral drains as necessary. Proposed expansion will not change the appropriateness of the current inflow management strategy within the pit, nor the adequacy based on the current available data.

Surface water, primarily in the form of short-term flow from precipitation events, is managed through a network of natural and engineered drainages to direct capture of precipitation behind five dams (Cowan, Brook, Southampton/Austin's Dam, Clear Water Dam, Clear Water Pond, and Tin Shed Dam).

These structures serve to feed several water supply impoundments across the mine site, water not used in site operations is released through evaporation or very slow seepage through the clay underlining.

All water usage on site is derived from capture of surface water run-off and groundwater production from removal of passive groundwater inflow to the pit. There are no groundwater production wells to support mine operations.

Potential Hydrologic Risks

The primary hydrology concern is the availability of water to support mining operations. The mine water supply is limited by the annual precipitation, storage capacity behind dams, and overall efficiency of the surface water management system to recycle water from the TSFs. The infrastructure has adequately performed to date, supplying sufficient water to support mine operations. However, due to these potentially limiting factors, additional surface water storage facilities may need to be constructed to support expansion of operations. Section 15.6 further discusses mine water supply and infrastructure.

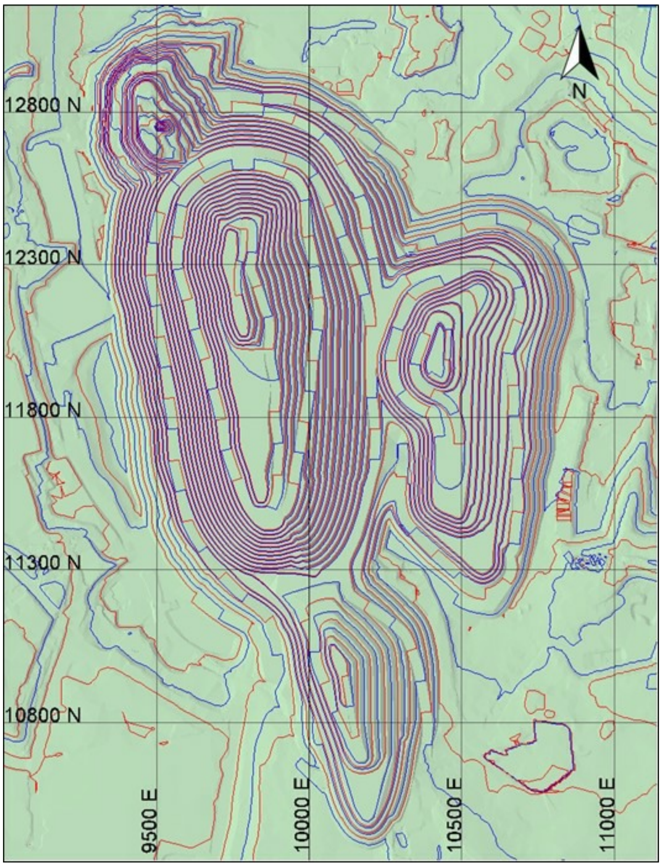
13.3 Mine Design

13.3.1 Pit Design

Pit optimization and design are discussed in detail in Section 12 of this report. The major design parameters used for the open pit are as follows:

- Ramp grade = 10%
- Full ramp width = 30 to 32 m (approximately 3x operating width for Cat 777F/G)
- Single ramp width = 20 m for up to 60 m vertical or six benches
- Minimum mining width = 40 m but targets between 100 m to 150 m
- Flat switchbacks
- Bench heights, berm widths and bench face angles in accordance with current site-specific design criteria

Figure 13-3 illustrates the LoM reserves pit design and associated ramp system. Ramp locations targeted saddle points between the various pit bottoms with ramps also acting as catch benches for geotechnical purposes. Each bench has at least one ramp for scheduling purposes.



Source: SRK, 2022

Figure 13-3: LoM Pit Design

Grade Tonnage

Table 13-4 details the grade tonnage at various cut-offs within the reserves pit design. The CoG used for reserves is 0.7 Li_2O%.

Table 13-4: Grade Tonnage Curve within the Reserves Pit (5% Diluted) – Current Stockpiles Not Included

Cut-off	Diluted Li_2O%	Tonnage	Fe_2O_3%
0.30	1.80	165,508,419	1.03
0.40	1.84	162,028,007	1.03
0.50	1.86	159,047,290	1.03
0.60	1.89	156,243,555	1.03
0.70*	1.91	153,447,888	1.03
0.80	1.93	149,939,860	1.03
0.90	1.96	145,942,524	1.02
1.00	2.00	141,270,397	1.02
1.10	2.04	135,470,757	1.01
1.20	2.09	128,091,745	1.01
1.30	2.14	120,381,040	1.00
1.40	2.20	111,724,054	0.98
1.50	2.27	102,408,933	0.97
1.60	2.34	93,484,855	0.96
1.70	2.42	84,340,667	0.94
1.80	2.49	75,622,519	0.92
1.90	2.57	67,754,725	0.91
2.00	2.64	60,637,981	0.90
2.10	2.72	53,944,013	0.89

Source: SRK 2022
* Cut-off of 0.7% of Li_2O defines the in situ mineral reserves

Phase Design Inventory

The ultimate pit has been broken into fourteen mine phases for sequenced extraction in the LoM production schedule. The design parameters for each phase are the same as those used for the ultimate pit including assumed ramp widths. Phase designs were constructed by splitting up the ultimate pit into smaller and more manageable pieces, while still ensuring each bench within each phase has ramp access. The phases have been developed by balancing mining constraints with the optimum extraction sequence suggested by pit optimization results presented previously.

The phases and direction of extraction allow for multiple benches on multiple elevations with a sump always available for pit dewatering. This means that during periods of heavy rainfall, perched benches will be available for extraction.

Once the phases have been designed, solid triangulations are created for each phase as they cut into topography from previous phases. These solid phases are then shelled (cut) on a 10 m lift height. These shells form a bench within each phase and represent the basic unit that is scheduled for the LoM production plan.

Table 13-5 details the phase inventory that formed the basis of the LoM production schedule.

Table 13-5: Phase Inventory (December 31, 2022 to End of Mine Life)

PHASE_ID	Total Mt	Ore Mt [1]	Waste Mt	Inferred Waste Mt	Li_2O% Diluted	FE_2O_3%
PH_01	1.50	1.4	0.1	-	3.52	0.47
PH_02	6.90	4.4	2.4	0.1	2.44	1.17
PH_03	16.40	7.9	8.1	0.4	2.03	1.04
PH_04	2.30	1.8	0.4	0.1	2.17	0.79
PH_04B	0.70	0	0.6	0.1	1.22	1.63
PH_05	110.60	32.8	76.8	0.9	2.21	1.06
PH_06	97.40	22.5	73	1.9	1.88	1.06
PH_07	86.20	13.2	71.3	1.8	1.75	1.04
PH_08	13.90	1	12.9	-	1.65	0.84
PH_09	29.40	4.4	25	0	1.65	0.94
PH_10	39.00	5.8	33.2	-	1.84	0.92
PH_11	130.20	14.3	115.7	0.2	2.02	0.87
PH_12	25.00	3.7	20.7	0.6	1.92	1
PH_13	131.80	17.5	111.5	2.9	1.45	1.25
PH_14	163.50	22.5	134.2	6.8	1.68	0.96
Total	**854.70**	**153.1**	**685.8**	**15.7**	**1.91**	**1.03**

Source SRK, 2022
[1] An additional 4.0 Mt of existing stockpile material as of December 31, 2022, is not included in the phase design

13.4 Mining Dilution and Mining Recovery

Based on reconciliation data for prior resource block models, the Greenbushes operation has historically applied a 95% grade factor and 100% mining recovery to the mineral reserves. The 95% grade factor was intended to account for, among other things, external dilution introduced by the mining process. SRK is of the opinion that this 95% grade factor should be applied to all ore blocks and, accordingly, the year-end 2022 mineral reserves adopt this historical factor.

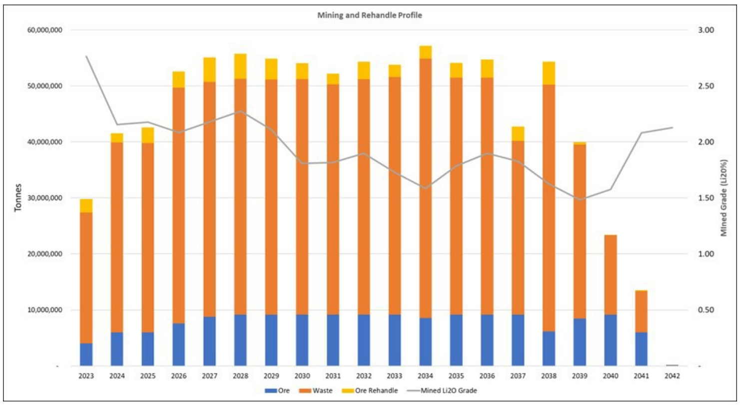
The SRK resource block model includes 2.7% internal dilution for all Indicated resource subblocks (5 m x 5 m x 5 m) inside the reserves pit. Including this internal dilution, the total block dilution is 7.7% (5% + 2.7%) for all blocks. The global mining recovery applied is 93%. The mining recovery is applied by targeting edge blocks that have greater than 2.3% Fe_2O_3. Any blocks above 2.3% Fe_2O_3 are removed from the ore reserves estimation. This results in the removal of approximately 11.4 Mt of edge blocks with high iron content (high iron content in the mill feed is detrimental to processing plant performance).

SRK is of the opinion that these mining dilution and mining recovery adjustments are appropriate for the conversion of Indicated mineral resources to Probable mineral reserves.

13.5 Production Schedule

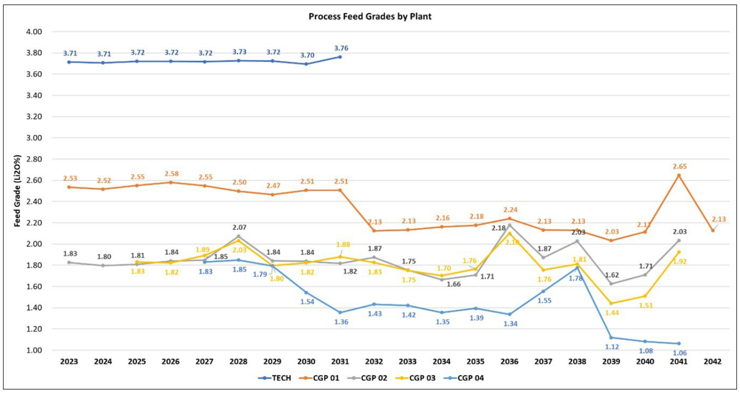
The LoM production is inherently forward-looking and relies upon a variety of technical and macroeconomic factors that will change over time and therefore is regularly subject to change. The schedule is based on December 31, 2022 pit topography, and the mine was scheduled on a quarterly basis for the full LoM timeframe. Bench sinking rates were limited to eight benches per phase per year.

Figure 13-4 through Figure 13-8 show the mine and mill metrics on a yearly basis.



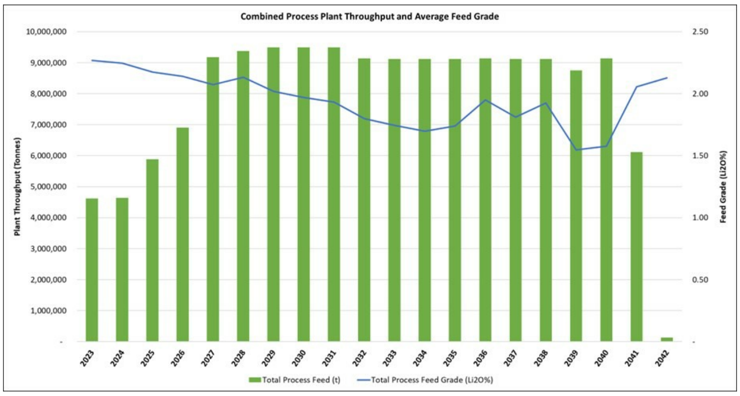
Source: SRK, 2022
LoM values are provided in Table 19-12.

Figure 13-4: Mining and Rehandle Profile



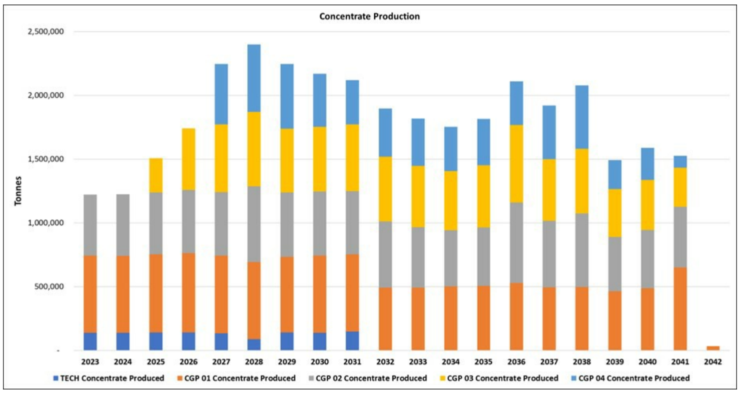
Source: SRK, 2022
LoM values are provided in Table 19-12.

Figure 13-5: Feed Grade by Plant



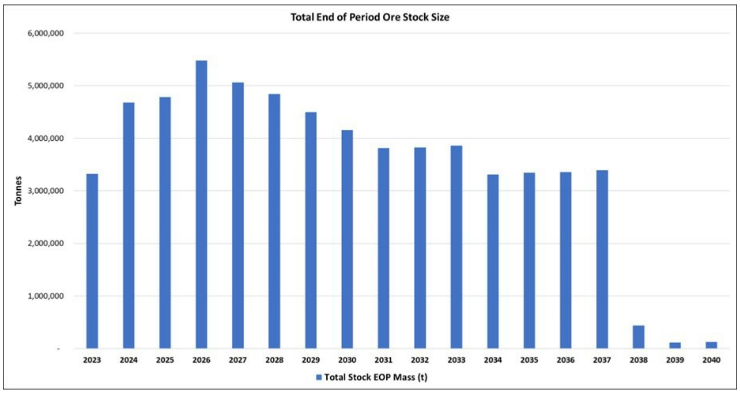
Source: SRK, 2022
LoM values are provided in Table 19-12.

Figure 13-6: Combined Process Plant Throughput and Grade (TECH, CPG1, CPG2, CPG3 and CPG4)



Source: SRK, 2022
LoM values are provided in Table 19-12.

Figure 13-7: Concentrate Production by Plant (TECH, CPG1, CPG2, CPG3 and CPG4)



Source: SRK, 2022
LoM values are provided in Table 19-12

Figure 13-8: Long-Term Ore Stockpile Size

The LoM production schedule is detailed in Table 13-6.

Table 13-6: LoM Production Schedule -Expit and Mill Concentrate Production

In-Pit RoM Summary	Total	1-Jan-23 31-Dec-23	1-Jan-24 31-Dec-24	1-Jan-25 31-Dec-25	1-Jan-26 31-Dec-26	1-Jan-27 31-Dec-27	1-Jan-28 31-Dec-28	1-Jan-29 31-Dec-29	1-Jan-30 31-Dec-30	1-Jan-31 31-Dec-31	1-Jan-32 31-Dec-32	1-Jan-33 31-Dec-33	1-Jan-34 31-Dec-34	1-Jan-35 31-Dec-35	1-Jan-36 31-Dec-36	1-Jan-37 31-Dec-37	1-Jan-38 31-Dec-38	1-Jan-39 31-Dec-39	1-Jan-40 31-Dec-40	1-Jan-41 31-Dec-41	1-Jan-42 31-Dec-42
RoM (t)	153,144,457	4,000,000	6,000,000	6,000,000	7,600,000	8,762,500	9,150,000	9,150,000	9,150,000	9,150,000	9,150,000	9,150,000	8,567,037	9,150,000	9,150,000	9,150,000	6,166,582	8,428,708	9,150,000	5,990,925	128,706
RoM Li_2O (%)	1.91	2.77	2.16	2.18	2.08	2.18	2.27	2.11	1.81	1.82	1.90	1.73	1.59	1.79	1.90	1.83	1.63	1.48	1.58	2.08	2.13
Strip Ratio (w:o)	4.58	5.89	5.70	5.67	5.58	4.86	4.66	4.66	4.66	4.66	4.66	4.66	5.54	4.66	4.66	3.47	7.34	3.91	1.81	1.62	1.23
Total Mill Feed Tonnes [1]	**157,081,508**	**4,617,126**	**4,644,548**	**5,890,243**	**6,908,715**	**9,175,218**	**9,375,324**	**9,490,652**	**9,490,652**	**9,490,652**	**9,140,606**	**9,115,632**	**9,115,632**	**9,115,632**	**9,140,606**	**9,115,632**	**9,115,632**	**8,752,566**	**9,140,606**	**6,117,127**	**128,706**
Mill Feed Li_2O (%)	1.91	2.27	2.25	2.17	2.14	2.07	2.13	2.02	1.97	1.93	1.80	1.75	1.70	1.74	1.95	1.81	1.93	1.55	1.58	2.06	2.13
Mill Feed Mass Yield (%)	22.22	26.48	26.38	25.59	25.21	24.48	25.58	23.66	22.86	22.32	20.75	19.94	19.23	19.91	23.07	21.07	22.79	17.04	17.38	24.93	25.82
TECH Produced	1,202,596	137,004	137,302	140,522	140,621	133,106	88,447	140,998	138,105	146,489	0	0	0	0	0	0	0	0	0	0	0
CGP 01 Produced	10,606,423	606,108	603,660	611,639	620,704	610,833	604,534	593,599	605,355	605,983	490,777	492,996	502,541	506,745	527,241	495,073	496,327	462,997	486,351	649,722	33,237
CGP 02 Produced	9,515,478	479,414	484,185	486,007	495,827	497,073	592,802	504,616	502,633	494,504	519,111	472,427	440,044	457,537	632,303	520,010	577,939	426,496	456,909	475,641	0
CGP 03 Produced	8,009,703	0	0	268,907	484,556	529,774	585,314	498,254	507,578	524,500	509,175	480,011	462,560	486,501	608,527	484,276	505,743	374,372	393,351	306,305	0
CGP 04 Produced	5,567,197	0	0	0	0	475,743	526,764	507,796	416,248	346,717	377,814	371,880	348,057	364,139	340,490	421,324	497,679	227,830	251,634	93,082	0

Source: SRK 2022
[1] Includes expit RoM and approximately 4 Mt of existing stockpiles.

Bench Sinking Rate

Table 13-7 shows the benches mined from each pit/phase on an annual basis. In SRK's opinion, the sinking rate is reasonable.

Table 13-7: LoM Yearly Bench Sinking Rates (Number of 10-m-High Benches Mined per Phase per Year)

Year	PH_01	PH_02	PH_03	PH_04	PH_05	PH_06	PH_07	PH_08	PH_09	PH_10	PH_11	PH_12	PH_13	PH_14
2023	6.0	5.3	3.0	2.0	5.2	4.2	4.0	1.0	2.0	2.0	3.0	2.0	-	-
2024	-	3.7	4.1	1.6	0.8	1.8	2.0	2.0	2.0	1.0	1.0	1.0	-	-
2025	-	-	6.8	-	4.6	-	1.0	-	-	1.0	1.0	1.0	-	-
2026	-	-	0.1	-	5.7	1.0	-	-	-	-	0.9	1.0	6.0	-
2027	-	-	0.0	-	3.7	3.0	4.0	0.2	-	-	-	3.0	1.0	-
2028	-	-	0.0	-	3.6	2.0	2.0	-	-	-	-	2.0	0.2	8.0
2029	-	-	2.0	-	5.5	2.8	2.0	1.8	2.0	-	-	2.0	0.8	1.0
2030	-	-	-	3.4	2.0	4.2	3.2	3.0	3.0	1.6	-	4.0	-	-
2031	-	-	-	-	0.9	7.1	2.8	-	0.8	0.9	1.0	3.0	1.0	1.0
2032	-	-	-	-	-	5.9	-	-	-	1.9	2.3	-	2.0	2.0
2033	-	-	-	-	-	2.7	-	-	3.2	5.1	1.7	-	2.0	2.0
2034	-	-	-	-	-	2.3	8.0	-	-	2.4	2.4	-	2.5	-
2035	-	-	-	-	-	-	2.7	-	-	-	6.0	-	1.0	1.0
2036	-	-	-	-	-	-	-	-	-	-	6.9	-	2.5	4.5
2037	-	-	-	-	-	-	5.3	-	-	-	4.7	-	4.4	2.1
2038	-	-	-	-	-	-	4.0	-	-	-	-	-	6.9	5.1
2039	-	-	-	-	-	-	-	-	-	-	-	-	3.7	7.6
2040	-	-	-	-	-	-	-	-	-	-	-	-	-	4.9
2041	-	-	-	-	-	-	-	-	-	-	-	-	-	8.0
2042	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7

Source: SRK 2022

13.6 Waste Dump Design

Waste for the final pit will be distributed between the main dump to the east of the pits (East Dump), the southern pit backfill and the Kapanga pit backfill. The current East Dump design has a final slope angle of 11 to 12° overall. This is to support concurrent reclamation to final configuration. The pit backfill dumps have been assumed to be dumped at steeper angles and can then be dozed into the pit bottom to achieve desired reclaimed slope angles.

SRK has designed the waste dump to match the waste volumes in the LoM production schedule. Table 13-8 shows the volumetrics including the 27% compacted swell factor. Figure 12-5 in Section 12 of this report shows the final waste dump design and location in relation to the open pit. In the future it is possible that part of the waste dump will need to be relocated due to potential additional resources within its footprint.

Table 13-8: Waste Dump Capacities

Dump	**Capacity** **Loose Cubic Meters** (27% Swell Factor Compacted)
East Waste Dump	202,271,062
South Pit Backfill	46,696,295
Kapanga Pit Backfill	72,321,527
Total	**321,288,883**

Source: SRK 2022

14 Processing and Recovery Methods

Greenbushes currently has two ore crushing facilities (CR1 and CR2) and three ore processing plants which includes the Technical Grade Plant (TGP), Chemical Grade Plant-1 (CGP1) and Chemical Grade Plant-2 (CGP2) with a nominal capacity of 4.5 Mt/y of pegmatite feed to produce a nominal 1.3 Mt/y of spodumene concentrates (chemical and technical grades). This section provides a discussion of the operation and performance of the CR1, CR2, TGP, CGP1 and CGP2. In addition, Greenbushes is currently constructing Chemical Grade Plant-3 (CGP3), which is based on the CGP2 design. CGP3 is scheduled to come on-line during Q2 2025. Greenbushes also has plans to construct Chemical Grade Plant-4 (CGP4), which will also be based CGP2 design. CGP4 is currently planned to commence production during Q1 2027.

14.1 Technical Grade Plant (TGP)

TGP is a relatively small plant that processes approximately 350,000 t/y of ore at an average grade of about 3.8% Li_2O and produces about 150,000 t of spodumene concentrate products. The TGP produces a variety of product grades identified as SC7.2, SC6.8, SC6.5 and SC5.0 (specifications for each grade are presented in Section 14-7). There are two sub-products for SC7.2 designated as Premium and Standard, and these products carry the SC7.2P and SC7.2S designation. TGP can be operated in two different production configurations as shown in Figure 14-1. When operating in configuration 1 TGP produces SC7.2, SC6.8 and SC5.0 products. Configuration-1 can be split into two subsets, producing either SC7.2P or SC7.2S. When operating in configuration 2, the coarse processing circuit (SC5.0 circuit) and flotation concentrate circuit are combined to produce SC6.5 and SC6.8 products All products, with the exception of SC6.8 are shipped in 1,000 kg bags or in bulk. SC6.8 is shipped only in 1,000 kg bags

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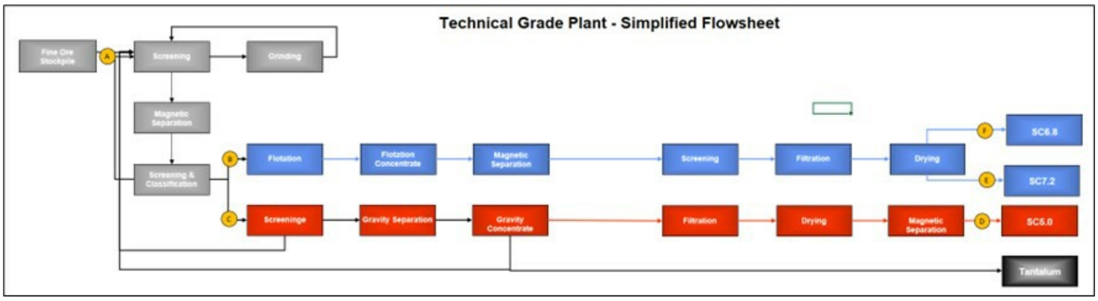


Source: Greenbushes 2020
Blue Represents Configuration-1 and Blue + Red Represents Configuration 2

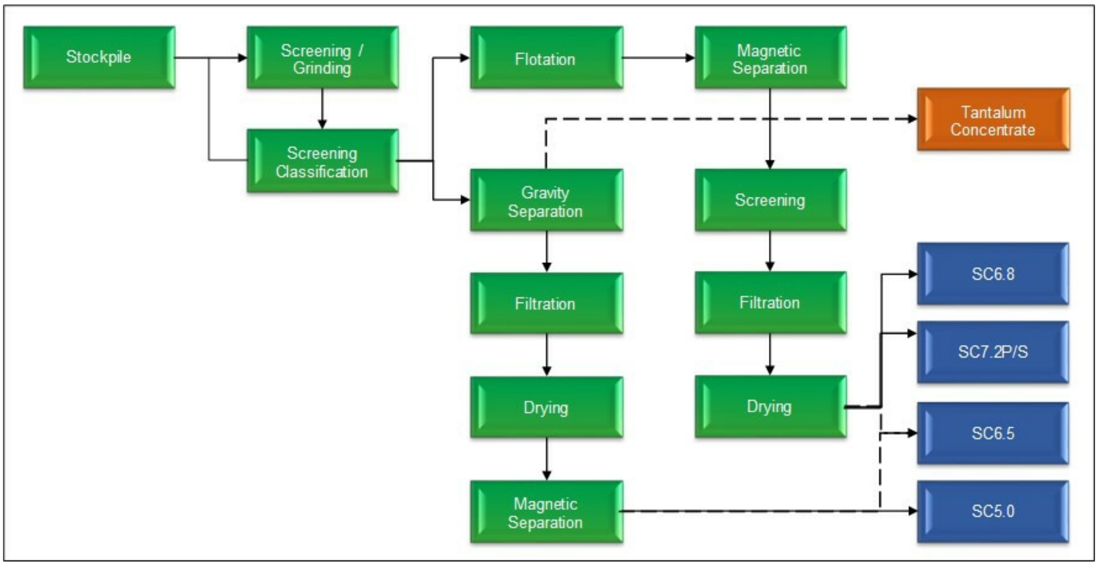
Figure 14-1: Simplified TGP Flowsheet

TGP has a current maximum sustainable feed rate of 50 dry tonnes per hour if maximum production for SC5.0 is required (configuration 1) and a maximum feed rate of 35 dry tonnes per hour if the SC5.0 circuit is off-line (configuration 2).

Feed to TGP is defined primarily by Li_2O grade and the iron grade that will achieve the final product iron quality specification for SC7.2. The iron grade for the plant feed is governed by mineralogy and is modeled using oxides of manganese, calcium, potassium, sodium and lithium in plant feed.

The TGP process flowsheet is shown in Figure 14-2 and incorporates the following unit operations:

- Crushing
- Grinding
- Classification
- Flotation
- Magnetic separation
- Filtration
- Drying



Source: Greenbushes, 2022

Figure 14-2: TGP Process Flowsheet

14.1.1 Crushing

TGP ore is crushed in crushing plant -1 (CR1), which serves both the TGP and CGP1. The CR1 plant and operation and flowsheet is discussed in Section 14.2.

14.1.2 Grinding and Classification Circuit

TGP feed is blended with a front-end loader and fed by conveyor to a primary screen. Oversize from the screen is fed into a ball mill with the ball mill discharge reporting back to the primary screen fitted with a 3 mm screen. The +3 mm screen fraction is returned to the ball mill and the -3 mm fraction is subjected to low intensity magnetic separation to remove iron mineral contaminants, which are discarded to tailings. The nonmagnetic fraction is screened at 0.7 mm with Derrick Stacksizers. The -3 mm +0.7 mm fraction is recirculated back to the grinding circuit and the -0.7 mm fraction is advanced to the hydraulic classification circuit. The classifier underflow is processed in the coarse processing circuit and the classifier overflow is advanced to the fine processing circuit.

14.1.3 Coarse Processing Circuit

The coarse classifier underflow is advanced to the coarse processing circuit where it is first deslimed and then processed through a spiral gravity circuit to produce a rougher tantalum gravity concentrate that is further upgraded on shaking tables to produce a final tantalum gravity concentrate. The gravity circuit tailings are screened at 0.8 mm on a safety screen and then dewatered with hydrocyclones and filtered on a horizontal belt filter to produce the SC5.0 product (glass grade product). The SC5.0 product is then dried in a fluid bed dryer and then subjected to a final stage of magnetic separation to remove any remaining iron contaminants. The final SC5.0 product is then conveyed to a 180 t storage silo pending packaging and shipment. It should be noted that the coarse processing circuit is operated only to fill market demand for the SC5.0 product and can be bypassed when SC5.0 production is not required.

14.1.4 Fines Processing Circuit

The classifier overflow is advanced to the fines processing circuit where it is first deslimed and then subjected to two stages of reagent conditioning prior to spodumene rougher flotation. The spodumene rougher flotation concentrate is further upgraded with two stages of cleaner flotation. The spodumene cleaner flotation concentrate is then attritioned and processed through both low intensity magnetic separation (LIMS) and wet high intensity magnetic separation (WHIMS) to remove iron mineral contaminants. The nonmagnetic spodumene concentrate is filtered on a horizontal belt filter and then dried in a fluid bed drier. Dried concentrate from the lower portion of the fluid bed drier is final SC7.2 product which is conveyed to a 250 t storage silo pending packaging and shipment. The fine fraction that discharges from the upper portion of the fluid bed drier is classified in an air classifier. The classifier underflow is the SC6.8 product, which is conveyed to a storage silo. The air classifier overflow is captured in a baghouse and subsequently recycled back to the process.

14.1.5 Control Philosophy

A process control system (PCS) provides an operator interface with the plant and equipment. A programmable logic controller (PLC) and operator workstations communicate over a fiber optic Ethernet link and are linked to the workstations in CGP1. The PCS controls the process interlocks, and PID control loop set-point changes are made at the operator interface station (OIS). Local control stations are located in the field proximal to the relevant drives. The OIS' allow drives to be selected to local or remote via the drive control popup. Statutory interlocks such as emergency stops are hardwired and apply in all modes of operation.

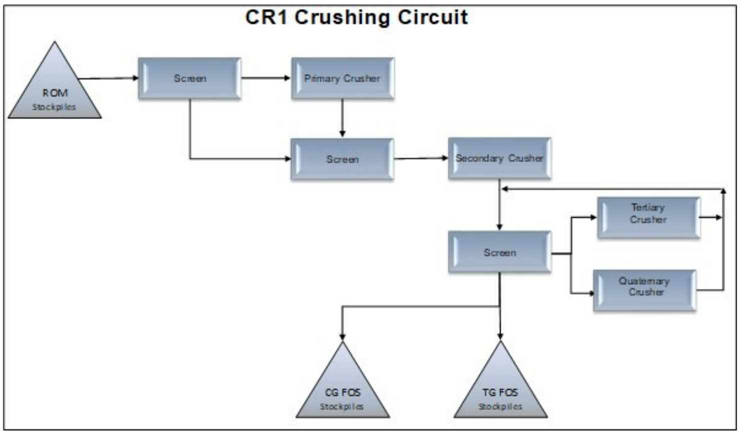
14.2 Chemical Grade Plant-1 Crushing and Processing Plants

The Chemical Grade Plant-1 (CGP1) process flowsheet includes the following major unit operations to produce chemical grade spodumene concentrates:

- Crushing
- Grinding and classification
- Heavy media separation
- WHIMS
- Coarse mineral flotation
- Regrinding
- Regrind coarse mineral flotation
- Fine mineral flotation
- Concentrate filtration
- Final tailings thickening and storage at the TSF

14.2.1 Crushing Circuit (CR1)

CR1 provides crushed ore to both the TGP and CGP1. The CR1 flowsheet is shown in Figure 14-3. RoM ore is delivered from the mine to the RoM storage bin. Ore is drawn from the RoM bin using a variable speed plate feeder that feeds a vibrating grizzly with bars spaced at 125 mm. The +125 mm grizzly oversize fraction reports to a Metso C160 primary jaw crusher, where it is crushed before recombining with the -125 mm grizzly undersize on the crusher discharge conveyor. The crusher discharge conveyor conveys the crushed ore to a second vibrating grizzly. The grizzly oversize fraction is fed to the secondary crusher. The grizzly undersize fraction and the secondary crusher discharge are combined and then conveyed to a double-deck banana screen. The oversize from the top deck is conveyed to a tertiary cone crusher which is operated in closed circuit with the banana screen. The oversize from the bottom deck is conveyed to two quaternary cone crushers which are also operated in closed circuit with the banana screen. The -12 mm bottom deck screen undersize is the final crushed product, which is conveyed to a 4,200 t (live capacity) fine ore stockpile (FOS). A weightometer is installed ahead of the FOS feed conveyor to monitor and record the crushing plant production rate and overall tonnage of crushed ore delivered to the FOS. The crushing circuit is controlled from a dedicated LCR located within the main crushing building.

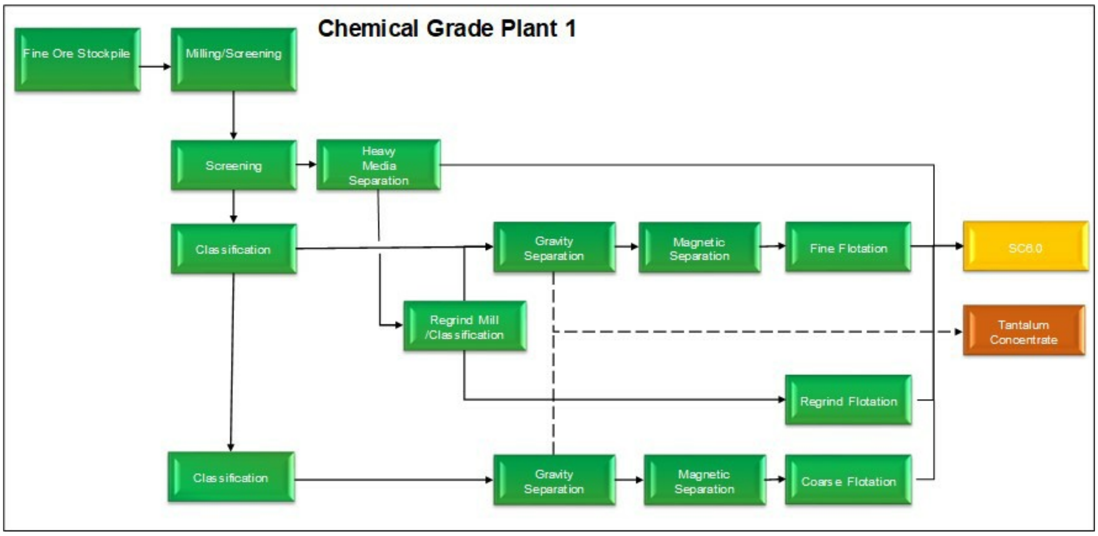


Source: Greenbushes, 2022

Figure 14-3: CR1 Crushing Plant Flowsheet

14.2.2 Chemical Grade Plant-1 (CGP1)

CGP1 has been upgraded over the years to process ore at the design rate of 2 Mt/y of crushed ore and during 2022 produced almost 575 kt/y of spodumene concentrate grading 6% Li_2O from ore containing 2.7% Li_2O. CGP1 produces concentrates from heavy media separation (HMS), coarse flotation and fine flotation circuits which are combined as a single product. A simplified flowsheet for CGP1 is shown in Figure 14-4.



Source: Greenbushes, 2022

Figure 14-4: CGP1 Process Flowsheet

Grinding and Classification

Plant feed is conveyed to the grinding circuit and is first screened on the primary vibrating screen. The screen oversize feeds a 3.6 m diameter by 4.06 m long ball mill which is operated in closed circuit with the primary screen. The screen undersize is then advanced to the primary screening circuit that consists of four five-deck Derrick Stacksizers. The Stacksizers serve to classify the ground ore into four size fractions. The coarsest fraction is processed in the HMS circuit, and the intermediate size fractions are processed by WHIMS followed by hydro-classification and then very coarse and coarse flotation. The fine screen fraction is processed by WHIMS and fine flotation. The screen undersize is too fine to process and is disposed of in the TSF. Several stages of classification throughout the flowsheet serve to remove the very fine fraction (slimes) that would otherwise interfere with the process.

HMS Circuit

The coarsest size fraction is processed in an HMS cyclone at a slurry feed specific gravity of about 2.55 which is adjusted with ferrosilicon to the correct specific gravity. The high specific gravity sink product is screened and washed to remove residual ferrosilicon and then filtered on a horizontal vacuum filter. The HMS float product is advanced to the regrind circuit for further processing.

WHIMS and Coarse Flotation

The intermediate-coarse screen fraction is processed by WHIMS to remove magnetic contaminants. The magnetic fraction is waste and sent to the TSF thickener. The nonmagnetic fraction is classified into coarse and very coarse fractions which are processed in separate flotation circuits to recover spodumene flotation concentrates, which are then filtered on horizontal vacuum filters as finished concentrate. The tailings from both the coarse and very coarse flotation circuits are advanced to the regrind circuit for further processing.

WHIMS and Fine Flotation

The intermediate-fine screen fraction is processed by WHIMS to remove magnetic contaminants. The magnetic fraction is waste and sent to the tailing thickener and then to the TSF. The nonmagnetic fraction is processed in a fine flotation circuit to recover spodumene flotation concentrate, which is then filtered as finished concentrate. The fine flotation tailing is waste and is sent to the tailing thickener and then to the TSF.

Regrinding and Regrind Flotation

The HMS float product and coarse and very coarse flotation tailings are reground and then classified into two size fractions. The coarse size fraction is processed in the regrind flotation circuit to produce a finished flotation concentrate which is then filtered and stockpiled in the concentrate storage bin. The regrind flotation tailing is recycled back to the regrind ball mill. The fine size fraction is processed in the fine flotation circuit. The fine flotation concentrate is filtered and sent to the concentrate storage bin. The fine flotation tailing is a waste product which is thickened and disposed of in the TSF.

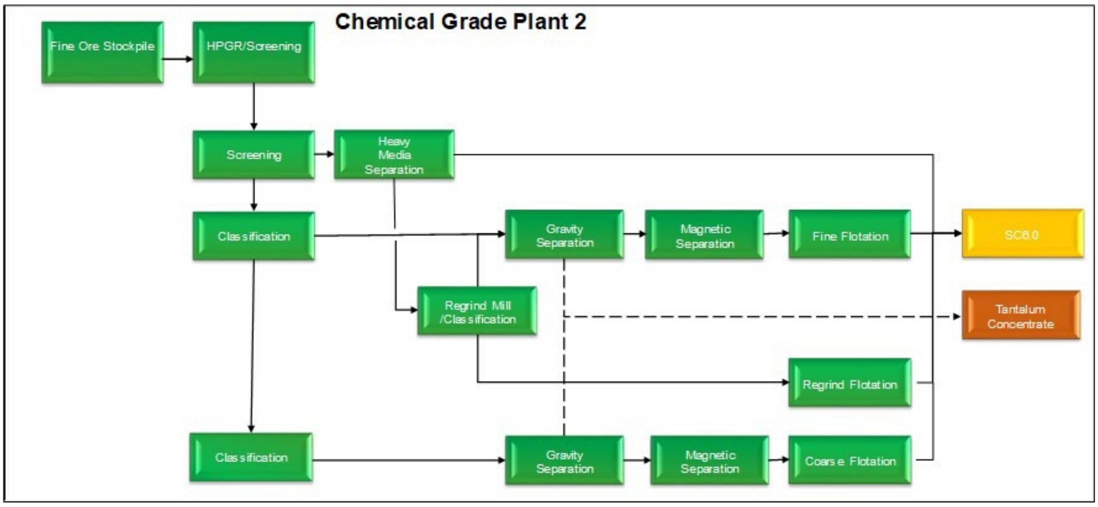
Tailings Thickening

Tailings are thickened and the thickener underflow is pumped to the TSF, and thickener overflow is recycled as process water back to the process.

14.3 Chemical Grade Plant-2 Crushing and Processing Plants

Crushing plant-2 (CR2) is a new crushing facility that was commissioned during 2019 and 2020 to provide crushed ore to CGP2. CGP2 is a new chemical grade processing plant that was commissioned during 2019 and 2020. CGP2 was designed to process 2.4 Mt/y of ore at an average grade of 1.7% Li_2O to produce final concentrates containing greater than 6% Li_2O and meet the specification for Greenbushes' SC6.0 product. The flowsheet is very similar to CGP1 but was designed with a number of modifications based on HPGR (high pressure grinding rolls) comminution studies and CGP1 operational experience. A schematic flowsheet for CGP2 is shown in Figure 14-5. The most notable modifications include:

- Replacement of the ball mill grinding circuit with HPGRs
- Plant layout to simplify material flow and pumping duties
- Orientation of the HMS circuit to allow the sinks and floats products to be conveyed to the floats WHIMS circuit and sinks tantalum circuit
- Locating the coarse flotation circuits above the regrind mill to allow flow steams to gravity feed directly into the mill
- Orientation of the fines flotation cells in a staggered arrangement to allow the recleaner and cleaner flotation tails to flow by gravity into the cleaner and rougher cells, respectively
- Orientation of the concentrate filtration circuit to allow the sinks to be conveyed to the sinks filter
- Provision for sufficient elevation for the deslime and dewatering cyclone clusters to gravity feed to the thickener circuits located at ground level



Source: Greenbushes, 2022

Figure 14-5: CGP2 Process Flowsheet

14.3.1 Crushing Plant-2 (CR2)

Ore is crushed to 80% passing (P80) 25 mm in a two-stage crushing circuit with a nominal feed capacity of 500 t/h, sufficient to crush 2.4 Mt/y on a 4,800 hours/y schedule, which allows for additional crushing capacity if it is needed. RoM ore is truck-hauled to the RoM pad and is stored next to the RoM bin in separate stockpiles of varying ore types and grades to facilitate blending of the feed into the crushing plant.

The RoM bin is fed from the various ore stockpiles with a front-end loader and is protected by a grizzly with bars on a 670 mm spacing. A dedicated rock breaker is provided to break grizzly oversize material. Feed to the RoM bins is controlled by a "dump–no dump" traffic signal mounted on the RoM pad adjacent to the RoM bin. The traffic signal is controlled by a level sensor mounted above the RoM bin and by the crusher operator.

Ore is drawn from the RoM bin using a variable speed apron feeder which feeds a vibrating grizzly with grizzly bars on a 100 mm spacing. The +100 mm grizzly oversize fraction reports to a Metso C160 primary jaw crusher, where it is crushed and combined with the grizzly undersize on the crusher discharge conveyor.

The primary crushed ore is then screened on a double-deck banana screen. The screen oversize fractions are conveyed to the secondary feed bin which feeds the secondary cone crusher. The undersize fraction (P80 25 mm) is conveyed to the fine ore stockpile ahead of the HPGR circuit. The fine ore stockpile has a "live" capacity of 7,200 t and total capacity of approximately 56,000 t. A weightometer is installed ahead of the fine ore stockpile to monitor and record the crushing plant production rate and overall tonnage of crushed ore delivered to the fine ore stockpile. The crushing circuit is controlled from a dedicated LCR controller located within the main crushing building.

14.3.2 Chemical Grade Plant-2 (CGP2)

HPGR Circuit

The HPGR circuit is fed from the fine ore stockpile by a single reclaim conveyor and conveyed to HPGR feed bins via a series of transfer conveyors. Two HPGR's are installed in a duty/standby configuration. HPGR feed rate is measured by a weightometer on the HPGR feed transfer conveyor and is controlled to a set-point by independently varying the speed of the reclaim feeders. The HPGR product reports to the primary screens where the ore is separated into screen undersize, which enters the wet plant, and oversize which is recycled back to the HPGR. The HPGR circuit serves to crush the ore to -3 mm prior to processing in CGP2

Plant Feed Preparation

The -3 mm HPGR product is advanced to the primary screening circuit that consists of five-deck Derrick Stack Sizers. The stack sizers serve to screen the HPGR product into four size fractions. The coarsest screen fraction is processed in the HMS circuit, the intermediate size fractions are processed by WHIMS followed by hydro-classification and very coarse and coarse flotation. The fine screen fraction is processed by WHIMS and fine flotation. The screen undersize is too fine to process and is disposed of in the TSF.

HMS Circuit

The coarsest size fraction is processed in an HMS cyclone at a slurry feed specific gravity of about 2.55, which is adjusted with ferrosilicon to the correct specific gravity. The HMS sink product is further processed by WHIMS. The nonmagnetic WHIMS product is finished concentrate and is screened and washed to remove residual ferrosilicon and then filtered on a horizontal vacuum filter. The HMS float product is processed by WHIMS and advanced to the regrind circuit for further processing.

WHIMS and Coarse Flotation

The intermediate-coarse size fraction is processed by WHIMS to remove iron contaminants. The magnetic fraction is waste and sent to the TSF thickener. The nonmagnetic fraction is classified into coarse and very coarse fractions which are processed in separate flotation circuits to recover spodumene flotation concentrates. The flotation concentrates are filtered on horizontal vacuum filters and stockpiled in the concentrate storage bin. The tailings from both the coarse and very coarse flotation circuits are advanced to the regrind circuit for further processing.

Regrinding and Regrind Flotation

The HMS float product and the coarse and very coarse flotation tailings are reground and then classified into two size fractions. The coarse size fraction is processed in the regrind flotation circuit to produce a finished flotation concentrate which is then filtered and stockpiled in the concentrate storage bin. The regrind flotation tailing is recycled back to the regrind ball mill. The fine size fraction is processed in the fine flotation circuit.

WHIMS and Fine Flotation

The intermediate-fine size fraction is processed by WHIMS to remove iron contaminants. The magnetic fraction is waste and sent to the tailing thickener and then to the TSF. The nonmagnetic fraction is processed in a fine flotation circuit to recover spodumene flotation concentrate, which is then filtered as finished concentrate. The fine flotation tailing is waste and is sent to the tailing thickener and then to the TSF.

Tailings Thickening

Tailings are thickened and the thickener underflow is pumped to the TSF, and thickener overflow is recycled as process water back to the process.

14.4 CGP1 and CGP2 Mass Yield and Recovery Projection

Greenbushes has developed mass yield models for both CGP1 and CGP2 which are used to predict concentrate mass yield and lithium recovery, based on ore grade, into concentrates containing 6% Li_2O. The mass yield models were developed from on an analysis of CGP1 plant performance at different feed grades. Greenbushes' Yield % model for CGP1 is given as:

CGP1 Yield Model

$$\text{Yield \%} = 9.362 * (\text{Plant Feed } Li_2O\%)^{1.319}$$

Greenbushes' yield model for CGP2 is based on the CGP1 yield model but includes provision for additional lithium recovery based on the use of HPGR's for plant feed comminution as opposed to ball mill grinding as practiced in CGP1. The provision for incrementally higher lithium recovery in CGP2 is based on a metallurgical evaluation conducted by Greenbushes and the expectation that fewer unrecoverable fines will be generated during comminution with an HPGR compared to ball mill grinding. Greenbushes' Yield % model for CGP2 is given as:

CGP2 Yield Model

Yield % = 9.362 * (Plant Feed Li_2O%) $^{1.319}$ + (0.82 * Plant Feed Li_2O%)

Predicted mass yield and lithium recoveries versus ore grade are shown Table 14-1 for both CGP1 and CGP2 (assuming final concentrate grade of 6% Li_2O). At the average planned feed grade of 2.5% Li_2O, the mass yield for CGP1 is estimated at 31.4% and lithium recovery is estimated at 75.2%. At the design feed grade of 1.7% Li_2O for CGP2 the mass yield for is estimated at 20.2% and lithium recovery is estimated at 71.5%.

Table 14-1: CGP1 and CGP2 Model Yield and Li_2O Recovery vs. Feed Grade

Feed Li_2O%	CGP1		CGP2	
	Yield (%)	Li_2O Recovery (%)	Yield (%)	Li_2O Recovery (%)
0.5	3.8	45.0	4.2	49.9
0.6	4.8	47.7	5.3	52.6
0.7	5.8	50.1	6.4	55.1
0.8	7.0	52.3	7.6	57.2
0.9	8.1	54.3	8.9	59.2
1.0	9.4	56.2	10.2	61.1
1.1	10.6	57.9	11.5	62.8
1.2	11.9	59.5	12.9	64.5
1.3	13.2	61.1	14.3	66.0
1.5	16.0	63.9	17.2	68.8
1.6	17.4	65.3	18.7	70.2
1.7	18.9	66.5	20.2	71.5
1.8	20.3	67.8	21.8	72.7
1.9	21.8	68.9	23.4	73.9
2.0	23.4	70.1	25.0	75.0
2.1	24.9	71.2	26.6	76.1
2.3	28.1	73.3	30.0	78.2
2.2	26.5	72.2	28.3	77.2
2.3	28.1	73.3	30.0	78.2
2.4	29.7	74.3	31.7	79.2
2.5	31.4	75.2	33.4	80.2
2.6	33.0	76.2	35.1	81.1
2.7	34.7	77.1	36.9	82.0
2.8	36.4	78.0	38.7	82.9
2.9	38.1	78.9	40.5	83.8
3.0	39.9	79.7	42.3	84.7

Source: Greenbushes and SRK, 2020

14.5 TGP Performance

TGP performance for the period 2017 - 2022 is summarized in Table 14-2. During this period ore tonnes processed ranged from 343,760 to 373,643 t (excluding 2020 production which was impacted by Covid) and ore grades ranged from 3.72% to 3.96% Li_2O. Overall lithium recovery ranged from 69.8% to 75.1% into six separate products (SC7.2-Standard, SC7.2-Premium, SC6.8, SC6.5, SC6.0 and SC5.0). Overall mass yield during this period ranged from 38.4% to 44.9%. Mass yield and lithium recovery are estimated based on mass yield and recovery equations developed by SRK from actual production, which are given as follows:

Li_2O Recovery = 24.658 * Li_2O% - 22.504 (R^2 = 0.9986)

Mass Yield = 31.792 * Li_2O - 80.809 (R^2 = 0.9838)

As shown in Table 14-2, there is good agreement between actual and estimated lithium recoveries. The TGP lithium mass yield and recovery equations have been used in resource and reserve modeling to provide estimates of TGP mass yield and lithium recovery at various ore grades in the mine plan.

Table 14-2: Production Summary for the Technical Grade Plant (TGP)

CGP-1	2017	2018	2019 [1]	2020	2021	2022
Feed Tonnes	343,760	363,462	373,643	232,055	354,075	370,893
Feed (Li_2O%)	3.96	3.93	3.75	3.72	3.88	3.94
Conc. Tonnes						
SC7.2 - Standard	42,063	56,919	56,387	37,470	43,146	52,995
SC7.2 - Premium	35,808	26,621	23,164	13,349	28,749	32,518
SC6.8	12,340	13,380	11,063	9,115	13,156	14,762
SC6.5	12,718	14,183	14,532	14,536	21,381	3,266
SC6.0	6,190	1,322	849	257	917	12,549
SC5.0	45,200	47,735	40,529	14,478	46,757	47,244
Total Conc.	**154,319**	**160,160**	**146,524**	**89,205**	**154,106**	**163,334**
Avg. Conc. (Li_2O%)[1]	6.62	6.64	6.68	6.94	6.55	6.49
Mass Yield (%)	44.9	44.1	39.2	38.4	43.5	44.0
Li_2O Recovery (%)	75.1	74.5	69.8	71.6	73.4	72.5
Model Yield (%)	45.1	44.1	38.5	37.5	42.5	44.5
Model Recovery (%)	75.1	74.4	70.0	69.2	73.2	74.6

Source: Greenbushes, 2022
[1] Calculated

14.6 CGP1 Performance

The performance of CGP1 for the period 2016 to 2022 is summarized in Table 14-3. Ore tonnes processed during this period ranged from 1.18 Mt to 1.83 Mt with ore grades ranging from 2.46 to 2.70% Li_2O. During 2022 CGP1 processed 1.79 Mt of ore at an average grade of 2.69% Li_2O with 72.1% of the contained lithium recovered into concentrates averaging 6.06% Li_2O. CGP1 plant performance is also compared to Greenbushes' yield model for CGP1 in Table 14-3. Greenbushes' CGP1 yield model provides an estimate of plant performance and is used in resource and reserve modeling to provide estimates of mass yield and lithium recovery at various ore grades in the mine plan. SRK notes that during 2021 and 2022 Greenbushes' yield model over predicted mass yield by about 2%. This may be due to the impact of processing of weathered ore during this period.

Table 14-3: Summary of CGP1 Production

Year	Ore		Concentrate		Li_2O Recovery (%)		Yield (%)	
	Tonnes	Li_2O%	Tonnes	Li_2O%	Actual	Model	Actual	Model
2016	1,184,572	2.51	355,199	6.08	72.7	76.3	30.0	31.5
2017	1,652,259	2.46	492,151	6.04	73.2	75.4	29.8	30.7
2018	1,817,853	2.49	563,883	6.04	75.3	75.6	31.0	31.2
2019	1,659,148	2.70	565,438	6.05	77.0	77.8	34.1	34.7
2020	1,401,625	2.51	435,772	6.06	74.9	76.1	31.1	31.5
2021	1,834,719	2.57	570,343	6.08	73.4	76.9	31.1	32.5
2022	1,795,316	2.69	574,876	6.06	72.1	77.8	32.0	34.5

Source: Greenbushes, 2022

14.7 CGP2 Performance

CGP2 commissioning began during September 2019 and continued through April 2020 and was then shut down and put on care and maintenance during the period of March 2020 to April 2021 due to market demand considerations. CGP2 was then put back into production during May 2021. CGP2 performance during 2021 (May-Dec) and 2022 is summarized in Table 14-4 and compared with Greenbushes' yield model for CGP2.

During 2021 (May to December), CGP2 processed 1,387,985 t of ore at an average grade of 1.97% Li_2O and recovered 50.5% of the lithium (versus a predicted recovery of 73.2%) into 229,521 t of concentrate at an average grade of 5.88% Li_2O. Concentrate yield for this period averaged 16.5% versus the model yield projection of 24.5%. Although, product quality specifications were generally achieved, lithium recovery and concentrate yield were substantially below target.

During 2022 CGP2 processed 1,999,006 t of ore at an average grade of 1.96% Li_2O and recovered 64.0% of the lithium (versus a predicted recovery of 74.3%) into 419,246 t of concentrate at an average grade of 5.98% Li_2O. Concentrate yield for this period averaged 21.0% versus the model yield projection of 24.4%. CGP2 performance improved steadily during 2022 with significant improvement during the fourth quarter. During the fourth quarter of 2022 lithium recovery averaged 68.2% versus the modeled recovery of 75.4% and the mass yield to concentrate was 22.5% versus the modeled yield of 24.7%.

Table 14-4: Summary of CGP2 Production (2021 - 2022)

Year	Month	Ore Tonnes	Ore Li_2O%	Concentrate Tonnes	Concentrate Li_2O%	Li_2O Recovery (%) Actual	Li_2O Recovery (%) Model	Yield (%) Actual	Yield (%) Model
2021	May	172,144	2.03	30,612	5.98	57.9	75.1	17.8	25.5
2021	June	148,981	1.94	23,268	5.79	46.9	71.7	15.6	24.0
2021	July	164,446	1.99	29,824	6.02	54.9	75.1	18.1	24.8
2021	Aug	193,138	2.03	29,786	6.01	45.6	75.5	15.4	25.5
2021	Sept	185,442	2.02	31,806	5.90	50.0	74.0	17.2	25.3
2021	Oct	194,598	1.92	28,229	5.88	44.6	72.6	14.5	23.7
2021	Nov	141,212	1.89	25,686	5.90	56.7	72.5	18.2	23.2
2021	Dec	188,024	1.94	30,310	5.57	50.1	69.0	16.1	24.0
2022	Jan	163,848	1.89	27,499	5.95	52.7	73.1	16.8	23.2
2022	Feb	126,975	1.92	22,762	5.82	54.5	71.9	17.9	23.7
2022	Mar	143,947	1.87	27,242	5.94	60.1	72.8	16.9	22.9
2022	Apr	163,370	1.76	31,020	5.94	63.9	71.5	19.0	21.2
2022	May	153,337	2.14	35,766	5.98	65.1	76.3	23.3	27.3
2022	June	166,656	2.08	38,932	5.95	66.8	75.2	23.4	26.3
2022	July	156,468	1.93	33,022	5.92	64.6	73.2	21.1	23.9
2022	Aug	180,265	1.88	35,513	5.98	62.8	73.4	19.7	23.1
2022	Sept	166,392	2.05	37,623	6.05	66.7	76.2	22.6	25.8
2022	Oct	192,958	1.92	40,779	6.07	66.7	75.0	21.1	23.7
2022	Nov	182,543	1.96	40,015	6.03	67.4	74.9	21.9	24.4
2022	Dec	202,249	2.05	49,124	6.05	71.5	76.2	24.3	25.8
Total									
2021	**YTD**	**1,387,985**	**1.97**	**229,521**	**5.88**	**50.5**	73.2	**16.5**	24.5
2022	**YTD**	**1,999,006**	**1.96**	**419,246**	**5.98**	**64.0**	74.3	**21.0**	24.4
2022	**Q4**	**577,750**	**1.98**	**129,918**	**6.05**	**68.2**	75.4	**22.5**	24.7

Source: Greenbushes, 2022

14.7.1 CGP2 Process Performance Assessment

Greenbushes retained MinSol Engineering (MinSol) to undertake a performance assessment of CGP2 and identify areas where improvements in the plant could be made to increase lithium recovery. MinSol issued a report of their finding on October 27, 2022, which presented their findings and a path forward to improve CGP2 performance. MinSol noted that the following key changes to CGP2 had been made since commencement of the plant optimization program:

- Plant sampling and handling methods have been improved.
- Accuracy of plant instrumentation has been improved.
- Screen sizes have been adjusted throughout the plant to debottleneck process circuits and provide optimal sizing for improved performance.
- Process split points throughout the plant have been manipulated to improve process efficiency, including:
  - Feed tonnage and sizing to the fine flotation circuit has been lowered to improve recovery by reducing coarse spodumene losses to rougher tails.
  - More even feed distribution through the fine and coarse WHIMS to aid iron removal efficiency.
  - Increased feed to the very coarse hydrofloat to increase high grade concentrate production.
- Operating conditions for the hydrofloat drum conditioners have been optimized and gearboxes upgraded. Density control and motor control upgrades were also in progress.

- Modifications to flotation circuit pump arrangement to increase flotation cell slurry density from 11 to 20%w/w.

These optimization changes have resulted in increasing lithium recovery from about 50% reported for 2021 to the Q4 2022 average of 68.2%. This represents an 18% increase in recovery. However, overall lithium recovery remains about 8% less than the design recovery. MinSol has identified the following process areas that could be further optimized in an effort to achieve the original design lithium recovery:

- Blending of ore on the ROM pad to decrease plant feed variability
- Redirecting fines flotation cleaner tailings to allow for additional reagent conditioning
- Improve reagent conditioning efficiency of the fines flotation conditioner
- Improve reagent conditioning in the Hydrofloat reagent conditioners.
- Prescreening HPGR feed to reduce slimes generation
- Add a scavenger flotation circuit
- Add a scavenger WHIMS circuit

It is expected that the optimization programs will be completed during 2023.

14.7.2 Revised CGP2 Yield Equation

SRK notes that that CGP2 and CGP1 flowsheets for are similar and both plants process ore from the same mining operation, as such, SRK believes that it is reasonable to expect that if the optimization programs proposed by MinSol are successfully implemented, CGP2 will eventually achieve lithium yields and recoveries defined by Greenbushes' CGP1 yield model. SRK is of the opinion that the incrementally higher lithium recovery included in Greenbushes CGP2 yield model (attributed to the inclusion of the HPGR in CGP2's comminution circuit) is not warranted as it has been determined that the HPGR results in higher unrecoverable lithium slimes production than had been anticipated.

SRK recommends that Greenbushes CGP1 yield model be used for both for CGP1 and CGP2 for resource and reserve modeling to provide estimates of mass yield and lithium recovery at various ore grades in the mine plan. It is expected that CGP2 optimization efforts will continue through 2023 and, as such, SRK has modified the yield model applied to 2023 CGP2 production which recognizes CGP2's performance achieved during Q4 2022. The revised yield equation applied to CGP2 for 2023 is given as:

$$\text{Yield \%} = (9.362 * (\text{Plant Feed } Li_2O\%)^{1.319}) - 0.5$$

14.8 Product Specifications

CGP1 and CGP2 are operated to produce a spodumene concentrate designated as SC6.0. The specification for SC6.0 is a minimum grade of 6% Li_2O and a maximum iron content of 1% Fe_2O_3. The moisture content is specified at 8% maximum (6% target) and there is no grain size specification. Greenbushes also produces a range of specialized spodumene concentrates in their technical grade plant. Table 14-5 provides a summary of the product specifications produced by Greenbushes.

Table 14-5: Greenbushes Lithium Product Specifications

Criteria	SC5.0	SC6.0	SC6.5	SC6.8	SC7.2 Std	SC7.2 Prem
			Element (%)			
Li_2O	5 min	6 min	6.5 min	6.8 min	7.2 min	7.2 min
Fe_2O_3	0.13 max	1 max	0.25 max	0.20 min	0.12 max	0.12 max
Al_2O_3				24.5 min	25 min	25 min
SiO_2				63.5 min	62.5 min	62.5 min
Na_2O				0.50 max	0.35 max	0.35 max
K_2O				0.60 max	0.30 max	0.30 max
P_2O_5				0.50 max	0.25 max	0.25 max
CaO					0.10 max	0.10 max
LOI				0.70 max	0.5 max	0.5 max
			Grain Size (µm)			
+1,000			<2%			
+850	0%					
+500					0%	0%
+212					18% max	18% max
+125				3% max		
+106	95%					
+75					60% min	60% min
-75				80% min		
Moisture (%)		8 max 6 target				

Source: Greenbushes, 2022

14.9 Process Operating Cost

Process operating costs for Greenbushes two crushing plant (CR-1 and CR-1), the TGP and the chemical grade plants (CGP1 and CGP2) are presented in this section.

14.9.1 Crushing Plant Operating Costs

Operating costs for CR1 and CR2 are summarized in Table 14-6. During 2021 CR1 operating costs were reported at AU$6.80, which increased significantly during 2022 to AU$13.95/t. CR2 operating costs were reported at AU$6.61/t during 2020 and AU$7.84/t during 2022. CR1 provides crushed ore to both the TGP and to CGP1, and CR2 provides crushed ore to CGP2.

Table 14-6: Crushing Circuit Operating Cost Summary

Cost Area	CR1 (AU$)		CR2 (AU$)	
	2021	2022	2021	2022
Overhead	7,629,132	12,917,145	4,613,871	8,508,337
Employee Overhead	2,289,432	2,647,561	1,059,446	1,780,782
Feed Preparation	4,926,383	14,605,376	3,482,693	5,334,205
Ancillary Equipment	23,021	30,609	16,095	48,417
Safety	9,936	11,224	4,226	4,942
Total	**14,877,904**	**30,211,915**	**9,176,331**	**15,676,683**
Ore Tonnes Processed	2,188,794	2,166,209	1,387,956	1,999,008
AU$/t Ore	**6.80**	**13.95**	**6.61**	**7.84**

Source: Greenbushes Foreman's Reports 2021 - 2022

14.9.2 TGP Operating Costs

TGP operating costs for 2021 and 2022 are shown in Table 14-7. During 2021 TGP processing costs were reported at AU$36.74/t ore processed. During 2021, processing costs were AU$44.36/t ore processed. TGP processing costs averaged AU$40.64/t during this two year period.

Table 14-7: TGP Operating Cost Summary

Cost Area	2021	2022
Overhead	4,774,241	7,047,317
Employee Overhead	3,180,578	2,969,008
Primary Grinding	1,697,044	2,179,581
SC 5.0 Circuit	464,114	724,922
Concentrate Circuit	2,442,525	3,086,433
Product Handling	270	-1,343
Tailing Disposal	1,154	2,159
Tailings Dam	210,325	243,817
Ancillary Equipment	122,810	146,869
Safety	116,028	53,529
Total	**13,009,089**	**16,452,292**
TGP (AU$/t ore)	**36.74**	**44.36**
Ore Tonnes Processed	354,075	370,893

Source: Greenbushes Forman's Report, 2021 and 2022

14.9.3 CGP1 Operating Costs

CGP1 operating costs for 2021 and 2022 are shown Table 14-8. During 2021, CGP1 processing costs were reported at AU$16.76/t ore processed. During 2022, CGP1 costs were reported at AU$22.53/t ore processed. CGP1 processing costs averaged AU$19.64/t during this two year period.

Table 14-8: CGP1 Operating Cost Summary

Cost Area	AU$	
	2021	**2022**
Overhead	7,053,327	10,630,825
Employee Overhead	5,550,993	6,297,295
Primary Grinding	3,484,385	4,986,455
HMS Circuit	1,043,843	1,750,777
Product Handling	5,049	1,342
Tailing Disposal	1,235,890	1,945,766
Tailings Dam	1,171,693	1,405,851
Ancillary Equipment	122,810	173,651
Safety	127,752	166,779
Classification	722,742	1,148,875
Filtration	1,655,663	1,659,968
Hydrofloat	2,753,915	3,230,670
Regrinding	3,142,269	3,945,923
Flotation	2,149,755	2,441,421
WHIMS	528,579	665,179
Total	**30,748,665**	**40,450,777**
CGP1 (AU$/t ore)	**16.76**	**22.53**
Ore Tonnes Processed	1,834,719	1,795,316

Source: Greenbushes Foreman's Reports 2021-2022

14.9.4 CGP2 Operating Costs

CGP2 operating costs for 2021 and 2022 are shown Table 14-9. During 2021, CGP2 processing costs were reported at AU$18.64/t ore processed. During 2022, CGP2 costs were reported at AU$22.47/t ore processed. CGP2 processing costs averaged AU$22.08/t during this two year period.

Table 14-9: CGP2 Operating Cost Summary

Cost Area	AU$ 2021	2022
Overhead	8,800,643	16,154,599
Employee Overhead	3,887,965	6,214,171
Primary Grinding	2,561,244	5,046,645
HMS Circuit	1,043,038	1,859,675
Product Handling	41,018	4,054
Tailing Disposal	585,139	1,534,984
Tailings Dam	628,433	1,856,716
Ancillary Equipment	2,418	22,604
Safety	98,412	92,003
Classification	1,096,038	2,001,541
Filtration	259,139	884,387
Hydrofloat	1,259,464	1,962,083
Regrinding	2,080,193	4,375,851
Flotation	1,864,366	4,591,875
WHIMS	1,659,160	2,304,560
Total	**25,866,670**	**48,905,748**
CGP2 (AU$/t ore)	**18.64**	**24.47**
Ore Tonnes Processed	1,387,985	1,999,006

Source: Greenbushes Foreman's Reports 2021-2022

14.10 Expansion Plans

Greenbushes is currently constructing Chemical Grade Plant-3 (CGP3), which is based on CGP2 design, with a design capacity of 2.4 Mt/y. CGP3 is scheduled to come on-line during Q2 2025. As of December 2022, the Capex for CGP3 is estimated at AU$611.3 million. Greenbushes also has plans to construct Chemical Grade Plant-4 (CGP4), which will also be based CGP2 at a design capacity of 2.4 Mt/y. CGP4 is currently planned to commence production during Q1 2027. For purposes of resource and reserve mine planning SRK recommends that Greenbushes' yield model for CGP1 be used to estimate future production from CGP3 and CGP4.

14.11 SRK Opinion

TGP and CGP1 are mature processing facilities with a record of consistent and predictable production. Greenbush's yield equation for CGP1 provides a reasonable prediction of plant production versus ore grade and can be used for resource and reserve modeling.

SRK is of the opinion that the incrementally higher lithium recovery included in Greenbushes CGP2 yield model (attributed to the inclusion of the HPGR in CGP2's comminution circuit) is not warranted as it has been determined that the HPGR results in higher unrecoverable lithium slimes production than had been anticipated. SRK recommends that Greenbushes CGP1 yield model be used for both for CGP1 and CGP2 for resource and reserve modeling to provide estimates of mass yield and lithium recovery at various ore grades in the mine plan. It is expected that CGP2 optimization efforts will continue through 2023 and, as such, SRK has modified the yield model applied to 2023 CGP2 production which recognizes CGP2's performance achieved during Q4 2022.

SRK notes that that CGP2 and CGP1 flowsheets for are similar and both plants process ore from the same mining operation, as such, SRK believes that it is reasonable to expect that if the optimization programs proposed by MinSol are successfully implemented, CGP2 will eventually achieve lithium yields and recoveries defined by Greenbushes' CGP1 yield model.

For purposes of resource and reserve mine planning SRK recommends that Greenbushes' yield model for CGP1 be used to estimate future production from CGP3 and CGP4.

15 Infrastructure

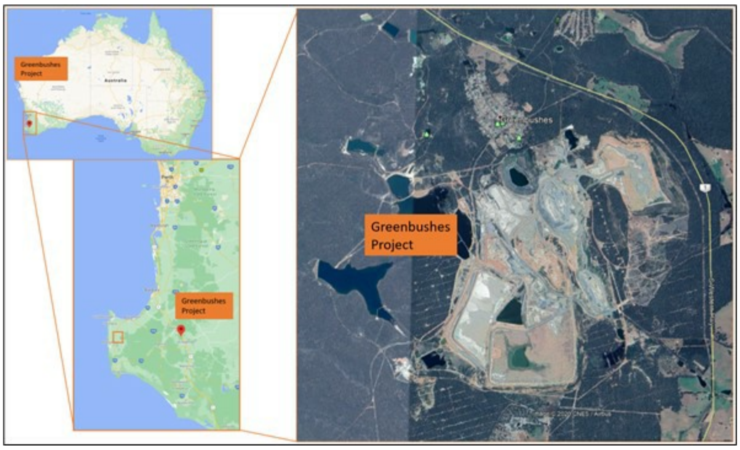
Greenbushes is a mature operating lithium hard rock open pit mining and concentration project that produces lithium carbonate. Access to the site is by paved highway off of a major Western Australian highway. Employees travel to the project from various communities in the region. The established facilities on the site include security fencing and guard house access, communications systems, access roads and interior site roads, administrative and other offices, change houses, existing mine services area (MSA), warehousing, shops, crushing plants, processing plants (CGP1/CGP2/TGP/TRP), tailings facilities, new explosives storage facilities, water supply and distribution system with associated storage dams, power supply and distribution system, laboratory, fuel storage and delivery system, reverse-osmosis water treatment plant, health-safety-training offices, mine rescue area, storage sheds, mine waste storage area, miscellaneous waste storage facilities, and engineering offices. The concentrate is shipped by truck to port facilities located at Bunbury 90 km to the east of the Project. These facilities are in place and functional. An abandoned rail line is present north of the project but not currently used.

Several modifications to the infrastructure are currently in construction or planned. An upgraded 132 kV power line will be placed in service by 2023. A new Mine Service Area (MSA) will be constructed and operating in mid-2023 to provide mine heavy and light equipment maintenance facilities and technical services offices as the existing MSA will be impacted by the planned pit progression. A mine access road will be added to reduce truck traffic through Greenbushes. The warehouse and laboratories are planned to be expanded. The tailings facilities are being expanded with the addition of a new two cell facility known as TSF4 located adjacent to and south of the existing TSF2 and TSF1 facilities. TSF1 will be expanded late in the mine life to meet tailings storage needs. The waste rock facilities will continue to expand on the west side of the pit toward the highway and south toward the permit boundary adjacent to TSF4. A new mine village will be constructed starting in 2023 to provide additional housing. It is expected to be completed in Q1 2024.

15.1 Access, Roads, and Local Communities

15.1.1 Access

The project is located in southwest Western Australia, Australia south of the larger cities of Perth and Bunbury. The small town of Greenbushes, near the project location, is accessed by Australian Highway 1, known as the South Western Highway, and is approximately 80 km from Bunbury and 250 km from Perth. From Greenbushes the site is approximately 3 km south via paved Maranup Ford Road. Maranup Ford Road is called Stanifer St within the town of Greenbushes. Figure 15-1 shows the general location of the project.



Source: SRK, 2020

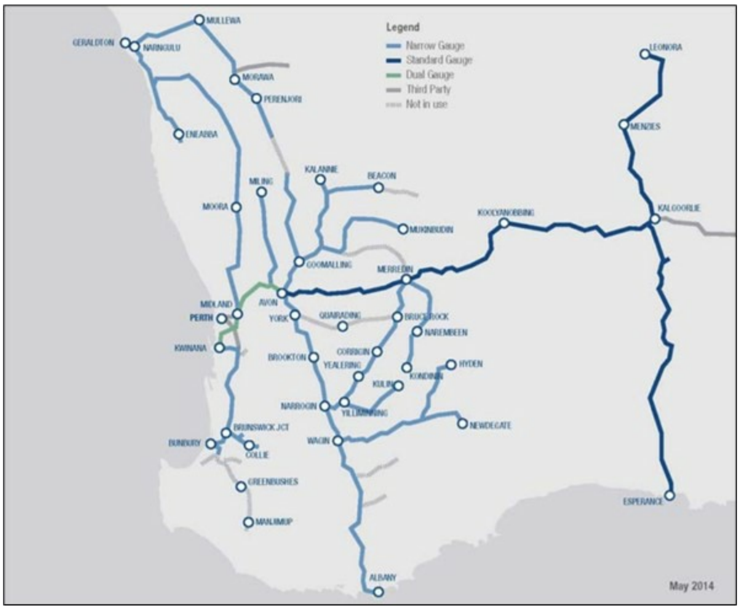
Figure 15-1: Greenbushes Project General Location

15.1.2 Airport

The nearest public airport is located approximately 60 km to the south in Manjimup. It is a small local airport with a 1,224 m asphalt runway. A larger airport with commercial flights is the Busselton Margaret River Airport located approximately 90 km to the northwest near Busselton, WA. A major international airport is located in Perth.

15.1.3 Rail

A rail line is located approximate 4 km north of the Greenbushes project. Known as the Northcliffe branch, the railway is controlled by Pemberton Tramway Company under arrangement with the Public transport Authority. Talison is researching rehabilitation of the line and utilizing the line to transport concentrate to Bunbury port. Figure 15-2 shows the location of the line. At Bunbury it connects with lines to the north to Perth and through Perth to the east. Talison has been undertaking minor repair work to rehabilitate rail access to the site.



Source: Economics and Industry Standing Committee The Management of Western Australia's Freight Rail Network Report No. 3, October 2014

Figure 15-2: Western Australia Railroad Lines

15.1.4 Port Facilities

Port facilities are available and used at Bunbury, 90 km north of the project. Bunbury is a major bulk-handling port in the southwest of Western Australia (WA). The Berth 8-8 shed is used for product storage. The bulk product is loaded into ships that are less than 229 m long and with a permissible draft of 11.6 m. The ship loader operates at 1,500 to 2,000 t/h depending on the configuration on the feed side. The feed can either be by Road Hopper or directly form the bulk storage at the higher rate.

The loading unit and storage sheds are shown in the photograph in Figure 15-3.

Source: Port of Bunbury Web Site (www.byport.com.au/berth8), 2020

Figure 15-3: Berth 8 at Bunbury Port

15.1.5 Local Communities and Labor

The mine and processing facilities are located about 3 km south of the community of Greenbushes part of Bridgetown-Greenbushes Shire and the community of Greenbushes is the closest community to the site. Personnel working at the project typically live within a thirty-minute drive of the project. Table 15-1 shows the local communities and distance from the site. Note that Bunbury and Perth are included for reference as major cities in the region. Skilled labor is available in the region and Talison has an established work force with skilled labor. The 2020 labor levels were approximately 659 people as summarized in Table 15-2. Currently the staff is approximately 950 with an additional 300 people working on CGP3 construction. Full Time Equivalent (FTE) personnel refer to additional part-time contract personnel included to represent the total labor requirement by Talison.

Table 15-1: Local Communities

Community	Population	Distance from Greenbushes (km)
Greenbushes	390	3
Bridgetown	4,350	20
Manjimup	5,400	57
Nannup	1,400	50
Donnybrook	6,100	45
Boyup Brook	1,800	42
Bunbury	12,100	80
Perth	2,100,000	250

Source: SRK, 2020

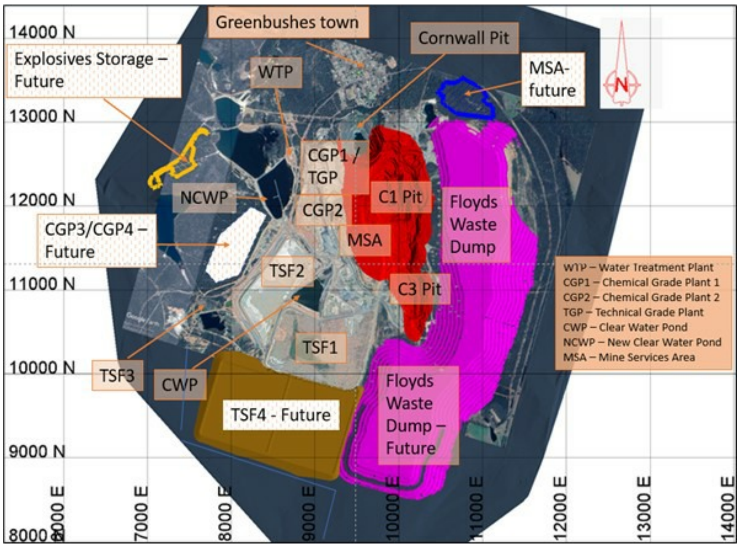
Table 15-2: Labor by Area

Area	2020
Administration	28
OHSTEC	22
Mining	37
Processing	109
Maintenance	49
Infrastructure	64
Shipping	6
Projects	7
Total Talison	**321**
L&H Mining Contractor	114
D&B Mining Contractor	32
Blasting Contractor	3
Total Contractors	**149**
FTE Personnel	188
Total Operational Workforce	**659**

Source: Talison, 2020

15.2 Facilities

The Project facilities are located proximate to the site. The overall layout can be seen in Figure 15-4. The established facilities on the site include security fencing and guard house access, communications systems, access roads and interior site roads, administrative and other offices, change houses, existing mine services area (MSA), warehousing, shops, crushing plants, processing plants (CGP1/CGP2/TGP/TRP), tailings facilities, explosives storage facilities, water supply and distribution system, power supply and distribution system, laboratory, fuel storage and delivery system, reverse-osmosis water treatment plant, health-safety-training offices, mine rescue area, storage sheds, mine waste storage area, miscellaneous waste storage facilities, and engineering offices. These facilities are in place and functional.



Source: SRK, 2020

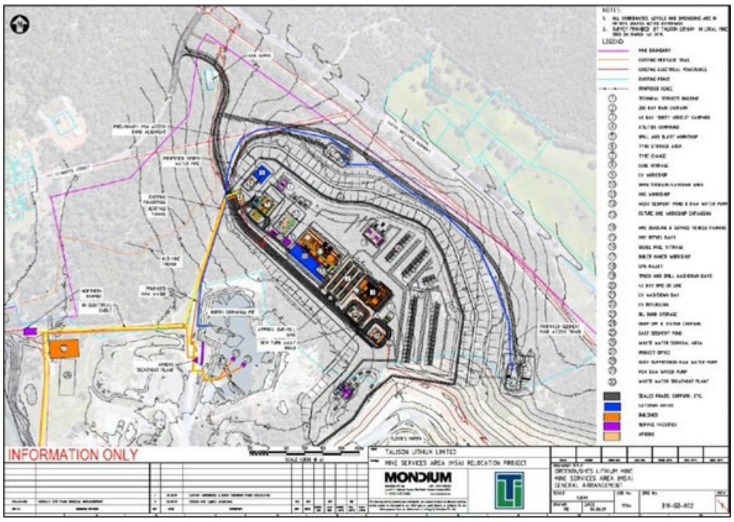
Figure 15-4: General Description with Facilities Map

15.2.1 Powerline Upgrade

The site power system is currently being upgraded to include a 15.3 km 132 kV power line routed to the north from Bridgetown North and then to the west along the south side of TSF4 past the end west of TSF4 and then north to the future location of CGP3/CGP4. The upgrade will include a 132 kV outdoor busbar with 2 x 60 MVA transformer circuits and a 22 kV switch room. Additionally, there will be a combined 132 kV relay room and Western Power 132 kV control and measuring room to upgrade the power to the site for potential future expansion.

15.2.2 Maintenance Service Area (MSA)

The current MSA is located on the IP dump near the existing open pit. The pit will consume the MSA, and relocation is necessary. The new MSA will be located to the northeast of the pit area as seen in Figure 15-4. The new MSA move is in progress and will be completed in Q1 2023. The facility supports maintenance activities on heavy mobile equipment including drill and blast equipment. The facility includes welding shops, support facilities including heavy and light equipment wash bays, lube storage and dispensing, tire handling and storage facilities, laydown yards, mining equipment parking, lighting, diesel storage and delivery facilities for light and heavy equipment, and a technical services complex with three separate offices and shared common areas. A parking area for contractor and employee parking is included in the facility design. The new facilities have a separate water supply, surface water control ditches and ponds, and waste-water treatment system. Construction is being completed in three stages with a pre-construction phase that includes bulk earthworks, geotechnical investigation, design, and tender which is currently being completed. The second stage will include the first stage of construction occurred in 2022 followed by a further expansion that will be tied to potential future expansion of the mining fleet in five years. Figure 15-5: shows the new MSA layout.



Source: Talison, 2020

Figure 15-5: Layout of the New MSA Facilities

15.2.3 Mine Access Road

The existing route for the trucks transporting the concentrate, is to travel along the South West Highway from Bunbury and then traverse through the Greenbushes townsite via Stanifer street to the Greenbushes Lithium Mine. The number of supply and product transport truck movements associated with the mine is expected to increase in the future. An investigation was carried out to identify what alternative routes there were for the trucks to access the Mine which did not require them to traverse through the Greenbushes townsite. An alternate route to the west of the Greenbushes townsite was located and a project to construct a new road was designed. This project is planned for 2023.

15.2.4 Warehouse Workshop Expansion

The warehouse workshop is planned to be expanded for additional space. The design work has been initiated and the expansion will be completed in 2024.

15.2.5 Laboratory Expansion

The laboratory geological preparation facility is being expanded to provide additional materials handling capacity. The lab upgrade also will include an XRF upgrade to handle additional testing. An ICP will also be included in the expansion. The expansion is expected to be complete in 2024.

15.2.6 New Camp Facilities

Talison plans to add additional camp facilities at the with construction starting in 2023 and completion in Q1 2024 to allow housing for additional workforce associated with the addition of CGP3 and CGP4. The facilities are planned to be southwest of the project.

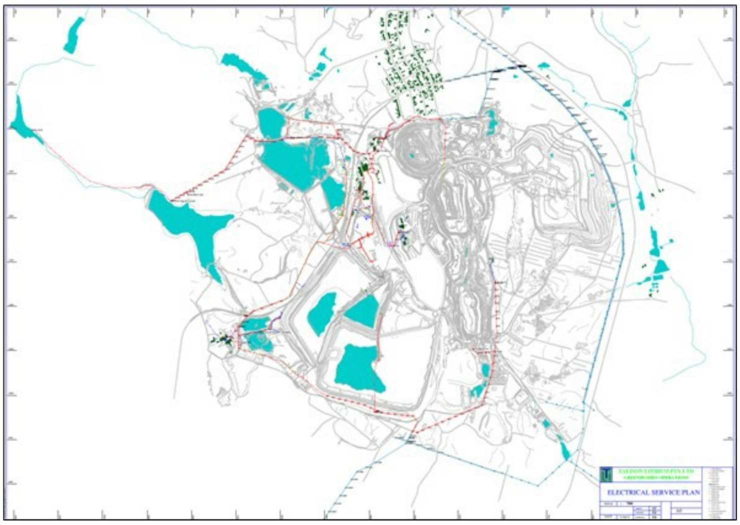
15.3 Waste Rock Storage and Temporary Stockpiles

Waste rock storage and temporary stockpiles are discussed in detail in Section 13.6.

15.4 Energy

15.4.1 Power

Greenbushes has a mature power delivery system with two feeds from Western Power with wholesale power from Alinta Energy through the Talison's retailer Perth Energy. The power supply system is in a loop configuration so that the project has redundancy (Figure 15-6). main Western power line runs from north, west of the town of Greenbushes, along the west side of the Project parallel to the South Western Highway to a point where it turns due west to a point approximately aligned with the center of the deposit and then continues due south. The Talison 22 kV power system connects to the north near the town of Greenbushes and then to the south near the future location of TSF4. The Talison 22 kV connection from the south runs along the TSF1 and TSF2 to the west then turns north to the processing facilities on the north end of the deposit where it connects with the Talison north feed. Portions of the Talison supply system is on poles above ground other portions are underground to reduced congestion with other infrastructure and facilities.



Source: Talison, 2020

Figure 15-6: Greenbushes Power Layout

Talison has a current connected load of approximately 20 MW and a running load of approximately 16 MW.

15.4.2 Propane

Propane (LPG in Au) is used for drying in the TGP, laboratory sample furnaces, shipping floor sweeping. The site consumes approximately 1.2 M liters annually. Storage is on site in LPG tanks. A 118,000-liter bulk tank is near TGP. A cylinder bank (210 kg capacity) is located at the lab. Two small 45 kg cylinders are used by the sweepers. Supply is by tanker truck for the large bulk tank.

15.4.3 Diesel

The site has four diesel tanks with a capacity of 55,000 liters each. Three are associated with the current MSA. One is located in the processing area. The three tanks associated with the existing MSA will be removed from service and disposed of once the new MSA is constructed. The new MSA will have two new 220,000 liter tanks when initial construction is complete. An additional 220,000 liter tank will be added in 2025, with the first site majority of the use is for the mining fleet. Supply is by tanker truck.

15.4.4 Gasoline

No gasoline is stored on site.

15.5 Water and Pipelines

Water Supply and Storage

Mine water supply is sourced from surface water impoundments for capture of precipitation runoff, pumping from sumps within the mining excavations and recycled from multiple TSFs. No mine water is sourced directly from groundwater aquifers through production or dewatering wells. This lack of significant groundwater production for mine usage indicates the overall importance of the surface water and TSF water management systems to the operational capacity of Greenbushes.

Existing water sources and storage facilities at the mine include active and flooded historical mining excavations (C1/C2/C3 pits, and Vulcan pit), surface water impoundments/dams (Cowan Brook, Southampton/Austin's Dam, Clear Water Dam, Clear Water Pond, Mt. Jones Dam, Norilup Dam, Dumpling Gully Dam, Swenkies Dam, and Tin Shed Dam), and tailings storage facilities (TSF1 and TSF2). Additional near-term storage is planned through the construction of TSF4 and expansion of the waste rock landform (WRL) storage infrastructure. The majority of these water sources and impoundments are linked through constructed surface pumps and conveyance.

Water Balance

SRK reviewed a water balance model constructed in 2018 to support current and future proposed operations at Greenbushes (GHD, 2018). The model included all existing water sources and storage facilities, pumps and transfer capabilities, and operating rules. On top of this base was added the proposed additional storage infrastructure and pump/pipeline modifications to increase optimization. In addition, numerous assumptions were applied where empirical data were not available to support operating methodology of the site wide water supply system.

The results of the water balance model indicated that there could be significant water supply shortfalls by 2025, potentially limiting operation of the proposed larger network of processing facilities, with significant depletion of water levels within the storage facilities by 2023. While the addition of water storage within TSF4, and more significantly the WRL, do serve to alleviate the magnitude of near-term supply shortages most commonly in the summer months; these structures will not serve to reduce the frequency of these supply shortfalls (GHD, 2018). Long term security of supply appears to be challenged. Talison has ongoing projects to increase the water storage options through raising the dam embankments on several storage structures including the Cowan Brook, Austins and Southhampton dams. The design of these water retention dam raises is being led by GHD and is undergoing independent third-party review.

Long term security of water supply is a significant risk for Greenbushes, given the scope of the proposed expansion of operations. Additional water storage structures, beyond those currently proposed, should be considered. It is recommended that those structures be located outside of the current facility catchment to maximize new supply sources. This work has commenced as noted in the previous paragraph.

15.6 Tailings Disposal

SRK performed a review of tailings data, relevant to the estimation of reserves, provided by Talison. Greenbushes has four tailings storage facilities (TSF) and SRK's review focused on the currently active TSF and plans for two future TSFs. Documentation available to SRK included the design data, the two most recent annual site inspection reports, and supporting data. SRK's review is for the purpose of supporting the resource and reserve disclosure reported herein and should not be interpreted by the reader to reflect an analysis of or any certification of TSF dam stability or associated risk and in no way should be interpreted to substitute for the role or any responsibilities of the Engineer of Record for the TSFs. SRK's scope of work included review to confirm that applicable design documentation exists, review the operational aspect of the TSFs, check that the planned TSF capacity is adequate to support extraction of the full reserve for the Project, and to note risk and opportunity associated with the operation and capacity of the TSF, as applicable to estimation of reserves.

15.6.1 General Overview

Greenbushes has four TSFs on site. Greenbushes utilizes pumped slurry tailings through pipelines that are deposited by spigot in conventional tailings storage for long term tailings storage. The four tailings storage areas are designated TSF1, TSF2, TSF3, and TSF4. TSF2 is the only currently active TSF. Figure 15-7 shows the existing and future tailings locations.

- TSF1, currently approximately 110 ha in size, was constructed in 1970 and operated for approximately 30 years mainly for tantalum production and was placed on care and maintenance in 2006. It was initially laid out in a three-cell configuration but has subsequently modified into a single cell with a central decant. At the existing mRL 1280 crest it holds approximately 333 Mt of storage capacity. A 5 m high upstream lift was constructed in 2018 using mine overburden materials. This capacity allows TSF1 to be available for emergency storage of tailings if needed (GHD/Talison, 2020). The tailings facility will be upgraded, and additional lifts added for further use late in the mine life. Talison is reprocessing tailings from TSF1 in the Tailings Reprocessing Plant (TRP).
- TSF2, currently approximately 35 ha in size, is the only active TSF and has been in operation since 2006. The facility was constructed in 2006 with additional upstream raises that elevated the crest level to mRL 1271, the current elevation, which is approximately 36 m above lowest ground level, (GHD/Talison, 2020). The TSF will eventually be elevated to a final elevation of mRL 1280, this raise is currently underway. The additional planned additional capacity will be 9.9 Mt.
- TSF3 is a small (5 ha) historic tailings storage area approximately 1 km south of TSF1 and is closed and undergoing trial reclamation. The small storage pre-dates 1943 and was historically used to dispose of slimes from the Tin Shed operations, which are thought to contain about 800,000 t of process waste. Local information is that deposition ceased around the late 1980s or early 1990s (GHD/Talison, 2020).
- TSF4 is a two-cell 240 ha new downstream construction slated for 2021/2022 that will be the primary storage area for the remaining LoM. The TSF4 facility will have two-cell design adjacent to TSF1 for a portion of the northern edge. The two-cell system will allow balancing of the fill between the cells while the facility is in service from 2022 through 2048. The final elevation will be 1295 mRL. The total capacity of the facility is planned to be 68.2 Mt.
- Water is managed at the TSF1 and TSF2 facilities through local ponds. The 8.5 ha old Clear Water Pond (CWP) is a small water storage facility located between TSF1 and TSF2. It held water from the TSF2 decant system before water was returned to the process facilities. CWP now acts as the TSF2 decant system. The New Clear Water Pond (NCWP) is the primary water storage for TSF2. Water management, as summarized by GHD (GHD/Talison, 2020) follows:

Rainfall runoff from the surfaces directly surrounding TSF 1 and TSF 2 collects within local surface water ponds. Runoff from the western side of TSF 1 and TSF 2 embankments and foundations is directed into open drains and pipe work running alongside Maranup Ford Road. The seepage water from TSF1 eastern wall reports back to Vultan dam via existing old mining channels. Vultan water is then pumped back to the TSF2 decant and into process.

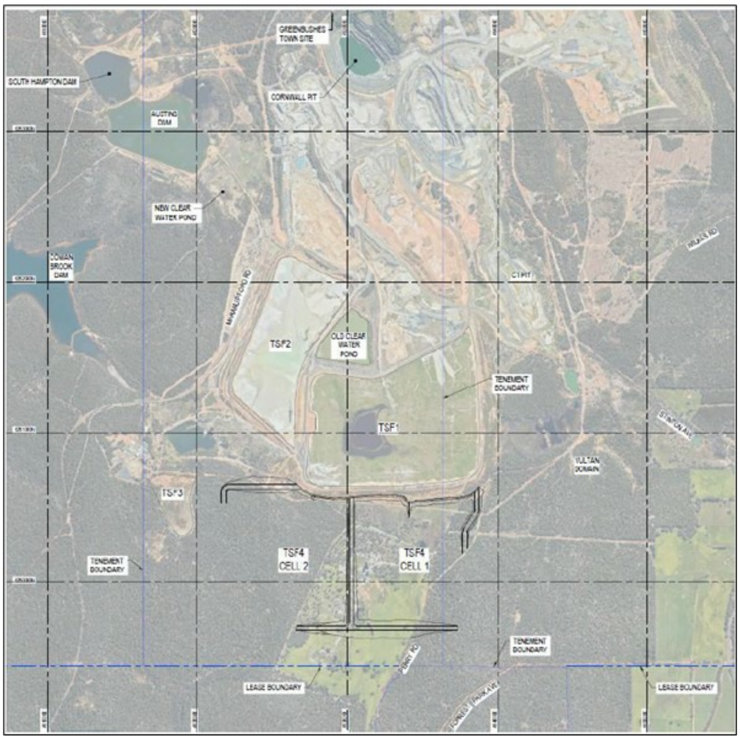
Decant water from TSF 2 is pumped via a floating suction decant to the NCWP from where it is pumped back to CGP1, CGP2 and TGP. Water is pulled from the circuit into the ATP where the processed water is returned back to the mine process water circuit.

Surface water runoff on the southern and eastern sides of TSF 1 is diverted east by a channel into the Old Pits and is pumped back into CWP where it is returned to the plant water circuit.

At the time of this audit there was no decant pond on TSF 1 and no active return water system in operation.

Decant water from TSF 2 is pumped via a floating suction decant to the NCWP and mainly returned to the plant water circuit after removal of arsenic or to Austin's Dam for return to the plant when required. Surplus water is pumped to Southampton Dam and some surplus from there is stored in underground workings until recovered in summer. Cowan Brook Dam is also used on occasion to top up the plant water circuit during dry periods.

The TSF4 water handling system will include a centralized tailings pumping station capable of moving tails from CGP1, CGP2, and TGP, power reticulation install and upgrade to the existing CGP1 tails booster pump system. The TSF4 design includes a decant system, underdrainage, toe drains, surface collection trenches and the associated sediment collection ponds.



Source: Talison, 2020

Figure 15-7: Greenbushes Tailings Locations

15.6.2 Design Responsibilities and Engineer of Record

Design responsibilities for the active tailings facilities have been performed by GHD. GHD is the established Responsible Technical Person (RTP) or Engineer of record formally documented July 12, 2022. SRK documents the key engineering activities and the companies involved as follows:

- TSF1:
  - D E Cooper and Associates (DCA) is understood to have been the original design engineer and Talison has limited documentation through 1998 from DCA.
  - GHD has done inspections since 2013 including this facility.
  - GHD is the RTP for TSF1.

- TSF2:
  - Constructed in 2006 under the direction of DCA:
    - Stability modeling (DCA 2005) confirmed that the embankments met government guidelines and the stability modeling assumptions were confirmed by monitoring readings (GHD 2013a). Further geotechnical investigation and analyses indicated that there was some potential for liquefaction of the tailings under earthquake conditions (GHD 2013c). After consideration of alternatives, it was decided that a stability buttress should be added to the southern and western walls. To achieve the wider footprint, part of the Maranup Ford road was realigned further to the west. The current design also incorporates internal seepage interceptor drains with discharge pipes carrying the water through the embankment to an external collection system. (GHD).
  - GHD is and will be the Engineer of Record for TSF2.
  - GHD has performed inspections on this facility since 2013.
  - GHD completed an engineering design for the development of TSF2 from mRL 1265 to mRL 1280 in 2015. An updated design was completed in 2020 to raise the facility to mRL 1275.
  - GHD monitored construction (Feb 2019 – Oct 2019) and provided a summary construction report at the completion of construction. (GHD, TSF2 Construction Report, February 2020).
  - A Dambreak Study was conducted by GHD in 2019 updating the 2014 Dambreak Study by GHD (GHD Draft Report dated October 2019):
    - Key findings from GHD included potential impact of TSF2 breaches to the north or west on CGP2 and other planned future facilities at mRL 1300. Based on GHD's analysis, breaches at mRL 1280 would have significantly lower impact.
    - GHD provided a preliminary engineering design for a ground improvement project on TSF2 in 2021 that will support buttressing the central section of theTSF2 western wall.
  - GHD will have design responsibilities for the active facilities TSF 2 and the future TSF4.
  - The raise to 1280 mRL is underway and will be completed in 2023.
  - The TSF2 buttress project is well progressed and nearing completion.
- TSF3:
  - There is limited design data available for TSF3 and no significant deposition has occurred since 2008. The facility is in the process of being reclaimed. GHD continues to inspect the area during their annual inspections.
- TSF4:
  - TSF4 is new construction and GHD is the Engineer of Record for the design and is participating in the construction and monitoring of the construction. Talison plans to use GHD to monitor the ongoing operations consistent with their use on the annual tailings dam inspections. The TSF4 design was modified to include a liner during the regulatory approval process.

15.6.3 Production Capacities and Schedule

The production schedule over the life of mine requires as total storage capacity of 84.7 million m^3 (118.5 million tailings tonnes at 1.4 t/m^3) of tailings. This equates to approximately 4.2 million m^3 per year of tailings placement. The tailings construction plans allow for placement of tailings in two or more locations to balance rate of rise needs. The tailings placement schedule with start and end year as well as capacity available and used is summarized in Table 15-3.

Table 15-3: Capacity Confirmation

Storage Location	Status	Start (year)	Finish (year)	Size (ha)	Current mRL	Final mRL	Additional Capacity (Millions of m^3)	Capacity Used (Millions of m^3)
TSF1	Inactive	2034	2042	110	1280	1305	30.6	30.1
TSF2	Active	2020	2024	35	1271	1280	5.9	5.9
TSF4	Construction	2023	2034	240	N/A	1295	48.7	48.7
Total Capacity (accounting for design freeboard)							**85.2**	**84.7**

Source: SRK, 2022

15.6.4 Tailings Risk Discussion

Several risks are noted in review of the tailings data:

- Tailings storage facilities are typically one of the highest risk aspects of a mining operation. Even if the probability of occurrence of a major incident is low, the magnitude of potential impact is often high which results in overall high risk to the business. Therefore, while SRK is not evaluating TSF dam stability or risk, it recommends that Talison follows all recommendations from its Engineer of Record in a prompt manner.
- SRK recommends a Comprehensive Dam Safety Review by a third party to be completed on all TSFs as soon as possible. This review will further clarify any issues of significance that have not been flagged by GHD and will provide guidance to Talison on any other key issues. The review will also note any deficiencies in the underlying design data and could flag additional technical work (geotech, hydro, materials characterization) to support future design or mitigation needs.
- The timing on construction of TSF4 is important from an operational flexibility standpoint with TSF2 being the only active TSF and TSF1 only available for emergency use. SRK recommends accelerating TSF4 construction, if possible. Additionally, permitting action delays can also delay Talison's ability to construct in a timely manner.
- The TSF1 design will require additional geotechnical and hydrogeology work to clarify design parameters and understand clearly the risks associated with the in situ tailings due to the historic nature of TSF1 and lack of detailed historic design information. This work has begun, but SRK notes that the work is planned to take four years. SRK recommends this be a priority so that a more detailed plan is developed for TSF1 so that it can be available if needed for future expansion or if problems develop with the other active TSFs. SRK recommends that Talison follow all recommendations by the EOR. Other alternatives should be considered including dry stack tailings storage if space constraints continue to exist for LoM.
- SRK recommends that the tailings life of mine planning be integrated into the LoM mine planning effort to confirm long term planning needs and to prioritize issues if expansion plans move forward. Coordination and finding space for tailings and waste is accelerated with the additions of CGP3 and CGP4 into the production mix.

16 Market Studies

Fastmarkets was engaged by Albemarle through SRK to perform a preliminary market study to support resource and reserve estimates for Albemarle's mining operations. This report covers the Greenbushes mine and concentrator and summarizes data from the preliminary market study, as applicable to the estimate of resources and reserves for Greenbushes. The preliminary market study and summary detail contained herein present a forward-looking price forecast for applicable lithium products. This includes forward-looking assumptions around supply and demand. Fastmarkets notes that as with any forward-looking assumptions, the eventual future outcome may deviate significantly from the forward-looking assumptions.

The Greenbushes facilities include a large-scale, long-life, low cost hard rock mine and a spodumene concentrate plant that produces a range of spodumene concentrate products that are sold primarily into the chemical lithium markets, with some sold into the technical lithium markets. As discussed in Section 11.6, Talison's ability to predict lithium production for technical grade products at a level that meets the standard of uncertainty for a reserve requires grade control drilling and therefore has been excluded from this reserve estimate. Instead of predicting reserves of technical grade concentrate, Fastmarkets has assumed that all product produced by the operation is sold into chemical markets.

As the technical grade production is not included in the reserve, it has also been excluded from this market discussion.

The Greenbushes operation also has the ability to produce tantalum concentrate. However, Talison does not own the rights to this production and does not receive any economic benefit from it. Therefore, it has not been included in this analysis.

16.1 Market Information

This section presents the summary findings for the preliminary market study completed by Fastmarkets on lithium.

16.1.1 Lithium Market Introduction

Historically, (i.e., prior to the 2000s), the dominant use of lithium was in ceramics, glasses, and greases. The current lithium market is driven by the battery electric vehicle industry. Demand from lithium-ion batteries currently contributes 81% of total demand. Split into EV's (70%), ESS (4%) and consumer electronics (7%) The remainder (19%) is from ceramics and other traditional applications.

Lithium is currently recovered from hard rock sources and evaporative brines. The predominant hard rock mineral is spodumene, whilst most production from brine operations occurs as lithium chloride (LiCl). For the rest of this document, unless specifically noted, when referring to brine production Fastmarkets will be referring to chloride brines, and when referring to hard rock, again unless specifically noted, Fastmarkets will be referring to spodumene. This is to minimize the complexity of this explanation and given these are the dominant forms of production from both sources, this simplification covers the majority of current and future production sources.

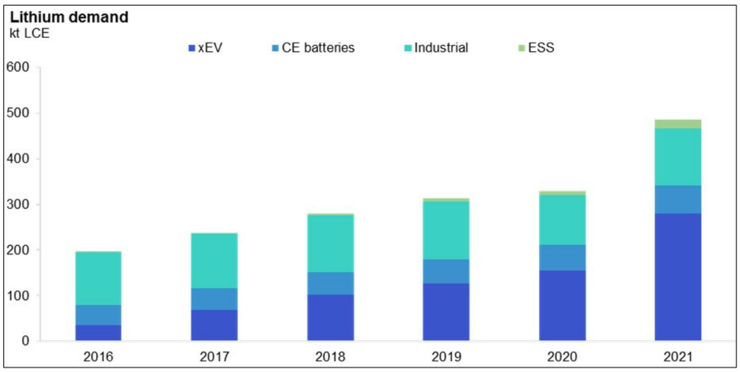
For use in batteries appropriate for electric vehicles, lithium is generally used in either a carbonate or hydroxide form. Current practice allows direct production of lithium carbonate from either brines or hard rock sources, whereas only hard rock sources directly produce lithium hydroxide (brine operations all first produce lithium carbonate which is then converted to hydroxide, if desired). However, there is a reasonable probability that lithium hydroxide will be produced directly from a brine source in the future. For existing producers, the major differences in cost between brine and hard rock include the following:

- Hard rock sources require additional mining, concentrating, and roasting/leaching costs.
- For a final hydroxide product, brine sources first produce a lithium carbonate that requires further conversion costs, whereas hard rock sources can be used to directly produce a lithium hydroxide from a mineral concentrate.
- Brine sources require concentration prior to production, as natural brine solutions are generally too diluted to allow for precipitation of lithium in a salable form.
- Brine sources generally have a higher level of impurities (in solution) that require removal.

Historically, brine producers have had a significant production cost advantage over hard rock producers for lithium carbonate and a smaller cost advantage for lithium hydroxide. New brine producers have relatively high operating costs when compared to traditional hard rock production, especially with respect to the production of lithium hydroxide, so the prior landscape is evolving.

16.1.2 Lithium Demand

In recent years, the lithium industry has gone through an evolution. The ceramic and glass sectors were traditionally the largest source of demand for lithium products globally. However, the development boom in demand for mobile consumer applications reliant upon lithium-ion batteries structurally changed the industry. Much of this change, 2000-2015, was driven by devices such as phones, laptop computers, tablet computers, and other devices (e.g., speakers, lights, drones and wearables, etc.), as well as small mobility devices (e.g., electric bikes). However, the use of lithium in EV’s has quickly become the most important aspect of overall lithium demand, not just within the battery sector of demand, but for lithium demand on whole. This is seen in Figure 16-1, with EV market share rapidly growing in importance and driving overall demand growth in the lithium industry.



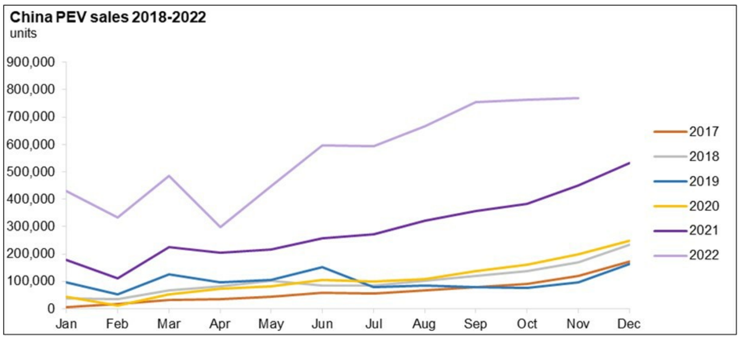
Source: Fastmarkets

Figure 16-1: Lithium Demand

The potential future demand scenarios look extremely strong as the adoption of EV's is happening at a fast pace, governments have accelerated their zero-carbon agendas, towns and cities are introducing emission charges, which is accelerating uptake of EV, especially light commercial EV's and as more power generation comes from renewables, the need for Energy Storage Systems (ESS) will also need to grow at a fast pace. Indeed, lithium demand from ESS applications is expected to be bigger than EV's.

But the future landscape could also change, instead of households owning cars, autonomous vehicles may lead to ride-hailing and car-sharing usage models, battery chemistries are likely to change and different power trains, such as hydrogen, could be adopted.

Nonetheless, acceleration in the growth of the EV industry appears to be unstoppable. Demand growth in 2019 and 2020 were relatively disappointing but were likely driven by external factors (e.g., changes in EV subsidies in jurisdictions such as China, as well as the global COVID-19 pandemic) that have largely moved through the system. Indeed, EV demand in China in the second half of 2020 and throughout 2021 accelerated at a fast pace and have remained strong in 2022 (Figure 16-2). In the first three quarters of 2022, BEV sales were up 89% in China, 69% in the US and 26% in Europe.



Source: CAAM, Fastmarkets

Figure 16-2: China PEV Sales

Ironically, the pandemic and the lockdowns led to significantly less polluted cities and clear skies, which has changed public perceptions about climate change, which combine with government incentives to buy EV's, in an effort to boost economic recovery, have further boosted demand for EV's. Most auto makers and other industry participants have invested heavily to expand into EV production and have accepted that the future is EV's, with many already signaling when they will stop producing internal combustion engine (ICE)- based vehicles. Interestingly, many of Japan's OEMs were reluctant to adopt EV's wholeheartedly, given they had to import energy to produce electricity, but in recent years they have signaled their intent to switch to electric. In Fastmarkets' opinion, many of the barriers to EV's becoming the dominant type of vehicle sales have been lifted, although there are still concerns about availability of raw materials and the cost of EV's.

Several barriers for mass EV adoption persist, with cost being the most significant one. In 2020, Bloomberg New Energy Finance (BNEF) estimated that the battery pack makes up 33% of the total BEV cost. At that time, the cells within the pack made up 75% of the battery pack cost and the cathode active material (CAM) made up around 51% of the cell cost. The CAM is the most expensive component of the entire battery pack. These proportions will now have changed due to high commodity prices and other global economic factors.

Due to a lack of maturity of the lithium battery market, current contract prices are significantly lower than spot market prices. This is expected to change with time. Fastmarkets expects that a move to market-based pricing mechanisms will result in raw material prices settling at a level that is mutually beneficial for both producers and consumers.

For higher-end vehicles, this cost is manageable in the context of the overall vehicle cost. However, for entry level vehicles, the cost of the battery pack remains a hurdle to BEV's being competitive with ICE cars. BNEF state that US$68 per kWh is a rough global benchmark for BEV's becoming cheaper than ICE vehicles.

Fastmarkets' modeling, which considers spot prices for lithium, nickel, manganese, cobalt, and iron phosphate, showed battery pack costs peaked at US$180 to US$190 per kWh for nickel-based chemistries in March 2022 following high lithium hydroxide prices and the nickel price spike. The LFP battery pack cost peaked near US$155 per kWh around the same time, driven by high lithium carbonate prices.

We expect a greater penetration of vehicles fitted with LFP/LMFP battery packs outside of China. LFP/LMFP is a lower cost on a kWh basis, helping to reduce the average fleet battery pack cost and improve cost parity in budget vehicle segments. Improvement in technologies will also help reduce battery pack costs by reducing material intensity (less material = reduced cost) and increasing energy density (higher kWh for the same cost).

We have seen EV's become increasingly popular across developed markets in 2021 and 2022. We expect to see this level of growth sustained due to two factors. Firstly, the variety and availability of EV models have expanded since 2021, making EV's attractive to a greater number of consumers. The second is the introduction, or expansion, of EV-related subsidies and electric mobility strategies by governments in order to increase local EV adoption rates.

That said, two headwinds pose a downside risk to EV adoption in the near term, namely EV prices and range anxiety. Data from Fleet Europe shows that, although EV prices have fallen in China by 52% since 2015, they have risen in the US and Europe by 20% and 14% respectively, making EV's 43% and 27% more expensive than ICE cars in these markets. EV's also remain unaffordable for most consumers in emerging markets where average household incomes are lower, making ICE and used vehicles more attractive. We also expect that range anxiety will continue to limit battery-only-EV (BEV) sales in the near term, particularly in markets where vehicle ownership is necessary for travel, until battery range and charging infrastructure improves. But, where range anxiety is an issue, plug-in-hybrid EV (PHEV) sales are expected to do well.

In Fastmarkets' opinion, raw materials and supply chain limitations are the other potential major risk to widespread EV adoption, given how much longer it takes to build new mine supply, compared with downstream manufacturing capacity. Out of all the battery raw materials, Fastmarkets expects graphite and lithium to be the materials that are most likely to constraint battery production, but it is not a given. The risks are generally considered to exist in the nearer term period, as the further out you look, a broader base of producers, who will by then have better knowhow, will be better placed to expand production or use their expertise to help, by partnership or acquisition, other junior miners get into production. In addition, longer-term, widespread recycling will likely mitigate this risk. Downstream production (e.g., battery-grade lithium carbonate/hydroxide, cathode precursor, cathodes, batteries, etc.) also appears to have a low risk of creating a bottleneck, as an extensive investment in this manufacturing capacity has already happened and continues. Technological improvements, including direct lithium extraction, DLE, and mining different ore types, like lepidolite and clays, are also expected to speed up the bringing of new supply to the market as well as expand the availability of lithium units, in the case of lepidolite.

Fastmarkets expects near- to mid-term growth in the EV market to remain robust, the biggest near-term threats are the cost of living crisis, the higher interest rate environment, and the prospect of widespread recession. The International Monetary Fund (IMF) expects one-third of the world’s economy to be in recession in 2023. Normally, such an economic outlook would dampen the outlook for new vehicle sales, but while Fastmarkets expects total vehicle sales to be negatively impacted, it does not expect EV sales to be impacted. The reasons being first there are long waiting lists to buy EV’s, these range 3-24 months. Second, EV production that has been constrained by the parts shortages, especially the semiconductor shortage, is expected to recover as more capacity has been built and supply lines have had time to adjust to the disruption caused by Russia’s invasion of Ukraine, the latter being a significant manufacturer of auto parts. In addition, the EV market has moved on from being a niche market to being much more mainstream. In addition, it needs to be remembered that EV growth will run parallel with ESS growth, and both will be driving demand for lithium-ion batteries. While Fastmarkets has little doubt the electrification era will unfold at a fast pace, there is no room for complacency. There are risks - technological changes could see hydrogen power-trains, with hydrogen being used as a fuel to combust, or to power fuel cells, and other battery chemistries could evolve, such as sodium-ion. In addition, advances in charging could mean EV’s could operate with significantly smaller batteries, which in turn would mean the global vehicle fleet needs less battery raw materials. Under these scenarios, demand for lithium from EV’s would be curtailed. Overall, Fastmarkets expects lithium-ion batteries will remain essential as the electrification era unfolds at a fast pace.

To quantify potential demand growth, Fastmarkets has constructed a bottom-up demand model, forecasting BEV sales by region, by EV type (BEV, PHEV, Mild-hybrid (MHEV)), which is further broken down by battery size and battery chemistry, from which we calculate the volume of demand for each battery material. The demand side remains extremely dynamic, different battery chemistries, including sodium-ion, LFP LMFP, high nickel, high manganese and others are expected to be utilized by different applications going forward. The main risk for lithium would be if a non-lithium-ion battery gained traction. Again, while we expect non-lithium batteries will find some applications, we expect lithium-ion batteries will dominate.

With governments imposing targets and legislation as to when the sale of ICE vehicles will be banned, strong growth in EV uptake is expected over the next 10-15 years. Fastmarkets’ forecast is by 2032, EV sales will reach 50 million, which will mean about 55% of global sales will be EV - highlighting there will still be a lot of room for organic growth ahead.

While the is a lot of focus on EV growth, there is a likely cap on how big the EV market can be. But given the potential for grid scale energy storage, the ESS market is likely to surpass the EV market in the future.

16.1.3 Lithium Supply

Lithium supply is currently sourced from two types of lithium deposit: hard rock (spodumene, lepidolite, and petalite minerals) and concentrated saline brines hosted within evaporite basins (largely salt flats in Chile, Argentina, China and Bolivia). Exploration and technical studies are currently ongoing on three additional types of deposits: hectorite clay deposits, a unique hard rock deposit with a lithium- boron mineral named Jadarite, and other deep brines (e.g., geothermal and oil field). Although extensive study has been completed and much is being invested in these alternate lithium sources, they have not yet been commercially developed, although some are expected to be commercially developed in the not too distant future.

Currently (i.e., 2022 production), approximately 45% of lithium produced comes from brines and 55% from hard rock deposits.

Up until 2016, global lithium production was dominated by two deposits: Greenbushes in Australia (hard rock) and the Salar de Atacama in Chile (brine), the latter having two commercial operations on it, Albemarle and SQM. Livent, formerly FMC, was the third main producer in South America with their operation in Argentina. Tianqi Lithium and Ganfeng Lithium were the two main Chinese lithium players, growing domestically and overseas with Tianqi buying a 51% stake in Greenbushes and Ganfeng developing lithium mining and production facilities in China, as well as investing in mines and brine operations in Australia and South America. Since then, many more producers have emerged on the scene, first with the restart of the Mt Cattlin mine in Australia, the brief restart of North American Lithium's La Corne mine in Canada, the expansion at Mt Marion and the start-up of Allkem (formerly Orocobre) brine operation in Argentina. These were then followed by a rush of new production in 2017/18, with AMG's Mibra in Brazil and four new starts in Australia, including Tawana Resources' (later Alita Resources) Bald Hill mine, Altura Mining's Pilgangoora mine, Pilbara Minerals' Pilgangoora mine and Mineral Resources' Wodgina mine. In addition, there were start-ups in China, including Qarhan, Taijinaier and Yiliping. In addition, a number of existing producers have expanded production in recent years, including at Albemarle, SQM, Pilbara Minerals, Allkem and Mineral Resources' Mt Marion mine. The result is that production climbed to 528,000 tonnes LCE in 2021, from 186,000 tonnes LCE in 2016.

As of mid-2022 there were 27 miners, operating 30 mines/salars, with the average size of production being 16,500 tonnes per year LCE. In 2021, brine accounted for 46%, spodumene 45% and lepidolite and clays 9%. Geographically, in 2021, 41% of lithium raw material was mined in Australia, 32% in South America, 24% in China, with 3% from other countries.

Looking forward, as discussed above, Fastmarkets forecasts that demand will grow significantly. However, supply is also rapidly increasing. Based on Fastmarkets' knowledge of global lithium projects in development, it forecasts that mine supply will grow by 165% between 2021 and 2025, with estimated mine supply reaching 1.4 million tonnes in 2025, from 0.58 million tonnes in 2021. This potential growth in supply is limited to projects that are near production (i.e., projects that are either producing, under construction, or at an advanced stage of development, such as operating demonstration plants and at the point of financing construction). The current price environment and political climate is extremely supportive of bringing on new production, with many governments giving grants, tax breaks and downstream consumers keen to provide support by offering partnerships and offtake agreements. The main headwinds today are social and environmental opposition while planning and permitting still take time. Given the demand outlook discussed above, Fastmarkets believes it is likely the next-in-line projects come into production and other junior miners will be incentivized to get into production as fast as they can. Our forecast is that there are more than enough potential lithium mines to provide enough supply, the big question is whether the supply can be commercially available in a timely manner.

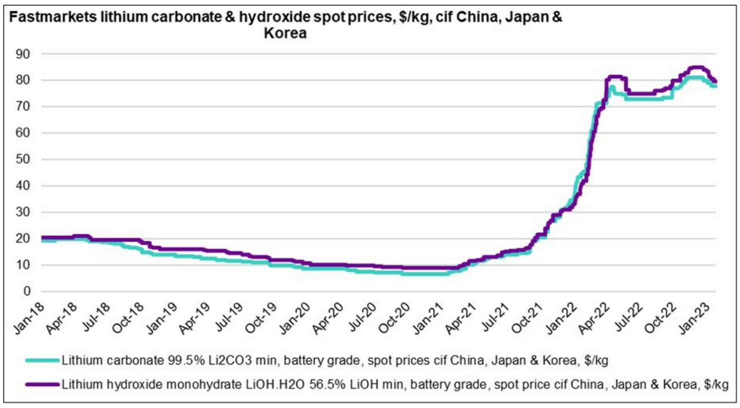
Beyond 2025, the supply pipeline is well stocked with junior miners and their journey to market may well be accelerated as existing miners invest in them, bringing with them their know-how, finance, and management expertise.

16.1.4 Pricing Forecast

Lithium prices reacted negatively to the supply increases that started in 2017/18, with spot prices for battery grade lithium carbonate, CIF China, Japan, Korea (CJK) falling from a peak of US$20 per kg in early 2018, to a low of US$6.75 per kg in the second half 2020. They have since been catapulted higher, averaging US$16.60 per kg in 2021 and US$70.66 in the first eleven months of 2022, with the high price range so far in 2022 being US$80 to US$82 per kg. This surge in prices has been driven by stronger-than-expected demand and a far-from-optimal supply response, which was hampered by the negative fallout from the pandemic and a much slower-than-expected restart of idle production capacity, while new capacity and restarts have suffered the usual ramp-up issues.

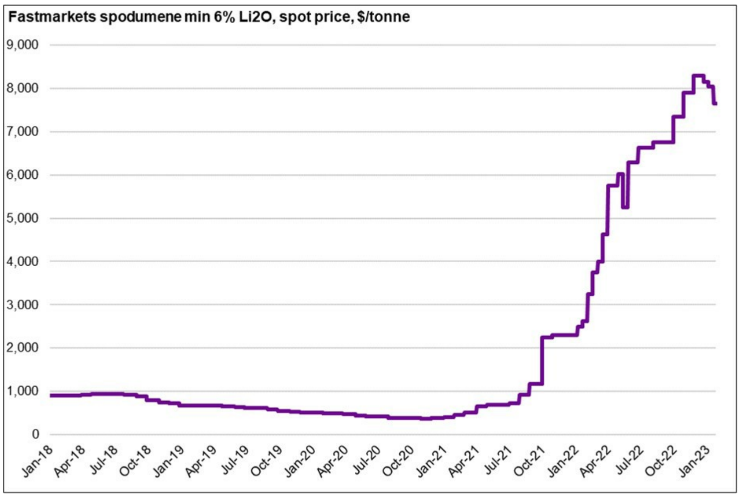
With demand accelerating and spodumene supply unable to keep pace, the price increased by 433% in 2021 (as shown in Figure 16-3 and Figure 16-4). The market was somewhat caught off guard when prices started to race higher, the perception was that there was considerable spodumene stock around (that had built up in 2019-2020), which combined with idle capacity, would mean producers would be able to deliver more material as demand recovered. As it turned out, the stock of spodumene was held in tight hands and idle production capacity took much longer to restart than the market expected. Another period of lockdowns in China, due to Covid-19, saw the spot spodumene price recede slightly in the second quarter of 2022, from US$6,025 per tonne to US$5,250, according to Fastmarkets spot price assessment for SC6 CIF China, before rallying again to an all-time high of US$8,288 per tonne.

But, as 2022 turns into 2023, another supply response is underway, with some idle capacity restarting, expansions, and new mines starting up. This new capacity has been ramping up during 2022 and is expected to continue to do so in 2023, bringing with it much-needed additional supply that should alleviate the current supply shortage. Fastmarkets does, however, expect the market to end up being in a small supply surplus in 2023, which should take the pressure of prices. The supply-demand estimate is summarized in Figure 16-5.



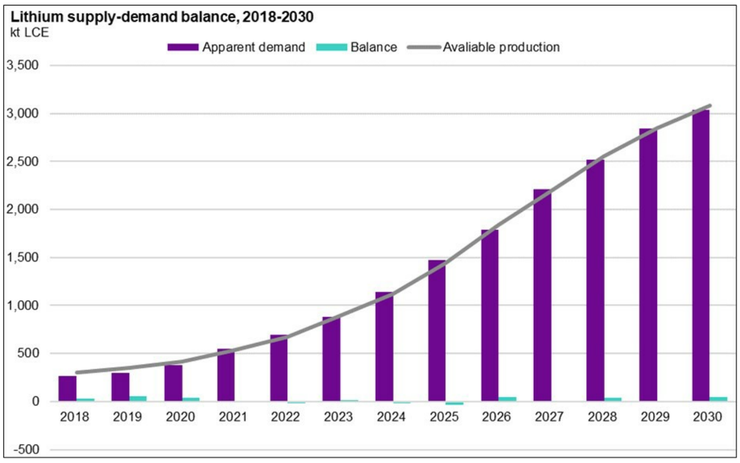
Source: Fastmarkets

Figure 16-3: Lithium Historical Carbonate and Hydroxide Spot Prices



Source: Fastmarkets

Figure 16-4: Historical 6% Spodumene Concentrate Spot Price



Source: Fastmarkets

Figure 16-5: Lithium Supply-Demand Balance

After two years of a deficit market, 2023 is expected to see a significant supply response and the market tightness is expected to ease. Although Fastmarkets expects the market to move into a small surplus of 11,500 tonnes LCE in 2023, the market will still feel tight, and as such the price is expected to remain elevated. Thereafter, the market is expected to be tight and mainly in deficit until 2026, as we move further away from the parts shortages that have been constraining EV production, and therefore lithium demand.

Given the strong demand outlook we envisage a challenge for producers to keep up and bring supply online in a timely manner. Given this challenge, Fastmarkets does not expect prices to drop down below the incentive price anytime soon. In Fastmarkets' opinion, the lithium price will need to exceed the production cost for new projects and provide an adequate rate of return on investment to justify developments.

Near to medium term supply increases will be fueled by traditional sources, including spodumene units from Australia, Africa and the Americas, as well as salar brines in Argentina, Chile and China. Post 2025, an increasing portion of new supply is forecast to come from lower-grade unconventional resources such as lepidolite, geothermal brines and oilfield brines. Based on how Chinese companies have rapidly developed the nickel/cobalt sector in Indonesia, as it strived to secure battery raw materials, Fastmarkets is confident in the ability of the Chinese to do the same in lithium by ramping-up domestic lepidolite production and developing lithium mines in Africa. Both of these are expected to become a significant contribution to global supply.

There is expected to be a period of surplus in the second half of the decade, but as mentioned, a significant amount of new capacity is reliant on the successful implementation of yet mostly unproven

DLE technology at unconventional resources, so the forecast presence of some surpluses is not a bad thing. While an 87,100-tonne surplus in 2031 seems a lot now, it will only represent around 3% of forecast demand. Surpluses will also likely be absorbed by restocking. In addition, experience tells us that even though we have allowed for delays, we are likely to see more issues affecting the delivery of new material into the market - as such, prices are expected to remain elevated. The emergence of more recycled material will provide an extra boost to supply in the later years.

Fastmarkets has provided price forecasts out to 2030 for the most utilized market prices. These are the battery grade carbonate and hydroxide, CIF China, Japan, and Korea, and spodumene 6%, CIF China. Fastmarkets recognizes that Albemarle's current operations are expected to continue for at least another 20 years, but due to a lack of visibility beyond 2030, there is little reward in attempting to forecast a supply-demand balance and therefore a price forecast beyond this period. We have therefore flatlined our forecast for 2030. Below, in Table 16-1, are the forecasts, provided in both nominal and real terms.

Table 16-1: Lithium Carbonate, Hydroxide, and 6% Spodumene Price Forecasts

Prices and Forecast (Base case)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Lithium carbonate BG CIF China, Japan And Korea spot US$/kg (nominal)	16.6	71.2	63.5	59.0	61.0	42.0	47.8	28.0	33.0	24.0
Lithium carbonate BG CIF China, Japan And Korea spot US$/kg (real 2022)	17.9	71.2	61.3	55.8	56.4	37.9	42.7	24.7	28.6	20.5
Lithium hydroxide BG CIF China, Japan and Korea spot US$/kg (nominal)	17.4	72.9	65.5	61.0	60.0	40.0	48.0	28.0	33.0	24.0
Lithium hydroxide BG CIF China, Japan and Korea spot US$/kg (real 2022)	18.8	72.9	63.2	57.7	55.5	36.1	42.8	24.7	28.6	20.5
Spodumene 6% CIF China, US$/tonne (nominal)	1,453	6,085	6,500	5,100	5,800	3,700	4,500	2,400	2,900	2,000
Spodumene 6% CIF China, US$/tonne (real 2022)	1,569	6,085	6,277	4,827	5,364	3,342	4,016	2,114	2,516	1,711
Prices and Forecast (High case)										
Lithium carbonate BG CIF China, Japan and Korea spot US$/kg (nominal)	16.6	70.8	76.0	76.0	70.0	65.0	65.0	55.0	55.0	55.0
Lithium carbonate BG CIF China, Japan and Korea spot US$/kg (real 2022)	17.9	70.8	73.4	71.9	64.7	58.7	58.0	48.4	47.7	47.1
Lithium hydroxide BG CIF China, Japan and Korea spot US$/kg (nominal)	17.4	72.2	76.0	76.0	70.0	65.0	65.0	55.0	55.0	55.0
Lithium hydroxide BG CIF China, Japan and Korea spot US$/kg (real 2022)	18.8	72.2	73.4	71.9	64.7	58.7	58.0	48.4	47.7	47.1
Spodumene 6% CIF China, US$/tonne (nominal)	1,453	5,800	7,500	7,500	7,000	5,000	5,000	3,500	4,000	3,500
Spodumene 6% CIF China, US$/tonne (real 2022)	1,569	5,800	7,242	7,098	6,474	4,517	4,462	3,083	3,470	2,995
Prices and Forecast (Low case)										
Lithium carbonate BG CIF China, Japan and Korea spot US$/kg (nominal)	16.6	70.8	60.0	43.0	40.0	20.0	16.0	12.0	12.0	12.0
Lithium carbonate BG CIF China, Japan and Korea spot US$/kg (real 2022)	17.9	70.8	57.9	40.7	37.0	18.1	14.3	10.6	10.4	10.3
Lithium hydroxide BG CIF China, Japan and Korea spot US$/kg (nominal)	17.4	72.2	60.0	43.0	40.0	20.0	16.0	12.0	12.0	12.0
Lithium hydroxide BG CIF China, Japan and Korea spot US$/kg (real 2022)	18.8	72.2	57.9	40.7	37.0	18.1	14.3	10.6	10.4	10.3
Spodumene 6% CIF China, US$/tonne (nominal)	1,453	5,800	5,000	4,000	3,000	2,000	1,500	1,200	1,200	1,000
Spodumene 6% CIF China, US$/tonne (real 2022)	1,569	5,800	4,828	3,786	2,775	1,807	1,339	1,057	1,041	856

Source: Fastmarkets

Tightness is expected to keep prices well above incentive prices for the whole forecast period, albeit at lower levels than the peaks seen in 2022. Volatility will remain a key theme, as supply increases in waves, we expect periods when supply will be greater than that year's demand, leading to surpluses, and downward pressure on prices.

Post 2030, the continued growth of demand for lithium from EV's and ESS, will require a lithium price that incentivizes new supply to come online to meet this demand. The lithium price will need to exceed the production cost for new projects and provide an adequate rate of return on investment to justify development. Based on our understanding of the cost of bringing new supply online, especially higher cost units such as lepidolite, whilst also ensuring an adequate rate of return, we believe prices long-term will settle around the US$20 per kg mark. Due to typical price volatility, Fastmarkets expects prices may spike well above or fall well below this level, but from an average pricing perspective, Fastmarkets views this forecast as reasonable. While Fastmarkets could select a similar price based on the spodumene cost curve, spodumene pricing is typically derived as a function of the more standard lithium carbonate and hydroxide pricing. We use this relationship and understanding of tolling and conversion costs as the basis for the spodumene price forecast.

Fastmarkets recommends that the above price of US$20 per kg for lithium carbonate CIF China, Japan, and Korea and US$1,500 per tonne spodumene SC6 CIF China should be utilized by Albemarle for the purpose of reserve estimation.

Our high-case scenario could pan out either if the growth in supply is slower than we expect, or if demand growth is faster than expected. The former could happen if the Chinese struggle to make lepidolite mining economically viable, or if DLE technology takes longer to be commercially available. The latter could be seen if the adoption of EV's continues to accelerate, or if demand for ESS grows at a faster pace. However, we do think prices over US$55 to US$60 per kg would be unsustainable over the long term when most of the market is priced basis market prices.

Our low-case scenario could unfold if the current price regime prompts a much faster reaction from producers. This is most likely to be achievable by Chinese producers both domestically and in Africa, considering the strict permitting process in western economies is already delaying project development timelines. Alternatively, or possibly in tandem, we would expect a fast return towards incentive prices if demand did end up being hit by either a recession, a massive escalation in geopolitical events, or a more incapacitating pandemic.

As noted above, Fastmarkets views it likely that there will be short-term volatility in pricing. However, from a longer-term viewpoint, the key points of uncertainty regarding the average spodumene or lithium carbonate price in this forecast follow:

- EV sales growth – The rate at which EV's are accepted by the general population will be the biggest driver of lithium prices. In the high case scenario, Fastmarkets believes prices of US$30/kg for battery grade lithium and US$3,000/t for spodumene are realistic for a sustained period to support the almost exponential supply growth required for this scenario beyond 2030.
- Fundamental battery technology – Even with very strong EV demand, if the industry substitutes away from lithium-based technology, it could materially reduce lithium demand resulting in a similar pricing situation to the low-scenario noted above. However, in Fastmarkets opinion, the probability of this occurring within the forecast period is low considering the performance, practicality and versatility of lithium-based battery technologies and chemistries. Given the very long timing to commercialize battery technology, it appears highly unlikely the industry will substitute away from lithium-ion in the forecast period.
- Supply growth beyond 2025 – As shown in Figure 16-5, Fastmarkets expects supply growth to broadly match demand in the period. There is a healthy number of potential projects in the

pipeline but there remains uncertainty in the ability for these to come online in a timely manner. We have placed faith in the markets ability to develop alternative deposit types, such as the hectorite clay deposits in Nevada and Mexico, some of the largest occurrences of lithium in the world. At this stage, the only question around development of these deposits is the ultimate timeline on when they can start, especially projects in the US, which are being continually delayed due to NIMBYism and delays in permit issuance. We have allowed for delays, but experience tells us that we are likely to see more issues affecting the delivery of new material into the market. Toward the end of the decade, recycling will become an increasingly important component in filling potential supply gaps, especially in areas which lack inadequate raw material supply (Europe and US).

16.2 Product Sales

Greenbushes is an operating lithium mine. The mine produces a chemical-grade spodumene concentrate and a range of technical-grade spodumene concentrates. The specifications for the primary product, chemical grade spodumene, which is the focus of this market study, are provided in Table 16-2.

Table 16-2: Chemical Grade Spodumene Specifications

Chemical	Specification	
Li_2O	min.	6.0%
Fe_2O_3	max.	1.0%
Moisture	max.	8%

Source: Talison Shareholders Agreement, 2014

Historic production quantities for chemical-grade spodumene concentrate are presented in Table 16-3. In addition, historic consolidated technical grade spodumene concentrate sales are presented for reference.

Table 16-3: Historic Greenbushes Production (Tonnes Annual Production, 100% Basis)

	2015	2016	2017	2018	2019	2020	2021
Chemical Grade Spodumene	351,243	357,018	498,341	565,205	618,896	433,000	734,000
Technical Grade Spodumene	86,714	136,795	148,129	158,838	145,676	91,000	146,000

Source: Talison Physicals Reporting, 2015-2021Technical grade concentrate tonnage includes SC7.2 (Standard and Premium), SC6.8, SC6.5 and SC5.0 products

Talison constructed a second chemical grade lithium concentrate production plant (CGP2) that opened in 2019, which doubled capacity to 1.34 Mt/y Since then, a tailings retreatment pant (TRP) has been built and is being ramped up and a final investment decision has been approved to build a third chemical grade plant (CGP3) and there are plans for a fourth plant (CGP4). CGP 1 and 2 and TRP now mean the mine has 1.5 Mt/y of spodumene capacity, when/if CGP 3 and 4 are added would take capacity to 2.5 Mt/y. Spodumene from Greenbushes will then feel feed Albemarle's Kemerton lithium hydroxide plant and Tianqi Lithium/IGO's JVs Kwinana lithium hydroxide plant.

As a chemical-grade spodumene concentrate, the primary customer for the product is lithium conversion facilities that convert the spodumene concentrate into various chemical products, including battery-grade lithium carbonate and hydroxide that can be utilized as feedstock for electric vehicle batteries (the forecast primary growth market for lithium products). Chemical-grade spodumene concentrate is currently fully consumed by the joint venture owners of the operation (i.e., Albemarle and Tianqi/IGO JV) for their downstream conversion facilities. Including the recently expanded production capacity for Greenbushes, Albemarle expects to continue to fully consume its allocated proportion of chemical grade concentrate production from the operation internally.

16.3 Contracts and Status

As outlined above, the lithium chemical grade spodumene concentrate produced by Greenbushes is consumed internally by the current joint venture owners of the operation (Albemarle and Tianqi/IGO JV). The purchase of this concentrate from the Greenbushes operating entity (Talison) is governed by the 2014 joint venture agreement between the two owners. This joint venture agreement establishes that while Albemarle is an owner, it is entitled to take an election of up to 50% of the annual production from Greenbushes, with that election made on an annual basis. The sales price of chemical grade concentrate to Albemarle or Tianqi/IGO JV is based on the market price, as would any third-party concentrate sales.

17 Environmental Studies, Permitting, and Plans, Negotiations, or Agreements with Local Individuals or Groups

The following sections discuss reasonably available information on environmental, permitting, and social or community factors related to the Project. Where appropriate, recommendations for additional investigation(s), or expansion of existing baseline data collection programs, are provided.

On August 19 and 20, 2020, SRK conducted an inspection of the Greenbushes mine site. This inspection was to confirm the conditions on the mine site and any potentially material information that could affect mine development. The Project has been in operation as a hard rock mine since 1983 and is fully permitted for its current operations. The Project is in the process of obtaining further approvals for expansion; however, consideration of the expansion has been excluded from this evaluation as detailed assessment information is not yet available. This review is compiled from information provided by Talison Lithium Australia Pty Ltd (Talison) and publicly available documents.

Talison holds the mining rights to lithium at the Project, and Global Advanced Metals (GAM) holds the rights to non-lithium minerals. GAM processes tantalum and tin extracted by Talison during mining activities within the Project area under their own Part V Environmental Protection Act of 1986 Operating License. GAM is responsible for compliance with their Part V Operating License; however, Talison provides assistance to GAM in the form of environmental monitoring and reporting under a shared services agreement. As GAM operates within Talison-owned mining tenements and Mine Development Envelope (MDE), GAM's compliance with environmental conditions associated with these approvals is the responsibility of Talison.

17.1 Environmental Study Results

The Project is in the southwest of WA in the Shire of Bridgetown-Greenbushes. The town of Greenbushes is located on the northern boundary of the mine. The majority of the Project is within the Greenbushes Class A State Forest (State Forest 20) which covers 6,088 hectares (ha) and is managed by the Department of Biodiversity, Conservation and Attractions (DBCA) as public reserve land under the Conservation and Land Management Act of 1984 (CALM Act). The DBCA manages State Forest 20 in accordance with the Forest Management Plan 2014-2023, that aims to maintain the overall area of native forest and plantation available for forest produce, including biodiversity and ecological integrity. The remaining land in the Project area is privately owned.

The Greenbushes region has been mined for tin, tantalum, and lithium since the 1880's, initially by alluvial mining via shafts, and sluices and later by dredging of deep alluvium. A smelter and associated crushing and dressing plant was constructed in 1900 and operated for four years, and several treatment plants also commenced operations at the same time (IT Environmental, 1999). Soft rock mining of the weathered pegmatite occurred in the 1970's and was processed at multiple wet and dry treatment plants before being consolidated at a single Integrated Plant site. Hard rock mining commenced in 1983, and a tin smelter, chemical plant, and Tailings Retreatment Plant were commissioned at the same time. Over this time, environmental studies and impact assessments have been completed to support project approval applications and these are summarized below.

17.1.1 Flora and Vegetation

The Project is located in the Jarrah Forrest Bioregions under the Interim Biogeographic Regionalization of Australia classification system (Australian Government, 2012). Several flora and vegetation studies have been reported in support of project approvals with the most recent detailed flora and vegetation surveys conducted in spring and autumn 2018 across areas proposed for the mine expansion and access corridors (Onshore Environmental, 2018a; Onshore Environmental, 2018b). A total of nine vegetation types have been mapped in the mining development envelope that consists of two types of *Eucalyptus* Forest, two types of *Corymbia* Forest, *Eucalyptus* Woodland, *Podocarpus* Heath A, *Hypocalymma* Low Heath C, *Melaleuca* Forest and *Pteridium* Dense Heath A, with *Allocasuarina* Forest and Heath reported for the infrastructure corridors for access and pipelines.

No Threatened Ecological Communities, Priority Ecological Communities or threatened flora listed under the federal Environmental Protection and Biodiversity Conservation Act of1999 (EPBC Act) or the Western Australian Biodiversity Conservation Act of 2016 (BC Act) have been reported in the vicinity of the mine site. The nearest population of threatened vegetation within the Mining Leases identified by Onshore Environmental (2012) are *Caladenia harringtoniae* in M01/3 approximately 560 m west of the southwest in a declared Environmentally Sensitive Area (ESA). One priority flora species (Priority 4 – rare and near-threatened), *Acacia semitrullata*, was recorded by Onshore Environmental in 2018 adjacent to the state forest.

The vegetation condition is predominantly rated as good or very good according to the classification developed by Keighery (1994), with degraded areas typically those that have been logged in the past, areas of historical mine rehabilitation, such as gravel pits, and pasture (Onshore Environmental, 2018a). A total of 886 introduced flora species have been reported, including three which are Declared Plants under the Biosecurity and Agriculture Management Act of 2007, Bridal Creeper (*Asparagus asparagoides*), Blackberry (*Rubus anglocandicans*) and Sorrel (*Rumex acetosella*). The Project is located in an area at risk of Dieback (*Phytophthora cinnamomi*) that results in widespread vegetation death. Areas of infestation are known within the mine development envelope and require ongoing management.

17.1.2 Terrestrial and Aquatic Fauna

Terrestrial Fauna

A number of fauna studies have been conducted in support of project approvals, most recently in 2011 and 2018 (Biologic, 2011; Biologic, 2018a; Harewood, 2018). There have been seven conservation significant fauna species recorded in the mine development envelope. Recorded species listed under the EPBC Act includes the vulnerable Chuditch (*Dasyurus geoffroii*), the critically endangered Western Ringtail Possum (*Pseudocheirus occidentalis*), the endangered Baudin's Cockatoo (*Calyptorhynchus baudinii*) and Carnaby's Cockatoo (*Calyptorhynchus latirostris*) and the vulnerable Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*). Species listed under the state's BC Act includes two priority four species, Southern Brown Bandicoot (*Isoodon fusciventer*) and the Western Brush Wallaby (*Notamacropus irma*) and one conservation dependent species, the Wambenger Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*). Additional species that may be present based on desktop assessments, but have not been recorded, include three mammals, seven birds, and one reptile.

The presence of the Black Cockatoos resulted in the determination of the waste rock dump expansion in 2016 to be a ‘controlled action’ under the EPBC Act and was conditionally approved with a requirement for biodiversity offsets and the protection of the habitat of for this species (2013/6904).

Six introduced mammals have been recorded in the mine development envelope, pig (*Sus scrofa*), cat (*Felis catus*), rabbit (*Oryctolagus cuniculus*), fox (*Vulpes vulpes*), house mouse (*Mus musculus*) and the black rat (*Rattus rattus*).

Short Range Endemic (SRE) Species

An SRE study conducted by Biologic (2018a; 2018b) was not able to conclude the regional significance of the 20 specimens collected due to limited available information regarding the taxonomy of species. However, the Jarrah/Marri Forest and Jarrah/Marri Forest over Banksia, which is suitable habitat for SRE species, is well represented outside the mine development envelope and SRE species are likely to exist in the surrounding areas as well.

17.1.3 Surface and Groundwater

The region has a Mediterranean climate, with warm dry summers and cool wet winters with average annual rainfall of 820 mm, mainly falling between April and September (Talison, 2019a). The active mining area lies along a topographic ridge which hosts the mineralized pegmatite zone. The majority of the Project is located in the Middle Blackwood Surface Water Area. Surface watercourses within the mining leases are all tributaries of the Blackwood River, which has the largest catchment in southwest WA, approximately 22,000 square kilometers (km^2) (Centre of Excellence in Natural Resource Management, 2005). The entire river is registered as a significant Aboriginal site (Site ID 20434) that must be protected under the Aboriginal Heritage Act of 1972.

The topographic ridge diverts surface water to either west into the Norilup Brook sub-catchment or east into the Hester Brook sub-catchment. The Project relies on surface water to supply mining activities; therefore, management of surface water between storage areas is important. The western catchment contains the mine infrastructure, processing plants, and TSFs. Surface water in the western catchment is stored in several dams that are part of the mine water circuit and that are impacted by mine waters, the Clean Water Dam, Austin’s Dam, Southampton Dam and Cowen Brook Dam. The Tin Shed Dam is the responsibility of GAM under their operating license. Schwenke's Dam and Norilup Dam are outside of the mining development envelope, but can potentially receive water from the mine water circuit as a result of overflows from the Southampton Dam or Cowen Brook Dam respectively. Water discharges from Cowen Brook Dam or Southampton Dam are not permitted. The current Water Management Plan (Talison 2020a) describes the Norilup Brook watercourse as fresh (500 to 1,500 microSiemens per centimeter (µS/cm)). The eastern catchment contains Floyds WRL which impacts the surface water. Discharges are permitted from Floyds Gully (below Floyds WRL) to Salt Water Gully which flows to the Hester Brook and onto the Blackwood River. The Hester Brook watercourse has elevated salinity (1,000 to 5,000 µS/cm).

Groundwater is not a resource in the local area due to the low permeability of the Archaean basement rock, as evidenced by low rate of groundwater ingress (approximately 5 L/s) into the existing Cornwall pit and underground workings (GHD, 2019a). In general, the mine site is underlain by a lateritic weathered basement of clays 15 to 40 m thick that has relatively low permeability (total hydraulic conductivity average 0.05 meters per day (m/d), range from 0.001 to 0.1 m/d) that is interpreted to limit the downward migration of water. Higher permeabilities are inferred to occur where the laterite is vuggy and have been identified from drilling data at the relatively sharp transition between the clays and the oxidized basement rocks (total hydraulic conductivity average 0.3 m/d, range from 0.05 to 1.3 m/d) (GHD, 2019a).

Earlier studies indicated that the pits would overflow to the south approximately 300 years after mine closure (Talison, 2016). Recent pit lake predictive modeling suggests that water levels will stabilize in approximately 500 to 900 years (based on the mine expansion) and that water levels will remain 20 m below the pit limits and will, therefore, not overflow after closure (GHD, 2020).

Paleochannels predominantly of sand between 2 m to 30 m are thick incised into the basement rock traverse the mine development envelope and were dredged as part of historically alluvial mining activities. Low-lying wetlands and surface water within the Project area, including the Austin's and Southampton Dams, are coincident with the paleochannels and indicates a high degree of hydraulic connectivity between surface water and the alluvial material (GHD, 2019a). The channels also occur beneath the TSFs which are unlined and connectivity between the channels and seepage derived from the TSFs was reported by GHD in 2014 (GHD, 2019b).

Groundwater quality is variable across the site based on groundwater quality monitoring and is inferred to be locally influenced by groundwater recharge from surface water, mineralization (resulting in elevated magnesium, carbonate, and low pH) or by possible influence of seepage derived from historic mine/dredge workings (GHD, 2019a). Background groundwater quality has been noted as difficult to determine due to a lack of monitoring wells upgradient from the mine, and as monitoring wells are located close to the TSFs and/or in the historically dredged channels (GHD, 2014). Some monitoring wells have been impacted by seepage; however, only one well was determined to be impacted by seepage in 2019, which is a shallow well south of TSF2 (GDH, 2019c).

Downstream surface or groundwater users consist of private rural holdings and State Forest that typically use water for stock, pasture, and garden irrigation. Surveys of users with direct access to Norilup Brook and Waljenup Creek confirmed that water is not relied upon as a resource, and the higher salinity of Hester Brook indicates potential for seasonal stock use only (Talison, 2020a). Groundwater may also discharge as baseflow to watercourses in the area and, therefore, supports the ecological values of the Blackwood River (GHD 2019a).

17.1.4 Material Characterization

Several materials characterization studies of waste rock and tailings have been completed since 2000 and include analysis of the Floyds Dump drainage water quality between October 1997 and May 2013 (GCA, 2014), tailings seepage water quality between 1997 and 2014 (GHD, 2014), and analysis of the potential for acid rock drainage and metal leaching (ARD/ML).

Waste Rock

Studies between 2000 and 2019 indicate:

- Waste rock is not typically acid generating, with average concentrations of 0.1% sulfur of waste rock and 0.006% sulfur for the pegmatite ore (GHD, 2019d). Sulfide-minerals (e.g., pyrrhotite) in the pit waste-zone are sporadic in distribution and invariably occur as trace components (GCA 2014).

- Waste rock that is potentially acid generating (PAG) are the granofels (metasediments) typically located in the footwall of the orebody. The amphibolite and dolerites also contain occasional stringers and pods of sulfides such as pyrite, pyrrhotite and arsenopyrite.
- Significant acid neutralizing capacity (ANC) has been shown to exist in waste rock and pit walls, predominantly in the amphibolite where frequent calcite veins occur (Baker 2014) and, therefore, leaching and mobilization of metals under acidic conditions is considered low risk (GCA, 2014; GHD, 2019d).
- Leachate analysis in 2019 concluded that there is a moderate risk that leaching of metals, such as arsenic, antimony, and lithium from waste rock, and may be a concern where there is hydraulic connection to groundwater and surface water systems (GHD, 2019d).
- The occurrences of high sulfur lithotypes are estimated to constitute less than 1% of the total volume of waste rock for the current mine plan (GCA, 2014). The mine expansion predicts that 17% of the mined waste rock will be PAG granofels (GHD, 2019d).
- Sulfide oxidation is occurring from Floyds Dump, as indicated by the elevated sulfate levels in the drainage water, which correlates seasonally with electrical-conductivity (EC) values within the range 2,500 to 3,500 µS/cm (GCA, 2014). Leach tests on 21 samples in 2019 suggest that elevated sulfate concentrations are due to the presence of granofels (GHD, 2019d).
- A close correlation of leachate-Li and leachate-SO_4 concentrations for a granofels sample tested in 2002 suggests a dependence of Li solubility on sulfide-oxidation (GCA, 2014).

Further studies into the geochemistry of the waste rock are currently underway and should help clarify some of the uncertainties ahead of the proposed mine expansion application planned to be submitted to DMIRS in Q4 2020.

Tailings

The mine produces two grades of lithium oxide for the processing plant: technical grade (greater than 3.8% lithium oxide), and chemical grade (greater than 0.7% lithium oxide). The process water pH is raised to 8.0 s.u. with the addition of sodium carbonate (Na_2CO_3) prior to deposition in the tailings dams, as slurry and ionic ratios provide an indicator to identify seepage. Tailings characterization studies indicate:

- Tailings and ore have a low sulfur content (less than 0.015%) and are without inherent mineralogy that can provide carbonate buffering capacity (GHD, 2016).
- Analysis of tailings assay results (1,932 samples) identified that arsenic, cesium, lithium, rubidium, and tungsten were relatively enriched, with tungsten likely to be derived from the tungsten carbide balls in the mill (GHD, 2016).
- An assessment of long-term tailings water quality, as measured from decants and ponds, were summarized between 2011 and 2014 and indicated that the water is slightly basic, with a dissolved salt content of between 800 and 11,200 mg/L, and elevated metals such as arsenic, lithium, boron, nickel, and zinc (GHD, 2016).
- Specific leaching studies have not been carried out on the tailings and ARD is considered unlikely considering the low sulfur content; however, leaching studies of the ore indicate a moderate risk for leaching of arsenic, antimony, lithium, and rubidium under neutral pH conditions (GHD, 2019d).

Soils

Soils have been characterized to consist of lateritic crests and upper hill (1a) slopes of sandy topsoil and gravelly sandy loam that are underlain by caprock at about 550 mm depth, lateritic mid and lower slopes (1b) sandy topsoil over gravelly sandy loam subsoil up to 1,100 mm depth, and sandy lower slopes and flats (2a) grey sand up to a minimum depth of 800 mm over laterite caprock (Talison, 2019a).

Radionuclides

Studies into the potential for radionuclides have consistently returned results that are below trigger values. This includes waste rock and ore samples (GHD, 2019d), radon flux assessments across the mine site (IT Environmental, 1999), and ongoing water monitoring for Radium-226 (Ra-226), and Radium-228 (Ra-228) within 20 monitoring wells, as required for the License.

17.1.5 Air Quality and Greenhouse Gas Assessment

The town of Greenbushes, located on the northern boundary of the mine development envelope, has a population of about 400 people, and includes a primary school approximately 100 m north of the Cornwall pit (currently in care and maintenance) and several rural residences nearby. The local existing air quality is primarily influenced by mining, and to a lesser extent surrounding agricultural activities, vehicle movements, burning (including residential wood burners, bush fires) and mechanical land disturbance (Talison, 2019). Air quality is regulated under the operating License (L4247/1991/13) and monitored by a continuous high-volume air sampler with a particle matter (PM_{10}) limit of 90 µg/L at a single location at the boundary between the mine and the town. Dust monitoring results between 2010 and 2019 show that the rare exceedances of the National Environment Protection (Ambient Air Quality) Measure (NEPM) limit (50 µg/L averaged over a 24-hour period) were attributed to bushfires and earthworks for water services near the sampler (DWER, 2020). The surface of the tailings is prone to dust generation, and dust is currently managed by a crop of rye grass on TSF1 which is not currently in use. In 2020, the method of tailings deposition was changed from a single discharge point to multiple spigots around the circumference to help minimize fugitive dust generation. Additional air quality samplers are planned for the monitoring network for the mine expansion and will determine the effectiveness of the new tailings deposition plan, and reduce uncertainties regarding potential exceedances of soluble barium, an issue identified by the Department of Health (DOH), suggesting that more stringent dust management measures may be required to manage dust emissions.

Reporting of greenhouse gas emissions is required annually under the National Greenhouse and Energy Reporting Act of 2007, and emissions reports show an increase from 60,506 t CO_2-e (Scope 1 and 2) in 2017 to 79,030 t CO_2-e (Scope 1 and 2) in 2019 (Greenbase Environmental Accountants, 2018; Greenbase Environmental Accountants, 2019). These figures are reported publicly, as they exceed the corporate threshold of 50,000 t CO_2-e, and as the project also consumes more than 200TJ energy per year. The current (and predicted emissions for project expansion) Scope 1 direct emissions do not exceed 100,000 t CO_2-e, which is the trigger for assessment under EPA guidelines (EPA, 2020).

17.1.6 Noise, Vibration and Visual Amenity

Due to the proximity of the mine to the Greenbushes town, a safety berm/sound wall has been constructed. The mine is unable to meet the noise limits specified by the Environmental Protection (Noise) Regulations of 1997 (Noise Regulations), and has been granted approval to exceed the limits through the Environmental Protection (Talison Lithium Australia Greenbushes Operation Noise Emissions) Approval 2015 (a Regulation 17 exemption). GAM also operates under an identical approval, and the combined noise emissions cannot exceed the specified limits (Talison, 2019a). There have been no reported noise exceedances in 2018 and 2019 (Herring Storer Acoustics, 2018; Talison, 2019b), one-blasting overpressure non-compliance was reported, and four noise and blasting complaints were received in the 2018 to 2019 Annual Environmental Report period. It was noted in the vibration assessment for the mine expansion that the current monitoring network is prone to false triggers due to the receiver locations. It is recommended that this is reviewed.

The mine and associated light spill are obscured from the town by the safety/ sound barrier; however, several rural residences located east of the mine and some sections of the South Western Highway can see Floyds Dump, a significant feature located between the open pits and the highway. Talison undertakes progressive rehabilitation of the Floyds Dump embankment with only active dumping areas exposed, and currently the mine is screened by the surrounding State Forest and undulating topography (Onshore Environmental 2018c).

17.1.7 Cultural Heritage

The Blackwood River (ID 20434) is the only registered Aboriginal heritage site of significance in the location of the mine and is a site of mythological significance as the home created by the *Waugal* and also a customary path from inland to the coast (Brad Goode and Associates, 2018). Cultural, archaeological, and ethnographic surveys that involved representatives of the Gnaala Karla Booja, South West Boojarah, and Wagyl Kaip Native Title Groups, and ethnographic consultation with the nominated Noongar representatives, were conducted in 2015, 2016, and 2018. No sites or artifacts of significance, as defined under section 5 of the Aboriginal Heritage Act of 1972, were identified (Brad Goode and Associates, 2018).

There are no other cultural sites listed within the mining development envelope, and the nearest heritage sites listed on the *inHerit* database of Western Australia are the Golden Valley Site 7.25 km North East, and the Southampton Homestead approximately 6.5 km west of the mine. Local municipal listed cultural sites include several sites and buildings in Greenbushes town and the South Cornwall Pit (place number 6,639, Category 2) due to the continuous history of mining activity since 1903.

17.2 Environmental Management and Monitoring

The Project operates under approvals that contain conditions for environmental management that include waste and tailings disposal, site monitoring, and water management. Primary approvals are authorized under the federal Environment Protection and Biodiversity and Conservation Act of 1999 (Cwlth) (EPBC Act), the Environmental Protection Act of 1986 (EP Act), including the environmental impact assessment approval for the proposed mine expansion (Ministerial Statement 1111), the operation of a prescribed premises (License L4247/1991/13), approval for the construction and commissioning of a prescribed premises for the proposed mine expansion (W6283/2019/1), and under the Mining Act of 1978 under an approved Mine Closure Plan (Reg ID 60857) and several Mining Proposals (section 17.3).

17.2.1 Environmental Management

The Project has operated using an Environmental Management System (EMS) that has been accredited under ISO 14001 since 2001 (Sons of Gwalia Ltd., 2004). The Project has a Quality Management System accredited under ISO 9001. The EMS was last accredited in February 2020 with no significant issues (Bureau Veritas, 2020) and key environmental management plans (EMP) must also be reviewed and approved by the regulatory authorities (under approval conditions):

- Conservation Significant Terrestrial Fauna Management Plan (Ministerial Statement 1111),
- Visual Impact Management and Rehabilitation Plan to minimize visual impacts including light spill (Ministerial Statement 1111),
- Disease Hygiene Management Plan to minimize impacts to flora and vegetation, including from marri canker and dieback (Ministerial Statement 1111),
- Water Management Plan (License L4247/1991/13),
- Noise Management Plan (Environmental Protection (Talison Lithium Australia Greenbushes Operation Noise Emissions) Approval 2015), and
- Dust Management Plan reviewed by the Department of Water and Environmental Regulation (DWER).

It was noted in the EPA's environmental impact assessment report for the proposed expansion (2019) that the mine "has been operating since 1983 with no significant impacts to the environment having occurred as a result of activities at the Mine during this time."

Additional management plans include:

- Waste Minimization and Management Plan,
- Hydrocarbon Management (Storage, Disposal and Maintenance and Cleanup Plans), and
- Emergency Management Plan (and location specific Emergency Repossess Plans).

17.2.2 Tailings and Waste Disposal

Tailings Disposal

Tailings are disposed of as a slurry from the processing plant into the active TSF2 under the Operation Manual – Tailings Storage Facility (Talison, 2020). TSF1 commenced operations around 1970 (GHD, 2014) and was originally used for tin mining operations prior to the 1990's, and later for hard rock mining tailings deposition until 2006 (Talison, 2011). TSF1 is currently covered with rye grass to minimize dust. TSF3 is currently partially rehabilitated and was originally used for tantalum tailings. All the TSFs are unlined.

- The tailings dams have been classified in accordance with ANCOLD guidelines (2012) as Significant for TSF1, High C for TSF 2, and Low for TSF2, and that Hazard Rating for all three TSFs are Category 1 in accordance with the Code of Practice for Tailings Storage Facilities in Western Australia (DMP, 2013).
- The emergency actions and response plans for the TSFs are defined using Trigger Actions Response Plans for actions to be taken at different escalation levels for flooding, seepage, embankment instability or damage, and earthquake scenarios.
- Seepage was identified in the shallow aquifer (paleochannels) in six bores; however, the deep aquifer was not impacted (GHD, 2014). Recent monitoring data only confirm one well.
- Seepage from the western embankment of TSF2 has been reported in the AERs since 2015. Significant works have been undertaken since 2017 to install buried pipe collector drains that transport the seepage to the mine water circuit. The requirement for ongoing active seepage management is due to the location of the TSF over the shallow sand aquifer/paleochannels.

- The tailings deposition strategy was updated in the winter of 2020 to include multiple spigots around the circumference of TSF2 to minimize dust generation during the summer months.
- Tailings deposited in TSF3 have been classified as predominantly NAF, with small quantities of PAG material generated as a result of sulfide flotation concentrate. Management of the small quantities of PAG material was by co-disposal with the NAF material (GCA, 1994).
- TSF3 has already been closed and partially rehabilitated. On closure, the TSFs will be capped, landscaped, and rehabilitated. The final design is not yet determined.

It is recommended that the closure designs or the TSFs are undertaken as soon as possible.

Waste Rock Disposal

Potentially hazardous waste rock has been managed on the site since 2003, whereby waste rock with a sulfide content greater than 0.25% is segregated for special treatment. In 2014, it was estimated that approximately 1% of samples of waste met this criterion (Baker, 2014). The site currently manages waste rock under the Waste Rock Management Plan (OPM-MP-11000, issued 2020) and Environmentally Hazardous Waste Rock Management (GEO-PR-2024, issued 2018). Waste rock with a sulfide content greater than 0.25%, or arsenic content greater than 1.000 ppm, is segregated with high sulfide material encapsulated in an unlined cell in the center of Floyds Dump, and material containing high arsenic is sent to the TSF. Historically, high arsenic material was sent to the Integrated Plant (IP) Waste Rock Dump which is no longer active (IT Environmental, 1999). The embankments of Floyds Dump are regraded to 18º batters and covered with topsoil or weathered growth media for rehabilitation.

17.2.3 Water Management

The Project is reliant on surface water and operates under a holistic Water Management Plan (WMP) which has been revised to include the current approval conditions for the mine expansion (Talison, 2020). The mine water circuit operates as a closed system and is comprised of the four primary storage dams (Southampton Dam, Austin's Dam, Clear Water Dam, Cowen Brook Dam), the TSF2 decant (Clear Water Pond), pits, seepage drains, collection sumps, and associated pipelines and pumps. The Project is currently upgrading the water circuit with the installation of additional pipeline tracks which will permit the movement of water between all the primary water storages to manage levels during periods of high rainfall. Contaminated water and seepage are pumped to the Clear Water Dam, which is the primary source of water for the adjacent processing plants. The Cornwall Pit and Vultan Pit are currently being used for water storage, but this will change with the proposed mine expansion.

Water levels and quality are monitored throughout the water circuit, as per the conditions of the License (L4247/1991/13). The primary source of arsenic in the mine water circuit was historically from tantalum processing activities and was contained within the Tin Shed Dam under GAM's responsibility, with some precipitation into dam sediments (Talison, 2017). Current arsenic and lithium sources are from lithium processing and pit dewatering. Over time, the water quality of the mine water circuit has shown increasing levels of arsenic and lithium. In 2014, arsenic remediation units (ARU) were established to manage arsenic concentrations which have now stabilized below License limits, and the ARUs have recently been replaced with a larger capacity unit. Lithium concentrations are planned to be managed at a Water Treatment Plant (WTP), currently being commissioned, which will remove lithium by reverse osmosis and is located at the Clear Water Dam.

Offsite discharge of water from the Southampton Dam and the Cowan Brook Dam is explicitly prohibited in the License due to potential downstream receptors from the accumulation of lithium and metals/metalloids in the mine water circuit, and connection to seepage from TSF2 via the underlying aquifer. Prior to 2018, discharges were permitted from the Cowen Brook Dam, and typically occurred during the winter months. Talison anticipates that water treatment will improve the quality of water to acceptable discharge levels in the future. Discharge is permitted from emission points specified in the license (L4247/1991/13) and Works Approval (W6283/2019/1) which are Floyds North and Floyds South (adjacent to Floyds Dump), Carters Farm and Cemetery.

There has been no predictive modeling of the pit lake quality as far as SRK is aware, and this is recommended to inform closure management strategies. There is potential for site water management to be required post-closure until seepage from TSF2 attenuates.

17.2.4 Solid Waste Management

Talison is required under License (L4247/1991/13) to dispose of solid waste in the waste rock dump by landfill (no more than 200 t) or by burial (batches of no more than 1,000 whole tires), or at a licensed third-party premises. Talison was non-compliant with the landfill criteria in the 2018-2019 AER period due to increased operations and have stated that they are seeking to amend the license conditions.

17.2.5 Environmental Monitoring

Specific requirements for compliance and ambient monitoring are defined in the License (L4247/1991/13) and Works Approval (W6283/2019/1). The monitoring results must be reported to the regulators (DWER and DMIRS) on an annual basis and include point source emissions to surface water including discharge and seepage locations, process water monitoring, permitted emission points for waste discharge to surface water, ambient surface water quality and ambient groundwater quality monitoring, ambient surface water flow and each spring, complete an ecological assessment of four sites upstream and six sites downstream of the Norilup Dam.

17.3 Project Permitting Requirements

17.3.1 Legislative Framework

Australia has a robust and well-developed legislative framework for the management of the environmental impacts from mining activities. Primary environmental approvals are governed by the federal EPBC Act and the environmental impact assessment process in Western Australia is administered under Part IV of the Environmental Protection Act of 1986 (EP Act). Additional approvals in Western Australia are principally governed by Part V of the EP Act and by the Mining Act of 1978 (Mining Act) as well as several other regulatory instruments.

17.3.2 Primary Approvals

The Project is currently approved under the EPBC Act and Part IV of the EP Act.

Environmental Protection and Biodiversity and Conservation Act 1999 (Cwlth)

The Project was referred to the federal Department of Environment and Heritage (now called the Department of Agriculture Water and the Environment – DAWE) under the EPBC Act in 2013 for expansion of the waste rock dump, and in 2018 for further expansion of the waste rock dump and tailings storage facilities. The works were determined to be a 'controlled action' due to potential impacts to listed threatened species and ecological communities and was approved with conditions for biodiversity offsets and to protect the habitat of black cockatoos (2013/6904 and 2018/8206).

Part IV, Environmental Protection Act 1986 (WA)

The principal legislative framework in Western Australia for environmental and social impact assessment is the EP Act. Approvals under Part IV of the EP Act are made by the Environmental Protection Authority (EPA), an independent statutory authority. Under the EP Act, projects that have to potential to cause significant impacts to the environment are referred to the EPA which determines if a proposal should be formally assessed. At the completion of the Part IV assessment process, the EPA provides advice to the Minister for the Environment who then issues a Ministerial Statement if the proposal is approved. The current operations have not required approval under part IV of the EP Act. The proposed mine expansion has been approved, and the Project now operates under Ministerial Statement 1111 (MS1111).

17.3.3 Other Key Approvals

Part V, Environmental Protection Act of 1986 (WA)

The Department of Water and Environmental Regulation (DWER) administers Part V, Division 3 of EP Act, which involves the regulation of emissions and discharges from 'Prescribed Premises' as defined by the Environmental Protection Regulations of 1987 (Schedule 1). Mining is not a prescribed activity; however, pit dewatering, ore processing, storage of tailings, crushing and screening, and power generation are among the prescribed activities regulated by the DWER.

A license is required for the operation of Prescribed Premises. Talison holds License No. L4247/1991/13, which was granted on December 12, 2013, was last amended July 27, 2021, and is valid until December 13, 2026. The License authorizes operation of Category 5 Prescribed Premises, processing or beneficiation of metallic or non-metallic ore up to 4.7 Mt/y of processing capacity and 5 Mt/y deposited tailings. The site operates two chemical grade processing plants (CGP 1 and 2) and one TSF (TSF2). TSF3 is closed and has been rehabilitated, and TSF1 is not currently receiving tailings and is approved for use only for emergency deposition.

Off-site discharge of water from the Southampton Dam and the Cowan Brook Dam is explicitly prohibited in the License due to the high risk from accumulation of lithium and metals/metalloids in the mine water circuit.

A Works Approval (W6283/2019/1) was granted on April 2, 2020, for the construction and commissioning of additional processing plants, a crusher, and a tailings retreatment plant to increase the processing capacity of spodumene ore to a maximum of 11.6 Mt/y, and the Project's current management and operating strategies include compliance with the conditions of the Works Approval.

Clearing permits are required for the disturbance of native vegetation under the EP Act. Talison holds two clearing permits, CPS 5056/2 valid until December 27, 2026, for clearing up to 120 ha for mine disturbances and CPS 5057/1 valid until December 27, 2026, for clearing up to 10 ha for rehabilitation purposes outside the mine development envelope. Offset proposals are required under these permits to address residual impacts to the Forest Red-tailed Black Cockatoo, Baudin's Cockatoo and Carnaby's Cockatoo.

Mining Act of 1978 (WA)

The environmental impacts of mining and related activities are also assessed by the Department of Mines, Industry Regulations and Safety (DMIRS), the statutory body for the regulation of mineral exploration and associated resource development activities. Environmental and social assessment requirements are defined by the Statutory Guideline for Mining Proposals and the Statutory Guidelines for Mine Closure Plans which are enabled under section 70O of the Mining Act and the MCP must be revised a minimum of every three years. The commitments made in mining proposals for a project generally accrue rather than superseding each other, so that obligations arising from earlier approvals become binding. The applicable mining proposals and MCPs are shown in Table 17-1.

A Mining Proposal and MCP must be approved by the DMIRS before mining activities commence and must contain a description of all the relevant environmental approvals and statutory requirements that must be obtained and that will affect the environmental management of the Project. A Memorandum of Understanding (MoU) exists between the DMIRS and other regulatory agencies to minimize duplication of effort and to enable consultation in cases where expertise relating to a particular type of impact resides with another agency.

Table 17-1: Mining Proposals and MCPs Conditioned in Mining Tenure

Registration ID	Document Title	Date	Applicable Tenure
14168	Greenbushes Notice of Intent: Greenbushes Tantalum/Lithium Project: Greenbushes, Western Australia	April 1991	M01/16
2122/92	Notice of Intent to build an additional waste dump for material form the Tantalum and Lithium Pits at the Greenbushes Mine site	13 July 1993	M01/16
15064	Proposed construction of Lithium carbonate Plant - Greenbushes Mine	21 June 1994	M01/16
16518	Greenbushes Operations - Preliminary Project Proposal - Continuation of Hard Rock Mining	March 1999	M01/16
45382	Greenbushes Operations 2013 Mining Proposal - Continuation of Hardrock Mining III	9 April 2014	M01/03, M01/16, G01/1
EARS-MP-30733	Talison Lithium Australia Pty Ltd Greenbushes Mine Site Project 640 2011 Lithium Processing Plant Upgrade Tenement G01/1	June 2011	G01/1
60857	Talison Lithium Australia Pty Ltd - Greenbushes Operations Mine Closure Plan 2016	23 February 2017	M01/1, M01/02, M01/03, M01/4, M01/5, M01/8, M01/10, M01/16, M01/18, G01/1
80328	Mining Proposal - Expansion of Mine Development Envelope, Mine Services Area, Chemical Grade Plant 3, 4, Mine Access Road and Tailings Retreatment Plant	23 July 2019	M01/03, M01/8
87604	Infrastructure and road works at the new site Explosives Magazine and Batching Facility	23 June 2020	M01/03
95694	Mine Services Area, Gate 5 and 132kV powerline corridor	30 April 2021	M01/03, M01/06, M01/09
96748	TSF2 buttressing and ground stabilization works	14 July 2021	M01/06

Source: Talison Lithium Australia Pty Ltd., 2019.

Aboriginal Heritage Act of 1972 (WA)

The Aboriginal Heritage Act of 1972 (AH Act) provides for the protection of all Aboriginal heritage sites in Western Australia regardless of whether they are formally registered with the administering authority, the Department of Planning, Lands and Heritage (DPLH). Overall, the surveys have not identified any heritage sites and, therefore, Section 18 consents are not required at this time.

Contaminated Sites Act of 2003 (WA)

The Project has five registered contaminated sites which encompass the entire mine area due to known or suspected contamination of hydrocarbons and metals in soil, and elevated concentrations of metals in groundwater and surface water (Site IDs 34013, 73571, 73572, 75019, and 75017). The classification of the Mine as 'Contaminated – Restricted use' restricts land for commercial and industrial uses only. The mine cannot be developed for more sensitive uses, such as recreation open space or residential use without further contamination assessment and/or remediation.

17.3.4 Environmental Compliance

The Project has not incurred any significant environmental incidents (EPA, 2020). Reportable incidents in the 2018-2019 AER period totaled 85 incidents and consist primarily of spills (44), followed by water or tailings incidents (18), flora and fauna incidents (16), and dust incidents (11). Complaints comprised four complaints for noise and blasting, one dust complaint, one light complaint, and one odor complaint. Through the end of 2022 there were 14 non-conformance events reported to regulators.

DWER note in the Works Approval decision report (2020) that there have been 36 dust related complaints since the 2015/2016 reporting period; however, dust monitoring for License L4247/1991/13 from previous years (2010-2019) confirms consistent dust measurements well below the NEPM standard, with results over 50 $\mu g/m^3$ observed on only rare occasions.

As noted above, the Project has contaminated five sites listed which encompass the entire mine area due to known or suspected contaminated site due to hydrocarbons and metals in soil, and elevated concentrations of metals in groundwater and surface water (Site IDs 34013, 73571, 73572, 75019, and 75017). These sites are classified as "Contaminated – Restricted use" and only permit commercial and industrial uses. This will need to be reviewed for final land use options for closure.

17.4 Local Individuals and Groups

The mining tenure for the Project was granted in 1984 and, therefore, is not a future act as defined under the Native Title Act of 1993 (a 'future act' is an act done after the January 1, 1994, which affects Native Title). The Project is, therefore, not required to have obtained agreements with the local native title claimant groups.

The Project lies immediately south of the town of Greenbushes and maintains an active stakeholder engagement program and information sessions to groups such as the "Grow Greenbushes." Senior mine management reside in the town. Talison promotes local education (the Greenbushes Primary School and tertiary sponsorships) and provides support community groups with money and services (allocated in the Environmental and Community budget).

Talison has two agreements in place with local groups:

- Blackwood Basin Group (BBG) Incorporated – offset management agreement whereby BBG have agreed to manage and improve the condition of native vegetation for the purpose of the Black Cockatoo offset requirements.
- Tonebridge Grazing Pty Ltd. – site conservation agreement for the protection and improvement of native vegetation to protect Black Cockatoo habitat.

17.5 Mine Reclamation and Closure

17.5.1 Closure Planning

The requirements for Mine Closure Plans (MCPs) in Western Australia are defined in the Mining Act of 1978 and the Guidelines for Preparing Mine Closure Plans (Department of Mines and Petroleum and Environmental Protection Authority (DMP and EPA), 2015) which is statutory guidance under s70O of the Mining Act. Talison has a mine closure plan submitted and approved by DMIRS on February 23, 2017, with their costs updated in October 2016.

Talison states in their currently approved MCP that the closure concept for the Greenbushes site is to re-integrate the mine into the surrounding State Forest. All of the project facilities would be part of the re-integration including artificial landforms such as tailings storage, two contoured waste rock dumps, and a large pit void.

Based on progressive rehabilitation that has been performed at the site, Talison believes that the rehabilitated landscape will be stable and non-polluting. However, the site is currently classified as Contaminated: restricted use and water from several areas does not meet current discharge criteria. Talison has stated this does not impact the proposed use to allow native fauna and general public to conduct normal activities.

Talison has developed a closure completion criterion for the return of historic areas to the State Forest after rehabilitation, specifically historic shallow alluvial workings along gullies surrounded by forest. The post-mining landforms associated with the active mine site have less in common with the pre-mining surrounding environment. Talison is working with the Department of Biodiversity, Conservation and Attractions (DBCA) on the development of a completion criteria for the active mine site, with the closure criteria still in early draft stage, with further negotiation needed with DBCA before final criteria can be agreed on.

The Broad Principal Closure Objectives are:

- Post-mining land use has been identified and is compatible with the surrounding land use
- Post-mining land use is achievable and acceptable to the future landowner/manager
- The Environment is safe, non-polluting, and stable, and will not be the cause of any environmental or public safety liability and has an acceptable contamination risk level for the intended land use
- Potential hazardous substances are removed from site and/or the location of buried or underground hazards is defined and adequately demarcated
- The Environment can be integrated into the post-closure management practices without the input of extraordinary resources above that which could reasonably and normally be expected, unless otherwise agreed by the future landowner
- The Environment is able to support functional landforms, soil profiles, ground and surface water systems, and ecological communities for the agreed post mining land-use
- Any built infrastructure is removed, unless otherwise agreed by the future landowner/manager and so long as the maintenance of the infrastructure is not inconsistent with all these objectives

The approved closure plan is based on 11 domains, with Talison responsible to all facilities but two, with the responsibility falling on to Global Advanced Metals Greenbushes (GAMG) who have the rights to the non-lithium minerals and ownership of the Tantalum processing facilities.

Domains and subdomains and infrastructure are summarized in Table 17-2.

Table 17-2: Reclamation and Closure Domains and Responsibilities

Pit Domain
Central pits
Haul Roads
Tantalum Ore Stockpiles
Portal
Powerlines and transformers
Water Pipelines
Monitored Rehabilitation
Natural regrowth/Unmonitored rehabilitation (disturbed but not assigned
Remnant vegetation
IP Waste Dump Domain
IP Waste landform
Rehabilitation soil stockpiles
Haul roads
Mining Contractors workshop
Drill and blast workshop
Offices
Bioremediation area
DG Storage-Mining contractors fuel farm
Lithium tailings (Historic)
Hardstand areas
TSF Domain
TSF1
TSF2
Clear water pond
TSF3
Tailings pipelines
Powerlines
Pumping station
Lithium Processing Domain
Technical Grade Lithium Production Plant
Chemical Grade Lithium Production Plant
Engineering workshop
Light vehicle workshop
Underground cables
LMP Warehouse and Offices
DG Storage - Light vehicle fuel farm
DG Storage - LMP gas storage
DG Storage - Sulphuric acid tank
Powerlines
Transformers and substations
Hardstand areas

GAMG Primary Domain
Crushing facility
Primary tantalum plant
Run of Mine pad
Fine ore stockpile
Hardstand areas
Water Pipelines

Talison Domain

Floyds Waste Dump
Waste landform
Haul roads
Magazine
Hardstand areas
Powerlines
Monitored Rehabilitation
Natural regrowth/Unmonitored rehabilitation (disturbed but not assigned
Remnant vegetation

Water Circuit Doman
Austins/Southampton Dam
Cowan Brook Dam
Water pipelines
Raw water tanks
Austins Wetland
Pumping stations
Powerlines and transformers
Monitored Rehabilitation
Natural regrowth/Unmonitored rehabilitation (disturbed but not assigned
Remnant vegetation
Vultan Domain
Vultans Wetland
Historic tailings
Powerlines and transformers
Monitored Rehabilitation
Natural regrowth/Unmonitored rehabilitation (disturbed but not assigned
Remnant vegetation

TSF 3 Domain
Historic tailings rehabilitated
Historic tailings no rehabilitated
Monitored rehabilitation
Natural regrowth/Unmonitored rehabilitation (disturbed but not assigned

Administration Domain
Administration offices
Laboratory
Research facility
Hardstand areas
Access roads.

GAMG Domains

GAMG Secondary Domain
Wet and Dry plant
Roaster/Smelter
Arsenic Remediation Facility
Settling pond
Tin shed dam
DG Storage - Arsenic trioxide fume storage
Gas storage
Pumping station
Powerline and transformers
Administration offices and store
Product storage warehouse
hygiene facility
Access roads

Post-closure activities will comprise of a 10-year monitoring schedule for the following:

- Surface water flows
- Monthly water quality
- Ground water monitoring
- Dust monitoring
- Monthly TSF inspections and seepage checks
- Annual TSF geotechnical reviews
- Pit wall stability
- Pit void water levels
- Weed monitoring
- Flora and fauna assessments
- Monthly rehabilitation slope stability
- Feral animal monitoring
- Monthly water dam inspections

Proposed monitoring methods must be able to demonstrate trends towards the agreed site-specific completion criteria and environmental indicators for a sufficient timeframe.

17.5.2 Closure Cost Estimate

Financial provision for MCPs are required to be prepared with transparent and verifiable methodology with uncertainties and assumptions clearly documented (DMP and EPA, 2015). A cost estimate for immediate (unplanned) closure of Greenbushes has been prepared by Talison using the Victorian Government Rehabilitation bond calculator (dpi-bond-calculator-24-feb-2011) as a template to assist them in identifying and costing the rehabilitation, decommissioning, and monitoring requirements for the Greenbushes site. As stated within their closure plan, Talison's initial closure costs were calculated in 2013, with these costs escalated annually using Perth, Western Australia inflation rates. The Victorian Government bond calculator uses predefined third-party unit rates based on the typical current market 'third party rates' as of July 2010, which may overestimate or underestimate closure costs for Western Australia. Where more accurate costing information was available, that was used in lieu of the default third-party rate as prescribed in the Victorian bond calculator. A more accurate closure cost estimate should be prepared using Western Australian third-party rates or quoted estimates based on 'first principles.'

The 2021 closure cost estimate update was AU$48,757,253, of which AU$37,232,334 represents Talison's portion of the operation.

The closure cost estimate for Greenbushes only addresses immediate mine closure. SRK was not provided a Life-of-Mine (LoM) closure cost estimate, which, although not a regulatory requirement, is industry best practice and consistent with sustainable development goals (Department of Industry, Innovation and Science, 2016). The LoM closure costs include rehabilitation, closure, decommissioning, monitoring, and maintenance following closure at the end of the mine life and are typically much higher than the immediate closure due to a greater final footprint. Early recognition of mine closure costs aids financial planning, long-term budgeting, and mine plans, and promotes improved strategies for progressive rehabilitation. It provides a more accurate representation of the total closure liability for the Greenbushes operation.

17.5.3 Performance or Reclamation Bonding

Western Australia does not require a company to post performance or reclamation bonds. However, all tenement holders in Western Australia are required to annually report surface disturbance and make contributions to a pooled mine rehabilitation fund (MRF) based on the type and extent of disturbance under the Mining Rehabilitation Fund Act of 2012 (MRF Act). Each operator supplies the areas of disturbance for each facility type, and a standard rehabilitation cost is applied to each. Therefore, the cost used to estimate the annual contribution to the MRF may not reflect the actual cost to close the mine, as it does not use site-specific information, and is unlikely to include all of the activities that would be required to close the mine. The pooled fund can be used by the Department of Mines, Industry Regulation and Safety (DMIRS) to rehabilitate mines where the tenement holder/operator has failed to meet their rehabilitation obligations and finances have not been able to be recovered. The interest earned on the pooled fund is used for administration and to rehabilitate legacy abandoned mine sites.

However, the *Mine Closure Plan Guidance - How to prepare in accordance with Part 1 of the Statutory Guidelines for Mine Closure Plans* (DMIRS, March 2020) states that "DMIRS may require a fully detailed closure costing report to be submitted for review, and/ or an independent audit to be conducted on the report to certify that the company has adequate provision to finance closure. Where appropriate, the costing report should include a schedule for financial provision for closure over the life of the operation." If requested by DMIRS, tenement holders are required to provide financial assurance for mine closure to ensure that adequate funds are available and that the government and community are not left with unacceptable liabilities. The financial assurance process and methodology must be transparent and verifiable, with assumptions and uncertainties that are clearly documented, and based on reasonable, site-specific information. As of the preparation of this report, DMIRS has not requested that Talison provide financial assurance for the Greenbushes operation; but Talison does submit annual payments to the MRF in accordance with the MRF Act.

17.5.4 Limitations on the Current Closure Plan and Cost Estimate

The latest closure cost estimate available for review was the 2021 updated estimate. It includes the facilities that currently exist on site and future expansion of Floyd's dump.

The model used to prepare the closure cost estimate was developed in the State of Victoria. Its purpose is to provide the Victorian government with an assessment of the closure liabilities at the site and form the basis of financial assurance. However, because Western Australia does not require operators to post a financial assurance and, instead relies on a pooled fund, it is believed this cost estimate has not been reviewed by the Western Australian government. Furthermore, this model was created in 2011, and uses fixed unit rates developed by a consultant to the government. These rates have been increased for inflation since that time.

Talison used this model to prepare a cost estimate in the event that the government requires demonstration of adequate financial assurance for the site. This type of estimate typically reflects the cost that the government agency responsible for closing the site in the event that an operator fails to meet their obligation. If Talison, rather than the government, closes the site in accordance with their current mine plan and approved closure plan, the cost of closure is likely to be different from the financial assurance cost estimate approved by the government.

There are a number of costs that are typically included in the financial assurance estimates that would only be incurred by the government, such as government contract administration. Other costs, such as head office costs, a number of human resource costs, taxes, fees and other operator-specific costs that are not included in the financial assurance cost estimate would likely be incurred by Talison during closure of the site. Because Talison does not currently have an internal closure cost estimate, other than the Victorian model, SRK was not able to prepare a comparison of the two types of closure cost estimates. The actual cost could be greater or less than the financial assurance estimate.

There is no documentation on the basis of the unit rates used in the Victorian model and the government of Victoria was unable to provide any information regarding the accuracy of the rates. Because of this, SRK cannot validate any of the unit rates used in the model or the overall cost estimate.

Furthermore, because closure of the site is not expected until 2057, the closure cost estimate represents future costs based on current site conditions. In all probability, site conditions at closure will be different than currently expected and, therefore, the current estimate of closure costs is unlikely to reflect the actual closure cost that will be incurred in the future.

17.5.5 Potential Material Omissions from the Closure Plan and Cost Estimate

As noted above, the closure plan and current cost estimate is based on the assumption that the mine site will be stable and non-polluting following completion of the closure measures included in the closure plan. However, there are several aspects of the project that may require additional measures to be implemented at the site to achieve this goal.

Currently, the site must treat mine water collecting in the Southampton and Cowan Brook Dams prior to discharge due to elevated levels of arsenic and lithium in the water. The sources of elevated lithium and arsenic in the mine water circuit include dewatering water from the pit. However, there has been no study to determine if water that will eventually collect in the pit or from any other point source and discharge will meet discharge water quality standards. Therefore, no assessment of the probability that post-closure water management or water treatment has been performed.

Additionally, contaminated seepage from TSF2 has recently been observed in the alluvial aquifer and is now being collected via French drains constructed along the toe of the embankment and conveyed to the water treatment plant. At this time, no studies have been conducted to determine the cause of the current seepage, the likelihood and duration of continued seepage, or the possibility that additional seepage could occur from the other TSF facilities.

If perpetual, or even long-term, treatment of water is required to comply with discharge requirements, the closure cost estimate provided by Talison could be materially deficient.

17.6 Adequacy of Plans

In general, current plans are considered sufficient to address any significant issues related to environmental compliance, permitting, and local individuals or groups. Additional studies such as waste rock characterization, noise and dust monitoring, and mine closure are recommended for the proposed mine expansion.

17.7 Commitments to Ensure Local Procurement and Hiring

The Project has no formal commitments to ensure local procurement and hiring. However, the mine applies a fatigue management policy that requires staff to have a maximum workday of 13 hours that includes travel to and from home (Distance from Work ADM-ST-014, 2018). Staff operating on a 12-hour workday must live within a 30-minute drive of the mine (approximately 50 km), and those on an 8-hour workday must live within 1.5 hours of the mine site (approximately 120 km). This policy limits the radius of staff employment to the local region, with the majority of staff residing within 50 km.

18 Capital and Operating Costs

Estimation of capital and operating costs is inherently a forward-looking exercise. These estimates rely upon a range of assumptions and forecasts that are subject to change depending upon macroeconomic conditions, operating strategy and new data collected through future operations. For this report, capital and operating costs are estimated to a PFS-level with a targeted accuracy of +/- 25%. However, this accuracy level is only applicable to the base case operating scenario and forward-looking assumptions outlined in this report. Therefore, changes in these forward-looking assumptions can result in capital and operating costs that deviate more than 25% from the costs forecast herein.

Cost presented here are presented on a 100% basis with no adjustment for Albemarle's ownership in the operation.

18.1 Capital Cost Estimates

Summary LoM capital costs are shown in Table 18-1.

Table 18-1: Life-of-Mine Capital Costs

Category	LoM Cost (AU$ million)	Distribution (%)
Expansionary Development	86.3	5%
Plant and Equipment Expansion	1,235.4	69%
Tailings Addition - Expansion	21.2	1%
Sustaining Development	33.7	2%
Exploration	14.7	1%
Plant and Equipment - Sustaining	352.1	20%
Closure	48.8	3%
Total	**1,792**	**100%**

Source: SRK, 2023

Total LoM capital expenditures are estimated at AU$1,792 million. Talison classifies capital expenditures as either expansionary or sustaining. A discussion of both types of capital expenditures is presented below.

18.1.1 Expansionary Capital Costs

Planned LoM capital expenditures that are characterized as expansionary are shown in Table 18-2.

Table 18-2: Life-of-Mine Expansionary Capital Costs

Category	LoM Cost (AU$ million)
Expansionary Development	
Water Circuit Facilities	13.9
TSF4	54.2
Waste dump expansion	7.0
Other Development - Expansion	11.3
Plant and Equipment Expansion	
CGP3	431.9
CGP4	626.8
Camp Facilities	119.1
Other Plant and Equipment Expansion	57.6
Tailings Addition – Expansion	
TSF 1 Tailings lift (2028 to end of life)	21.2
Total Expansionary Capital	**1,342.9**

Source: SRK, 2023

LoM expansionary capital expenditures are estimated at AU$1,343 million, with approximately AU$75 million directly attributable to constructing tailings storage facilities. The majority of the capital expenditure is related to the construction of the CGP3 and CGP 4 processing facilities. CGP 3 is currently under construction and CGP is scheduled to start construction in 2025. SRK's review of the Talison capital expenditure buildups confirmed that the estimates typically include contingency. The contingency is embedded within the line-item expenditures in Table 18-3. SRK review indicates that all contingency amounts were less than 15%.

18.1.2 Sustaining Capital Costs

Planned LoM capital expenditures that are characterized as sustaining are shown in Table 18-3.

Table 18-3: Life-of-Mine Sustaining Capital Costs

Category	LoM Cost (AU$ Million)
Sustaining Development	
Cutback Preparation Works	1.2
TSF1 (2023-2026)	24.2
TSF2	0.9
Floyds Preparation Works	7.4
Exploration	
Drilling	14.7
Plant and Equipment	
Other Sustaining	352.1
Closure	
Closure	48.8
Total Sustaining Capital	**449.2**

Source: SRK, 2023

LoM sustaining capital expenditures are estimated at AU$449.2 million, including estimated closure costs. The assumption is that Talison will continue to rely on a contractor for open pit mining and, accordingly, no mining equipment costs have been included in the sustaining capital cost estimate. No contingency is included in the sustaining capital shown in Table 18-4.

18.2 Operating Cost Estimate

The LoM operating costs are summarized in Table 18-4. No contingency is included in the operating cost estimates.

Table 18-4: Life-of-Mine Total Operating Cost Estimate

Category	LoM Total Cost (AU$ million)	LoM Unit Cost (AU$/t-processed)	Distribution (%)
Mining	6,328	40.29	35%
Processing	5,169	32.90	28%
G&A	674	4.29	4%
Water Treatment	182	1.16	1%
Market Development	11	0.07	0%
Concentrate Shipping	1,572	10.01	9%
Other Transport and Shipping Costs	697	4.44	4%
Government Royalty	3,557	22.64	20%
Total	**18,190**	**118.77**	**100%**

Source: SRK, 2023

The LoM total operating cost is AU$118.77 per t processed. On a combined basis, mining and processing make up approximately 63% of total LoM total operating cost.

A discussion of the cost categories comprising the total operating cost estimate is presented below.

1.2.1 Mine Operating

The LoM mine operating costs are summarized in Table 18-5.

Table 18-5: Mine Operating Costs

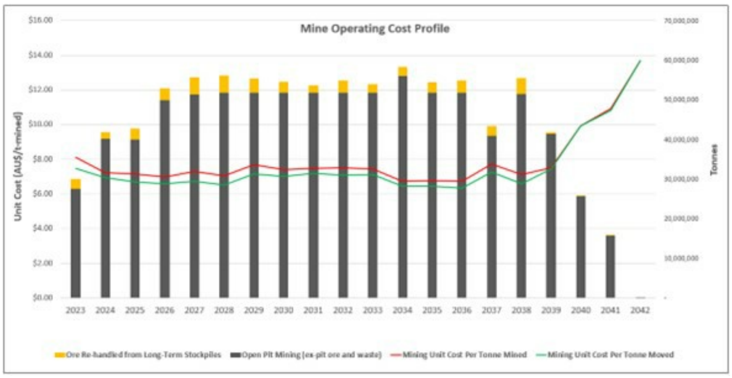
Category	LoM Total Cost (AU$ million)	LoM Unit Cost (AU$/t-mined)
Mining Overheads	473	0.55
Drill and Blast	1,336	1.56
Load and Haul	3,916	4.58
RoM Loader	362	0.42
Stockpile Rehandle	151	0.18
Grade Control Assays	8	0.01
Rockbreaking	82	0.10
Total	**6,328**	**7.40**

Source: SRK, 2022

The operating cost estimate is based on recent actual costs and the load and haul rates specified in the existing mining contract between Talison and SG Mining Pty Ltd (SGM), which include appropriate adjustments for rise and fall. Load and haul costs are variable depending on the pit bench from which the material is mined and whether the destination is the RoM pad, a long-term stockpile, or a waste dump.

The LoM unit operating cost is AU$7.40 per t mined from the open pit (AU$20.47 per bcm mined). On a total material movement basis (which includes tonnes of ore re-handled from long-term stockpiles), the LoM unit cost is AU$7.01 per t moved.

The mine operating cost profile over the life of the operation is shown in Figure 18-1.



LoM values are provided in Table 19-12
Source: SRK, 2022

Figure 18-1: Mine Operating Cost Profile

Mine operating costs remain in a relatively constant range until the final three years of open pit mining (2040 to 2042) when the annual mining rate decreases, and the deepest benches of the open pit are mined.

18.2.2 Processing Operating Costs

The LoM processing costs are summarized in Table 18-6.

Table 18-6: Process Operating Costs

Category	LoM Total Cost (AU$ million)	LoM Unit Cost (AU$/t-processed)
Crushing		
Crushing Plant 1	412	10.37
Crushing Plant 2	352	7.84
Crushing Plant 3	301	7.84
Crushing Plant 4	266	7.84
Subtotal Crushing Plants	**1,332**	**8.48**
Technical Grade Plant		
Variable Costs	142	44.36
Chemical Grade Plant 1		
Variable Costs	823	22.53
Chemical Grade Plant 2		
Variable Costs	1,098	24.47
Chemical Grade Plant 3		
Variable Costs	941	24.47
Chemical Grade Plant 4		
Variable Costs	831	24.47
Subtotal All Plants	**3,836**	**24.42**

Source: SRK, 2023

The average LoM crushing cost is AU$8.48/t crushed. The average LoM processing cost for the Technical Grade Plant is AU$44.36/t processed. For Chemical Grade Plant 1, Chemical Grade Plant 2, Chemical Grade Plant 3, and Chemical Grade Plant 4 the LoM average processing costs are AU$22.53/t-processed, AU$24.47/t-processed, AU$24.47/t-processed, and AU$24.47/t-processed, respectively. The average LoM combined crushing and processing cost is AU$32.90/t processed. The estimate of processing costs is based on Talison's recent actual costs. The processing costs exclude the crusher feed loader and the mobile rockbreaker.

18.2.3 Other Operating Costs

Other operating costs consist of general and administrative costs (G&A), water treatment and marketing development as shown Table 18-7.

Table 18-7: Other Operating Costs

Category	LoM Total Cost (AU$ million)	LoM Unit Cost (AU$/t-processed)
G&A		
Site G&A	674	4.29
Water Treatment	182	1.16
Market Development	11	0.07
Total Other Operating Costs	**867**	**5.52**

Source: SRK,2023

The other operating costs (G&A, water treatment and market development) are generally fixed over the life of the project and average approximately AU$43.3 million per year. The estimate of other operating costs is based on Talison's recent actual costs.

18.2.4 Shipping and Transportation Costs

Shipping and other transportation cost are shown Table 18-8.

Table 18-8: Shipping and Transportation Costs

Category	LoM Total Cost (AU$ million)	LoM Unit Cost (AU$/t-processed)
Shipping	1,572	10.01
Other Transportation Costs	697	4.44
Total Other Operating Costs	**2,269**	**14.45**

Source: SRK, 2023

Costs for shipping and transportation are estimated based on Talison's recent actual costs, near term budgets and rates from current contracts.

18.2.5 Royalties

LoM royalty payments are estimated at AU$3,557 million based on application of a 5% government royalty. The royalty is applicable to estimated LoM gross revenue from concentrate sales after deducting shipping costs to China.

19 Economic Analysis

19.1 General Description

SRK prepared a cash flow model to evaluate Greenbushes' ore reserves on a real basis. This model was prepared on an annual basis from the reserve effective date to the exhaustion of the reserves. This section presents the main assumptions used in the cash flow model and the resulting indicative economics. The model results are presented in U.S. dollars (US$), unless otherwise stated.

All results are presented in this section on a 49% basis reflective of Albemarle's ownership unless otherwise noted. Technical and cost information is presented on a 100% basis to assist the reader in developing a clear view of the fundamentals of the operation.

As with the capital and operating cost forecasts, the economic analysis is inherently a forward-looking exercise. These estimates rely upon a range of assumptions and forecasts that are subject to change depending upon macroeconomic conditions, operating strategy and new data collected through future operations.

19.1.1 Basic Model Parameters

Key criteria used in the analysis are presented throughout this section. Basic model parameters are summarized in Table 19-1.

Table 19-1: Basic Model Parameters

Description	Value
TEM Time Zero Start Date	January 1, 2023
Mine Life (years)	20
Discount Rate	8%

Source: SRK, Albemarle

All costs incurred prior to the model start date are considered sunk costs. The potential impact of these costs on the economics of the operation is not evaluated. This includes contributions to depreciation and working capital as these items are assumed to have a zero balance at model start.

The model continues one year beyond the mine life to incorporate closure costs in the cashflow analysis.

The selected discount rate is 8% as directed by Albemarle.

19.1.2 External Factors

Exchange Rates

As the operation is located in Australia, the operating and capital costs are modeled in AU$ and converted to US$ within the model. The foreign exchange rate for the model was provided by Albemarle, is held constant over the life of the model and is presented in Table 19-2.

Table 19-2: Modeled Exchange Rate

FX Rate	AU$:US$	0.72

Source: Albemarle

Pricing

Modeled prices are based on the prices developed in the Market Study section of this report. The prices are modeled as US$1,500/t concentrate over the life of the operation. This price is a CIF price and shipping costs are applied separately within the model.

All concentrate streams produced by the operation are modeled as being subject to the price presented above.

Taxes and Royalties

As modeled, the operation is subject to a 30% income tax. All expended capital is subject to depreciation over a 20 year period. Depreciation occurs via a reducing balance method with a 2x multiplier. No existing depreciation pools are accounted for in the model.

As the operation is located within Western Australia, the operation is subject to a royalty of 5%. The amount of revenue subject to the royalty is the project's gross revenue less deductions for shipping costs.

SRK notes that the project is being evaluated as a standalone entity for this exercise (without a corporate structure). As such, tax and royalty calculations presented here may differ significantly from actuals incurred by Albemarle.

Working Capital

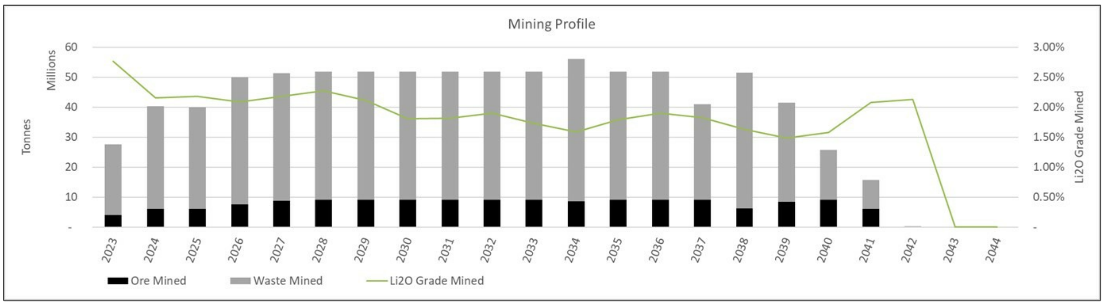
The assumptions used for working capital in this analysis are as follows:

- Accounts Receivable (A/R): 30 day delay
- Accounts Payable (A/P): 30 day delay
- Zero opening balance for A/R and A/P

19.1.3 Technical Factors

Mining Profile

The modeled mining profile was developed by SRK. The details of mining profile are presented previously in this report. No modifications were made to the profile for use in the economic model. The modeled profile is presented on a 100% basis in Figure 19-1.



Source: SRK

Figure 19-1: Greenbushes Mining Profile (Tabular data in Table 19-12)

A summary of the modeled life of mine mining profile is presented in Table 19-3.

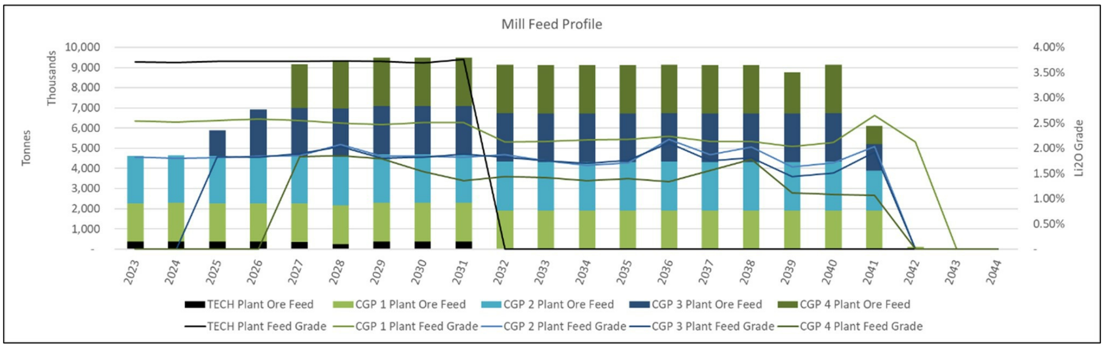
Table 19-3: Greenbushes Mining Summary

LoM Mining	**Units**	**Value**
Total Ore Mined	**Mt**	**153.1**
Total Waste Mined	**Mt**	**701.5**
Total Material Mined	**Mt**	**854.7**
Average Mined Li_2O Grade	%	1.91%
Contained Li_2O Metal Mined	Mt	2.9
LoM Strip Ratio	Num#	4.58x

Source: SRK

Processing Profile

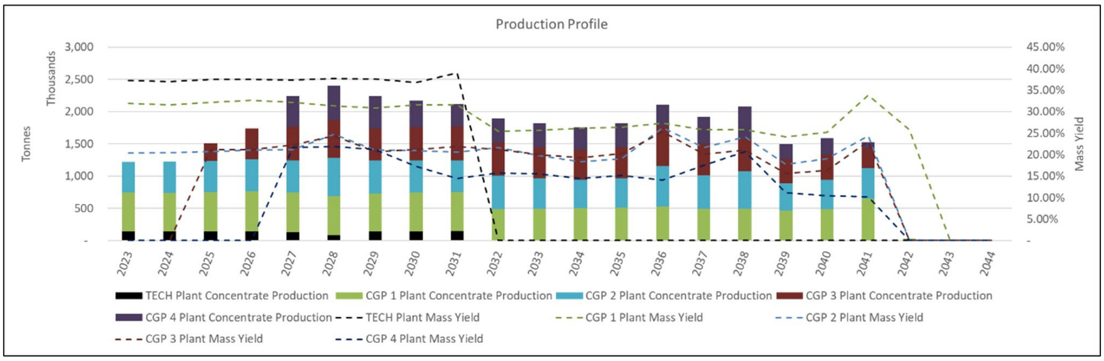
The processing profile was developed by SRK and results from the application of stockpile logic to the mining profile external to the economic model. No modifications were made to the profile for use in the economic model. The modeled profile is presented on a 100% basis in Figure 19-2.



Source: SRK

Figure 19-2: Greenbushes Processing Profile (Tabular data in Table 19-12)

The production profile was developed by SRK and results from the application of processing logic to the processing profile external to the economic model. No modifications were made to the profile for use in the economic model. The modeled profile is presented on a 100% basis in Figure 19-3.



Source: SRK

Figure 19-3: Greenbushes Production Profile (Tabular data in Table 19-12)

A summary of the modeled life of mine processing profile is presented on a 100% basis in Table 19-4.

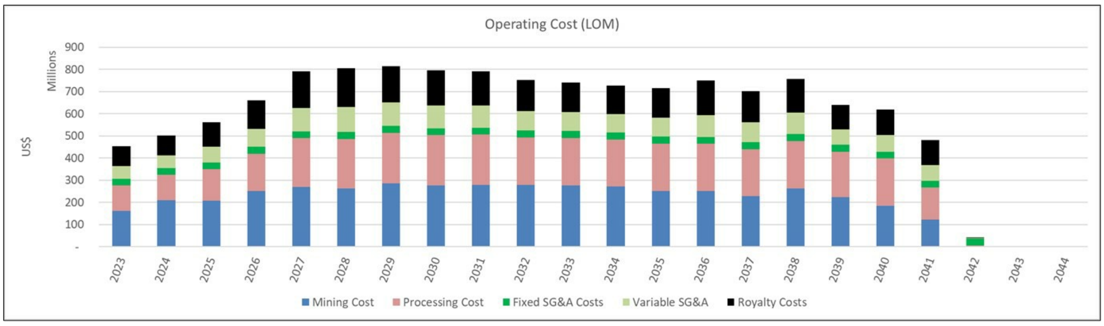
Table 19-4: Greenbushes Processing Summary

LoM Processing	Units	Value
TECH Plant		
Plant Feed (LoM)	Mt	3.2
Average Annual Feed Rate	kt/y	356
Average Feed Grade (Li_2O)	%	3.72%
Average Mass Yield	%	37.52%
CGP 1		
Plant Feed (LoM)	Mt	36.5
Average Annual Feed Rate	kt/y	1,823
Average Feed Grade (Li_2O)	%	2.35%
Average Mass Yield	%	29.03%
CGP 2		
Plant Feed (LoM)	Mt	44.9
Average Annual Feed Rate	kt/y	2,363
Average Feed Grade (Li_2O)	%	1.85%
Average Mass Yield	%	21.2%
CGP 3		
Plant Feed (LoM)	Mt	38.5
Average Annual Feed Rate	kt/y	2,264
Average Feed Grade (Li_2O)	%	1.80%
Average Mass Yield	%	20.82%
CGP 4		
Plant Feed (LoM)	Mt	34.0
Average Annual Feed Rate	kt/y	2,265
Average Feed Grade (Li_2O)	%	1.48%
Average Mass Yield	%	16.39%

Source: SRK

Operating Costs

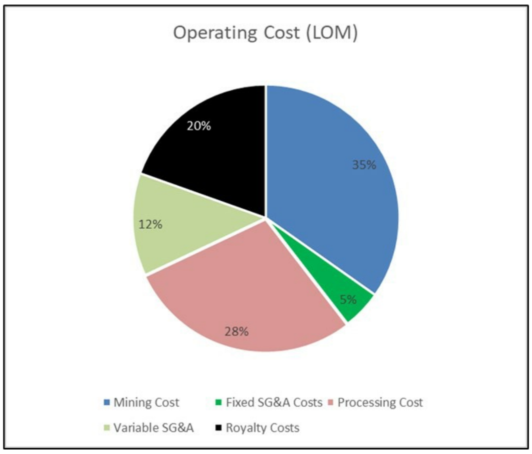
Operating costs modeled in Australian dollars and can be categorized as mining, processing and SG&A costs. No contingency amounts have been added to the operating costs within the model. All cost information in this section is presented on a 100% basis. A summary of the operating costs over the life of the operation is presented in Figure 19-4.



Source: SRK

Figure 19-4: Life of Mine Operating Cost Summary (Tabular data in Table 19-12)

The contributions of the different operating cost segments over the life of the operation are presented in Figure 19-5.



Source: SRK

Figure 19-5: Life-of-Mine Operating Cost Contributions

Mining

The mining cost profile was developed external to the model and was imported into the model as a fixed cost on an annual basis in Australian dollars. Within the model, the cost was converted to US$ using the long term exchange rate of 0.72 AU$:1:00 US$. The result of this approach is presented in Table 19-5 on a 100% basis.

Table 19-5: Greenbushes Mining Cost Summary

LoM Mining Costs	Unit	Value
Mining Costs	US$ million	4,556
Mining Cost	US$/t mined	5.33

Source: SRK

Processing

Processing costs were incorporated into the model as variable costs. Variable costs are applied to the tonnage processed each processing plant. Table 19-6 presents the variable cost on a per tonne basis for each plant. The CR 1 crushing facility process ore for both the TECH plant and the CGP 1 plant.

Table 19-6: Variable Processing Costs

Processing Area	Unit	Value
Crushing (CR 1)	AU$/t	10.37
Crushing (CR 2)	AU$/t	7.84
Crushing (CR 3)	AU$/t	7.84
Crushing (CR 4)	AU$/t	7.84
TECH Plant	AU$/t	44.36
CGP 1	AU$/t	22.53
CGP 2	AU$/t	24.47
CGP 3	AU$/t	24.47
CGP 4	AU$/t	24.47

Source: SRK

Within the model, the cost was converted to US$ using the long term exchange rate of 0.72 US$:AU$ The result of this approach is presented in Table 19-7on a 100% basis.

Table 19-7: Greenbushes Processing Cost Summary

LoM Processing Costs	Unit	Value
Processing Costs	US$ million	3,721
Processing Cost	US$/t processed	23.69

Source: SRK

SG&A

SG&A costs were incorporated into the model as annual fixed and variable costs. The fixed cost component is presented on a 100% basis in Table 19-8.

Table 19-8: SG&A Fixed Costs

Item	Unit	Value			
		Op Yr 1	Op Yr 2	Op Yr 3	Op Yr 4+
G&A	AU$ million	32.1	32.1	32.1	34.0
Water Treatment	AU$ million	9.1	9.1	9.1	9.1
Market Development	AU$ million	0.5	0.5	0.5	0.5

Source: SRK

Variable SG&A costs consist of the transport and shipping costs associated with moving the operation’s product to the selling point. These costs are presented on a 100% basis in Table 19-9.

Table 19-9: SG&A Variable Costs

Item	Unit	Value
Shipping	AU$/t concentrate	45.04
Other Transport and Shipping Costs	AU$/t concentrate	19.98

Source: SRK

Within the model, the cost was converted to US$ using the long term exchange rate of 0.72 AU$:US$ The result of this approach is presented in Table 19-10 on a 100% basis.

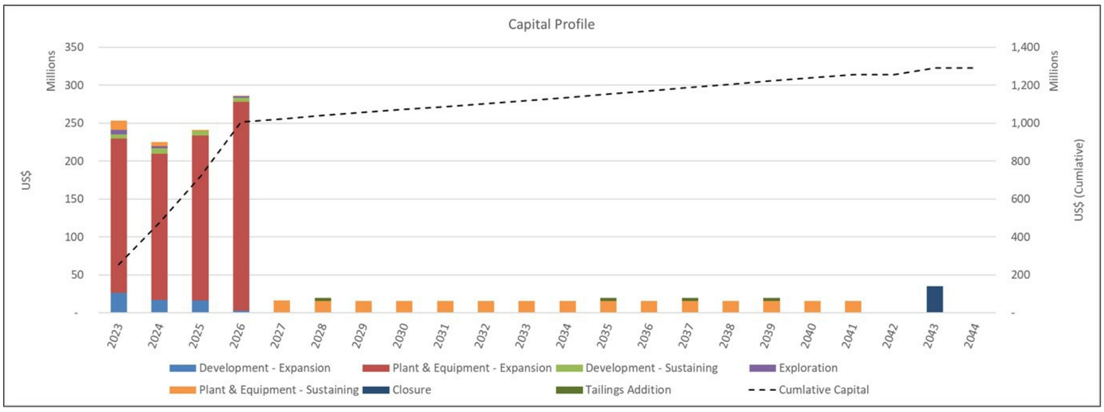
Table 19-10: Greenbushes SG&A Cost Summary

LoM SG&A Costs	Unit	Value
SG&A Costs	US$ million	2,258
SG&A Cost	US$/t concentrate	64.7

Source: SRK

Capital Costs

As the operation is an existing mine, no initial capital has been modeled. Sustaining capital is modeled on an annual basis and is used in the model as developed in previous sections. No contingency amounts have been added to the sustaining capital within the model. Closure costs are modeled as sustaining capital and are captured as a one-time payment the year following cessation of operations. The modeled sustaining capital profile is presented on a 100% basis in Figure 19-6.



Source: SRK

Figure 19-6: Greenbushes Sustaining Capital Profile (Tabular data in Table 19-12)

19.2 Results

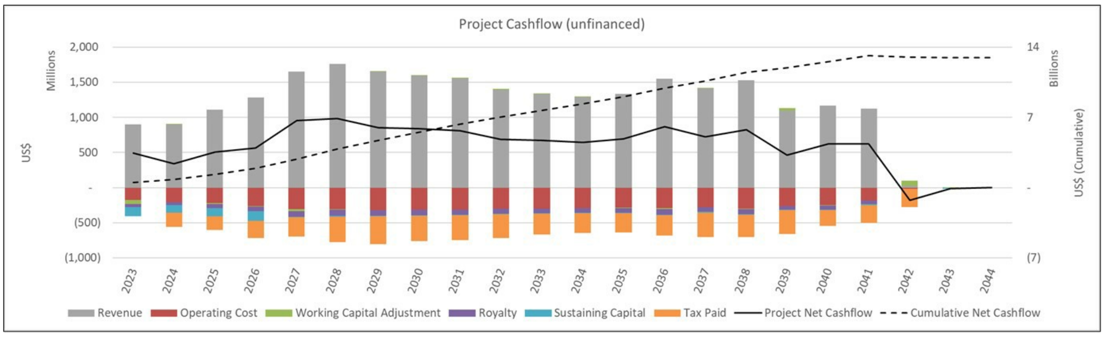
The economic analysis metrics are prepared on annual after-tax basis in US$. The results of the analysis are presented in Table 19-11. The results indicate that, at a concentrate price of US$1,500/t CIF China, the operation returns an after-tax NPV at 8% of US$13.2 billion (US$6.5 billion attributable to Albemarle). Note, that because the mine is in operation and is valued on a total project basis with prior costs treated as sunk, IRR and payback period analysis are not relevant metrics. Information about the economic result of the operation in this section is presented on a 49% basis (portion of the project attributable to Albemarle). Information about the technical aspects of the mining operation (tonnes, grade, costs, recoveries, etc.) is presented on a 100% basis to provide clear visibility into the underlying asset and aid the reader in resolving the information presented here to earlier sections in this report where the information is developed.

Table 19-11: Indicative Economic Results (Albemarle)

LoM Cash Flow (Unfinanced)	Units	Value
Total Revenue	**US$ million**	**25,653**
Total Opex	**US$ million**	**(5,162)**
Operating Margin	US$ million	20,490
Operating Margin Ratio	%	80%
Taxes Paid	US$ million	(5,631)
Free Cashflow	US$ million	12,972
Before Tax		
Free Cash Flow	US$ million	18,603
NPV at 8%	US$ million	9,048
After Tax		
Free Cash Flow	US$ million	12,972
NPV at 8%	US$ million	6,455

Source: SRK

The economic results and back-up chart information for charts within this section are presented on an annual basis in Table 19-12, Table 19-13 and Figure 19-7.



Source: SRK

Figure 19-7: Annual Cashflow Summary (Albemarle) (Tabular data in Table 19-12)

Table 19-12: Greenbushes Annual Cashflow (on an attributable basis)

US$ in millions																								
Counters																								
Calendar Year			**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**
Days in Period			**365**	**366**	**365**	**365**	**365**	**366**	**365**	**365**	**365**	**366**	**365**	**365**	**365**	**366**	**365**	**365**	**365**	**366**	**365**	**365**	**365**	**366**
Escalation																								
Escalation Index			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Project Cashflow (unfinanced) – (Albemarle)																								
Revenue	US$ million	25,652.5	898.6	900.5	1,107.7	1,280.2	1,651.2	1,762.4	1,650.3	1,594.9	1,556.9	1,394.2	1,335.7	1,288.6	1,334.0	1,549.8	1,411.7	1,527.1	1,096.4	1,167.4	1,120.7	24.4	-	-
Operating Cost	US$ million	-5,162.4	(177.7)	(201.7)	(221.0)	(260.7)	(306.9)	(308.4)	(318.6)	(311.7)	(311.7)	(300.3)	(297.1)	(292.6)	(284.9)	(291.3)	(275.1)	(296.5)	(259.6)	(246.6)	(181.0)	(19.0)	-	-
Working Capital Adjustment	US$ million	0.0	(59.2)	2.0	(15.6)	(10.9)	(26.7)	(8.7)	9.7	4.0	3.1	12.7	4.3	3.5	(4.4)	(16.9)	9.7	(7.7)	32.4	(6.7)	(1.8)	76.8	0.4	-
Royalty	US$ million	-1,254.9	(44.0)	(44.1)	(54.2)	(62.6)	(80.8)	(86.2)	(80.7)	(78.0)	(76.2)	(68.2)	(65.3)	(63.0)	(65.3)	(75.8)	(69.1)	(74.7)	(53.6)	(57.1)	(54.8)	(1.2)	-	-
Sustaining Capital	US$ million	-632.3	(124.1)	(110.4)	(118.2)	(140.1)	(8.1)	(9.5)	(7.6)	(7.6)	(7.6)	(7.6)	(7.6)	(7.6)	(9.5)	(7.6)	(9.5)	(7.6)	(9.5)	(7.6)	(7.6)	-	(17.2)	-
Other Government Levies	US$ million	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tax Paid	US$ million	-5,630.6	-	(203.1)	(192.7)	(243.1)	(277.5)	(366.3)	(398.6)	(364.4)	(351.5)	(341.5)	(299.2)	(284.1)	(272.5)	(288.3)	(348.4)	(314.2)	(341.1)	(229.6)	(254.0)	(260.6)	-	-
Project Net Cashflow	US$ million	12,972.4	493.6	343.3	506.0	562.7	951.3	983.4	854.4	837.1	813.0	689.3	670.8	644.8	697.4	869.8	719.4	826.3	465.0	619.8	621.5	(179.6)	(16.8)	-
Cumulative Net Cashflow	US$ million		493.6	836.8	1,342.9	1,905.5	2,856.8	3,840.2	4,694.6	5,531.7	6,344.7	7,034.0	7,704.8	8,349.5	9,046.9	9,916.8	10,636.2	11,462.5	11,927.5	12,547.3	13,168.8	12,989.1	12,972.4	12,972.4

Source: SRK

Table 19-13: Greenbushes Key Project Data (100% basis)

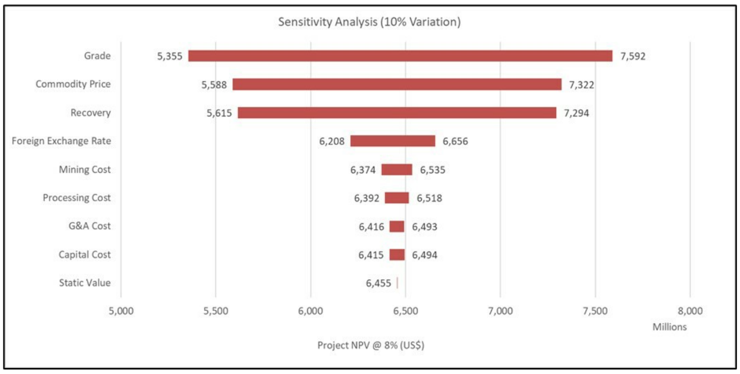
US$ in millions																								
Counters																								
Calendar Year			**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**
Days in Period			**365**	**366**	**365**	**365**	**365**	**366**	**365**	**365**	**365**	**366**	**365**	**365**	**365**	**366**	**365**	**365**	**365**	**366**	**365**	**365**	**365**	**366**
Escalation																								
Escalation Index			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Operating Cost (LoM) – (100% Basis)																								
Mining Cost	US$ million	4,556.2	161.2	209.3	206.5	251.6	269.7	263.0	286.1	275.5	277.9	279.1	277.0	270.8	252.3	250.9	227.2	263.6	224.2	184.0	123.5	2.8	-	-
Mining Cost	US$/t mined	5.33	5.8	5.2	5.2	5.0	5.3	5.1	5.5	5.3	5.4	5.4	5.4	4.8	4.9	4.8	5.6	5.1	5.4	7.2	7.9	9.8	-	-
Fixed SG&A Costs	US$ million	624.0	30.1	30.1	30.1	31.4	31.4	31.4	31.4	31.4	31.4	31.4	31.4	31.4	31.4	31.4	31.4	31.4	31.4	31.4	31.4	31.4	-	-
Processing Cost	US$ million	3,721.3	114.2	114.8	143.9	167.6	220.0	222.7	227.6	227.6	227.6	213.4	212.9	212.9	212.9	213.4	212.9	212.9	204.4	213.4	143.1	3.0	-	-
Variable SG&A	US$ million	1,634.0	57.2	57.4	70.6	81.5	105.2	112.3	105.1	101.6	99.2	88.8	85.1	82.1	85.0	98.7	89.9	97.3	69.8	74.4	71.4	1.6	-	-
Royalty Costs	US$ million	2,561.0	89.7	89.9	110.6	127.8	164.8	176.0	164.8	159.2	155.4	139.2	133.4	128.6	133.2	154.7	140.9	152.5	109.5	116.5	111.9	2.4	-	-
Mining Profile – (100% Basis)																								
Ore Mined	kt	153,144	4,000	6,000	6,000	7,600	8,762	9,150	9,150	9,150	9,150	9,150	9,150	8,567	9,150	9,150	9,150	6,167	8,429	9,150	5,991	129	-	-
Waste Mined	kt	701,517	23,577	34,213	34,000	42,400	42,550	42,600	42,600	42,600	42,600	42,600	42,600	47,495	42,654	42,600	31,735	45,275	32,997	16,554	9,709	158	-	-
Li_2O Grade Mined (%)	%	1.91%	2.77%	2.16%	2.18%	2.08%	2.18%	2.27%	2.11%	1.81%	1.82%	1.90%	1.73%	1.59%	1.79%	1.90%	1.83%	1.63%	1.48%	1.58%	2.08%	2.13%	-	-
Mill Feed Profile – (100% Basis)																								
TECH Plant Ore Feed	kt	3,205	368	371	375	375	356	235	375	375	375	-	-	-	-	-	-	-	-	-	-	-	-	-
TECH Plant Feed Grade	%	3.72%	3.71%	3.71%	3.72%	3.72%	3.72%	3.73%	3.72%	3.70%	3.76%	-	-	-	-	-	-	-	-	-	-	-	-	-
CGP1 Plant Ore Feed	kt	36,534	1,899	1,909	1,899	1,899	1,899	1,925	1,920	1,920	1,920	1,925	1,920	1,920	1,920	1,925	1,920	1,920	1,920	1,925	1,920	129	-	-
CGP1 Plant Feed Grade	%	2.35%	2.53%	2.52%	2.55%	2.58%	2.55%	2.50%	2.47%	2.51%	2.51%	2.13%	2.13%	2.16%	2.18%	2.24%	2.13%	2.13%	2.03%	2.11%	2.65%	2.13%	-	-
CGP2 Plant Ore Feed	kt	44,892	2,351	2,364	2,351	2,351	2,351	2,402	2,396	2,396	2,396	2,402	2,396	2,396	2,396	2,402	2,396	2,396	2,396	2,402	1,955	-	-	-
CGP2 Plant Feed Grade	%	1.85%	1.83%	1.80%	1.81%	1.84%	1.85%	2.07%	1.84%	1.84%	1.82%	1.87%	1.75%	1.66%	1.71%	2.18%	1.87%	2.03%	1.62%	1.71%	2.03%	-	-	-
CGP3 Plant Ore Feed	kt	38,480	-	-	1,266	2,284	2,375	2,407	2,400	2,400	2,400	2,407	2,400	2,400	2,400	2,407	2,400	2,400	2,400	2,407	1,329	-	-	-
CGP3 Plant Feed Grade	%	1.80%	-	-	1.83%	1.82%	1.89%	2.03%	1.80%	1.82%	1.88%	1.83%	1.75%	1.70%	1.76%	2.10%	1.76%	1.81%	1.44%	1.51%	1.92%	-	-	-
CGP4 Plant Ore Feed	kt	33,971	-	-	-	-	2,194	2,407	2,400	2,400	2,400	2,407	2,400	2,400	2,400	2,407	2,400	2,400	2,037	2,407	913	-	-	-
CGP4 Plant Feed Grade	%	1.48%	-	-	-	-	1.83%	1.85%	1.79%	1.54%	1.36%	1.43%	1.42%	1.35%	1.39%	1.34%	1.55%	1.78%	1.12%	1.08%	1.06%	-	-	-
Production Profile – (100% Basis)																								
TECH Plant Mass Yield	%		37.26%	37.01%	37.47%	37.50%	37.35%	37.68%	37.60%	36.83%	39.06%	-	-	-	-	-	-	-	-	-	-	-	-	-
TECH Plant Concentrate Production	kt	1,203	137	137	141	141	133	88	141	138	146	-	-	-	-	-	-	-	-	-	-	-	-	-
CGP1 Plant Mass Yield	%		31.92%	31.62%	32.21%	32.69%	32.17%	31.40%	30.92%	31.53%	31.56%	25.49%	25.68%	26.17%	26.39%	27.39%	25.79%	25.85%	24.11%	25.26%	33.84%	25.82%	-	-
CGP1 Plant Concentrate Production	kt	10,606	606	604	612	621	611	605	594	605	606	491	493	503	507	527	495	496	463	486	650	33	-	-
CGP2 Plant Mass Yield	%		20.39%	20.48%	20.67%	21.09%	21.14%	24.68%	21.06%	20.98%	20.64%	21.61%	19.72%	18.37%	19.10%	26.32%	21.71%	24.12%	17.80%	19.02%	24.33%	-	-	-
CGP2 Plant Concentrate Production	kt	9,515	479	484	486	496	497	593	505	503	495	519	472	440	458	632	520	578	426	457	476	-	-	-
CGP3 Plant Mass Yield	%		-	-	21.24%	21.21%	22.30%	24.32%	20.76%	21.15%	21.85%	21.16%	20.00%	19.27%	20.27%	25.29%	20.18%	21.07%	15.60%	16.34%	23.05%	-	-	-
CGP3 Plant Concentrate Production	kt	8,010	-	-	269	485	530	585	498	508	525	509	480	463	487	609	484	506	374	393	306	-	-	-
CGP4 Plant Mass Yield	%		-	-	-	-	21.68%	21.89%	21.16%	17.34%	14.45%	15.70%	15.49%	14.50%	15.17%	14.15%	17.56%	20.74%	11.18%	10.46%	10.19%	-	-	-
CGP4 Plant Concentrate Production	kt	5,567	-	-	-	-	476	527	508	416	347	378	372	348	364	340	421	498	228	252	93	-	-	-
Capital Profile – (100% Basis)																								
Development-Expansion	US$ million	62.1	26.3	17.0	16.0	2.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plant and Equipment-Expansion	US$ million	889.5	203.5	192.9	218.0	275.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Development-Sustaining	US$ million	24.2	5.5	7.2	5.8	5.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tailings Addition	US$ million	15.3	-	-	-	-	-	3.8	-	-	-	-	-	-	3.8	-	3.8	-	3.8	-	-	-	-	-
Exploration	US$ million	10.5	6.0	2.6	0.3	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plant and Equipment-Sustaining	US$ million	253.5	12.0	5.6	1.2	0.6	16.4	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	-	-	-
Closure	US$ million	35.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35.1	-
Total	**US$ million**	1,290.3	253.2	225.2	241.3	286.0	16.4	19.4	15.6	15.6	15.6	15.6	15.6	15.6	19.4	15.6	19.4	15.6	19.4	15.6	15.6	-	35.1	-

Source: SRK

19.3 Sensitivity Analysis

SRK performed a sensitivity analysis to determine the relative sensitivity of the operation's NPV to a number of key parameters. This is accomplished by flexing each parameter upwards and downwards by 10%. Within the constraints of this analysis, the operation appears to be most sensitive to, mined lithium grades, commodity prices and recovery or mass yield assumptions within the processing plant.

SRK cautions that this sensitivity analysis is for information only and notes that these parameters were flexed in isolation within the model and are assumed to be uncorrelated with one another which may not be reflective of reality. Additionally, the amount of flex in the selected parameters may violate physical or environmental constraints present at the operation.



Source: SRK

Figure 19-8: Greenbushes NPV Sensitivity Analysis (Albemarle)

20 Adjacent Properties

SRK notes that no adjacent properties are relevant or material to the study or understanding of the Greenbushes property. Minor exploration areas exist on the same property discussed herein, and there is potential for disclosure of additional materials from these areas if they are developed.

21 Other Relevant Data and Information

SRK includes the following information as it involves future expansion options at the Greenbushes site and the reader should be aware that they could have an impact on the overall production, economics, and roll on impact of permitting.

21.1.1 Technical Grade Plant (TGP)

The TGP plant operation is discussed in detail in Section 14.1. The TGP has operated historically for many years. The material feeding the plant is identified in the geologic model, then detailed grade control drilling is conducted in the pit. The results of the grade control assays are then used by Talison to assign which material is processed through the TGP. Feed to TGP is defined primarily by Li_2O grade and the iron grade that will achieve the final product iron quality specification for SC7.2. The iron grade for the plant feed is governed by mineralogy and is modeled using oxides of manganese, calcium, potassium, sodium and lithium in plant feed.

21.1.2 Tailings Retreatment Plant (TRP)

Greenbushes has developed and installed a Tailings Reprocessing Plant (TRP) to reprocess tailings at a rate of 2 Mt per year from Tailings Storage Facility 1 (TSF1). The TRP is planned to process approximately 10 Mt of tailings. The TRP processing facilities include an oxide flotation plant capable of processing 2.0 Mt/y of reclaimed tailings, nominally grading 1.4% Li_2O at a design feed rate of 250 tph, to produce 285 kt/y of Spodumene concentrate grading 6.0% Li_2O. Feed to the TRP is by a dedicated mining fleet operated by a Mining Contractor with experience in tailings reclamation. Feed is directly loaded into the plant by a fleet of mining trucks or stored on a RoM stockpile adjacent to the feed bin. Mining is conducted on a day shift only basis, with the processing plant fed by front end loader from the RoM during night shift. The TRP is located adjacent to and west of the planned TSF4. Operation of the facility began in 2022 and continues today. As noted earlier in the report, the TRP production is not included in reserve cost model as the resource does in the QP’s opinion meet the standards for inclusion in reserves.

22 Interpretation and Conclusions

22.1 Geology and Resources

Geology and mineralization on the Greenbushes property are well understood through decades of active mining and exploration. SRK has used relevant data to integrate into the modeling effort at the scale of LoM resources for public reporting.

The Greenbushes operation utilizes a 3D geological model informed by various data types (primarily drilling and pit mapping) to constrain and control the volume of the pegmatite bodies which host the Li_2O. Drilling data from the exploration data was composited within relevant geological wireframes, and Li_2O grades were interpolated into a block model using ordinary kriging methods. Results were validated visually, via various statistical comparisons, and against recent production reconciliation data. The estimate was depleted for recent production, categorized in a manner consistent with industry standards, and reviewed with Talison site personnel. Mineral resources have been reported using an economic pit shell, based on economic and mining assumptions to support the reasonable prospects for economic extraction of the resource. A cut-off grade has been assigned based on site practices, and the resource has been reported above this cut-off.

In SRK's is of the opinion, that the mineral resources stated herein are appropriate for public disclosure and meet the definitions of Indicated and Inferred resources established by SEC guidelines and industry standards.

22.2 Reserves and Mining Methods

22.2.1 Reserves and Mine Planning

SRK has reported mineral reserves that, in our opinion as QP, are appropriate for public disclosure. The mine plan, which is based on the mineral reserves, spans approximately 19 years. Annual material movement requirements are reasonable, with a peak annual material movement of approximately 56 Mt. Over the life of the project, approximately 701 Mt of waste will be mined from the open pit. A feasible waste dump design exists to accommodate the LoM waste quantity; however, a portion of the waste will need to be deposited (backfilled) into the Kapanga pit and the southern portion of the Central Lode pit after all ore has been extracted from those areas. SRK recommends that alternative waste dump locations be investigated so there is flexibility to expand the open pit operations and extend the mine life beyond what has been contemplated for the year-end 2022 reserves discussed herein.

22.2.2 Geotechnical

The overall pit has been designed such that it meets the minimum acceptable stability criteria. Even under reduced strength conditions the slopes are predicted to remain stable. The 2022 pit has been adjusted to minimize the bullnose geometry between Cornwall and Central Lode pits to enhance stability. This is an area to watch for local stability issues, but it is not anticipated to present a major stability problem.

There remains uncertainty in hydrogeological conditions, particularly in regard to bench face stability due to local pore pressures and the need to dewatering benches.

The character and orientation of the interpreted geologic structures in the east wall of the Central Lode have a high degree of uncertainty. Given the conservative FoS of the east wall, this uncertainty is not expected to have significant impact of predicted stability unless geologic structures locally intersect such that unstable wedges are formed. Additional structural data should be collected to mitigate this potential ahead of any local instabilities.

The thickness and strength properties of the waste dump material at the crest of the west wall of the Central Lode are uncertain. Given the adequate stability analysis results this should not be a major issue unless the assumed properties are vastly different. This can be mitigated by conducting a geotechnical investigation of the waste dump nearest the pit crest.

Local bench-scale failures and rockfalls in the west wall of the Central Lode present a safety risk. Greenbushes is aware of this need which can be mitigated via the slope monitoring program and use of safety protocols when approaching the face, including annual/semiannual bench face scaling and real-time movement monitoring.

22.3 Mineral Processing and Metallurgical Testing

As part of the process design for CGP2, Greenbushes conducted an evaluation of the use of HPGR as an alternative to the ball mill grinding circuit currently used in CGP1.

Greenbushes used a combination of size distributions, Li_2O analysis of size fractions and liberation data to estimate the yield and lithium recovery. Greenbushes' HPGR yield model developed for CGP2 predicts about 5% higher overall lithium recovery than the CGP1 yield model.

CGP2 plant optimization has not been completed and the lithium recovery benefit associated with HPGR comminution has not yet been demonstrated.

22.4 Processing and Recovery Methods

Greenbushes currently has two ore crushing facilities (CR1 and CR2) and three ore processing plants which includes the Technical Grade Plant (TGP), Chemical Grade Plant-1 (CGP1) and Chemical Grade Plant-2 (CGP2) with a nominal capacity of 4.5 Mt/y of pegmatite feed to produce a nominal 1.3 Mt/y of spodumene concentrates (chemical and technical grades).

The process flowsheets utilized by both CGP1 and CGP2 are similar, however, CGP2 was designed with a number of modifications based on HPGR comminution studies and CGP1 operational experience. The most notable modification included the replacement of the ball mill grinding circuit with HPGRs.

CGP2 commissioning began during September 2019 and continued through April 2020 and was then shut down and put on care and maintenance during the period of March 2020 to April 2021 due to market demand considerations. CGP2 was then put back into production during May 2021 and has continued through to-date. During 2021 CGP2 significantly underperformed design expectations.

Greenbushes retained MinSol Engineering to undertake a performance assessment of CGP2 and identify areas where improvements in the plant could be made to increase lithium recovery. MinSol identified and coordinated process plant improvements which resulted in increasing lithium recovery from about 50% reported for 2021 to the Q4 2022 average of 68%. This represents an 18% increase in recovery.

Lithium recovery remains about 8% less than the design recovery and MinSol has identified additional process improvements for CGP2 that could be implemented in an effort order to achieve the original design lithium recovery.

SRK notes that that CGP2 and CGP1 flowsheets are similar and both plants process ore from the same mining operation, as such, SRK believes that it is reasonable to expect that CGP2 will eventually achieve performance similar to CGP1 but cautions that at this point design performance of CGP2 remains to be demonstrated and has not yet been confirmed.

Greenbushes is currently constructing Chemical Grade Plant-3 (CGP3), which will be identical to CGP2. CGP3 is scheduled to come on-line during Q2 2025. Greenbushes also has plans to construct Chemical Grade Plant-4 (CGP4), which will also be based CGP2. CGP4 is currently planned to commence production during Q1 2027.

22.5 Infrastructure

The infrastructure at Greenbushes is installed and functional. Expansion projects have been identified and are at the appropriate level of design depending on their expected timing of the future expansion. Tailings and waste rock are flagged as risks due to the potential for future expansion and location of future resources that are in development. A detailed review of long-term storage options for both tailings and waste rock will allow timely planning and identification of alternative storage options for future accelerated expansion if needed.

22.6 Environmental/Social

The Project has been in operation as a hard rock mine since 1983 and is fully permitted for its current operations. The Project is in the process of obtaining further approvals for expansion; however, consideration of the expansion has been excluded from this evaluation, as detailed assessment information is not yet available.

During development and subsequent modifications to the mine, environmental studies and impact assessments have been completed to support project approval applications. Many of these studies are currently being updated as part of the current expansion efforts; as such, the most up-to-date information was not readily available. Some of the key findings from previous studies include:

- No Threatened Ecological Communities, Priority Ecological Communities or threatened flora have been reported in the vicinity of the mine site.
- There have been seven conservation significant fauna species recorded in the mine development area.
- Surface water drains through tributaries of the Blackwood River, which is registered as a significant Aboriginal site that must be protected under the Aboriginal Heritage Act of 1972.
- Groundwater is not a resource in the local area due to the low permeability of the basement rock.
- Earlier studies indicated that the pits would overflow approximately 300 years after mine closure. However, more recent modeling suggests that water levels will stabilize in approximately 500 to 900 years and remain 20 m below the pit rims (i.e., no overflow).
- Background groundwater quality data are limited due to a lack of monitoring wells upgradient of the mine, and as monitoring wells are located close to the TSFs and/or in the historically

dredged channels; some of these wells have been impacted by seepage and is under investigation and remediation efforts.

- Waste rock is not typically acid generating, though some potentially acid generating (PAG) granofels (metasediments) do occur in the footwall of the orebody. Significant acid neutralizing capacity (ANC) has been shown to exist in waste rock and pit walls.
- Studies into the potential for radionuclides has consistently returned results that are below trigger values.
- There are no other cultural sites listed within the mining development area.

The Project operates under approvals that contain conditions for environmental management that include waste and tailings disposal, site monitoring, and water management. The Project has not incurred any significant environmental incidents (EPA, 2020).

There has been no predictive modeling of the pit lake quality as far as SRK is aware, and this is recommended to inform closure management strategies. There is potential for site water management to be required post-closure until seepage from TSF2 attenuates.

The Project has contaminated five sites listed which encompass the entire mine area due to known or suspected contaminated sites due to hydrocarbons and metals in soil, and elevated concentrations of metals in groundwater and surface water. These sites are classified as “Contaminated – Restricted use” and only permit commercial and industrial uses. This will need to be reviewed for final land use options for closure.

Talison has agreements in place with two local groups.

22.7 Closure

Although Greenbushes has a closure plan prepared in accordance with applicable regulations, this plan should be updated to include all closure activities necessary to properly close all of the project facilities that are part of the current mine plan, including future expansions and facilities. This update should be prepared in accordance with applicable regulatory requirements and commitments included in the approved closure plan. It should also be prepared in sufficient detail that a proper PFS-level closure cost estimate can be prepared. SRK cannot validate the current closure cost estimate because there is no information on how the unit rates used in the model were derived.

22.8 Costs

The Greenbushes cost forecasts are based on mature mine budgets that have historical accounting data to support the cost basis and forward looking mine plans as a basis for future operating costs as well as forward looking capital estimates based on engineered estimates for expansion capital and historically driven sustaining capital costs. In SRK’s opinion, the estimates are reasonable in the context of the current reserve and mine plan.

22.9 Economics

The Greenbushes operation consists of an open pit mine and several processing facilities fed primarily by the open pit mine. The operation is expected to have a 20 year life. Under the forward-looking assumptions modeled and documented in this report, the operation is forecast to generate positive cashflow.

As modeled for this analysis, the operation is forecast to produce 34.9 Mt of concentrate to be sold at a spodumene price of US$1,500/t CIF China. This results in a forecast after-tax project NPV at 8% of US$13.2 billion, of which, US$6.5 billion is attributable to Albemarle.

The analysis performed for this report indicates that the operation's NPV is most sensitive to variations in the grade of ore mined, the commodity price received and processing plant performance.

23 Recommendations

23.1 Recommended Work Programs

23.1.1 Geology and Mineral Resources

SRK recommends the following work programs as opportunities for improvement to geology and mineral resources:

- Updating of the property-wide geological and resource block model from a first principles perspective to align the Central Lode and Kapanga deposit input parameters for consistency and include recent drilling and other geological data in the update.
- Conduct a full data validation and review of QA/QC of Central Lode and Kapanga data during the next resource model update.
- Construct a detailed 3D wireframe structural model across the property to support the geological model update and provide aid to geotechnical design assumptions.
- Continue exploration drilling across the property for condemnation and deposit definition purposes.

23.1.2 Mining and Mineral Reserves

SRK recommends that alternative waste dump locations be investigated so there is flexibility to expand the open pit operations and extend the mine life beyond what has been contemplated for the year-end 2022 reserves discussed herein.

SRK also recommends that Greenbushes closely monitor the mining sequence as mining progresses to ensure timely availability of in-pit dumps.

23.1.3 Processing and Recovery Methods

SRK recommends that Greenbushes continue with the optimization programs identified by Minsol for CGP2, which includes the following:

- Blending of ore on the ROM pad to decrease plant feed variability
- Redirecting fines flotation cleaner tailings to allow for additional reagent conditioning
- Improve reagent conditioning efficiency of the fines flotation conditioner
- Improve reagent conditioning in the Hydrofloat reagent conditioners
- Prescreening HPGR feed to reduce slimes generation
- Add a scavenger flotation circuit
- Add a scavenger WHIMS circuit

23.1.4 Geotechnical Program

Recommendations for future geotechnical work includes the following:

- Field mapping to ground truth interpreted geologic structures and update structural model
- Conduct numerical modeling of the east wall to check for interaction with the proposed Kapanga pit
- Update the hydrogeological conceptual model considering VWP data and asses the benefits of dewatering on bench stability

- Conduct rock fall trials and perform a rock fall risk assessment towards developing rockfall hazard maps with focus on ramp and active pit safety

23.1.5 Environmental and Closure

There has been no predictive modeling of the pit lake quality as far as SRK is aware, and this is recommended to inform closure management strategies. There is potential for site water management to be required post-closure until seepage from TSF2 attenuates. The closure cost estimate should be updated to reflect current industry best practice.

23.2 Recommended Work Program Costs

Table 23-1 summarizes the costs for recommended work programs.

Table 23-1: Summary of Costs for Recommended Work

Discipline	Program Description	Cost (1000's US$)
Geology and Mineralization	Detailed 3D structural model development	50
Mineral Resource Estimates	Update property scale geological and resource models incorporating recent data.	100
Deposit definition drilling	Continued exploration and condemnation drilling across the deposit to define extents of pegmatites on the Greenbushes property.	500 to 1,000 per year
Mineral Reserves and Mining	Investigated alternative waste dump locations to determine if there is flexibility to expand the open pit operations and extend the mine life.	100
Geotechnical	Structural mapping, hydrogeological model update, pit phase stability assessments, rock fall assessment	90
Process	Continue ongoing performance assessment on CGP2 to determine modifications/adjustments to the flow sheet to improve the performance to design levels.	2,000
Infrastructure	Life of Mine Tailings Disposal study, Studies required for further characterization of TSF1 and advancement of the expansion design, Comprehensive 3rd party dam safety review.	2,500
Environmental Studies, Permitting, and Plans, Negotiations, or Agreements with Local Individuals or Groups	Conduct comprehensive geochemical predictive modeling of the post-closure pit lakes, as this could have significant bearing on possible long-term water treatment requirements. A site-wide assessment of water quality should be completed including diffuse and point sources, and predictions of long-term water quality. This would inform closure planning and determine if long-term, post-closure water management or treatment is required.	375
Closure Costs	The closure cost estimate should be updated to reflect current industry best practice. The update should use standard calculating methods, site specific data, and include all costs that could be reasonably incurred. It is possible that the closure plan may require additional modification, such as predicting the need for long-term water treatment.	75
Total US$		**$5,790 to $6,290**

Source: SRK, 2022

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25 Reliance on Information Provided by the Registrant

The Consultant's opinion contained herein is based on information provided to the Consultants by Albemarle throughout the course of the investigations. Table 25 1 of this section of the Technical Report Summary will:

(i) Identify the categories of information provided by the registrant;

(ii) Identify the particular portions of the Technical Report Summary that were prepared in reliance on information provided by the registrant pursuant to Subpart 1302 (f)(1), and the extent of that reliance; and

(iii) Disclose why the qualified person considers it reasonable to rely upon the registrant for any of the information specified in Subpart 1302 (f)(1).

Table 25-1: Reliance on Information Provided by the Registrant

Category	Report Item/ Portion	Portion of Technical Report Summary	Disclose why the Qualified Person considers it reasonable to rely upon the registrant
Discount Rates	19	19 Economic Analysis	Albemarle provided discount rates based on a benchmarking of publicly available information for 54 lithium mining project studies. The median value of the benchmarking dataset is 8%. SRK typically applies discount rates to mining projects ranging from 5% to 12% dependent upon commodity. SRK views the selected 8% discount rate as appropriate for this analysis.
Foreign Exchange Rates	19	19 Economic Analysis	SRK was provided with an exchange rate comparison of a forward-looking consensus average and 12 month historical rates and a 3-year trailing average. The selected FX rate is the average of the consensus and 3-year trailing average. The selected rate is lower than the spot FX rate and is therefore more conservative. As such, it is SRK's opinion that the rates provided are appropriate for a long term analysis such as reserves.
Tax rates and government royalties	19	19 Economic Analysis	SRK was provided with tax rates and government royalties for application within the model. These rates are in line with SRK's understanding of the tax regime at the project location.
Environmental Studies	17	17.1 Environmental Studies	SRK was provided various environmental studies conducted on site. These studies were of a vintage that independent validation could not be completed.

Environmental Compliance	17	17.3.4 Environmental Compliance	Registrant provided regulatory compliance audit results. SRK did not conduct an independent regulatory compliance audit as part of the scope.
Local Agreements	17	17.4 Local Individuals and Groups	Registrant provided agreements with local stakeholders. SRK was unable to query all project stakeholders on issue of agreements.

Signature Page

This report titled "SEC Technical Report Summary, Pre-Feasibility Study, Greenbushes Mine, Western Australia" with an effective date of December 31, 2022, was prepared and signed by:

SRK Consulting (U.S.) Inc. ***Signed*** **SRK Consulting (U.S.) Inc.**

Dated at Denver, Colorado
February 14, 2023

Exhibit 96.2

SEC Technical Report Summary
Pre-Feasibility Study
Salar de Atacama
Región II, Chile

Effective Date: August 31, 2022
Report Date: February 14, 2023

Report Prepared for

Albemarle Corporation

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SRK Project Number: USPR000574

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List of Abbreviations

The metric system has been used throughout this report. Tonnes are metric of 1,000 kg, or 2,204.6 lb. All currency is in U.S. dollars (US$) unless otherwise stated.

Abbreviation	Definition
°C	degrees Celsius
2D	two dimensional
3D	three dimensional
A/P	Accounts Payable
A/R	Accounts Receivable
ADI	Indigenous Development Area
Albemarle	Albemarle Corporation
APVC	*Altiplano-Puna volcanic complex*
BEV	battery electric vehicle
BG	Battery grade
BNEF	Bloomberg New Energy Finance
CoG	cut off grade
CONAF	National Forestry Corporation
DGA	General Water Directorate
ET	Evapotranspiration
EWMP	Environmental Water Monitoring Plan
H_2SO_4	sulfuric acid
ha	hectares
HCl	hydrochloric acid
ICE	internal combustion engine
ID2	Inverse Distance Squared
IDW	inverse distance weighting
KE	kriging efficiency
kg	kilograms
kg/d	kilograms per day
km	kilometers
km^2	square kilometers
L	liter
L/s	liters per second
LCE	lithium carbonate equivalent
Li	lithium
LiCl	lithium chloride
LME	lithium metal equivalent
LoM	life of mine
m	meters
m/d	meters per day
m3/y	cubic meters per year
Ma	mega annum
mamsl	meters above mean seal level
mg/L	milligrams per liter
mm	millimeters
mm/y	millimeters per year
MNT	*Monturaqui-Negrillar-Tilopozo*
MOP	muriate of potash
MRE	Mineral Resource Estimate

Mt/y	million tonnes per year
NaOH	sodium hydroxide
NMR	Nuclear Magnetic Resonance
NN	nearest neighbor
OK	ordinary kriging
PAT	Early Warning Plan
PFS	prefeasibility study
PMB	Environmental Monitoring Plan
PPE	personal protective equipment
QA/QC	Quality Assurance/Quality Control
QP	Qualified Person
RAMSAR	Convention on Wetlands
RMSE	root mean square error
SCL	Chilean Society of Limited Lithium
SEA	Environmental Assessment Service
SEC	Securities and Exchange Commission
SEIA	Chilean Environmental Impact System
SEN	Sistema Eléctrico Nacional
SEP	Sistema de Empresas
SERNAGEOMIN	National Service of Geology and Mining
SMA	Environmental Superintendence
SOR	slope or regression value
SRK	SRK Consulting (U.S.), Inc.
SS	specific storage
Sy	specific yield
SYIP	Salar Yield Improvement Program
t	metric tonnes
t/y	tonnes per year
TG	technical grade
TRS	Technical Report Summary
VGC	Volcanic, Gypsum and clastic
ZOIT	Zone of Tourist Interest

1 Executive Summary

This report was prepared as a prefeasibility study (PFS)-level Technical Report Summary (TRS) in accordance with the Securities and Exchange Commission (SEC) S-K regulations (Title 17, Part 229, Items 601 and 1300 until 1305) for Albemarle Corporation (Albemarle) by SRK Consulting (U.S.), Inc. (SRK). This TRS is for the portion of the Salar de Atacama lithium-rich brine deposit controlled by Albemarle and the associated brine concentration facilities and La Negra lithium processing facilities owned by Albemarle, combined referred to as the “Project” located in Region II, Chile. The purpose of this TRS is to support public disclosure of Albemarle’s mineral resources and mineral reserves for the Salar de Atacama for Albemarle’s public disclosure purposes. This Technical report is an update of the previous report titled "SEC Technical Report Summary, Pre-Feasibility Study, Salar de Atacama, Region II, Chile. Amended Date December 16, 2022”.

1.1 Property Description and Ownership

Albemarle is 100% owner of the Salar de Atacama and La Negra operations. The Salar de Atacama Basin is located in the commune of San Pedro de Atacama, with the operations approximately 100 kilometers (km) to the south of this commune, in the extreme east of the Antofagasta Region and close to the border with the republics of Argentina and Bolivia. In a regional context, the salar is located in a remote area with the nearest city, Calama, approximately 190 km by road to the northwest. The regional capital, Antofagasta, which also is located near the La Negra processing facilities, is located approximately 280 km, by road to the west.

Albemarle's mining properties within the Salar de Atacama include two groups of exploitation concessions, CASEME (Carlos Sáez – Eduardo Morales Echeverría) and OMA (mining concessions in Salar e Atacama owned by CORFO), which cover a total of 5,227 mining properties. They comprise of approximately 25 km at the widest zone in the East-West direction and 12 km in the widest North-South zone. For the purpose of the reserve estimate, the OMA concessions are those that are relevant. The CASEME concessions include 1,883 properties and the same number of hectares (ha). The OMA concessions include 3,344 mining properties of 5 ha each, which corresponds to 16,720 ha.

Albemarle owns the land on which the extraction/processing facilities at Salar de Atacama (Salar Plant) and the processing facility at La Negra operate. However, the ownership of the land at the Salar de Atacama will revert to the Chilean government once all amounts of lithium remaining under Albemarle’s contracts with the Chilean government are sold (the ownership of the land and fixed assets at La Negra will remain unchanged).

Albemarle’s mineral rights at the Salar de Atacama in Chile consist of the right to extract lithium brine, pursuant to a long-term contract with the Chilean government, originally entered into in 1980 by Foote Minerals, a predecessor of Albemarle. This contract has been subsequently amended and restated.

Albemarle’s predecessor’s initial contract with the Chilean government will remain in effect until the date on which it has produced and sold 200,000 metric tonnes (t) of lithium metal equivalent (LME), although the lithium can be produced in any of its forms, from the Salar de Atacama. As of August 31, 2022, the remaining amount of lithium from the initial contract equals approximately 69,083 t of LME. On November 25, 2016, CORFO and Albemarle entered into an annex to the initial agreement adding an additional 262,132 t LME to the total quota and setting an expiry for production of the quota of January 1, 2044 (i.e., any remaining quota after this date will be forfeited). As of August 31, 2022, the remaining amount of lithium from the second quota equals 262,132 t Combined, as of the effective date of this TRS, August 31, 2022, Albemarle has a remaining quota of 331,215 t of LME, expiring January 1, 2044.

1.2 Geology and Mineralization

Salar de Atacama is located in the Central Andes of Chile, a region which is host to some of the most prolific lithium (Li) brine deposits in the world. The Central Andean Plateau and the Atacama Desert are two important physiographic features that contribute to the generation of Li brines in the Central Andes. In these environments, the combination of hyper-arid climate, closed basins, volcanism, and hydrothermal activity has led to extensive deposition of evaporite deposits since approximately 15 million years ago (Ma) (Alonso et al., 1991). The size and longevity of these closed basins is favorable for lithium-rich brine generation, particularly where thick evaporite deposits (halite, gypsum and less commonly borates) have removed ions from solution and further concentrated lithium.

Basin fill materials at the Salar de Atacama are dominated by the Vilama Formation and modern evaporite and clastic materials currently being deposited in the basin. In the Albemarle operation area, the Vilama Formation is up to approximately 1 km thick and is host to the producing aquifer system. The formation is composed of evaporite chemical sediments including intervals of carbonate, gypsum and halite punctuated by volcanic deposits of ignimbrite sheets, volcanic ashes and minor clastic deposits. These deposits can be observed in outcrop along the salar margin and in drill cores from the Albemarle project site.

Lithium-rich brines are produced from a halite aquifer within the salar nucleus. Carbonate and sulfate flank the basin and indicate that carbonate and sulfate mineral precipitation may have played a role in producing the brine. In addition to the evaporative concentration processes, the distillation of lithium from geothermal heating of fluids may further concentrate lithium in these brines and provide prolonged replenishment of brines that are in production. Since many lithium-rich brines exist over, or in close proximity to, relatively shallow magma chambers, the late-stage magmatic fluids and vapors may have pathways through faults and fractures to migrate into the closed basin.

Waters in the Salar de Atacama basin and the adjacent Andean arc vary in lithium concentration from approximately 0.05 to 5 milligrams per liter (mg/L) Li in the Andean inflow waters, 5 to 100 mg/L Li in shallow groundwaters in the south and east flanks of the basin and in excess of 5,000 mg/L Li in brines in the nucleus (Munk et al., 2018). This indicates that the lithium-rich brine in the basin is concentrated by up to five orders of magnitude compared to water entering the basin. This is a unique hydrogeochemical circumstance to the salar compared to other lithium brine systems.

1.3 Mineral Resource

Mineral resources have been estimated by SRK. SRK generated a three dimensional (3D) geological model informed by various data types (drillhole, geophysical data, surface geologic mapping, interpreted cross sections and surface/downhole structural observations) to constrain and control the shapes of aquifers which host the lithium.

Lithium concentration data from the brine sampling exploration data set was composited to equal lengths for consistent sample support. Lithium grades were interpolated into a block model using ordinary kriging (OK) and inverse distance weighting (IDW3) methods. Results were validated visually and via various statistical comparisons. The estimate was depleted for current production, categorized in a manner consistent with industry standards and statistical parameters. Mineral resources have been reported above a cut-off grade (CoG) supporting reasonable prospects for economic extraction (RPEE) of the resource. Mineral resources, as of August 31, 2022 exclusive of reserves, are summarized in Table 1-1.

Table 1-1: Salar de Atacama Mineral Resource Estimate, Exclusive of Mineral Reserves (Effective August 31, 2022)

	Measured Resource		Indicated Resource		Measured + Indicated Resource		Inferred Resource	
	Contained Li (Tonnes x 1,000)	Brine Concentration (mg/L Li)	Contained Li (Tonnes x 1000)	Brine Concentration (mg/L Li)	Contained Li (Tonnes x 1000)	Brine Concentration (mg/L Li)	Contained Li (Tonnes x 1000)	Brine Concentration (mg/L Li)
Total	470.8	2,390	362.8	1,943	833.6	2,195	236.8	1,617

Source: SRK, 2022

- Mineral resources are reported exclusive of mineral reserves. Mineral resources are not mineral reserves and do not have demonstrated economic viability.
- Given the dynamic reserve versus the static resource, a direct measurement of resources post-reserve extraction is not practical. Therefore, as a simplification, to calculate mineral resources, exclusive of reserves, the quantity of lithium pumped in the life of mine plan was subtracted from the overall resource without modification to lithium concentration. Measured and indicated resource were deducted proportionate to their contribution to the overall mineral resource.
- Resources are reported on an in situ basis.
- Resources are reported above the elevation of 2,200 masl. Resources are reported as lithium metal
- Resources have been categorized subject to the opinion of a QP based on the amount/robustness of informing data for the estimate, consistency of geological/grade distribution, survey information.
- Resources have been calculated using drainable porosity estimated from measured values in Upper Halite and Volcano-sedimentary units, and bibliographical values based on the lithology and QP's experience in similar deposits
- The estimated economic cut-off grade utilized for resource reporting purposes is 800 mg/l lithium, based on the following assumptions:
  - A technical grade lithium carbonate price of US$22,000 / metric tonne CIF La Negra. This is a 10% premium to the price utilized for reserve reporting purposes. The 10% premium applied to the resource versus the reserve was selected to generate a resource larger than the reserve, ensuring the resource fully encompassed the reserve while still maintaining reasonable prospect for eventual economic extraction.
  - Recovery factors for the salar operation increase gradually over the span of 4 years, from the current 40% to the proposed SYIP 65% recovery in 2025. After that point, evaporation pond recovery is relatively constant 65%. An additional recovery factor of 80% lithium recovery is applied to the La Negra lithium carbonate plant.
  - An average annual brine pumping rate of 414 L/s is assumed to meet drawdown constraint consistent with Albemarle's permit conditions.
  - Operating cost estimates are based on a combination of fixed brine extraction, G&A and plant costs and variable costs associated with raw brine pumping rate or lithium production rate. Average life of mine operating cost is calculated at approximately US$4,155/metric tonne CIF Asia.
  - Sustaining capital costs are included in the cut-off grade calculation and post the SYIP installation, average around US$98 million per year.
- Mineral Resources tonnage and contained metal have been rounded to reflect the accuracy of the estimate, and numbers may not add due to rounding.
  - SRK Consulting (U.S.) Inc. is responsible for the Mineral Resources with an effective date: August 31, 2022.

1.4 Mining Methods and Mineral Reserve Estimates

The brine reserve is extracted at the Salar de Atacama by pumping the raw brine from the aquifer utilizing a network of wells and trenches. This method of brine extraction has been used at the operation since 1983. The extracted brine is transferred to a series of evaporation ponds for initial processing (i.e., concentration with solar evaporation).

There are currently approximately 76 active brine extraction wells, and, over the life of mine, this number of wells is forecast to remain constant. There are both shallow and deep wells in place with depths of between 25 meters (m) and 40 m for the shallow wells and 70 to 102 m for deep wells. Legally, a well is considered shallow if its total depth is less than 50 m. Brine extraction rates from the aquifer are restricted by permit conditions to a combined maximum average annual rate of 442 liters per second (L/s), and considering a maximum of 120 L/s for the deep wells. Pumping from deep wells is restricted to the area A1 only. Extraction wells are located to maximize lithium grades as well as balance calcium and sulphate-rich brines to benefit process recovery rates.

A geologically-based, 3D, numerical groundwater-flow and solute transport model was developed to evaluate the extractability of brine from the salar and develop the life of mine (LoM) pumping plan that underpins the reserve estimate. The model construction is based on an analysis of historical hydrogeologic data conducted by Albemarle and SRK.

Using these hydrogeologic properties of the salar combined with the wellfield design parameters, the rate and volume of lithium projected as extracted from the Project area was simulated using this predictive model. The predictive model output generated a brine production profile appropriate for the salar based upon the wellfield design assumptions with a maximum pumping rate of 442 L/s (i.e., maximum authorized extraction rate) over a period of 20 years. The use of a 20-year period reflects the timing required to extract the full, authorized quota of lithium production. Given the approximately two year offset in timing from pumping to final production, this also is the last year that extraction from the salar can be reasonably expected to still result in lithium produced by the 2043 year end expiry of Albemarle's production quota.

When estimating brine resources and reserves, different models are utilized to define those resources and reserves. The resource model presents a static, in situ measurement of potentially extractable brine volume whereas the reserve model (i.e., the predictive model) presents a dynamic simulation of brine that can potentially be pumped through extraction wells. As such, the predictive model does not discriminate between brine derived from inferred, measured, or indicated resources. Further, a brine resource is dynamic and is constantly influenced by water inflows (e.g., precipitation, groundwater inflows, pond leakage, etc.) and pumping activities which cause varying levels of mixing and dilution. Therefore, direct conversion of measured and indicated classification to proven and probable reserves is not practical. As the direct conversion is not practical, in the QP's opinion, the most defensible approach to classification of reserves (e.g., proven versus probable) is to utilize a time-dependent approach as the QP has the highest confidence in the early years of the predictive model results, with a steady erosion of that confidence over time.

Therefore, in the context of time-dependent risk, in the QP's opinion, the production plan through the end of 2031 approximately 10.3 years of pumping) is reasonably classified as a proven reserve with the remainder [10.3 years]) of production classified as probable. Notably, this results in approximately 57% of the reserve being classified as proven and 43% of the reserve being classified as probable. For comparison, the measured resource comprises approximately 56% of the total measured and indicated resource. In the QP's opinion, this is reasonable as the overall geological and technical uncertainty for the Salar de Atacama resource and reserve are similar.

Table 1-2 presents the Salar de Atacama mineral reserves as of August 31, 2022.

Table 1-2: Salar de Atacama Mineral Reserves, Effective August 31, 2022

	Proven Reserve		Probable Reserve		Proven and Probable Reserve	
	Contained Li (Metric Tonnes x 1000)	Li Concentration (mg/L)	Contained Li (Metric Tonnes x 1000)	Li Concentration (mg/L)	Contained Li (Metric Tonnes Li x 1000)	Li Concentration (mg/L)
In Situ	319.9	2,407	236.9	2,069	556.8	2,247
In Process	23.1	2,741	0	0	23.1	2,741

Source: SRK, 2022

- In process reserves quantify the prior 24 months of pumping data and reflect the raw brine, at the time of pumping. These reserves represent the first 24 months of feed to the lithium process plant in the economic model.
- Proven reserves have been estimated as the lithium mass pumped during Years 2020 through 2030 of the proposed Life of Mine plan
- Probable reserves have been estimated as the lithium mass pumped from 2031 until the end of the proposed Life of Mine plan (2041)
- Reserves are reported as lithium metal
- This mineral reserve estimate was derived based on a production pumping plan truncated in December 31, 2041 (i.e., approximately 20 years). This plan was truncated to reflect the projected depletion of Albemarle's authorized lithium production quota.
- The estimated economic cut-off grade for the Project is 858 mg/l lithium, based on the assumptions discussed below. The truncated production pumping plan remained well above the economic cut-off grade (i.e., the economic cut-off grade did not result in a limiting factor to the estimation of the reserve).
  - A technical grade lithium carbonate price of US$20,000 / metric tonne CIF Asia.
  - Recovery factors for the salar operation increase gradually over the span of 4 years, from the current 40% to the proposed SYIP 65% recovery in 2025. After that point, evaporation pond recovery remains relatively constant at 65%, An additional recovery factor of 80% lithium recovery is applied to the La Negra lithium carbonate plant.
  - A fixed average annual brine pumping rate of 414 L/s is assumed to meet consistent with Albemarle's permit conditions.
  - Operating cost estimates are based on a combination of fixed brine extraction, G&A and plant costs and variable costs associated with raw brine pumping rate or lithium production rate. Average life of mine operating cost is calculated at approximately US$4,155/metric tonne CIF Asia.
  - Sustaining capital costs are included in the cut-off grade calculation and post the SYIP installation, average around US$98 million per year.
- Mineral reserve tonnage, grade and mass yield have been rounded to reflect the accuracy of the estimate and numbers may not add due to rounding.
- SRK Consulting (U.S.) Inc. is responsible for the mineral reserves with an effective date: August 31, 2022.

In the QP's opinion, key points of uncertainty associated with the modifying factors in this reserve estimate that could have a material impact on the reserve include the following:

Resource dilution: the reserve estimate included in this report assumes that the salar brine is replenished at its boundaries at certain rates and with certain chemical composition. Changes in the rate of inflows, versus those assumed, will impact the reserve. For example, an increase in the magnitude of lateral flows into the salar could act to dilute the brine and reduce lithium concentrations in extraction wells, primarily in the southwest area of the Albemarle property.

Initial lithium concentration: The current initial concentration was estimated based on the available historical data by space distribution and date (up to 2020 sampling campaign), and the calibration process. In order to illustrate the effect of the initial lithium concentration in the predictions, the lithium distribution mentioned above was decreasing by 10%. As a result, the average lithium concentrations decreased by 9 to 10%.

Seepage from processing ponds: the predictive simulations did not consider potential seepage of concentrated brine from the processing pond. Such seepage may have two opposing effects: on one hand, loss of lithium mass between extraction from groundwater and production of lithium carbonate at the end of the concentration process, and on the other hand replenishing groundwater with lithium that could be captured by extraction wells. SRK completed a sensitivity simulation that predicts that pond seepage would result in average lithium concentrations increase of approximately 10% at the end of production as compared to the base case (for the conditions evaluated in the sensitivity analysis).

Freshwater/brine mixing: the numerical model implicitly simulated the density separation of lateral freshwater recharge and salar brine by imposing a low-conductivity zone at the brine-freshwater interface. It is possible that lateral recharge of freshwater into the salar may increase without this restriction, as the water table declines as a result of pumping and reducing the amount of freshwater lost to evaporation at the periphery of the salar. SRK completed a sensitivity analysis where the hydraulic conductivity at the freshwater/brine interface was increased by half an order of magnitude (dashed green line). This scenario resulted in no material change compared to the base case.

Hydrogeological assumptions: factors such as specific yield, hydraulic conductivity, and dispersivity play a key role in estimating the volume of brine available for extraction in the wellfield and the rate it can be extracted. Actual contacts between hydrogeological units may not be exactly as represented in the numerical model. These factors are variable through the salar and are difficult to directly measure. Hydraulic conductivities and specific yields lower than assumed in the numerical model would result in reduced pumpability and reduced lithium mass extraction. Specific yields and porosities lower than assumed in the model would lead to faster migration of fresh / brackish water from the edges of the salar and dilution of lithium concentrations in extraction wells. SRK completed a sensitivity where the effective porosities in the Chepica peninsula area and the Lower Halite (UH5) were reduced by 25% and 40% respectively; the hydraulic conductivity in the Silt, Clay and Salt (UH4) was reduced by 50% (scenario 6); and dispersivity was decreased by 50%. These scenarios resulted in average lithium concentrations reduction of less than 3% at the end of production as compared to the base case.

Lithium carbonate price: although the pumping plan remains above the economic cut-off grade, commodity prices, can have significant volatility which could result in a shortened reserve life.

Change to SQM pumping plan: the numerical model makes certain assumptions regarding the SQM pumping plan (which terminates at the end of 2030). Overall, SQM has extracted and is expected to extract – brines at greater rates than Albemarle. SQM pumping has resulted in drawdowns at the salar of up to approximately 14 m in the southwest region of the salar. Increased pumping by SQM, or lengthening of the pumping period, may have two effects: reduce available resource in the salar, and draw freshwater at greater rate from the periphery of the salar (dilution effect). Conversely, reduced extraction by SQM would increase available resources and reduce dilution.

Process recovery: the ability to extract the full lithium production quota within the defined production period relies upon the ability to increase recovery rates of lithium in the evaporation ponds from current levels of approximately 40% to a target of approximately 65%. This will require updating the process flow sheet at the salar to reduce lithium losses to precipitated salts. In the QP's opinion, the assumed recovery rates are reasonable; however, there remains uncertainty in performance of the new process and any material underperformance to these targets could limit Albemarle's ability to extract its full lithium quota prior to expiry of the quota.

Lithium production quota: the current production quota acts as a hard stop on the estimated reserve. It is important to note that the expiry date for production of this lithium is the end of 2043. If raw brine grades, pumping rates or process recoveries underperform forecasts and Albemarle cannot produce the full quota by 2043, this potential reserve will be lost (i.e., Albemarle cannot recover lost production in later years and cannot pump faster than the regulatory limit of 442 L/s to offset any underperformance). Conversely, with lithium grades well above economic cut-off and approximately 30% of the estimated mineral resource converting to reserve, the potential to negotiate an additional production quota with the government of Chile presents an opportunity to increase the current reserve, which is artificially constrained by the current quota.

1.5 Mineral Processing and Metallurgical Testing

Albemarle's operations in Chile are developed in two areas, the Salar de Atacama and La Negra.

At the salar, a lithium-rich chloride brine is extracted from production wells. This brine is pumped to ponds where it goes through a concentration process utilizing solar evaporation. The objective of the concentration process is to obtain a concentrated lithium chloride brine of around 6% lithium that is largely depleted of impurities such as sulfate, sodium, calcium, potassium and magnesium. This concentrated brine is transported to the La Negra chemical plant for further processing. There is also a potash (KCl) plant for byproduct potash production at the salar. Albemarle also harvests halite and bischofite salts from the evaporation ponds as byproduct production for third party sales.

The La Negra plant receives the concentrated brine from the salar, and the brine is further processed with several purification steps followed by the conversion of the lithium from a chloride to a lithium carbonate. The La Negra plant produces both technical and battery grade lithium carbonate. Albemarle has also historically produced lithium chloride product at La Negra.

These operations have been in production for approximately 40 years and most of the data relied upon to forecast operational performance relies upon experience with historic production. However, Albemarle is proposing a modification to its flow sheet at the salar to improve lithium process yields in the evaporation ponds. Albemarle refers to this process as the Salar Yield Improvement Program (SYIP). The SYIP aims to improve this process recovery through mechanical grinding and washing of by-product salts in two new plants, the Li-Carnalite Plant and Bischofite Plant.

Based on testwork performed in 2017 by K-UTEC on the proposed SYIP flowsheet, Albemarle has assumed evaporation pond yield improves up to an average of around 65%. Current operations have a 40% recovery and is increasing. SRK has generally accepted this assumption although has modified the yield to be variable based on lithium concentration in the raw brine. Over time, SRK's pumping plan predicts that the ratio of sulfate to calcium will increase in the raw brine, potentially reducing evaporation pond yields. To offset this potential future imbalance, SRK has assumed addition of a liming plant to increase calcium levels in the ponds and reduce lithium losses which could be solved in the future by optimizing the annual pumping plan. SRK note that the latest pumping plan has deferred the liming plant. Post the installation of this liming plant, SRK has assumed a fixed 65% evaporation pond yield.

1.6 Infrastructure

The Project is a mature functioning operation with two separate sites that contain key facilities. Access is fully developed, with the majority accessible by paved major highway and local improved roadways on site. There is an air strip at the salar operations. The Antofagasta airport is the nearest major commercial airport servicing the La Negra operation (the Calama airport is the closet major commercial airport to the salar). The infrastructure is in place, operating and provides all necessary support for ongoing operations as summarized in this report.

The Salar site contains the brine well fields, brine supply water pipelines to evaporation ponds, primary processing facilities to create a concentrated brine, a phosphate plant that creates a potassium chloride product, camps; including a new camp that is partially constructed and functional with a second phase planned, airfield, access and internal roads, diesel power generated supply and distribution, water supply and distribution, shop and warehouse facilities, administrative offices, change houses, waste salt storage areas, fuel storage systems, security and communications systems. The concentrated brine product is trucked approximately 260 km to the La Negra facility. Future additions to the infrastructure include substation and powerline additions to connect to the local Chilean power system in Q1 or Q2 2023.

The La Negra plant purifies the lithium brine from the Salar Plant and converts the brine into lithium carbonate and lithium chloride. Facilities at the site include the boron removal plant, calcium and magnesium removal plant, lithium carbonate conversion plants, lithium chloride plant, evaporation sedimentation ponds and an "offsite" area where raw materials are warehoused and combined as needed in the processing facilities. Power to the facility is provided by the regional power company via a 110 kV transmission line and distributed throughout the plant to load centers. Piped natural gas provides the energy for heating and steam needs at the facilities. The project is security protected and has a full communication system installed.

Final products from the La Negra plant are delivered to clients by truck, rail, or through two port facilities near the plant.

1.7 Environmental, Social, and Closure

Baseline studies, in both operational areas, have been developed since the first environmental studies for permitting were submitted; 1998 in La Negra, and 2000 at Salar de Atacama. With the ongoing monitoring programs in both locations. Environmental studies, such as hydrogeology and biodiversity, are regularly updated.

The Salar de Atacama basin presents a unique system due to the biodiversity associated with wetland systems that depend on the hydrogeological conditions of the area. There are also indigenous areas and communities in the sector. As such, the key environmental issues at Salar de Atacama include biodiversity, hydrogeology, and socioeconomics.

La Negra is located within an industrial area which is in saturation conditions for the daily and annual standard of inhalable particulate matter (PM_{10}). Although there are no surface water courses, there is an aquifer that could be affected by potential infiltrations from the plant facilities. As such, a water quality monitoring program is in place. Air quality, hydrogeology, and water quality have been deemed as key environmental characteristics of the La Negra area.

The operations of Albemarle have adequate plans to address and follow-up the most sensitive and relevant environmental issues, such as hydrogeological/biodiversity issues, and those associated with the indigenous communities in the Salar de Atacama area.

Albemarle adequately follows up on issues related to water quality in La Negra as well as fluctuations in the water table and potential effects on the sensitive ecosystems around the Salar de Atacama, including analysis of possible cumulative effects given the multiplicity of actors that extract brine and freshwater in the area. The aim of the Early Warning Plan is to promptly detect any deviation from what was indicated in the initial environmental assessment, preventing unforeseen impacts from occurring. Notwithstanding the above, the Salar de Atacama is a complex system and requires constant updating of management tools based on the results of the monitoring programs, and to be attentive to requirements or new tools that the authority may incorporate.

Albemarle has the environmental permits for an operation with an average brine extraction rate of 442 L/s per permit year (from October to September), a production of 250,000 cubic meters per year (m^3/y) of brine concentrated in solar evaporation ponds with an approximate surface area of 1,043 ha, for a production of 94,000 tons per year (t/y) of lithium carbonate equivalent (LCE). Brine exploitation is authorized until 2041. Any modification of the production and/or extraction, or to any approved conditions, will require a new environmental permit.

Albemarle has an approved closure plan (Res. Ex. N°287/2019), which includes all environmental projects approved until 2016, including EIA “Modification and improvement solar evaporation system” (RCA N°021/2016). This closure plan considers a life of mine until 2043 year of final operation of Salar and La Negra, where the brine extraction ends in 2041 in accordance with the levels of lithium extraction authorized by the environmental permit.

In terms of closure activities, the approved closure plan considers a 17-month period of execution, which includes backfilling of the ponds, and dismantling and demolish of all infrastructure, including final disposal.

Closure activities comprise monitoring of a total of 226 points for water quality (40), evapotranspiration (22), brine and groundwater table (125), position of the saline interphase (13), surficial waters flux (6), limnometric level of lagoons (20) and surface area covered by lagoons and meteorological variables on site.

The closure cost has been estimated based on the approved closure plan plus a conceptual estimate of all environmental projects reviewed in this document, and that were not included in the approved closure plan. The total closure costs of La Negra and Salar de Atacama Plants are US$40.89 million, considering direct and indirect costs, and contingencies.

However, the purpose of this estimate is only to provide the Chilean government an assessment of the closure liabilities at the site and form the basis of financial assurance. This type of estimate typically reflects the cost that the government agency responsible for closing the site in the event that an operator fails to meet their obligation. If Albemarle, rather than the government, closes the site in accordance with their current mine plan and approved closure plan, the cost of closure is likely to be different from the financial assurance cost estimate approved by the government.

Albemarle has submitted an updated version to the closure plan including the projects approved after 2016. This updated closure plan is still being reviewed by the authority SERNAGEOMIN and its approval is pending. As such, it was not included in this report or the economic model. Upon regulatory approval the new estimate will be included in future revisions to the report.

Furthermore, because closure of the site is not expected until 2043, the closure cost estimate represents future costs based on current expectations of site conditions at that date. In all probability, site conditions at closure will be different than currently expected and, therefore, the current estimate of closure costs is unlikely to reflect the actual closure cost that will be incurred in the future.

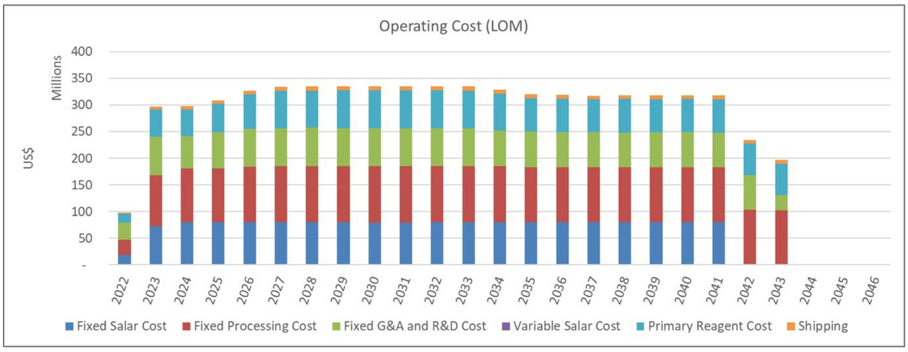
1.8 Capital and Operating Costs

The Salar de Atacama and La Negra facilities are currently operating. Capital and operating costs are forecast as a normal course of operational planning with a primary focus on short term budgets (i.e., subsequent year). The operations currently utilize mid (e.g., five year plan) and less detailed long-term (i.e., LoM) planning. Given the limited official mid and long-term planning completed at the operation, SRK developed a long-term forecast for the operation based on Albemarle forecasts, combined with historic operating results, adjusted for assumed changes in operating conditions and planned strategic changes to operations (the most significant changes being completion of the La Negra 3 expansion and the installation of the SYIP). SRK's capital expenditure forecast is provided in Table 1-3 and its operating cost forecast is provided in Figure 1-1.

Table 1-3: Capital Cost Forecast (US$ million Real 2022

Period	Total Sustaining Capex				Closure	Total Expansion Projects		Total Capital Expenditure
	La Negra	Liming	Well Replacement / Expansion	General Wellfield	Closure	La Negra	SYIP	
2022	15.8	-	2.4	7.5	-	1.6	53.5	80.8
2023	82.1	-	4.1	64.8	-	-	50.6	201.6
2024	54.4	-	4.1	37.0	-	-	-	95.5
2025	46.5	-	4.1	36.9	-	-	-	87.5
2026	65.7	-	4.1	36.9	-	-	-	106.7
2027	66.8	-	4.1	36.1	-	-	-	106.9
2028	66.8	-	4.1	36.1	-	-	-	106.9
2029	66.8	-	4.1	36.1	-	-	-	106.9
2030	66.8	-	4.1	36.1	-	-	-	106.9
Remaining LoM (2031 – 2045)	784.6	26.4	44.7	396.8	40.9	-	-	1,293.4
LoM Total	**1,316.3**	**26.4**	**79.6**	**724.1**	**40.9**	**1.6**	**104.1**	**2,293.1**

Source: SRK
2022 capex is September – December only, assumed at 33% of total 2022 spend



Source: SRK
2022 costs reflect a partial year (September – December)

Figure 1-1: Total Forecast Operating Expenditure (Real 2022 Basis) (Tabular Data shown in Table 19-9)

Estimation of capital and operating costs is inherently a forward-looking exercise. These estimates rely upon a range of assumptions and forecasts that are subject to change depending upon macroeconomic conditions, operating strategy and new data collected through future operations. For this report, capital and operating costs are estimated to a PFS-level, as defined by S-K 1300, with a targeted accuracy of +/-25%. However, this accuracy level is only applicable to the base case operating scenario and forward-looking assumptions outlined in this report. Therefore, changes in these forward-looking assumptions can result in capital and operating costs that deviate more than 25% from the costs forecast herein.

1.9 Economics

As with the capital and operating cost forecasts, the economic analysis is inherently a forward-looking exercise. These estimates rely upon a range of assumptions and forecasts that are subject to change depending upon macroeconomic conditions, operating strategy and new data collected through future operations.

The operation is forecast to have a 22-year life with the first modeled year of operation being a partial year to align with the effective date of the reserves.

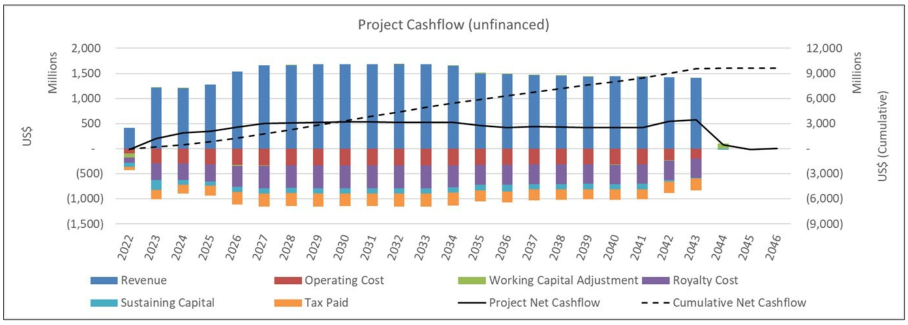
The economic analysis metrics are prepared on annual after-tax basis in US$. The results of the analysis are presented in Table 1-4. At a technical grade lithium carbonate price of US$20,000/t, the net present value, using an 8% discount rate (NPV 8%) of the modeled after-tax free cash flow is US$4,240 million. Note that because Salar de Atacama is in operation and is modeled on a go-forward basis from the date of the reserve, historic capital expenditures are treated as sunk costs (i.e., not modeled) and therefore, IRR and payback period analysis are not relevant metrics.

Table 1-4: Indicative Economic Results

LoM Cash Flow (Unfinanced)	**Units**	**Value**
Total Revenue	**US$ million**	**32,069.5**
Total Opex	**US$ million**	**(6,663.0)**
Royalties	US$ million	(8,613.9)
Operating Margin	US$ million	16,792.6
Operating Margin Ratio	%	52%
Taxes Paid	US$ million	(4,872.2)
Free Cashflow	US$ million	9,627.4
Before Tax		
Free Cash Flow	US$ million	14,499.6
NPV at 8%	US$ million	6,529.8
NPV at 10%	US$ million	5,550.9
NPV at 15%	US$ million	3,893.1
After Tax		
Free Cash Flow	US$ million	9,627.4
NPV at 8%	US$ million	4,240.3
NPV at 10%	US$ million	3,583.4
NPV at 15%	US$ million	2,475.4

Source: SRK

A summary of the cashflow on an annual basis is presented in Figure 1-2.



Source: SRK

Figure 1-2: Annual Cashflow Summary (Tabular Data shown in Table 19-9)

1.10 Recommendations and Conclusions

1.10.1 Geology

The property is well known in terms of descriptive factors and ownership. Geology and mineralization are well-understood through decades of active mining. The status of exploration, development, and operations is considered advanced and active. Assuming that exploration and mining continue at Salar de Atacama in a manner consistent with good industry standards, there are no additional recommendations for geology at this time.

1.10.2 Mineral Resource Estimate

SRK has reported a mineral resource estimation (MRE) which is appropriate for public disclosure and long-term considerations of mining viability. The mineral resource estimation could be improved with additional infill drilling to decrease the distance between data and provide great confidence in spatial variability of grades.

1.10.3 Mineral Reserves

Mining operations have been established at the Salar de Atacama over its more than 35-year history of production. Reserve estimates have been developed based on a predictive hydrogeological model that estimates brine production rates and associated lithium concentrations over time. In the QP's opinion, the mining methods and predictive approach for reserve development are appropriate for the Salar de Atacama.

However, in the QP's opinion, there remains opportunity to further refine the production schedule. This optimization should focus on the balance between calcium and sulfate concentration in the production brine. Maintaining an optimum blend of calcium-rich and sulfate-rich brine improves process recovery in the evaporation ponds. SRK's current assumption is an optimum balance in these contaminants is lost in 2037 and has assumed the additional capital and operating cost expenditure associated with installation and operation of a liming plant is required. However, if additional calcium-rich brine can be sourced in the pumping plan, these assumed expenses could potentially be delayed or avoided altogether.

1.10.4 Infrastructure

The project is a mature functioning operation with two separate sites that contain key facilities. The infrastructure is in place, operating and provides all necessary support for ongoing operations as summarized in this report. No significant risks associated with the Project are identified in this report.

1.10.5 Environmental, Social, and Closure

The operations of Albemarle have adequate plans to address and follow-up relevant environmental issues, such as hydrogeological/biodiversity issues, and those associated with the indigenous communities in the Salar de Atacama area.

Albemarle adequately follows up on issues related to water quality in the Negra as well as fluctuations in the water table and potential effects on the sensitive ecosystems around the Salar de Atacama, including analysis of possible cumulative effects given the multiplicity of actors that extract brine and freshwater in the area. Notwithstanding the above, the Salar de Atacama is a complex system and requires constant updating of management tools based on the results of the monitoring programs, and also be attentive to requirements or new tools that the authority may incorporate.

In relation with the indigenous communities, Albemarle maintains relations with all the communities and indigenous groups in the area and has achieved and maintained agreements in Chile with these communities. Any future significant development or modification of the current conditions of the operation will be subject to an Indigenous Consultation Process; therefore, it is of high importance to maintain this management strategy with these communities.

Currently, there are no known environmental issues that could materially affect Albemarle's capacity to extract the resources or reserves of the Salar de Atacama, as long as the brine extraction is kept at the values approved by the environmental authority. Any requirement of a brine extraction greater than the one approved (442 L/s) has an uncertain approval success, considering the multi-user conditions in the Salar de Atacama, the sensitivity of the ecosystem and the synergistic impacts on this ecosystem which concern the environmental and water authorities.

There is an operational issue that could generate regulatory risk, related with infrastructure requirements to adequately manage the liquid solutions that are generated in La Negra's process, which is not possible to manage with the current facilities. Any spill or overflow from the ponds can lead to an environmental non-compliance that can be sanctioned by the Superintendence of the Environment. This issue is being addressed as a priority action by the company to seek a definitive solution in the long term, and also one that allows them to solve the issue in the short term.

Albemarle has also an approved closure plan (Res. Ex. N°287/2019), which includes all environmental projects approved until 2016, including EIA “Modification and improvement solar evaporation system” (RCA N°021/2016).

Albemarle has prepared an updated closure estimate that has not been approved by the regulators. As such, the newer estimate was not included in this report or the economic model. Upon regulatory approval the new estimate will be included in future revisions to the report.

The QP notes that Albemarle does not currently have an internal closure cost estimate other than for financial assurances (the closure plans referenced above). Therefore, other costs would likely be incurred by Albemarle during closure of the site. Then, the actual closure cost could be greater or less than the financial assurance estimate.

Due to new environmental approvals not included in the approved closure plan, it is required that Albemarle update its closure plan in order to be able to operate some of these projects, as they need the closure plan approval for execution.

Therefore, it is highly recommended to develop an internal closure plan, where other costs could be determined, such as head office costs, human resources costs, taxes, operator-specific-costs, and social costs. Also, closure provision should be determined in this document.

1.10.6 Mineral Processing and Metallurgical Testing

In the QP’s opinion, the long operating history and associated knowledge and information provide appropriate support for development of operating predictions for this reserve estimate. The notable deviation from historic practice is the SYIP.

Albemarle is currently planning on operating the SYIP in 2023. Historic testwork associated with this project has gaps in sample representivity and support for projected mass balances. SRK recommends updating these test results with more representative samples and a more thorough evaluation of associated mass balances with the potential to further optimize the SYIP performance and reduce risk in ramp up and performance. Nonetheless, in the QP's opinion, the projected performance for the SYIP is reasonable.

SRK has assumed that a liming plant will be required starting in 2037 to offset a reduction in calcium-rich brine available for blending. If further optimization of the life of mine pumping plan is not possible (i.e., the sulfate to calcium ratio cannot be reduced by alternative pumping strategy), Albemarle will need to add calcium to the evaporation pond system to avoid additional lithium losses in the ponds. Albemarle should start conceptual evaluation of this calcium addition (whether through liming as assumed by SRK or alternative options) so that if/when this plant is required, Albemarle will have an appropriate design developed for installation.

1.10.7 Capital and Operating Costs

The capital and operating costs for the Salar de Atacama operation have been developed based on actual project costs. In the opinion of the QP, the cost development is acceptable for declaration of mineral reserves. However, the operation itself lacks detailed life of operation planning and costing. As such, the forward-looking costs incorporated here are inherently strongly correlated to current market conditions. Due to the recent COVID-19 pandemic and subsequent economic uncertainty, the currently global economic environment can be described as 'somewhat chaotic', and any forward-looking forecast based on such an environment carries increased risk.

The QP strongly recommends continued development and refinement of a robust life of operation cost model. In additional to further refinement of the cost model, the QP also recommends that close watch be kept on the economic environment with an eye toward continuous updates as the market environment continues to evolve.

1.10.8 Economics

The operation is forecast to generate positive cashflow during every year of the LoM plan (with the exception of the first period due to partial year distortions) in which it is pumping, or processing brine based on the production schedule, costs and process performance outlined in this report.

An economic sensitivity analysis indicates that the operation's NPV is most sensitive to variations in commodity price, plant recovery and lithium grade.

2 Introduction

This TRS was prepared in accordance with the SEC S-K regulations (Title 17, Part 229, Items 601 and 1300 through 1305) for Albemarle by SRK on the Salar de Atacama. Associated lithium processing facilities at the La Negra operation are included in this report as they are critical to the production of a final, commercially salable product. Albemarle is 100% owner of the Salar de Atacama and La Negra operations.

2.1 Terms of Reference and Purpose

The quality of information, conclusions, and estimates contained herein are consistent with the level of effort involved in SRK's services, based on i) information available at the time of preparation and ii) the assumptions, conditions, and qualifications set forth in this report. This report is intended for use by Albemarle subject to the terms and conditions of its contract with SRK and relevant securities legislation. The contract permits Albemarle to file this report as a TRS pursuant to the SEC S-K regulations, more specifically Title 17, Subpart 229.600, item 601(b)(96) - TRS and Title 17, Subpart 229.1300 - Disclosure by Registrants Engaged in Mining Operations. Any other uses of this report by any third party is at that party's sole risk. The responsibility for this disclosure remains with Albemarle.

The purpose of this TRS is to report mineral resources and mineral reserves for Salar de Atacama. This report is prepared to a pre-feasibility standard, as defined by S-K 1300. This Technical report is an update of the previous report titled "SEC Technical Report Summary, Pre-Feasibility Study, Salar de Atacama, Region II, Chile. Amended Date December 16, 2022".

The effective date of this report is August 31, 2022.

2.2 Sources of Information

This report is based in part on internal Company technical reports, previous feasibility studies, maps, published government reports, company letters and memoranda, and public information as cited throughout this report and listed in Section 24.

Reliance upon information provided by the registrant is listed in Section 25 where applicable.

2.3 Details of Inspection

Table 2-1 summarizes the details of the personal inspections on the property by each qualified person or, if applicable, the reason why a personal inspection has not been completed.

Table 2-1: Site Visits

Expertise	Date(s) of Visit	Details of Inspection	Reason Why a Personal Inspection Has Not Been Completed
Process	Several, most recent March 2017	Site visit with inspection of evaporation ponds, and La Negra plant and packaging area.	
Resource and Mining	November 12 and 13, 2021	Site visit with inspection of drillholes, production wells, packer testing, evaporation ponds, site facilities, laboratory, trucking facilities at the salar.	
Resource and Mining	June 22 and 23, 2022	Site visit with inspection of production wells, brine sampling, and laboratory at the salar.	

Source: SRK, 2022

2.4 Report Version Update

The user of this document should ensure that this is the most recent TRS for the property.

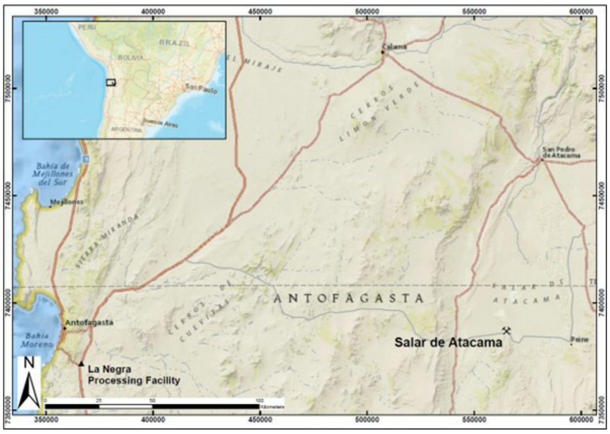
This Technical report is an update of the previous report titled "SEC Technical Report Summary, Pre-Feasibility Study, Salar de Atacama, Region II, Chile. Amended Date December 16, 2022".

2.5 Qualified Person

This report was prepared by SRK Consulting (U.S.), Inc., a third-party firm comprising mining experts in accordance with § 229.1302(b)(1). The marketing section of the report, (Chapter 16 with the exception of 16.3.1 which was QP'd by SRK) was prepared by Fastmarkets, a third-party firm with lithium market expertise in accordance with § 229.1302(b)(1). Albemarle has determined that SRK and Fastmarkets meet the qualifications specified under the definition of qualified person in § 229.1300. References to the Qualified Person (QP) in this report are references to SRK Consulting (U.S.), Inc. and Fastmarkets respectively, and not to any individual employed at either QP.

3 Property Description

The Salar de Atacama Basin is located in the commune of San Pedro de Atacama, with the Albemarle operations approximately 100 kilometers (km) to the south of this commune, in the extreme east of the Antofagasta Region and close to the border with the republics of Argentina and Bolivia, as shown in Figure 3-1. The communal area is 23,439 square kilometers (km^2) and has an approximate population of 10,000 inhabitants, which are mainly distributed in the populated areas of San Pedro de Atacama, Toconao, Socaire and Peine.



Source: SRK, 2021

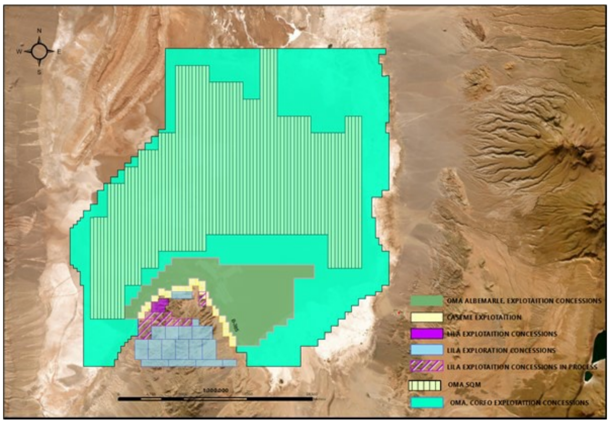
Figure 3-1: Location Map

In a regional context, the salar is located in a remote area with the nearest city, Calama, approximately 190 km by road to the northwest. The regional capital, Antofagasta, which also is located near the La Negra processing facilities, is located approximately 250 km, by road to the west.

3.1 Property Area

Albemarle's mining properties within the Salar de Atacama include two groups of exploitation concessions, CASAME (private) and OMA (miming properties in Salar de Atacama owned by Corfo), which cover a total of 5,227 mining properties. They comprise of approximately 25 km at the widest zone in the East-West direction and 12 km in the widest North-South zone. For the purpose of the reserve estimate, the OMA concessions are those that are relevant.

The CASEME concessions include 1,883 properties and the same number of hectares. The OMA concessions include 3,344 mining properties of 5 hectares (ha) each, which corresponds to 16,720 ha. Figure 3-2 shows the location of the Albemarle concessions at the southern end of the Salar de Atacama (in dark green), the rest of the OMA properties belonging to CORFO (in light blue) and the location of SQM's properties (in green bars) in the Salar.



Source: Albemarle, 2023

Figure 3-2: Albemarle Mining Claims in the Salar de Atacama

3.2 Mineral Title

Albemarle's mineral rights at the Salar de Atacama in Chile consist of the right to extract lithium brine, pursuant to a long-term contract with the Chilean government, originally entered into in 1980 by Foote Minerals, a predecessor of Albemarle. This contract has been subsequently amended and restated. This agreement is discussed in more detail in Section 16.3.1 although key details follow.

Albemarle's predecessor's initial contract with the Chilean government will remain in effect until the date on which it has produced and sold 200,000 tonnes (t) of lithium metal equivalent (LME), although the lithium can be produced in any of its forms, from the Salar de Atacama. As of August 31, 2022, the remaining amount of lithium from the initial contract equals approximately 69,083 t of LME. On November 25, 2016, CORFO and Albemarle entered into an annex to the initial agreement adding an additional 262,132 t LME to the total quota and setting an expiry for production of the quota of January 1, 2044 (i.e., any remaining quota after this date will be forfeited). As of August 31, 2022, the remaining amount of lithium from the second quota equals 262,132 t. Combined, as of the effective date of this TRS, August 31, 2021, Albemarle has a remaining quota of 331,215 t of LME, expiring January 1, 2044.

The size of the area at the Salar de Atacama covered by Albemarle's OMA mining concessions (those relevant to the current reserve estimate) is 16,720 ha. Table 3-1 describes these OMA concessions. Albemarle also currently owns the land on which the extraction facility at the Salar de Atacama and the processing facility at La Negra operate. However, the ownership of the land at the Salar de Atacama will revert to the Chilean government once all amounts of lithium remaining under Albemarle's contract with the Chilean government are sold (the ownership of the land and fixed assets at La Negra will remain unchanged).

Section 17 of this report provides a summary of the existing environmental permits and under which Albemarle operates. The rights to use existing water and the agreements with the communities are also summarized.

Table 3-1: OMA Mining Concessions

Property of Albemarle Limitada					
Concession Name	**National Role**	**Page**	**Number**	**Year**	**Hectares**
Oma 1 Al 59820	02303-0007-0	3989	249	2016	16,720
Property of CORFO					
Concession Name	**National Role**	**Page**	**Number**	**Year**	**Hectares**
Oma 1 Al 59820	02301-1965-1	408	11	1977	6,850

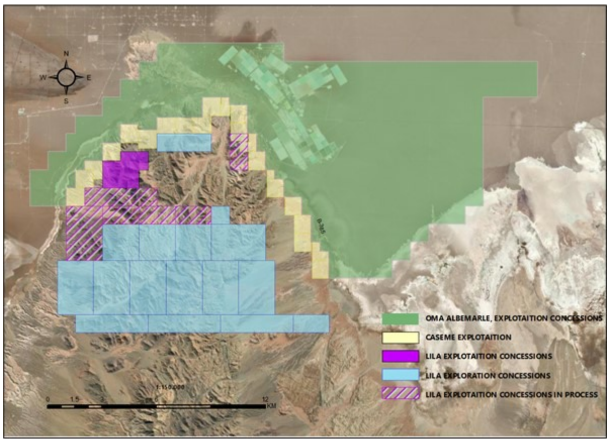
Source: Albemarle, 23

In addition, to the mining properties located in the core of the Salar de Atacama, although not covering the area relevant to the resource and reserve reported herein, Albemarle has mining properties located in the extreme north of the Cordón de Lila called CASEME and LILA as shown in Table 3-2 and Figure 3-3.

Table 3-2: Albemarle Mining Concessions

		CASEME Mining Concessions				
Role Number	**Concession Name**	**Pages**	**Number**	**Year**	**Properties**	**Hectares**
023030381-9	Caseme uno 1 al 100	394	119	2004	100	100
023030382-7	Caseme dos 1 al 100	387	118	2004	100	100
023030383-5	Caseme tres 1 al 75	401	120	2004	75	75
023030384-3	Caseme cuatro 1 al 100	408	121	2004	100	100
023030385-1	Caseme cinco 1 al 97	416	122	2004	97	97
023030386-K	Caseme seis 1 al 100	424	123	2004	100	100
023030401-7	Caseme siete 1 al 100	432	124	2004	100	100
023030402-5	Caseme ocho 1 al 100	440	125	2004	100	100
023030388-6	Caseme nueve 1 al 95	448	126	2004	95	95
023030389-4	Caseme diez 1 al 100	456	127	2004	100	100
023030387-8	Caseme once 1 al 46	464	128	2004	46	46
023030390-8	Caseme doce 1 al 90	471	129	2004	90	90
023030391-6	Caseme trece 1 al 90	479	130	2004	90	90
023030392-4	Caseme catorce 1 al 65	556	140	2004	65	65
023030393-2	Caseme quince 1 al 90	563	141	2004	90	90
023030394-0	Caseme dieciseis 1 al 20	570	142	2004	20	20
023030395-9	Caseme diecisiete 1 al 90	487	131	2004	90	90
023030396-7	Caseme dieciocho 1 al 90	495	132	2004	90	90
023030397-5	Caseme diecinueve 1 al 90	503	133	2004	90	90
023030398-3	Caseme veinte 1 al 90	511	134	2004	90	90
023030399-1	Caseme veintiuno 1 al 65	519	135	2004	65	65
023030400-9	Caseme veintidos 1 al 90	526	136	2004	90	90
					1,883	**1,883**
Lila Mining Concessions						
Role Number	**Concession Name**	**Pages**	**Number**	**Year**		**Hectares**
02303-D968-0	Lila 1 C	4867	2920	2022		400
02303-D975-3	Lila 2 C	4869	2921	2022		400
02303-D969-9	Lila 3 C	4871	2922	2022		400
02303-D976-1	Lila 4 C	4873	2923	2022		200
02303-D970-2	Lila 5 C	4875	2924	2022		600
02303-D966-4	Lila 6 C	4877	2925	2022		600
02303-D977-K	Lila 7 C	4880	2926	2022		600
02303-D971-0	Lila 8 C	4882	2927	2022		600
02303-D978-8	Lila 9 C	4884	2928	2022		600
02303-D972-9	Lila 10 C	4886	2929	2022		600
02303-D981-8	Lila 12 C	4888	2930	2022		400
02303-D979-6	Lila 13 C	4891	2931	2022		400
02303-D973-7	Lila 14 C	4893	2932	2022		400
02303-D967-2	Lila 15 C	4895	2933	2022		600
02303-D980-K	Lila 16 C	4898	2934	2022		100
02303-4040-4	Llila 19 , 1 al 400	633	115	2021		400
02303-D974-5	Lila 2O C	4900	2935	2022		300
						7,200
		Lila Mining Concessions (under process to be granted)				
Role Number	**Concession name**	**Pages**	**Number**	**Year**		**Hectares**
N/A	Lila 11 B, 1 AL 600	1972	1153	2022		600
N/A	Lila 12 B, 1 AL 200	1974	1154	2022		200
N/A	Lila 13 B, 1 AL 200	1976	1155	2022		200
N/A	Lila 14 B, 1 AL 200	1978	1156	2022		200
N/A	Lila 17 B, 1 AL 400	1980	1157	2022		400
N/A	Lila 21 B, 1 AL 200	1982	1158	2022		200
						1,800

Source: Albemarle, 2023



Source: Albemarle, 2023

Figure 3-3: Albemarle Mining Concessions

Section 17 of this report provides a summary of the existing environmental permits and under which Albemarle operates. The rights to use existing water and the agreements with the communities are also summarized.

Since 2000, numerous Environmental Impact Declarations and Environmental Impact Studies have been approved by the Environmental Assessment Service (SEA) for both the La Negra Plant and the El Salar Plant. In addition, 10 Pertinence Queries to the SEA have been entered. Albemarle has wells located in the Tilopozo, Peine and Tucúcaro areas, which have groundwater rights.

3.3 Royalties

CORFO owned the concessions in the Salar de Atacama prior to 1979, which are currently operated by Albemarle and SQM, under specific contracts with limits to lithium extraction in time and/or quantity. The role of the corporation in is to safeguard its rights in contracts and collect agreed payments, which it exercises through the Sistema de Empresas (SEP). In the case of ALB, only one royalty payment for potassium is contemplated since the usage of the concessions granted by CORFO was recognized as a contribution to the constitution of the initial company.

The new agreement of Albemarle with CORFO adds an additional royalty payment to the state development agency, according to the sales price for both carbonate and lithium hydroxide. Table 3-3 presents this royalty schedule.

Table 3-3: CORFO Royalty Scheme for Albemarle in Atacama

Lithium Carbonate		Lithium Hydroxide	
Price Range (US$/tonne)	**Progressive Commission Rate (%)**	**Price Range (US$/tonne)**	**Progressive Commission Rate (%)**
0-4,000	6.8%	0-4,000	6.8%
4,000-5,000	8%	4,000-5,000	8%
5,000-6,000	10%	5,000-6,000	10%
6,000-7,000	17%	6,000-9,000	17%
7,000-10,000	25%	9,000-11,000	25%
Over 10,000	40%	Over 11,000	40%

Source: CORFO, 2019

Albemarle Limitada is the Chilean entity. Albemarle owns 100% of Albemarle Limitada. Albemarle Limitada also contributes 3.5% of its annual sales to the communities (Council of Atacameños Peoples -CPA), which contributes to their development.

4 Accessibility, Climate and Infrastructure

The Salar del Atacama basin is located within the Pre-Andean Depression, limited to the east by the Andes Mountains and to the west by the Domeyko Mountains. While located within the Andes, the salar itself is flat over an extensive area. The elevation of the salar is approximately 2,300 meters above mean sea level (mamsl) and has an area of approximately 3,500 km^2. It has an elliptical surface with orientation from North to South and a slight slope towards the South. It is made up of 75% saline deposits that give it a rough surface.

The main climatic feature of the region is its aridity. The most extreme aridity (in fact the driest location on earth) is located to the west of the salar, between the coastal range and the Andes, where there is no maritime influence. The extreme aridity in this intermediate zone and the scarce existing vegetation defines a natural landscape known as the Atacama Desert.

The climate is high altitude marginal desert, which presents a greater quantity and volume of rainfall in the summer months, between 20 and 60 millimeters per year (mm/y). The desert environment (low rainfall and high evaporation rates), combined with limited natural water courses, has resulted in the formation of numerous salars, among which the Salar de Atacama stands out for its extension.

Rainfall occurs mainly from January to March, as a result of the humidity transported from the Amazon basin (Bolivian winter) and to a lesser extent between April and August due to the displacement of cold fronts from Antarctica. The rainfall decreases from 300 mm/y in the Andes Mountains to about 10 to 20 mm/y in the Domeyko mountain range and on the Salar itself, with a statistical average of about 12 mm/y for the salar.

Maximum temperatures occur during the months of December to March, coinciding with the summer season and the minimum temperatures are seen in winter, between the months of June and August. The highest temperatures reach values close to 35 degrees Celsius (°C), while the minimum temperatures reach values close to -5°C in some cases. The average difference between the minimum and maximum temperatures is observed constant throughout the historical temperature series, having a value of approximately 20°C between day and night.

Evaporation also shows a seasonal variation, where the highest evaporation rates were measured in the months from December to February (summer) and the minimum values, between the months of June and August (winter). These results are consistent with the temperature variations between the different seasons of the year.

4.1 Infrastructure

As a mature operation, adequate infrastructure is in place to support operations at both the Salar de Atacama and La Negra processing facilities. Infrastructure is described in detail in Section 14.

The La Negra facilities are located 20 km south-east of the city of Antofagasta, the regional capital, which has power, water, highway, airport and port facilities as well as adequate local population to support operations.

At the La Negra Plant, the purification of lithium brine, coming from the Salar Plant, is carried out for its subsequent conversion into Lithium Carbonate and Lithium Chloride. The following facilities are operating at the plant: boron removal plant, calcium and magnesium removal plant, lithium carbonate conversion plants, lithium chloride plant, evaporation-sedimentation ponds, an off-site area where the raw materials are housed and the inputs used in the process are prepared, and a dry area where the different products are prepared.

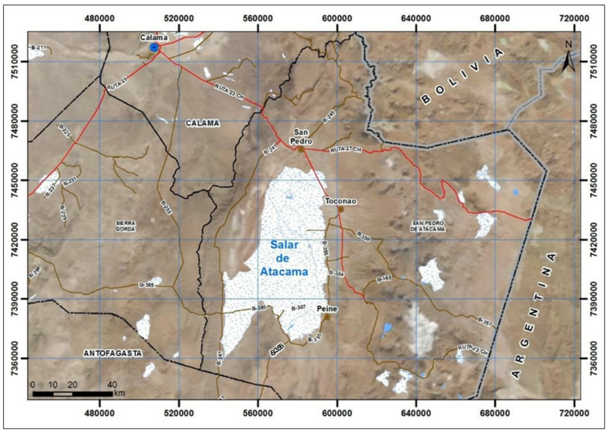
The salar is located in a much more remote location, although existing road infrastructure is in place, as described in more detail below. The salar relies upon a camp to support workers, which are sourced regionally. In general, the Antofagasta/Calama region is a major mining hub with adequate support systems for both La Negra and the salar.

The infrastructure facilities at the salar are extraction wells, evaporation and concentration ponds, leaching plant 1 and 2, potash plant, drying plant, service area and general areas, including waste salts stockpiles. The service sector is made up of various buildings, such as: change room, dining room, administrative office building, operations building, and laboratory.

Road transport to and from the salar is important for the movement of supplies, personnel and consumables (e.g., reagents). In addition, the salar produces a concentrated brine (approximately 6% lithium) which must be transported by truck to the La Negra facilities.

From Antofagasta, with the La Negra facilities located in this area, access to the Salar de Atacama basin is possible along the regional highway Route 5 North, which connects with the local B-385 route, which enters the basin from the west and the south of the salar, where the Albemarle operations are located. This is the primary transport route for concentrated brine from the salar to La Negra and is approximately 250 km by road. From Calama, access is via the regional highway 23-CH, which connects the city of Calama with the international Sico pass, on the border with Argentina. This route passes on the northern margin of the salar with access to the site again on the local B-385 route, passing along the eastern margin of the salar and entering to the south. The distance from the operation on the salar to Calama is around 190 km (Figure 4-1).

At the local level, the entrance to Albemarle's properties is located south of the communal territory of San Pedro de Atacama and is approximately 100 km, by road, away from this commune.



Source: GWI, 2019

Figure 4-1: Property Access

5 History

In the early 1960s, William E. Rudolph, a geologist at Anaconda Company, conducted surveys in northern Chile for new water sources for the Chuquicamata operation and found water with high concentrations of salts in the Salar de Atacama Basin. In the mid-1960's, the report on the results of the brine obtained in the Salar de Atacama reached the hands of Foote Mineral Company. Later in 1970, these reports were also published in The Mining Journal of London and The Christian Science Monitor.

On August 13, 1980, CORFO signed an agreement with Foote Mineral Company (currently Albemarle US Inc) to develop a lithium project in the Salar de Atacama, on the OMA mining leases incorporated by CORFO in 1977.

In this context, Foote Mineral Company and CORFO created the Chilean Society of Limited Lithium (SCL) with a 55% and 45% stake in the share capital, respectively. The duration of the company was agreed in a term equal to that necessary to exploit, produce and sell the indicated amount of LME approved for extraction, i.e., 30 years, automatically renewable for successive terms of five years each. CORFO contributed to the company the OMA mining leases. This contribution was subject to the condition that such leases are returned free of charge and in full right to CORFO upon the fulfillment of the agreement.

Between 1988 and 1989, CORFO sold its 45% stake in SCL to Foote Mineral Company. In 1998 Chemetall purchased Foote Mineral Company, creating Chemetall-Foote Corporation. Subsequently, in 2004, Chemetall-Foote was acquired by Rockwood Lithium Inc., and in 2016, the latter was acquired by Albemarle US Inc, changing ownership of the Salar and La Negra Plants to Albemarle Ltda.

On November 25, 2016, CORFO and Albemarle US Inc. modified the original lithium production agreement through which its duration was modified, extending it and adding an additional 262,132 metric tons of production rights. This extension is valid until the original and expanded production rights have been exploited, processed, and sold, or January 1, 2044, whichever comes first.

In 1981, the first construction of evaporation ponds in the Salar de Atacama began. The following year, the construction of the Lithium Carbonate Plant in La Negra sector in Antofagasta began, which treats and transforms the concentrated brines, coming from the Salar Plant, into lithium carbonate and lithium chloride. A photograph of the first installations is provided in Figure 5-1.

Source: GWI, 2019

Figure 5-1: Year 1981, First Installations

Initially, SCL constructed a solar pond system at the salar and a lithium carbonate plant with 6,350 million tonnes per year (Mt/y) of lithium carbonate capacity was constructed at La Negra. Production started in 1984. In 1990, the salar operations were expanded with a new well system and the capacity of the lithium carbonate plant at La Negra was expanded to approximately 11,000 t of lithium carbonate per year. In 1998, the lithium chloride plant started operating at La Negra. In the early 1990's, potash also began to be recovered as a by-product from the sylvinite harvested from their solar ponds. Operations at the salar and La Negra have subsequently been expanded and current production rates are around 56,000 t per year of LCE (combined lithium carbonate and chloride).

6 Geological Setting, Mineralization, and Deposit

6.1 Regional, Local and Property Geology

6.1.1 Regional Geology

As described in GWI, 2019:

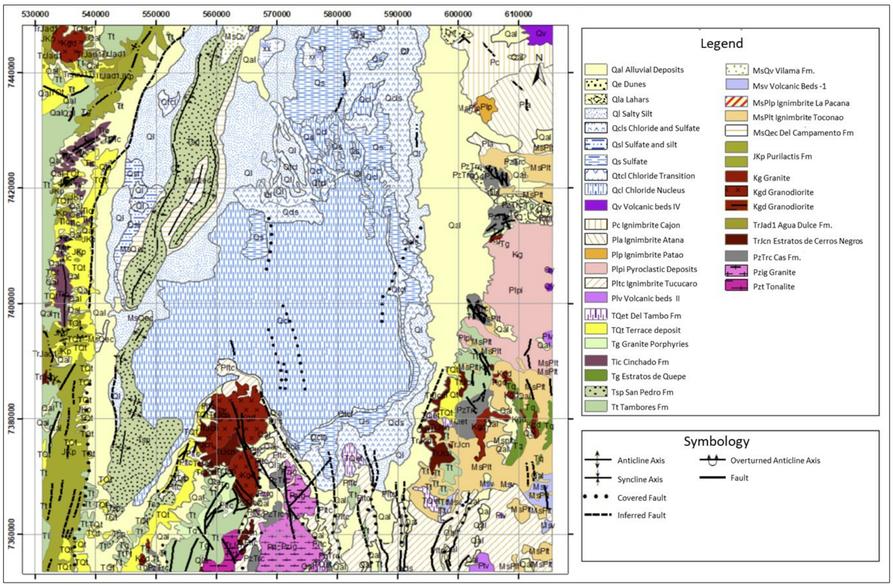
The geological history of the Salar de Atacama basin is summarized in Munk et al. (2016) and references within the regional geological map (i.e., Niemeyer, 2013) (Figure 6-1). Sedimentary, volcanic and plutonic rocks indicate the basin was positioned along the western margin of Gondwana during the Paleozoic. During the Jurassic and early Cretaceous this region was an extensional backarc basin, with inversion and basin scale tectonic subsidence initiating in the late Cretaceous. This continental backarc setting persisted through the Paleogene, transitioning to a forearc basin in the Neogene. Uplift and predominantly clastic deposition have been ongoing since the Cretaceous, and during the Plio-Pleistocene thick halite deposits accumulated in the center of the basin.

Details of the Cenozoic geologic history highlight several relevant observations in the Salar. A foreland basin originated in the mid-Cretaceous, with thrusting and coeval sedimentation occurring during the Cretaceous and Paleogene (Arriagada et al., 2006). During the Oligocene-early Miocene, normal faulting controlled the western margin of the basin, accommodating thousands of m of strata (Jordan et al., 2007). Most of this sedimentation was accommodated by a normal fault along the western basin margin that generated as much as 6 km of vertical displacement (Pananont et al., 2004).

From approximately 12 Ma onward the volcanic arc was established east of the Salar and shortening resumed, uplifting the intrabasinal Cordillera de la Sal and later resulting in development of blind thrust faults within the basin (Jordan et al., 2007). A number of late Miocene and Pliocene ignimbrites derived from calderas on the plateau can be traced westward into the subsurface of the Atacama basin. These ignimbrites interfinger with Plio-Pleistocene evaporite deposits that are typically 1 km thick and establish the age of these strata as Plio-Pleistocene. In the southern portion of the salar these deposits are offset by the Salar Fault System (SFS), which exhibits close to one km of down-to-the-east offset on a reverse fault (Jordan et al., 2002b).

Several aspects of the geological history are relevant to the generation of lithium rich brine in the Salar. For example, there are a number of fault systems with km scale offsets that may be preferential flow paths for fluids. During the Miocene and Pliocene, several voluminous ignimbrite pulses related to development of the large Altiplano-Puna volcanic complex (APVC) indicate major magmatic activity to the east on the plateau (Salisbury et al., 2011). It is possible that this volcanism is intimately related to late Miocene uplift of the plateau via lower crustal delamination (cf. Hoke and Garzione, 2008).

If large scale tectonic factors play a role in the generation of lithium brines these processes might be relevant to generation of the lithium enriched brine in the Salar, particularly if the mantle is considered the ultimate source of lithium to brines. Crustal scale faults within the Atacama basin itself are not necessarily good candidates for communication between the mantle and brine aquifers in light of the fact that the lithosphere below the Atacama basin is widely believed to be a cold, rigid block on the basis of seismological data (Schurr and Rietbrock, 2004).



Source: Carta Geologica de Chile No 54. Hoja Toconao (1:250.000), Hoja Cordon de Lila- Peine (1:100.000). Modified from IIG 1982 by Vai 2021. (UTM WGS84 HUSO 19S)

Figure 6-1: Regional Geology Map

6.1.2 Local Geology

As described in GWI, 2019

The salar basin is divided into two distinct morphological zones. In the north, the eastern slope is characterized by monoclinal folding blanketed by thick ignimbrite deposits and alluvial fans (e.g., Reutter et al., 2006; Jordan et al., 2010). To the south, a series of large fold and thrust belts form a series of ridges and troughs that delineate sedimentary deposition and groundwater flow (Ramirez and Gardeweg, 1982; Aron et al., 2008). Alluvial fans around the salar are important for transporting fluid to the marginal zones (Mather and Hartley, 2005), but large aquifer systems are not well defined. The largest aquifer is the Monturaqui-Negrillar-Tilopozo (MNT) system in the south. Unwelded to moderately welded ignimbrites in the basin have high infiltration capacity and permeability, while welded ignimbrites may act as confining units (Lameli, 2011; Houston, 2009).

Recent and ongoing work on a set of sediment cores from the south part of the basin and the halite nucleus indicate a complex hydrostratigraphy of sand and gravel, ash and ignimbrite and evaporites (Munk et al., 2014). The low permeability Peine block (Lameli, 2011) diverts groundwater flow to the north and south, while the zone of monoclinal folding is expected to be more conducive to regional groundwater flow based on laterally extensive strata dipping towards the salar (Jordan et al., 2002a, 2002b). The blind, high-angle, down-to-the-east north-south trending reverse SFS, which cuts across the salar, accommodates over 1 km of offset basin fill strata (Jordan et al., 2007; Lowenstein et al., 2003).

The southeastern slope of the Salar, south of the Tumisa volcano and east of the Cordon de Lila, is bounded to the southwest by the MNT trough, a 60 km long N–S oriented depression bounded to the east by the Toloncha fault (Aron et al., 2008). This trough contains several folds and thrust belts including the prominent Tilocalar ridge. The Miscanti fault and fold to the east separates the basin from the Andes and controls the development of the intra-arc Miñiques and Miscanti lakes (Rissmann et al., 2015; Aron et al., 2008). A large lithospheric block of Paleozoic rock, bounded by the N-S trending Toloncha Fault System and Peine fault is interposed in the center of the southeastern slope forming a major hydrogeologic feature that likely diverts groundwater as well as generally restricting groundwater flow through this zone (Breitkreuz, 1995; Jordan et al., 2002a; Ruetter et al., 2006; Gonzalez et al., 2009; Boutt et al., 2018).

The fold and thrust belt architecture of the basin slope is responsible for the development of several other thrust fault systems of varying depths and length but which generally trend N-S, parallel to the salt pan margin. These faults are thought to be major conduits for groundwater flow to the surface as evidenced by the spring complexes emerging along or in the immediate vicinity of these fault zones (Aron et al., 2008; Jordan et al., 2002b).

6.1.3 Property Geology

As described in GWI, 2019

Salar basin fill materials are dominated by the Vilama Formation and modern evaporite and clastic materials currently being deposited in the basin. A detailed stratigraphy of the Salar basin is published in Lin et al. (2016). In the Albemarle operation area, the Vilama Formation is up to approximately 1 km thick and is host to the production aquifer system. The formation is composed of evaporite chemical sedimentary rocks including intervals of carbonate, gypsum and halite *punctuated by sedimentary volcanic deposits of large ignimbrite sheets, volcanic ashes and minor clastic deposits. These deposits are best observed in outcrop along the salar margin and in drill cores from the Albemarle project site.*

In the Tilocalar Peninsula region, younger lacustrine carbonates (approximately 435 ka from Lin et al., 2016) of the El Tambo formation unconformably overlie the Tucucaro ignimbrite. These two geologic units are folded and faulted along north-south trending fault-cored reverse faults. The youngest geologic deposits in the project area are the modern evaporite (halite) and clastic sediments (primarily clay and windblown silt) being deposited today through processes of evaporation and physical sedimentation. In the southern part of the project area these deposits are dominated by carbonate and gypsum, which are deposited as solute-rich inflow waters are evaporated in the transition zone.

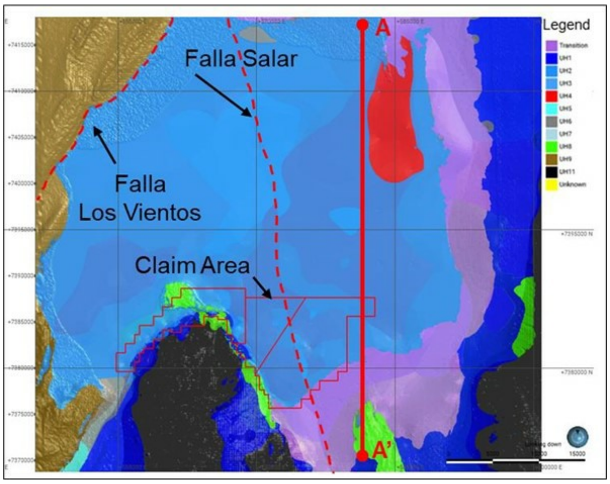
The salar margin on the east side of the Cordon de Lila is characterized by the 3.1 Ma Tucucaro ignimbrite. The ignimbrite unconformably overlies either the bedrock of the Cordon de Lila or older salar lacustrine sediments, as seen along the margins of the Cordon de Lila and of the Chepica Peninsula.

The Chepica Peninsula is another prominent geologic feature within the Albemarle concessions. It consists of the Tucucaro ignimbrite overlying gypsum and carbonate lacustrine sediments.

Similar geologic features and exposures occur to the south of the Chepica Peninsula on the north part of the Cordon de Lila.

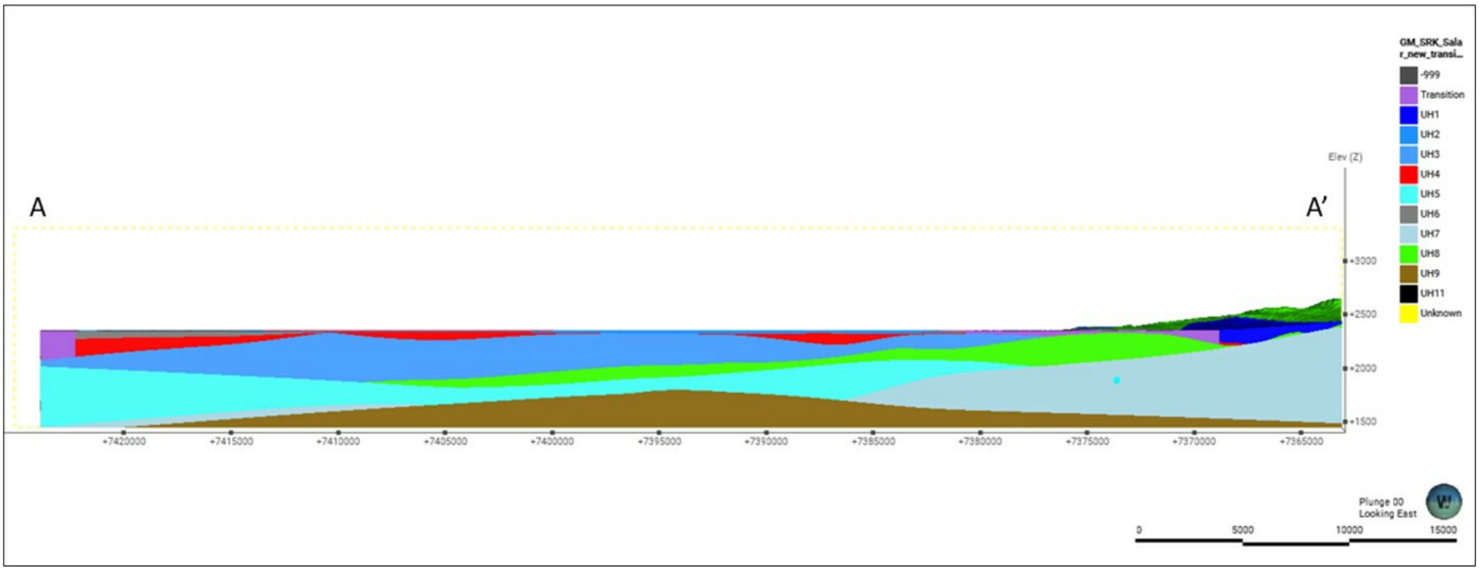
SRK and Albemarle defined lithostratigraphic units for the salar deposits based on numerous diamond drillholes and outcrop observations. These are classified in terms of their general rock type (clastic, evaporite, volcanic) as well as textures.

Two principal structures can be recognized (Falla Salar and Falla Los Vientos), resulting in the development of three structural domains. Figure 6-2 shows the approximate location of these two structures. Generalized geologic cross section A-A’ across the salar are shown in plan view on Figure 6-2. Section A-A’ (Figure 6-3) is oriented north-south on the east side of the Cordon de Lila and extends through the transition zone and the salar nucleus.



Source: SRK, 2022
Geological unites are described in section 6.3 Stratigraphic Column and Local Geology Cross-Section

Figure 6-2: Generalized Conceptual Geologic Plan View Along a N-S Transect



Source: SRK, 2022
Geological unites are described in section 6.3 Stratigraphic Column and Local Geology Cross-Section

Figure 6-3: Generalized Conceptual Geologic Cross Sections Along a N-S Transect

6.2 Mineral Deposit

The salar is located in the Central Andes of Chile, a region which is host to some of the most prolific Li brine deposits in the world. The Central Andean Plateau and the Atacama Desert are two important physiographic features that contribute to the generation of Li brines in the Central Andes. In these environments, the combination of hyper-arid climate, closed basins, volcanism, and hydrothermal activity has led to extensive deposition of evaporite deposits since approximately 15 Ma (Alonso et al., 1991). The size and longevity of these closed basins is favorable for Li brines generation, particularly where thick evaporite deposits (halite, gypsum and less commonly borates) have removed ions from solution and further concentrated Li.

The salar occurs in the plateau margin basin of a volcanic arc setting and active subsidence in the basin is driven by transtension and orogenic loading. The Li-rich brine at salar contains on average 1,400 mg/L Li with a minimum of 900 mg/L and a maximum of nearly 7,000 mg/L. Li appears to be sourced from weathering of the basin geology, the Andean arc and the Altiplano-Puna plateau, which is transported into the closed basin where it is concentrated by evapotranspiration (Munk et al., 2018).

Li-rich brines are produced from a halite aquifer within the salar nucleus. Carbonate and sulfate flank the basin and indicate that carbonate and sulfate mineral precipitation may have played a role in producing the brine. In addition to the evaporative concentration processes, the distillation of Li from geothermal heating of fluids may further concentrate Li in these brines and provide prolonged replenishment of brines that are in production. Since many Li-rich brines exist over, or in close proximity to, relatively shallow magma chambers, the late-stage magmatic fluids and vapors may have pathways through faults and fractures to migrate into the closed basin.

Waters in the salar basin and the adjacent Andean arc vary in Li concentration from approximately 0.05 to 5 mg/L in the Andean inflow waters, 5 to 100 mg/L Li in shallow groundwaters in the south and east flanks of the basin and in excess of 5,000 mg/L in brines (Munk et al., 2018). This indicates that the Li-rich brine in the basin is concentrated by up to five orders of magnitude compared to water entering the basin. This is a unique hydrogeochemical circumstance to the salar compared to other Li brine systems. Ultimately, it is the combination of Li concentrations, the overall geochemical character of the brine and the accessibility of the brine for production that have led to the optimal conditions for producing Li-enriched brine in the salar.

6.3 Stratigraphic Column and Local Geology Cross-Section

Geological Units Definitions

The halite and sedimentary sequences described in Addendum 5 (SGA, 2015) as nucleus of the salar, has been divided into 5 levels, from the most superficial to the deepest, UH2 Upper Halite, UH4 Silts, clays and salts, UH3 Intermediate Halite, UH8 Volcanoclastic, and UH5 Lower Halite (Vai, 2021). The units are dominated by halite sequences and represent the main upper aquifer in the salar. Evaporite systems dominate the deposit environment in the eastern side of the nucleus with an inflow component that enhances dissolution. Conversely, the western side shows a more evaporitic system, where the inflow factor is less significant. The fine clastic component increases towards the west.

A detailed description of the geological units is presented below.

Unconsolidated Sediments (UH1)

This unit groups the alluvial units corresponding to heterogeneous mixtures of gravel, sand, silt, and clay, and in some cases, with salt content. It is recognized in three sectors on the periphery of the salar: Cordón Lila Alluvial, Llano de la Paciencia Alluvial, and Cordillera de la Sal Alluvial.

Cordón Lila alluvial unit occupies a narrow strip that surrounds the Cordón de Lila from the drainage network that runs through the Cordón de Lila, forming alluvial fans in the area. Lithologically, this is a heterogeneous mixture of gravel, sand, silt, and clay with varying in thickness, reaching 80 m in boreholes.

Llano de la Paciencia alluvial unit is located west of the Salar de Atacama, between the Cordillera de Domeyko and the Cordillera de la Sal. It consists of silt and clay deposits with high salt content. The silts and clays form part of coalescent alluvial fans, which correspond mainly to deposits of mudflows (80%) and secondarily to alluvial deposits of sand and gravel (20%). In the topographically lowest part of the unit, recent saline deposits maybe found (Ramírez and Gardeweg, 1982). The deposits of this unit would present lower permeability values than the other two subunits that present thicker material.

Alluvial Cordillera de la Sal Alluvial unit is located on the eastern edge of the Cordillera de la Sal and to the west of the delta of the San Pedro River and is mainly made up of alluvial deposits corresponding to alluvial fans deposits formed by the erosion of the rocks of the Cordillera de la Sal. These are accumulations of clay, silt, and gravel, with grain size decreasing towards the center of the basin (Ramirez and Gardeweg, 1982).

San Pedro River Delta alluvial unit is geographically located to the north of the Salar de Atacama and the east of the Cordillera de la Sal. It originates in the materials accumulated at the delta of the San Pedro River on the halite core of the salar. Lithologically, it is composed mainly of clays, silts, and gypsum, frequently mixed with organic matter, sand and halite. The proportion of chlorides increases towards the distal edge of the delta, and clays and silts are more abundant in the center-distal sector of the delta and function as confining levels. Sulfates appear predominantly in the distal areas and are sometimes mixed with organic mud (Bevacqua, 1994).

Upper Halite (UH2)

UH1 Upper Halite, corresponds to the first 20 m (on average) with a homogeneous thickness throughout the salar area; the highest thicknesses are recorded in the northeast sector of the same; the main lithology is halite and halite with fine sediments towards the edges of the salt flat. The exposed surface in the salar is very irregular, jagged, and brittle brown in color. Upper Halite presents primary porosity (crystalline) and secondary porosity in the form of fractures and dissolution conduits. It is found overlying Silts, clays and salts in the eastern block and partially the Intermediate Halite on the east edge, with Unconsolidated Sediments on the west slope of Cordón Lila, and with Volcano-sedimentary. The hydraulic conductivity of this unit is characterized by a wide variation, between 1.0×10^2 and 1.0×10^4 m/d; the storage coefficient, according to the hydraulic tests, would be around 0.1. Regarding the intermediate and deep Halite units, the upper Halite registers the highest conductivity values.

Intermediate Halite (UH3)

This unit is formed mainly by crystalline and massive halite, levels of halite with sediments, and gypsum. It is primarily distributed in the nucleus of the salar, underlying Silts, clays, and salts. This unit is divided into two blocks by the salar fault. To the east of the fault (eastern block), the thickness is greater and varies between 30 and 300 m; in the western block the thickness varies between less than 1 m and 40 m (locally on the northwest edge of the salar it can exceed 100 m). Mardones (1997) describes a change in porosity with depth due to the compaction effect, which would decrease the unit's permeability. This has been corroborated in some Packer tests carried out in the same drilling at different depths. The permeability of the unit varies between 1.0×10^{-4} and 1.0×10^{0} m/d, and the storage between 1.0×10^{-3} and 1.0×10^{-1}, taking as reference the information available for the upper and lower Halite units.

Silt, Clay and Salt (UH4)

Corresponds to a level of fine sediments that vary between silt, ash, clay with halite and gypsum, and/or organic matter, the latter as described by SQM, mainly in the northeast sector of the salar. This unit is below 20 m depth, and its thickness varies between 0.5 m in the eastern area of the salar and 150 m in the northeast edge in the Marginal Zone (average 18 m). Towards the edges of the salar in the northeast sector, the highest thickness are observed where the content of clastic material increases and engages with the alluvial sediments. On the contrary, in the center of the salar the average thickness does not exceed 5 m, and to the west of the Cordón Lila there is no clear evidence of its presence as a continuous layer. The unit overlies UH3 Intermediate Halite, underlies the Upper Halite, and laterally to the east meshes with the Marginal Zone. According to SQM's background, this unit could have permeability values between 1.0×10^{-3} and 1.0×10^{1} m/d, and a storage coefficient between 1.0×10^{-4} and 1.0×10^{-1}. Conceptually, the permeability values should increase in the area of high heterogeneity of the unit towards the northeast edge.

Lower Halite (UH5)

This unit corresponds mainly to levels of halite, gypsum, and crystalline halite, with fine clay-type sediments. It is distributed in the Núcleo del Salar sector, covering an area smaller than the upper units of halite. This unit likely extends to depths greater than 1,000 m in the halite nucleus and exhibits a significantly lower permeability and porosity than the higher halite levels. The top of this unit is below 40 to 160 m depth, underlying the Volcanoclastic and the Intermediate Halite units. The permeability range is between 1.0×10^{-4} and 1.0×10^{-1} m/d according to the results of the hydraulic tests (the deepest at approximately 125 m depth), and the storage coefficient would vary between 1.0×10^{-3} and 1.0×10^{-1}.

Silt and Salt (UH6)

This unit corresponds to transition crusts to chlorides, gypsum crusts, gypsum chloride crusts, and saline silt crusts. It is distributed bordering the halite units of the Salar de Atacama along its southern and eastern limits. Two hydrogeological subunits are distinguished in the Marginal Zone: Silt Zone and Chloride Transition Crust Zone. These areas are differentiated by their physical appearance and chemical and mineralogical composition, and their contacts in some regions are transitional.

The Silt Zone is located on the edges of the salar; it is composed of alluvial clays and silts locally cemented by chloride and sulfate salts. This area is flat with abundant and homogeneous vegetation.

The Salt Crust Zone compromises saline deposits of chloride transition crust, gypsum crust, chloro-gypsum crust and Saline Silt crust (Moraga et al., 1974). Borates, carbonates, and other salts also appear in a subordinate manner. According to the different records of hydraulic tests carried out by different authors, the hydraulic conductivity values in this unit vary between 1.0×10^{-3} and 1.0×10^{2} m/d, and storage coefficients from 0.01 to 0.1.

East Sediments (UH7)

This unit comprises a series of alluvial and volcanic deposits, including gravel to clay, ash, and ignimbrites. Its total thickness is over 500 m, reaching its maximum at the contact with the Marginal Zone unit. In the eastern part of the salar, this unit limits in an angular unconformity with the basement. In the west, it borders the Zona Marginal unit through a lateral change in an interfingering chance of facies. The permeability varies between 1.0×10^{0} and 1.0×10^{2} m/d, and the storage coefficient is between 1.0E $\times 10^{-4}$ and 1.0×10^{-1}.

Volcanoclastic (UH8)

The volcanoclastic unit corresponds to levels of volcanic rocks, mainly ash tuffs, and ignimbrite, with intercalations of sediments ranging from clays and silts to gravels, mostly clay and sand, with gypsum and minor levels of halite and carbonates. Its thickness varies between less than 1 m and 100 m. In the western area of the salar this unit is found below 50 to 70 m depth, deepening to the southeastern area in the southern part below 100 to 130 m depth. In the north-central sector, where the chloride core deepens, there are no records for the volcanoclastic unit.

In the Chépica peninsula, volcanoclastics correlates with the Tucúcaro Ignimbrite, whose outcrops extend along the eastern edge of the Cordón Lila. This ignimbrite is a unit with a heterogeneous thickness, ranging from less than 10 m in some areas to slightly more than 100 m. It was formed through multiple eruptive events and may be locally welded, unwelded, or fractured, with its thickness and presence varying from a few centimeters to 10's meters throughout the region. Data suggests this fracturing (permeability and porosity) is a critical factor in the Li brine system. The ignimbrite footprint is well understood in the vicinity of the mine operations and exploration areas; however, drill data observations indicated the presence of various ash sequences with similar properties throughout the salar.

The hydraulic permeability of the volcanoclastic unit varies between 1.0×10^{-3} and 1.0×10^{0} m/d; the storage coefficient would be between 1.0×10^{-1} and 2.5×10^{-1}.

In order to represent the highly complex, interlayered, and stratified zone located along the eastern margin of the model above UH8, an additional unit called Transition zone was modeled. This unit has insufficient drillhole data to model its variability in detail; therefore, it is currently modeled as a single volume based on surface-mapped data provided by Albemarle.

West Sediments (UH9)

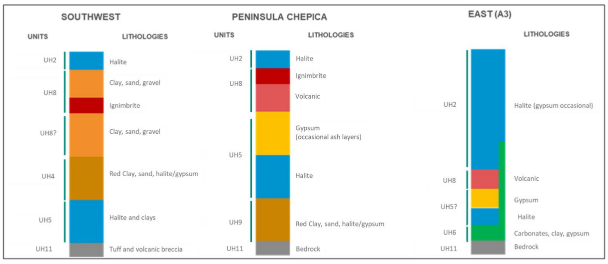
This unit is located to the south of the Salar de Atacama. It is formed by different materials that fill the corridors of Tilopozo, Tilomonte, and the Tilocalar hills, shallow alluvial deposits, ignimbrites levels, and materials from the Tambores Formation at the bottom. The shallow alluvial deposits consist of a mixture of gravel, sand, and silt without consolidation. All these deposits are crossed by a set of normal faults, with a predominant North-South trend, which has been identified in the different geophysical campaigns.

Hydraulic conductivity values of 1.0×10^{0} to 1.0×10^{1} m/day are assumed for this unit. Storage coefficient values are between the magnitude of 3.0×10^{-2} and 1.4×10^{-1} (MEL, 1996).

Basement (UH11)

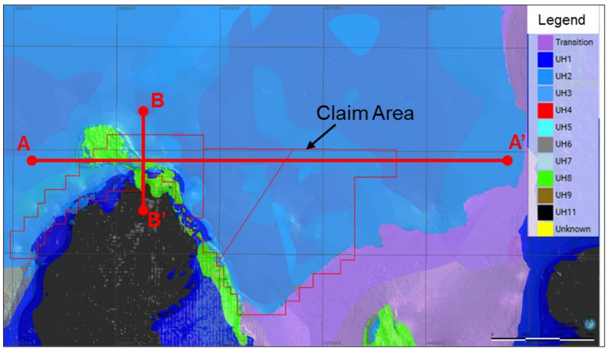
Corresponds to the unit defined as low to very low permeability and groups the rock, igneous and sedimentary units that make up the base of the evaporite sediments that fill the Salar de Atacama and that border the basin.

A stratigraphic column of the in Albemarle claim area is shown in Figure 6-4 representing the southwest, adjacent to the Chepica Peninsula, and eastern portions of the local geologic model. The local geology is shown in plan view and cross sections in Figure 6-5 and Figure 6-6 respectively.



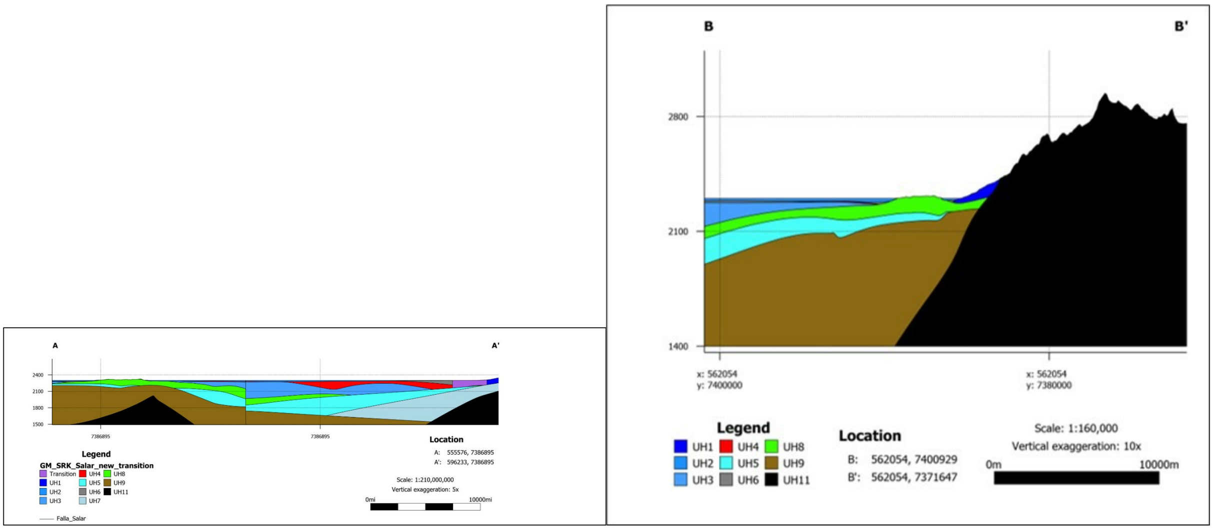
Source: Albemarle 2020
Southwest stratigraphic column represents the southwestern side of the area A1.
Peninsula Chepica stratigraphic column represents the area A1 in the north of Peninsula Chepica.
East (A3) stratigraphic column represents the area A3.

Figure 6-4: Stratigraphic Column in Albemarle Property



Source: SRK 2022

Figure 6-5: Local Geology Plan View



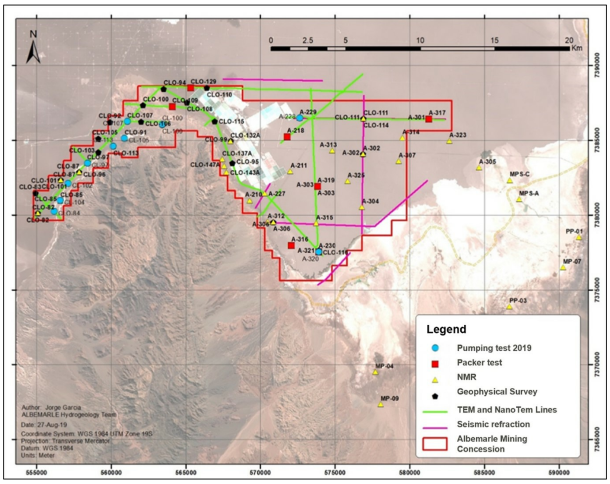
Source: SRK 2022

Figure 6-6: Local Geology Cross Sections

7 Exploration

7.1 Exploration Work (Other Than Drilling)

A number of geophysical surveys have been conducted within the claims areas as well as within the salar to evaluate continuity of lithologic units and changes in brine salinity. Downhole geophysical surveys have been conducted in various boreholes to evaluate the permeability of sediments and evaporites in addition to nuclear magnetic resonance (NMR) surveys to evaluate the porosity of the sediments. Figure 7-1 shows the locations of the various geophysical surveys that have been conducted for the site with a summary of the work outlined in Table 7-1.



Source: GWI, 2019

Figure 7-1: Location of Exploration at the Albemarle Atacama

Table 7-1: Summary of Exploration Work

Exploration Technique	Number	Meters
TEM and Nanotem Lines	15	93,500
Seismic Reflection Lines	7	39,870
Well Geophysical Records	25	2,000
NMR Records	36	4,348
Deep Pumping Tests	10	-

Source: Albemarle, 2019

7.1.1 Transient Electromagnetic Survey (TEM)

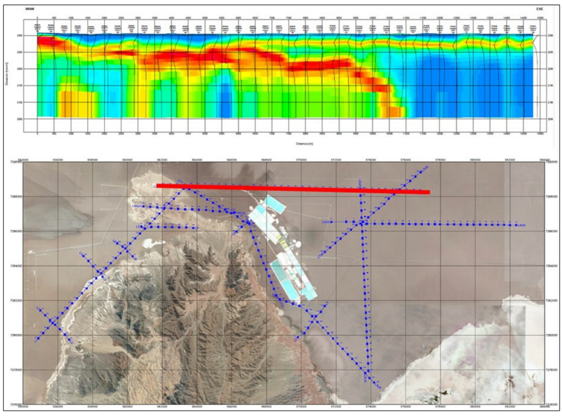
In 2017, Albemarle commissioned Geodatos (Geodatos, 2017) to determine the geoelectric characteristics of the subsurface by acquiring additional data of the stratigraphic variations, both laterally and vertically, of the different lithologies present. Furthermore, the study was intended to determine the relative variations in porosity of the saturated strata, these being directly related to the variations in electrical resistivity.

The acquisition of transient electromagnetic (TEM) data was performed for 19 days from November 24, 2016 to January 12, 2017 and NanoTEM for 26 days from November 24, 2016 to January 12, 2017. The location of the measurement lines of both methodologies is shown in Figure 7-1.

The number of stations and lines, the spacing and the type of loop used are detailed below:

- Electromagnetic Transient, 234 stations were measured on 15 lines, the spacing between stations being approximately 400 m. TEM soundings were measured with Coincident Loop Tx = Rx of 100 x 100 m^2.
- Electromagnetic Nano Transient, 467 stations were measured on 15 lines, the spacing between stations being approximately 200 m. The NanoTEM soundings were measured with a Central Loop of Tx = 50 m^2 x 50 m^2 and Rx = 10 m^2 x 10 m^2.

Figure 7-2 shows an example of the result of a TEM profile, the trace of which is shown in red on the lower map, made in the North of the study area.



Source: GWI, 2019

Figure 7-2: Example of Results from the Geophysical Profile TEM

7.1.2 Seismic Reflection

In 2018, Albemarle commissioned Wellfield Services Ltda. to carry out a seismic study in the southern portion of Salar de Atacama, specifically on the Albemarle mining concession in this area, in order to characterize the geology. This study includes the application of the seismic reflection technique, with a vibratory energy source for accessible areas of relatively flat terrain (Wellfield Services, 2019).

The topography work began on October 11, 2018 and ended on February 13, 2019. The seismic record begins on November 18, 2018 and ends on February 14, 2019. The seismic survey considered seven blue dashed seismic lines whose locations are shown in Figure 7-2.

The horizons generated in the sequence satisfactory intensity and resolution, being able to distinguish horizontal and vertical events both at the level of the stack in the two-dimensional (2D) lines.

Reflection seismic results were used to define the limits of several hydrogeological units. In particular, the bottom of the upper halite, which represents the main aquifer within the Albemarle property.

7.1.3 Borehole Geophysics

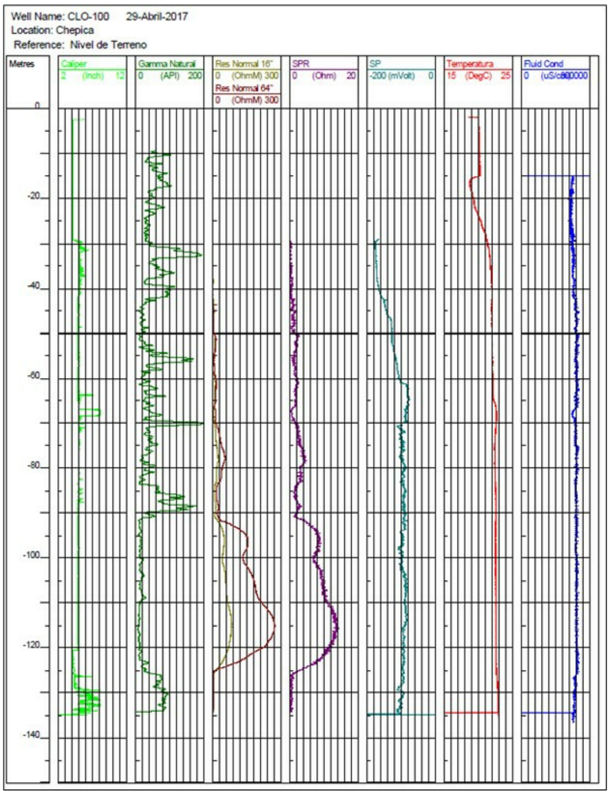
During the 2017 and 2018 drilling campaign, downhole geophysical logging was carried out in 26 boreholes over a total lithological column recorded of approximately 2,000 m.

Geophysical logging was carried out using the following probes:

- Caliper (one probe)
- Natural gamma, Spontaneous Potential (SP), single-point resistance (SPR), resistivity 16/64 (one probe)
- Temperature, fluid conductivity (one probe)

Use of several of these probes require that the boreholes should not be cased. Because the surveys were made during drilling, a complete record is not always available because it was necessary to leave certain meterage within casings as protection against instabilities of the borehole walls.

An example is shown in Figure 7-3 of the measurement results of a borehole with the different parameters measured in the field.



Source: GWI, 2019

Figure 7-3: Example of Geophysical Log in Well CLO-100

The results of the well geophysical logging were considered in the interpretation of the lithological column along with the mapping of the lithology. The combination of these inputs served as the criteria for definition of hydrostratigraphic units represented in the 3D model described in Chapters 6 and 11.

7.1.4 Nuclear Magnetic Resistance (NMR)

In 2018, Albemarle contracted the acquisition of nuclear magnetic resonance (NMR) and gamma rays to Zelandez (2019) in conjunction with Suez Medioambiente Chile SA. Suez staff operated the equipment in the field while Zelandez supplied the equipment and guidance. In total, NMR surveys were conducted in 36 boreholes over 26 days, with a total of 4,348 m tested.

The processing and interpretation of the data was carried out remotely within 24 hours after acquisition. In all boreholes, the acquisition of NMR data was performed satisfactorily, obtaining high quality data. The only drawback found was the influence of the well fluid signal in various wells, it affected the data in these intervals and could not be corrected.

The interpretation of the data has made it possible to group the records by type of borehole, assigning common characteristics to each group related to the hydrogeological environment in which they are found. In summary, the interpretation of these data has served to identify lithological changes and to determine the porosity.

7.1.5 Significant Results and Interpretation

SRK notes that this property is producing and is considered well-understood from previous exploration and production. The results and interpretation from exploration data is supported by extensive drilling and active pumping from production wells over the course of more than 35 years of production. The aforementioned data have been interpreted together with the data from the core logging to develop the 3D hydrostratigraphic model described in Chapter 6 and 11.

7.2 Exploration Drilling

Drilling at Salar de Atacama has been ongoing since 1974. Drilling has been primarily for production wells with limited drilling dedicated to exploration of other areas within the claims.

7.2.1 Drilling Type and Extent

In the process of drilling pumping or observation wells to study resources and reserves, three different methods have been used in order to obtain information for the study. The types of equipment used, and their characteristics of use are indicated below:

- Cable Tool Drilling: Used topiezometers define the geology, obtain brine samples and perform pumping tests. Wells were used as monitoring points of water levels and for brine sampling.
- Diamond Drilling: Used to define the geology in depth and obtain drill cores, establish fracture zones in the vertical, perform packer tests, well geophysics measurements and finally they are enabled as hydrogeological control wells for level measurement.
- Rotary Drilling: Used to carry out pile driving of hydraulic tests in depth (airlift) establishing an indicative flow value for exploration and research and also to obtain brine samples in

depth evaluating the chemical changes of each well. In stable drilling areas, it was used to widen test wells for pumping and hydraulic evaluation of each sector.

- Dual-Rotary Drilling: Used in areas of high geological complexity where the stability of the land did not allow the use of rotary equipment. With this equipment, the expansion was carried out for production wells, isolating areas of different aquifers and different chemists to avoid salting the wells

7.2.2 Historical Drilling

The first exploration campaign was completed from 1974 to 1979 (Foote Mineral Company, 1979).. The first two pumping wells were drilled and tested in 1975 (CL-1 and CL-2).

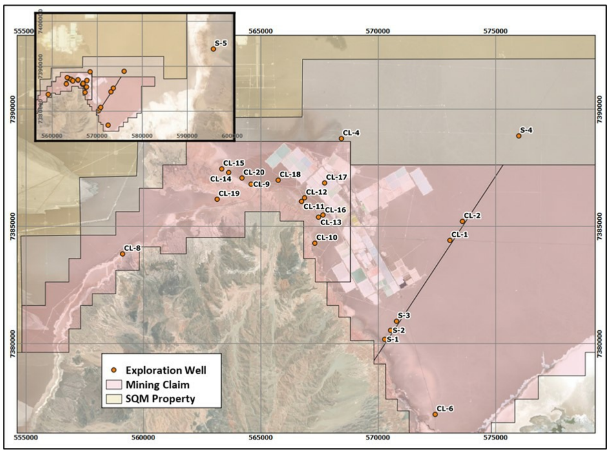
In June 1977, an exploration program designed to define the distribution of lithium over the entire salar was undertaken. The drilling program can be summarized as follows:

- A total of 32 exploration holes about 2 inches in diameter with depths ranging from 2.6 to 4.6 m
- Four 6-inch exploration holes from 25 to 185 m depth (CL-3, CL-4, CL-5, and CL-8)
- Four 12-inch diameter wells from 20 to 30 m depth (CL-6, CL-7, CL-9 and CL-10)

Finally, in 1979, 15 6-inch exploration wells were drilled in Chepica Peninsula area (CL-11 to CL-20) and in the south of the southwestern arm of the salar (S1-S5) (Figure 7-4). Upon completion of the drilling program, all the producing wells were subjected to pumping tests.

Few data regarding the drilling campaigns from 1980 to 2016 was available from Rockwood (previous owner). However, Albemarle informed them that at least 27 wells and 20 observation wells or piezometers were drilled from 2013 to 2016, no further details were obtained.

The geological information obtained in the historical campaign were used as a reference for the geological model in the resource and reserve estimates. Drilling campaigns in 2017 to 2019 have significant more coverage of the salar and this data was used for geological log interpretation.



Source: SRK 2021 (modified from Foote Mineral Company, 1979)

Figure 7-4: Map of Location of Wells Drilled During 1974 to 1979 Campaigns

<u>2017 and 2018-2019 Drilling Campaigns</u>

Two drilling campaigns were carried out in order to obtain geological and hydrogeological information in the Albemarle mining concession. The following are the campaigns completed:

- The 2017 campaign started in January 2017 and ended in September 2017. This campaign was conducted by Geosud.
- The 2018 to 2019 campaign started in April 2018 and ended in February 2019. This campaign was conducted by Geotec.

Table 7-2 shows the number of wells along with meters drilled by each method for the 2017 and 2019 drilling campaigns.

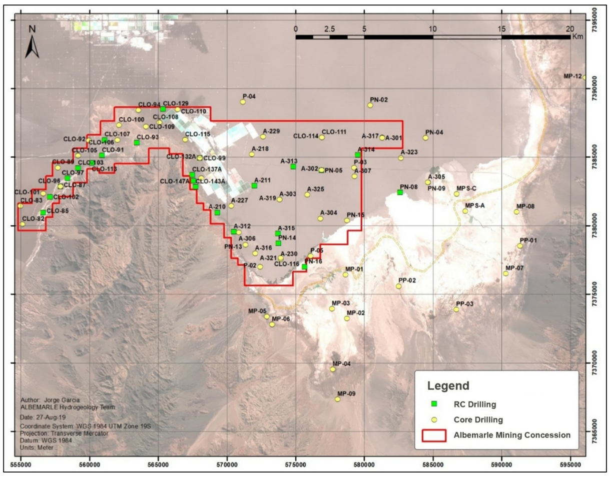
Table 7-2: 2017 through 2019 Drilling Types and Meters

Type of System	Number of Wells (2017)	Number of Meters Drilled (2017)	Number of Wells (2019)	Number of Meters Drilled (2019)
Core Drilling	21	3,970.5	11	1,511
Rotary Drilling	9	1,148	15	2,638.15
Pumping Test	-	-	10	927

Source: GWI, 2019

Between 2017 and 2019, two specific drilling campaigns were carried out in order to obtain data on the geology and its hydraulic properties in order to improve the existing hydro-stratigraphic model that was used in the Environmental Assessment at the time, which gave rise to the RCA N°021/2016 agreement with the Chilean government.

The drillholes are mainly located in the Albemarle mining concession (Figure 7-5) but some are located in the southeast part of the salar, in the Marginal Zone where the Peine and La Punta Brava lagoon systems are located. In this area, even though it is outside the mining concession, it has been necessary to update the hydrostratigraphic model so that information is consistent with that existing in the Nucleus.



Source: GWI, 2019

Figure 7-5: Location Map of 2017 – 2019 Reverse Circulation and Core Drilling Considered to Update the Hydrostratigraphic Model

7.2.3 Drilling Results and Interpretation

The drilling supporting the mineral resources has been conducted by several contractors, that in SRK's opinion, utilized industry standard techniques and procedures. The database used for this technical report includes 186 holes drilled directly on the Property, 82 exploration holes and 104 production wells. The collar locations, downhole surveys, geological logs, and assays have been verified and used to build a 3D geological model and grade interpolations. Geologic interpretation is based on structure and stratigraphy as logged in the drillholes.

In SRK's opinion, the drilling activities were conducted by professional contractors using industry standard practices to achieve representativity with the sample data. SRK is not aware of any material factors that would affect the accuracy and reliability of the results from drilling and associated sampling and recovery. Therefore, in SRK's opinion, the drilling is sufficient to support mineral resource disclosure.

7.3 Hydrogeology

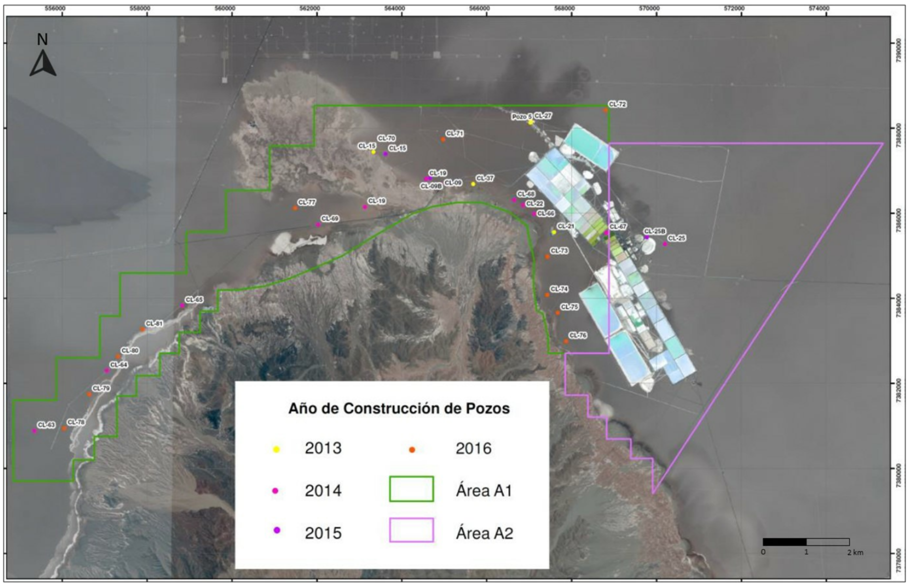
Hydraulic tests have been conducted since the beginning of the Salar de Atacama exploration campaigns. Pumping tests started in the well CL-1 in 1975. However, not all the hydraulic tests have been adequately recorded in terms of methodology and interpretations. The 2016, 2018 and 2019 field test campaigns were conducted in old and new production wells to determine the hydraulic properties of the aquifers within Albemarle property.

7.3.1 2016 Campaign

In the 2016 campaign, 12 brine production wells were installed in A1 (CL-70, CL-71, CL-72, CL-73, CL-74, CL-75, CL-76, CL-77, CL- 78, CL-79, CL-80 and CL-81) along with six shallow observation wells distributed throughout the same area (CLO-73.1, CLO-74.1, CLO-75.1 and CLO-76.1), all of them drilled to a depth of 30 m and two 101 m deep observation wells (PE-01 and PE-02).

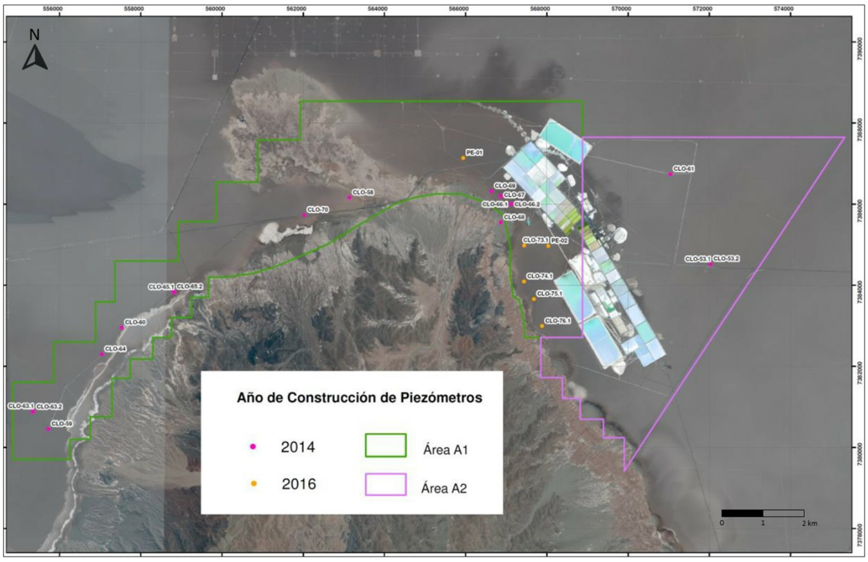
Pumping tests were carried out in the 12 production wells and Lefranc-type permeability tests were conducted every 10 m in the two deep observation wells (PE-01 and PE-02).

The 2016 drilling campaign report (Aquist, 2016) presents the hydraulic parameters obtained from the interpretation of the aforementioned hydraulic tests, as well as a compilation of background information from previous campaigns. Figure 7-6 and Figure 7-7 show the locations of the production and observation wells, respectively.



Source: Aquist, 2016

Figure 7-6: Location of the Production Wells Drilled, 2013 Through 2016 Campaigns



Source: Aquist, 2016

Figure 7-7: Location of Observation Wells or Piezometers Drilled in the 2013 through 2016 Campaigns

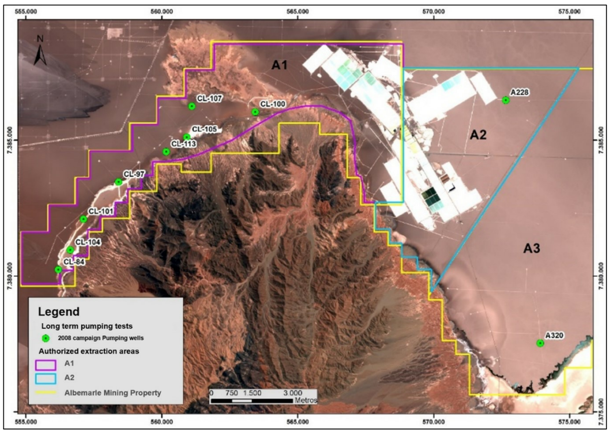
7.3.2 2018 - 2019 Testing Campaign

Between October 2018 and June 2019, long-term pumping tests were carried out in 10 deep wells (deeper than 50 m) that had been drilled in 2008 and distributed in the A1, A2, and A3 claim areas: eight tests were carried out in the Chépica Oeste sector of A1, one test north of A2 and one south of A3, near the Salar de Atacama Marginal Zone (Figure 7-8).

The main objectives of the long-term pumping tests were the following:

- Evaluate if there is a differentiated deep aquifer and if it is connected to the surface aquifer
- Evaluate the type of aquifer and characterize the hydraulic parameters of the deep aquifer

A shallow well that is up to 20 m deep and a deep well with characteristics similar to the pumping well, both at a distance of 10 to 30 m from the pumping well, were drilled on the same platform of the pumping well. These were used as observation wells during the pumping tests. The shallow well was used to determine whether the pumping in the deep aquifer produces any effect in the upper part of the aquifer and the deep well was used to calculate hydraulic parameters in the lower part of the aquifer.



Source: GWI, 2019

Figure 7-8: Location Map of the Long-Term Pumping Tests: Deep Pumping Wells

Pumping Tests Design

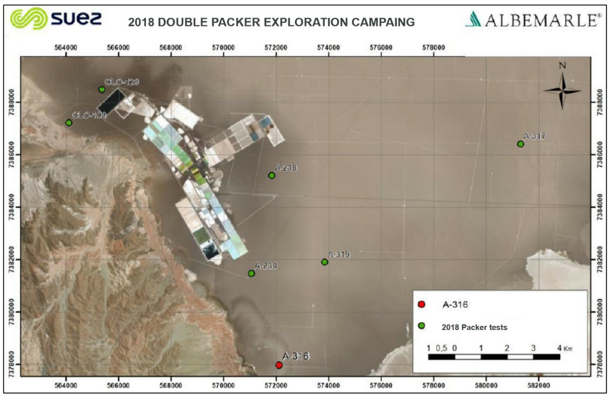
Up to three pumping tests were carried out in each pumping well: a first trial of one-hour duration, a second of staggered flow between three hours and four hours in duration and a third test at constant flow for seven days. Where a flow rate greater than 5 liters per second (L/s) could not be extracted, only trial and error and constant flow tests were conducted. Where a flow rate greater than 5 L/s could be maintained, the three tests were carried out. After each test, recovery was monitored.

During the constant flow pumping tests, four brine samples were collected to determine if there is a chemical evolution during the duration of pumping.

7.3.3 Packer Testing Campaign

Albemarle requested that Suez Medio Ambiente Chile SA and Solexperts SA carry out an exploration project using a system of inflatable shutters (packers) in wells in Salar de Atacama (Suez, 2019) during two campaigns: July 2018 and October-November 2018.

The tests were carried out in seven wells distributed along areas A1, A2 and A3 in 2018 (Figure 7-9).



Source: Suez, 2019

Figure 7-9: Map of the Location of the Wells Tested by the Double Packer System (DPS)

This type of hydraulic test allows for obtaining hydraulic parameters at specific depth intervals, by means of two packers that individualize the section to be tested from the rest of the vertical well column. In this way, the permeability (K) and transmissivity (T) of a given geological formation can be characterized and/or representative brine samples can be extracted from specific depths of the aquifer.

The hydraulic parameters from the packer tests were obtained using the Aquifer Test software (Waterloo Hydrogeologic, 2016). Each of the companies that acquired the exploration data generated a report describing the details of the work carried out, the methods used for processing the data, and the conclusions. The data were reviewed by the Albemarle hydrogeology team and subsequently provided to SRK.

7.3.4 Pumping Test Re-Analysis by SRK in 2020

The long-term constant rate pumping tests were initially analyzed to evaluate the aquifer properties specified in the objectives above, but test results were deemed inadequate due to the analysis assumptions and the aquifer conditions provided. The tests were then re-analyzed by SRK in the summer of 2020 using the analytical software AQTESOLV™ (HydroSOLVE, 2008).

Results varied by analysis since each method makes different assumptions and is subject to interpretation. Some challenges were encountered when analyzing the pumping tests and resulted in a lower level of confidence of the estimated hydraulic parameters. For example, discrete hydraulic parameters from the upper observational wells could not be calculated due to the nature of the analysis methods and the largely heterogeneous aquifer conditions. Instead, only general conditions could be implied, such as the propensity for a vertical hydraulic connection between two aquifers separated by a semi-confining unit.

A conceptual hydrogeologic setting of the test sites were developed with the analysis and diagnosis of the data provided. These include the following assumptions or characteristics of the aquifers:

- Most tests probably took place in partially confined conditions.
- Derivative analysis indicates possible leaky, locally confining aquitards and/or constant head boundary conditions (facies changes, cordillera) in some cases.
- Aquifer was not stressed long enough to transition to delayed yield.
- Leaky confined conditions observe storage influence from connected systems, inflecting storage parameters. Reliable Sy values from 4.9% to 13.0%.
- Leaky confined systems do calculate vertical hydraulic conductivity of the aquitard (K'), but it is often unconfirmed by upper well response.
- Deep aquifer shows small variation in the transmissivity values calculated by Albemarle in 2019.
- Reliable calculated hydraulic conductivity values range from 1.1 to 4.6 meters per day (m/d) in sequences of gravel, ignimbrite, and sands; average 0.26 m/d in sequences of gypsum and ash; and range from 2.9 to 3.4 m/d in layers of ash, evaporites, and gypsum.

7.3.5 Data Summary

The hydrogeological data described in the previous chapters and additional information on hydraulic properties outside of the Albemarle property available from the governmental agency CORFO (SGA, 2015 and Amphos21, 2018) and the SQM environmental report (SQM, 2020) was used as a reference to construct the dynamic groundwater model as described in Section 12. The measured hydraulic conductivity values are summarized in Table 7-3, Table 7-4 shows the groundwater storage values (Sy) within the hydrogeological units.

Table 7-3: Summary of Measured Hydraulic Conductivity Values

Hydrogeological Unit (UH)	Description	Horizontal Hydraulic Conductivity (K) (m/d)			
		Measured			
		#	Minimum	Maximum	Median[1]
Transition	Transition	57	0.001	3000	3
UH1	Unconsolidated Sediments	28	0.407	156	15.2
UH2	Upper Halite	189	0.005	6000	3
UH3	Intermediate Halite	157	0.00003	600	1
UH4	Silt, Clay, and Salt	127	0.00005	1110	4
UH5	Lower Halite	18	0.00006	21.7	0.1
UH6	Silt and Salt	132	0.005	2590	5
UH7	East Sediments	-	-	-	-
UH8	Volcanoclastic	63	0.005	380	0.4
UH9	West Sediments	13	0.006	8	0.3

Source: SRK 2022
= number of tests
[1] Median is the value in the middle of a set of measurements. Also called 50th percentile

Table 7-4: Summary of Measured Groundwater Storage Values (Specific Yield, Sy)

Hydrogeological Unit	Description	Specific Yield (Sy)			
		Measured			
		#	Minimum	Maximum	Average
Transition	Transition		-	-	-
UH1	Unconsolidated Sediments	10	0.001	0.2	0.05
UH2	Upper Halite	9	0.001	0.55	0.09
UH3	Intermediate Halite	25	0.004	0.269	0.07
UH4	Silt, Clay, and Salt	19	0.003	0.554	0.11
UH5	Lower Halite	4	0.001	0.32	0.08
UH6	Silt and Salt	18	0.001	0.34	0.09
UH7	East Sediments		-	-	-
UH8	Volcanoclastic	36	0.001	0.558	0.16
UH9	West Sediments	3	0.003	0.5	0.2

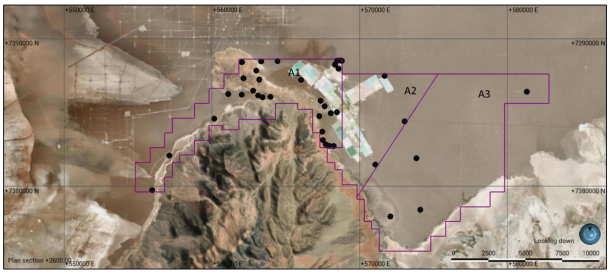
Source: SRK 2022
= number of tests, Sy measured values over 0.6 has been discarded

7.4 Brine Sampling

In the early stages of drilling campaign brine samples have been collected from trenches, monitoring wells and pumping wells drilled from 1974 to 1979 (section 7.2.2). However, no further details were available for SRK to review.

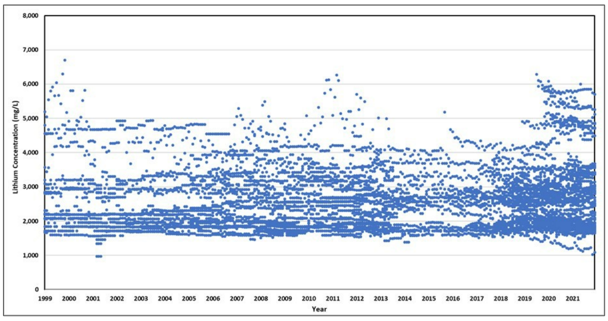
Historical samples have been collected from production and monitoring wells and analyzed in the on-site salar laboratory (Albemarle). The samples were collected systematically on a monthly basis since January 1999. The hydrochemistry Albemarle database, used in the groundwater model to support the reserve estimate, has records through December 2021.

Albemarle also provided a secondary hydrochemistry database with records from January 1999 to August 2020; it has similar values with the database mentioned above. Albemarle do not use these records for any evaluation or future planning, and SRK used this alternative database for comparison purposes only. Figure 7-10 and Figure 7-11 show the distribution of the sampling point and the lithium concentration recorded from 1999 to 2019.



Source: SRK 2021

Figure 7-10: Historical Sampling Points Location (1999 -2019)



Source: SRK 2022
The graph includes samples within Albemarle's claim areas only

Figure 7-11: Measured Lithium Concentration from Historical Database (1999 - 2021)

In years 2018 and 2019, 77 samples were collected: 12 samples from exploration wells using a packer, 32 samples during long-term pumping tests, seven samples in short-term pumping tests and 26 samples from the production wells, extracted at 48 different points. This sampling campaign was designed to support a resource model estimate. In 2022 a new brine sampling campaign was conducted to update the resource estimate. Both campaigns are described in detail in Section 8.

8 Sample Preparation, Analysis, and Security

Samples of the host rocks and the brines themselves have been collected and analyzed from the active production wells as part of operations at Atacama since 1999., During the exploration campaign carried out between 2018 and 2019, a total of 77 brine samples were extracted at 48 different points. Additionally, a sampling campaign was carried in 2022 in 31 production wells and three observation wells. Samples from existing production wells, pumping tests, and from packer tests were sent to the different laboratories as outlined below as part of the quality assurance and quality control (QA/QC) process

The samples from 2018-2019 and 2022 campaign were considered for the resource estimate (as they are reflective of current salar conditions). Historical samples measured since 1999 were used for development and calibration of the numerical groundwater model to support the reserve estimate.

8.1 Sampling Events

8.1.1 Historical Sampling

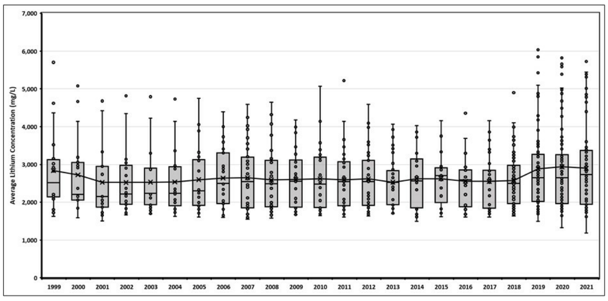
Lithium concentrations from historical sampling were available for 127 monitoring locations, with a total number of 7,724 samples from Jan 1999 to Feb 2022 within Albemarle properties and transition zone to the southeast.

Since the beginning of the extraction of brine at the Salar Plant, samples from the pumping wells have been periodically analyzed. Since 1999, brine chemistry data has been collected on a monthly basis.

These samplings are carried out in order to control the chemical evolution of the brine that will be pumped to the evaporation ponds. The sampling method is by means of plastic bottles of 1 L or 0.5 L capacity, one sample is taken per month from each well. Until 2018, this sampling was carried out at the outlet of each HDPE line, when the brine was discharged into the pond. During 2018, wastewater valves began to be installed after the flowmeter, which reduces risks and improves the representativeness of the sample, as they are taken right at the wellhead.

The analyses are carried out in the Salar Plant laboratory and the following determinations are usually made density, Li^{+}(%), SO_4^{-2} (%), Ca^{+2}(%), Mg^{+2}(%), K^{+}(%), Na^{+}(%), Cl^{-}(%), B^{+}(%), Temperature (°C) and pH.

Figure 8-1 shows the box-and-whisker diagram of the historical variability (since 1999) of lithium concentrations, in the samplings from production wells and expressed as an annual average per well.



Source: SRK 2022
Each data point (circle) represents an average concentration at a specific location at the year shown. "x" symbols connected by a line represent the multi-well average of that year.

Figure 8-1: Historical Lithium (mg/L) Variability (1999-2021)

As can be seen in Figure 8-2 the minimum values, established by the lower whisker, do not materially change with time, so it is interpreted by SRK that the brine has a minimum lithium concentration that remains unchanged. It can also be seen that the median in the last 10 years remains relatively steady.

The historical brine samples collected at pumping wells were used for a qualitative indication of brine grade persistence over the prolonged pumping periods. They were also used quantitatively in developing the grade interpolations as input to the numerical groundwater model. Historical brine samples were not used for developing the resource estimate.

8.1.2 2018 and 2019 Campaign

Considering the brine is a dynamic resource, the samples to support the resource estimate need to be collected in a recent time period. The 2018 to 2019 sampling campaign was developed with that purpose in mind.

The 77 samples obtained during the 2018 to 2019 campaign have been collected from 12 exploration wells using a packer, 32 during long-term pumping test, 7 in short-term pumping tests and 26 from the production wells, extracted at 48 different points (Table 8-1). Details on each of the different sampling rounds and how each dataset were used in the resource and reserve estimation process are described below.

Packer Sampling

The samples extracted with the double packer system were obtained after pumping the tested interval at a time equal to at least three times the volume of brine storage in the well plus the existing volume in the pipes that carry the brine to the surface. In this way, the extracted sample is representative of the conditions of the brine entering the well and not of the brine previously stored in it, which may have its origin in other layers of the aquifer.

Therefore, the duration of each test is determined as the time necessary for the volume of brine contained in the tested interval (plus accumulated water column in the PVC pipes) to be renewed ideally more than three times. This has not been possible in all cases due to the low flow that some intervals present. In some tests, the evolution of the physical-chemical parameters of the brine has been recorded during the pumping test with a HANNA HI 98194 multiparameter through the use of a flow cell. The flow cell makes it possible to measure parameters before the brine comes into contact with the atmosphere. Multi-parameter gear was only available during the first DPS field campaign.

Sampling from Pumping Test and Production Wells

The sampling of the production wells has been carried out in different campaigns, between the months of December 2018 and April 2019. A brine sample has been extracted from 27 production wells distributed throughout claim areas A1 and A2, where 23 and 4 wells have been sampled, respectively (Table 8-1).

Table 8-1: List and Coordinates of Production Wells Sampled for 2018-2019 Campaign

Well	X_UTM WGS84	Y_UTM WGS84
CL-120	568,791	7,388,180
CL-85	568,447	7,385,037
CL-92	567,679	7,385,928
CL-41	556,151	7,381,491
CL-59	555,731	7,380,459
CL-98	559,973	7,386,200
CL-99	568,048	7,384,939
CL-78	556,046	7,380,948
CL-80	557,315	7,382,635
CL-91	567,715	7,382,838
CL-90	567,488	7,383,686
CL-1	573,041	7,384,392
CL-115	566,959	7,386,256
CL-15	563,329	7,387,453
CL-19	563,132	7,386,157
CL-20	564,190	7,387,063
CL-22	566,843	7,386,203
CL-23	571,141	7,384,543
CL-24	570,070	7,382,264
CL-27	567,535	7,387,586
CL-37	565,679	7,386,693
CL-45	571,689	7,387,482
CL-60	557,531	7,382,960
CL-65	558,805	7,383,832
CL-79	556,639	7,381,750
CL-9	564,577	7,386,801
CL-97	558,413	7,383,460

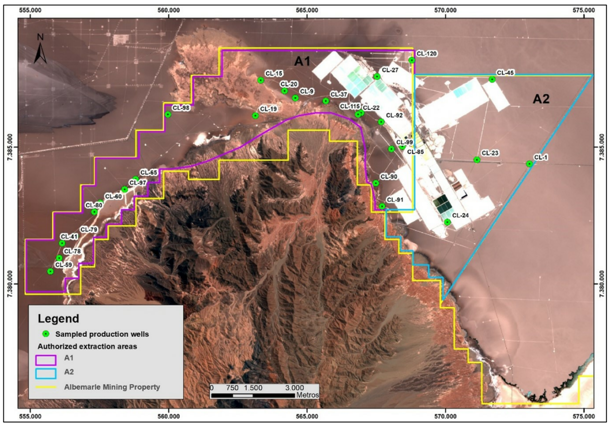
Source: GWI, 2019

The brine samples have been taken from the pipeline of each of the production wells or from a sampling valve on the pumping well pipe during the pumping test (Figure 8-2). The bottles have been rinsed three times with the brine from the well and then completely filled without leaving air bubbles, to avoid precipitation processes and physical-chemical changes within the container. In addition, during the sampling, physicochemical parameters of the brine (specifically pH, EC, TDS, and T) have been measured using the Hanna HI98196, HI98192, and HI98128 multiparameter meter. A multiparameter data verification procedure has been followed and the meter was calibrated, if necessary.

The bottles were labeled with the name of the well, the type of well (e.g., “Production Well") and the date and time of sampling. The sampling information was recorded in project records.

From each well, five 1-liter bottles were collected. During the transport and storage of the samples, exposure to environmental conditions was prevented to avoid sudden changes in temperature that might alter the chemical composition of the sample. It was not necessary to use preservatives.

Notably, the extraction flow rate and the depth of the brine level in Albemarle's production wells are monitored online by a telemetry system.



Source: GWI, 2019

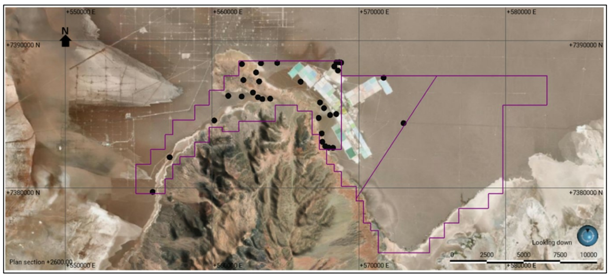
Figure 8-2: Production Wells Sampled

8.1.3 2022 Campaign

In 2022 a new brine sampling campaign was carried out. The targets were update the lithium concentration data in the production wells for the resource estimate and to verify their correlation with the historical records from Albemarle labs (Planta Salar). The samples were collected from 33 production wells and from 4 observation wells between June and August of 2022. The samples are mainly located in Albemarle areas A1 and A2, and only 4 in A3. Figure 8-3 and Table 8-2 shows the distribution and details of the samples from the 2022 campaign. In production wells the sample was collected directly form the discharge valve after the flowmeter, in the monitoring wells a pump was installed to purge 3 volumes of the well prior to taking a sample.

Five samples were collected in each well in 1-liter bottles, which were rinsed three times with the brine from the well and then completely filled without leaving air bubbles, to avoid precipitation processes and physical-chemical changes within the container. The label in the bottle included the sample ID, laboratory code, sampler, date and time. Other details such well ID, laboratory, type of sample, water level, and type of well were only included in the brine sampling database for the 2022 campaign.

The following parameters were taken immediately after sampling as field parameters: pH, temperature, conductivity, total dissolved solids, redox potential, salinity, and density. The measurements were taken by using the Hanna HI98192, HI98198, and HI991001 multiparameter meter devices. The instruments were calibrated daily.



Source: SRK, 2022

Figure 8-3: Wells Included in the 2022 Sampling Campaign

Table 8-2: List and Coordinates of Production and Observation Wells Sampled during 2022 Campaign

Well	X_UTM WGS84	Y_UTM WGS84
CL-1	573,049	7,384,403
CL-100	563,437	7,386,040
CL-101	557,123	7,382,092
CL-104	556,633	7,380,959
CL-106	568,797	7,388,505
CL-107	561,110	7,386,256
CL-113	560,156	7,384,585
CL-114	568,672	7,388,530
CL-119	568,474	7,388,527
CL-128	568,577	7,387,972
CL-133	562,022	7,386,212
CL-134	562,789	7,386,481
CL-136	562,033	7,388,407
CL-137	562,139	7,387,328
CL-140	568,243	7,382,732
CL-149	567,944	7,382,746
CL-151	563,211	7,387,236
CL-154	563,962	7,386,065
CL-155	563,003	7,387,844
CL-158	562,142	7,387,327
CL-162	567,630	7,385,423
CL-163	566,038	7,387,211
CL-168	568,458	7,385,019
CL-172	567,360	7,385,803
CL-176	555,961	7,379,740
CL-19	563,132	7,386,157
CL-45	571,689	7,387,482
CL-82	568,327	7,388,254
CL-90	567,472	7,383,701
CL-91	567,715	7,382,838
CL-94	567,510	7,383,140
CL-97	558,413	7,383,460
CL-99	568,043	7,384,955
CLO-278B	567,266	7,384,759
CLO-280A	564,444	7,388,488
CLO-280B	563,332	7,388,463
CLO-283	554,962	7,381,440

CL and CLO series corresponds to pumping and observation wells respectively

8.2 Sample Preparation, Assaying, and Analytical Procedures

8.2.1 Historical Sampling

Historical samples from the production wells and observation points have been collected on a monthly basis by the operators of the Salar de Atacama Plant Hydrogeology Department. The samples were analyzed in the plant laboratory located on site. No duplicates were collected in this process.

SRK notes that while comprehensive QA/QC or independent verification of sampling has not been a continuous part of the plant lab, Albemarle operations in Salar de Atacama have been producing lithium from brines for 25 plus years. Production has been consistent with reserve planning from the brine reservoir.

8.2.2 2018-2019 Campaign

The samples obtained from the 2018 to 2019 campaign were collected during pumping tests at discrete times of 30 minutes, 24 hour, 72 hour and 7 days; from production wells; and from exploration wells using packers.

The brine samples were collected as follows:

- Brine was pumped from inside the well up to three times its volume or the interval to be sampled, thus ensuring that the brine being sampled represented what was flowing into the well screen from the aquifer.
- Each bottle (1 liter [L]) was conditioned with the freshly extracted brine.
- Five increments of 1 L each were extracted directly from the pump flow or from the pipe into the bottles. These were stored and duly labeled in five bottles according to the previously defined chain of custody. The destination of each bottle was:
  - Albemarle Laboratory: La Negra - Antofagasta, Chile - Original Sample A - 100%
  - K-UTEC Laboratory: Germany. Sample B - 100%
  - Alex Stewart Laboratory: Mendoza, Argentina. Control Sample C - 30%
  - CCHEN Laboratory: Control Sample D - 30%
  - Albemarle Laboratory: La Negra - Antofagasta, Chile. Duplícate Sample - 100%

Each bottle was labeled with the following information:

- Sample number
- Sample interval
- Well name
- Depth of sampling
- Type of sampling (pumping tests, production wells or packer)
- Name and company of the sampler
- Date of sampling

The sampling control information was entered into an Excel data sheet for further processing.

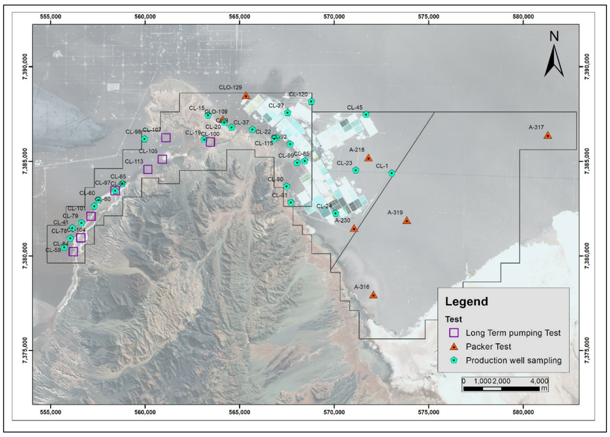
All samples were stored in equivalent containers duly sealed in order to protect against contamination during transportation.

The chemical analyzes of Li, Mg, K, Ca, Na, B, and sulfate were carried out by means of ICP, optical, with standards, procedures, and protocols consistent between the involved laboratories. Sulfate and chloride were determined with different techniques. Table 8-3 summarizes the methods used for each of the elements analyzed. Figure 8-4 shows the sampling points used.

Table 8-3: Analytical Methods by Laboratory - 2018-2019 Campaign

Parameter	Investigation Lab Albemarle La Negra	K-Utec Lab Germany	Alex Stewart Lab Argentina
B	ICP	ICP	ICP
SO_4	ICP	Gravimetry (ICP requested)	Gravimetry (ICP requested)
Mg	ICP	ICP	ICP
Li	ICP	ICP	ICP
K	ICP	ICP	ICP
Ca	ICP	ICP	ICP
Na	ICP	ICP	ICP
Density	Gravimetry	No information	Pycnometry
Chloride	Titration of precipitation with a silver nitrate solution using potassium dichromate for its detection.	Automatic potentiometric titration with a solution of silver nitrate in solution.	Mohr's Method in Solutions > 5% TDS and Potentiometry (Ion Selective Electrode) in solutions <5% TDS.

Source: GWI, 2019



Source: GWI, 2019

Figure 8-4: Sampling Points 2018–2019 campaign

No sample preparation was necessary, as care was taken to obtain samples of the brine in their native state. The samples were taken by the operators of the salar hydrogeology group, while the water resources area sent them to the corresponding laboratories.

During the exploration campaign carried out between 2018 and 2019, a total of 77 samples were extracted from 48 different points, with four sample bottles each. Duplicates of the 77 samples were sent to the La Negra laboratories in Antofagasta and K-Utec in Germany, Alex Stewart laboratory (Mendoza, Argentina), and the CCHEN laboratory.

The analyses carried out consisted of determining the concentration of sulfate, chloride, boron, barium, calcium, iron, potassium, lithium, magnesium, manganese, sodium, strontium and density, according to the methods indicated in the certificates of each laboratory.

Table 8-4 shows the Well ID, type of test in which the samples were drawn, and the laboratories to which they were sent (“All”: includes Alex Stewart and CCHEN). It should be noted that the fourth column indicates the depth to which the sample was extracted or the time, depending on whether it was extracted during a packer test or a pump test, respectively.

A chain of custody was established, which incorporated not only sampling, but also storage and shipment of samples to each laboratory. The samples were labeled immediately after being taken from the wells, then they were stored at the Albemarle storage in Salar Plant. Later, they were transferred in coolers and sent by DHL to the respective laboratories.

Table 8-4: List of Samples in the 2018-2019 Campaign

Sample No.	Well ID	Type	Depth (m) - Test Time	Label	Laboratory
1	A218	Sampling during packer testing	28-43	A-218A	All
2			86-101	A-218B	All
3	A228	Pumping test	30 minutes	A228-T1	LN & K Utec
4			24 hours	A228-T2	All
5			72 hours	A228-T3	LN & K Utec
6			7 days	A228-T4	LN & K Utec
7	A230	Sampling during packer testing	129-146	A-230A	LN & K Utec
8	A316	Sampling during packer testing	25-45	A-316A	LN & K Utec
9			70-85	A-316B	LN & K Utec
10			90-105	A-316C	LN & K Utec
11	A317	Sampling during packer testing	35-50	A-317A	LN & K Utec
12	A319	Sampling during packer testing	28-43	A-319A	LN & K Utec
13	A320	Pumping test	30 minutes	A320-T1	LN & K Utec
14			24 hours	A320-T2	LN & K Utec
15			72 hours	A320-T3	LN & K Utec
16			7 days	A320-T4	LN & K Utec
17	CL-1	Production well	-	CL-1	LN & K Utec
18	CL-15	Production well	-	CL-15	LN & K Utec
19	CL-19	Production well	-	CL-19	LN & K Utec
20	CL-20	Production well	-	CL-20	LN & K Utec
21	CL-22	Production well	-	CL-22	LN & K Utec
22	CL-23	Production well	-	CL-23	LN & K Utec
23	CL-24	Production well	-	CL-24	LN & K Utec
24	CL-27	Production well	-	CL-27	LN & K Utec
25	CL-37	Production well	-	CL-37	LN & K Utec
26	CL-41	Production well	-	CL-41	LN & K Utec
27	CL-45	Production well	-	CL-45	LN & K Utec
28	CL-59	Production well	-	CL-59	LN & K Utec
29	CL-60	Production well	-	CL-60	LN & K Utec
30	CL-65	Production well	-	CL-65	LN & K Utec
31	CL-78	Production well	-	CL-78	LN & K Utec
32	CL-79	Production well	-	CL-79	LN & K Utec
33	CL-80	Production well	-	CL-80	LN & K Utec
34	CL-84	Short Pumping test	30 minutes	CL84-T1	LN & K Utec
35			24 hours	CL84-T2	LN & K Utec
36			72 hours	CL84-T3	LN & K Utec
37			7 days	CL84-T4	LN & K Utec
38	CL-85	Production well	-	CL-85	LN & K Utec
39	CL-9	Production well	-	CL-9	LN & K Utec
40	CL-90	Production well	-	CL-90	LN & K Utec
41	CL-91	Production well	-	CL-91	LN & K Utec
42	CL-92	Production well	-	CL-92	LN & K Utec
43	CL-97	Pumping test	30 minutes	CL97-T1	LN & K Utec
44			24 hours	CL97-T2	LN & K Utec
45			72 hours	CL97-T3	LN & K Utec
46			7 days	CL97-T4	LN & K Utec
47	CL-98	Production well	-	CL-98	LN & K Utec
48	CL-99	Production well	-	CL-99	LN & K Utec
49	CL-100	Pumping test	30 minutes	CL100-T1	LN & K Utec
50			24 hours	CL100-T2	LN & K Utec
51			72 hours	CL100-T3	LN & K Utec
52			7 days	CL100-T4	LN & K Utec

53	CL-101	Pumping test	30 minutes	CL101-T1	LN & K Utec
54			24 hours	CL101-T2	LN & K Utec
55			72 hours	CL101-T3	LN & K Utec
56			7 days	CL101-T4	LN & K Utec
57	CL-104	Pumping test	30 minutes	CL104-T1	LN & K Utec
58			24 hours	CL104-T2	LN & K Utec
59			72 hours	CL104-T3	LN & K Utec
60			7 days	CL104-T4	LN & K Utec
61	CL-105	Short Pumping test	30 minutes	CL105-T1	LN & K Utec
62			24 hours	CL105-T2	LN & K Utec
63			72 hours	CL105-T3	LN & K Utec
64	CL-107	Pumping test	30 minutes	CL107-T1	LN & K Utec
65			24 hours	CL107-T2	LN & K Utec
66			72 hours	CL107-T3	LN & K Utec
67			7 days	CL107-T4	LN & K Utec
68	CL-113PW	Pumping test	30 minutes	CL113PW-T1	LN & K Utec
69			24 hours	CL113PW-T2	LN & K Utec
70			72 hours	CL113PW-T3	LN & K Utec
71			7 days	CL113PW-T4	LN & K Utec
72	CL-115	Production well	-	CL-115	LN & K Utec
73	CL-120	Production well	-	CL-120	LN & K Utec
74	CLO-109	Sampling during packer testing	21-71	CLO-109A	LN & K Utec
75			80-107	CLO-109B	All
76	CLO-129	Sampling during packer testing	71-86	CLO-129A	All
77			115-150	CLO-129C	All

K-Utec Lab, Germany (K-Utec); Investigation Lab Albemarle La Negra (LN)
Source: GWI, 2019

8.2.3 2022 Campaign

The samples collected in the 2022 sampling campaign correspond to 33 production wells and 4 observation wells according to the following protocol:

- All sampling equipment, sampling buckets, glassware, and instrumentation should be washed with deionized water or with phosphate-free detergent before sampling begins.
- Use distilled water to rinse all sampling equipment and instrumentation before it is used at a different sample point. The use of auxiliary glassware should be minimized to reduce sample cross contamination.
- Measure the water level and assure there are no issues with the well that may cause the bailer to get stuck or lost. Only take a water level in wells that do not have a pump or other equipment downhole. Do not disturb wells with installed equipment.
- Each bottle (1 liter [L]) was conditioned with the freshly extracted brine.
- The sample bottle label included the sample id, laboratory code, date, time, and responsible person. The samples were labeled immediately after being taken from the wells, then they were stored at the Albemarle storage in Salar Plant. The samples were shipped using a cooler or ice box taking care of packaging to ensure the sample bottles are not damaged in transport, including a chain of custody sheet
- The sampling control information was recorded in a excel file database, which include the following information: sample ID, well ID, laboratory, collection date, ship date, sample source type (production well or observation well), sampling depth interval, water levels, well purge data, sample type (original, duplicate, blank, standard, or backup), field parameters, results and, delivery date).

- In each location samples were collected for the following labs:
  - Albemarle Atacama Salar Plant laboratory (Salar de Atacama) - 100% of sampling
  - K-UTEC laboratory (Germany): 100% of sampling
  - Alex Stewart laboratory (Mendoza, Argentina): 100% of sampling
  - Boreau Veritas S.A. laboratory (Santiago, Chile): 100% of sampling
  - Backup sample (stored in Albemarle Atacama plant laboratory)
- Blank, duplicates and standard were collected for the 30% of the samples for each laboratory.
- Well CL-114 was used in the preparation of the standard samples. The main reason was its stability in the historical lithium concentration records.

The chemical analyzes of Li, Mg, K, Ca, Na, B, and sulfate were carried out by means of ICP, optical, with standards, procedures and protocols consistent between the involved laboratories. Sulfate and chloride were determined with different techniques. Table 8-5 summarizes the laboratory methods.

Table 8-5: Analytical Methods by Laboratory - 2022 Campaign

Parameter	Albemarle Atacama Salar Plant Laboratory Chile	K-Utec Lab Germany	Alex Stewart Lab Argentina	Bureau Veritas S.A. Chile
B	ICP	ICP	ICP	Spectrofotomer UV/Vis
SO_4	ICP	Gravimetry (ICP requested)	Gravimetry (ICP requested)	Gravimetry
Mg	ICP	ICP	ICP	AA
Li	ICP	ICP	ICP	AA
K	ICP	ICP	ICP	AA
Ca	ICP	ICP	ICP	AA
Na	ICP	ICP	ICP	AA
Density	Gravimetry	No information	Pycnometry	Gravimetry
Chloride	Titration of precipitation with a silver nitrate solution using potassium dichromate for its detection.	Automatic potentiometric titration with a solution of silver nitrate in solution.	Mohr's Method in Solutions > 5% TDS and Potentiometry (Ion Selective Electrode) in solutions <5% TDS.	Mohr's Method in Solutions > 5% TDS and Potentiometry (Ion Selective Electrode) in solutions <5% TDS.

Source: SRK, 2022 (based on information received from lab)

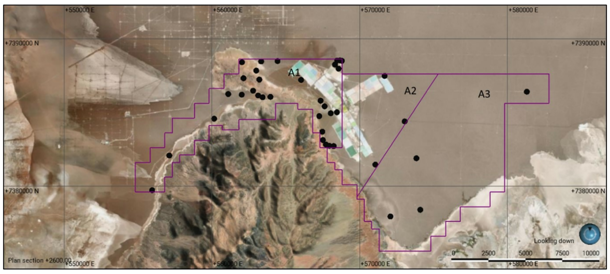
A chain of custody was established, including sampling, storage in the Albemarle Atacama Salar Plant laboratory and shipment of samples to each external laboratory. The samples were labeled immediately after being taken from the wells, with correlative numbers. Table 8-6 presents the samples of the 2022 campaign.

Table 8-6: List of Samples in 2022 Campaign

Well	Well Type	Screen Interval (m depth) Top	Bottom	Laboratory	# Samples
CL-1	Production	0	30	All	4
CL-100	Production	30.42	59.97	All	4
CL-101	Production	25.07	66.37	All	4
CL-104	Production	23.83	64.11	Salar	1
CL-106	Production	0	18	All	4
CL-107	Production	20.43	96.92	K-Utec, BV, AS	3
CL-113	Production	30.65	77.9	All	4
CL-114	Production	0	18	All	4
CL-119	Production	0	24	All	4
CL-128	Production	0	24?	K-Utec, AS, Salar	3
CL-133	Production	31.99	93.9	All	4
CL-134	Production	36.92	95.92	All	4
CL-136	Production	32.53	76.72	All	4
CL-137	Production	35.61	76.92	All	4
CL-140	Production	54.48	86.91	All	4
CL-149	Production	33.98	86.92	All	4
CL-151	Production	11.66	40	All	4
CL-154	Production	39.22	59.43	All	4
CL-155	Production	5.79	39.9	All	4
CL-158	Production	14.4	38.1	All	4
CL-162	Production	16.29	40	All	4
CL-163	Production	13.3	39.8	All	4
CL-168	Production	0	40	K-Utec, AS, Salar	3
CL-172	Production	23.3	46.9	All	4
CL-176	Production	29	46.9	K-Utec, AS, Salar	3
CL-19	Production	0	30	K-Utec, AS, Salar	3
CL-45	Production	0	30	All	4
CL-82	Production	5.4	23.1?	K-Utec, BV, AS	3
CL-90	Production	2.74	40	All	4
CL-91	Production	11.3	40	All	4
CL-94	Production	3.58	40	All	4
CL-97	Production	36.12	56.9	Salar	4
CL-99	Production	11.3	39.9	K-Utec, AS, Salar	3
CLO-278B	Observation Well	4.04	21.91	K-Utec, AS, Salar	3
CLO-280A	Observation Well	0	25	K-Utec, AS, Salar	3
CLO-280B	Observation Well	0	25	K-Utec, AS, Salar	3
CLO-283	Observation Well	0	50	Salar	2

K-Utec Lab (K-Utec); Alex Stewart Lab (AS); Bureau Veritas S.A. Chile (BV); Albemarle Atacama Salar Plant Lab (Salar). Number Samples with labs results.

The 2022 campaign collected samples in the claims areas A1 and A2. Observation wells in area A3 were not sampled at the end of the campaign due to problems with the pumps and the conditions of the wells. Albemarle is planning an additional sampling in A3 during the first quarter of 2023. Because of this situation, four samples from 2018-2019 campaign were included for the resource estimate. The Figure 8-5 shows the location of the samples used in this study.



Source: GWI, 2019

Figure 8-5: Samples Used in This Study

8.3 Quality Control/Quality Assurance Procedures

Quality Control/Quality Assurance procedures are generally employed by companies to ensure accuracy and precision of the results obtained from laboratories. Generally, this may include independent checks (duplicates) on samples by third party laboratories, blind blank/standard insertion into sample streams, duplicate sampling, and more. Albemarle has historically only engaged in independent third party laboratory checks (i.e., Control Laboratories) of sampling as described in section 8.2.3 (2022 Campaign). For transparency, SRK decided to use results from one of the third-party labs, K-Utec, for development of resource estimate.

8.3.1 Control Laboratories

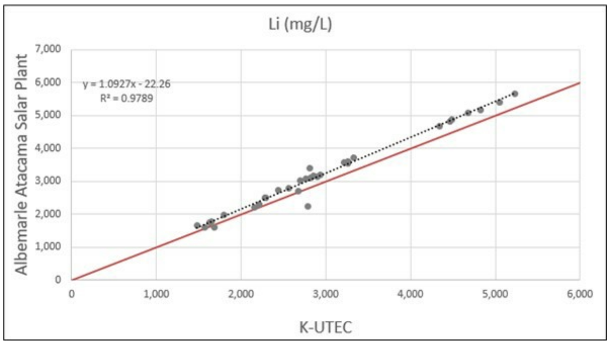
The procedure to control and ensure the quality of the sampling and chemical analysis performed on the samples in this study has been carried out by extracting five samples from observation points. These samples were sent to Albemarle Atacama Salar Plant laboratory (Salar de Atacama), K-UTEC laboratory (Germany), Alex Stewart laboratory (Mendoza, Argentina), and Boreau Veritas S.A. laboratory (Santiago, Chile).

Correlation of duplicate analytical values for the same samples from independent laboratories can identify relative biases between these laboratories. In this case, the objective is not to demonstrate which laboratory is “correct” as all are assumed to be high quality laboratories using consistent analytical procedures and methods. The comparison makes it possible to review both the inherent local variability of the sampling, inconsistencies in preparation of the samples, or biases from the laboratories themselves.

8.3.2 Correlation Between Lithium Grades of Different Invariant Laboratories of the Sampling Type

A comparison of the results between Albemarle Atacama Salar Plant laboratory and K-Utec’s laboratory in Germany indicates a good correlation, represented by a value of 0.9789 (through

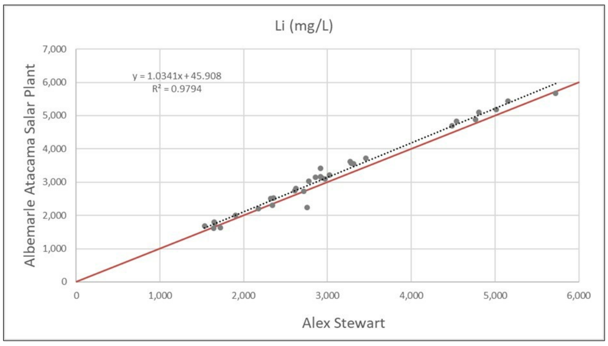
Figure 8-6). However, a bias can be observed between both labs. The K-Utec laboratory generally results in a lower lithium concentration than Albemarle's laboratory, especially for values greater than 2,250 mg/L, where differences over 500 mg/L can be found. On the other hand, values below 2,250 mg/L generally are very similar (Figure 8-6).



Source: SRK, 2022

Figure 8-6: Scatter Diagram Comparing the Results Obtained for Lithium Between Albemarle Atacama Salar Plant Laboratory and K-Utec's Laboratory

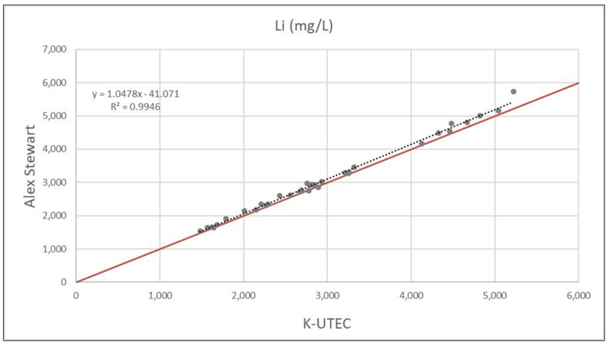
The correlation between the Alex Stewart and Albemarle Atacama Salar Plant laboratory is also high (0.9794). A bias can be observed, showing a minor overestimation in the lithium concentration tested in Albemarle's laboratory. Samples above 3,000 mg/L trends to be lower in Alex Stewart labs, reaching differences up to 350 mg/L. Measured values below 3,300 mg/L generally are very similar (Figure 8-7).



Source: SRK, 2022

Figure 8-7: Scatter Diagram Comparing the Results Obtained for Lithium Between Albemarle Atacama Salar Plant Laboratory and Alex Stewart Laboratory

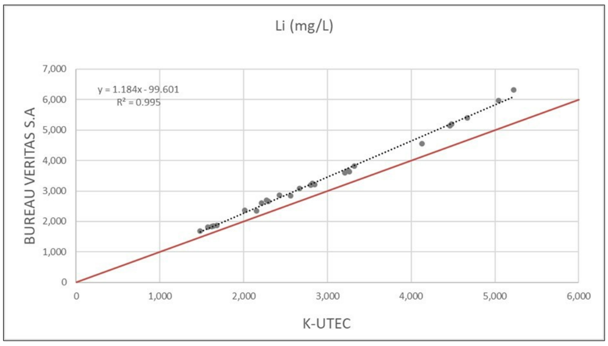
The correlation between Alex Stewart and K-Utec labs is extremely good (0.9946). Despite this high correspondence, Alex Stewart lab consistently returns a slightly higher lithium concentration than K-Utec when the values are greater than 4,150 mg/L. Below this value, the samples are practically the same (Figure 8-8).



Source: SRK, 2022

Figure 8-8: Scatter Diagram Comparing the Results Obtained for Lithium Between Alex Stewart Laboratory and K-Utec's Laboratory

Finally, the Bureau Veritas S.A. laboratory shows an acceptable correlation however a significant bias is observed with the K-Utec data. The lithium concentration values are consistently higher in Bureau Veritas S.A, showing differences from 200 to 1,100 mg/L (Source: SRK, 2022 Figure 8-9). The bias bios is also similar with the laboratories Alex Stewart and Albemarle Atacama Salar Plant.



Source: SRK, 2022

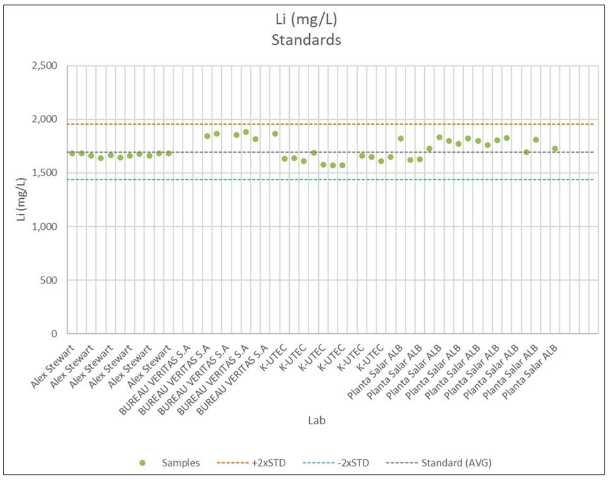
Figure 8-9: Scatter Diagram Comparing the Results Obtained for Lithium Between Bureau Veritas S.A Laboratory and K-Utec's Laboratory

In summary, Albemarle Atacama Salar Plant laboratory presents a good correlation but persistent bios with the rest of the labs, overestimating the lithium content in the high concentration interval. Bureau Veritas S.A laboratory shows a significant overestimate in the lithium concentration compared to other laboratories. Alex Stewart laboratory shows reasonable trends and a slight bias; however, the values from K-UTEC are more consistent and conservative than the other three laboratories.

8.3.3 Standards, Blanks, and Duplicates

The campaign 2022 considered blank, duplicates and standard for approximately 30% of the samples for each laboratory.

The standards were prepared by using the production well CL-114. This well presents very stable and consistent values in the historical production database. A total of 51 standard samples were sent to the four laboratories. The standard samples analyzed from Alex Stewart, Atacama Salar Plant, and K-Utec Laboratories are consistent with the standards values (Figure 8-10). On the other hand, Bureau Veritas S.A laboratory presents higher concentrations than the standards, confirming the bias found in the correlation between lithium grades developed in the previous section.



Source: SRK 2021
Standard deviation (STD)

Figure 8-10: Standard Samples

A total of 46 blanks were sent to the four laboratories, as results four errors in the analysis were detected:

- Albemarle Atacama Salar Plant laboratory; two samples
- K-Utec laboratory; one sample
- Alex Stewart laboratory: one sample

The errors correspond to a misreading of the sample ID, or the reported values are in the wrong units.

Finally, the duplicated collected for each labs presented errors under 2.4% in the lithium concentration, and a mean absolute error (MAE) of 0.9%.

8.4 Opinion on Adequacy

SRK used the results from the independent K-Utec laboratory to support the development of the resource estimate. SRK utilized historical results from the Albemarle La Negra laboratory and Albemarle Atacama Salar Plant laboratory (Albemarle database) for the numerical groundwater model to support the reserve estimate. SRK has reviewed the sample preparation, analytical, and

QA/QC practices employed by consultants for 2022 campaign samples analyzed by the Albemarle Atacama Salar Plant laboratory, K-Utec in Germany, Bureau Veritas S.A laboratory, (Chile), and Alex Stewart laboratory (Mendoza, Argentina). In the QP's opinion:

- The QA/QC program for the 2022 campaign supports that the extraction of each sample is reproducible and auditable and it is sufficient to support a resource estimate. The correlation between the K-Utec lab and Albemarle Atacama Salar Plant laboratory is high, however SRK acknowledges that there is potential for bias to exist. It is the QP's opinion that uncertainty associated with this potential for bias is mitigated by the long history of brine extraction at consistent levels supporting historic lithium production.
- The historical data supporting the mineral reserve estimates at Salar de Atacama have not been fully supported by a robust QA/QC program. This potentially introduces uncertainty in the accuracy and precision of the sample data. However, in the QP's opinion, this uncertainty is mitigated through the consistency of results from the 2022 campaign and the historical data. In the QP's opinion, the risk is also mitigated through the inherent confidence derived from more than 35 years of consistent feed to the processing plant producing lithium at the Salar de Atacama/La Negra.

9 Data Verification

9.1 Data Verification Procedures

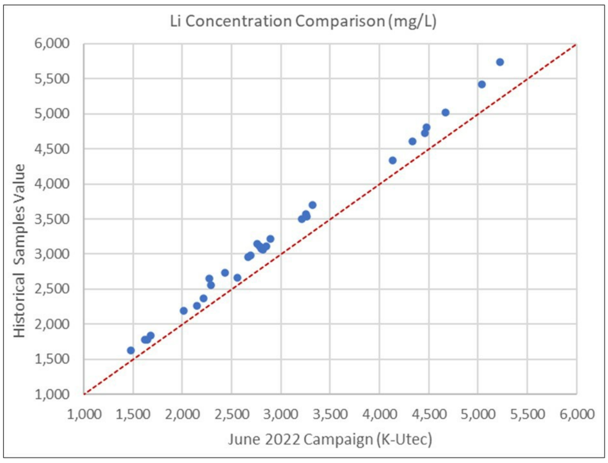
SRK conducted the following review and verification procedures during 2022 to support the resource and reserve estimates:

- Review of the original laboratory analysis certificates.
- Review and analysis of historical lithium concentration data per well. Checking the consistency of data in time, and identification of locations alternated by evaporation (trenches) or leakage from concentration ponds.
- A review and reinterpretation of the geological model developed by Vai in 2021. SRK worked in collaboration with original authors and the Albemarle geological team (Atacama). The work included:
  - A review of the available literature and third-party studies in Salar de Atacama.
  - Interpretation of applied geophysical studies (HRS, TEM, and NMR), surface geological maps and the consistency with the 3D geological units.
  - Data review from all Albemarle concessions and environmental permit zones.
  - A detail reinterpretation of the lithologies from boreholes in the Albemarle concession areas.
  - The available data was evaluated to provide cross-confirmation of geological and hydrostratigraphic interpretations

A 3D geological model was built in collaboration with the original authors and Albemarle personnel, including:

- A review and recalculation of the lateral recharge from the surrounding basing to the groundwater system presented in 2019 environmental model report (SGA, 2019).
- A new structural interpretation of the the main faults.

The consistency of the historical data was verified against the 2022 campaign samples (K-Utec lab), described in Section 8. Figure 9-1 shows a high correlation (R^2 =0.9955) between values in 2022 analyzed at the on-site plant lab and the results from K-Utec laboratory. However, a bias can be observed between both labs. The K-Utec laboratory generally results in a lower lithium concentration than Albemarle's laboratory. Differences ranges from 100 to 520 mg/L.



Source: SRK 2022

Figure 9-1: Comparison of Historical Lithium Concentrations and 2022 Campaign (K-Utec)

9.2 Limitations

All the data collected historically could not be independently verified. However, in the QP's opinion, verification of the samples collected in 2022 campaign and analyzed by independent labs provided sufficient level of confidence in the methods used and results of samples analyzed by the Albemarle Atacama Salar Plant laboratory. However, the consistent overestimate in Albemarle's lab values should be revisited and corrected in the future.

9.3 Opinion on Data Adequacy

The brine data were compiled in a standardized database under the supervision of Albemarle personnel. All data were converted into the same units and the database was checked for discrepancies, errors, and missing data. The data received from multiple sources were cross-referenced by SRK against the Albemarle database and original laboratory certificates; Albemarle reviewed and corrected any discrepancies with respect to sample locations and depths.

SRK visited the salar operation and its on site laboratory in June 2022. SRK verified that the stated procedures are being followed. All details and data on QA/QC methodology are as described by Albemarle personnel.

Based on review of the historical database, the consistency of the values during the history of brine extraction, and the high correlation of the historical data and the results from the 2022 campaign, in SRK's opinion, the data used for the resource and reserve estimates is acceptable and appropriate. Historical sampling at production wellheads and at ponds supports that there has been a consistent feed to the processing plant and the lithium produced provides additional verification of the historical data used for calibration of the numerical model.

10 Mineral Processing and Metallurgical Testing

Albemarle's operations in Chile are developed in two areas, the Salar de Atacama and La Negra. The Salar de Atacama operation extracts lithium brines from deep and shallow groundwater wells. These brines are then discharged to solar evaporation ponds to concentrate the lithium brine, which is then transferred to the La Negra plant for processing. The La Negra plant refines and purifies the lithium brines, producing a technical and battery-grade lithium carbonate (and historically lithium chloride although this is not forecast for future production).

. The SYIP aims to improve this process recovery through mechanical grinding and washing of by-product salts in two new plants, the Li-Carnalite Plant and Bischofite Plant and testing associated with the SYIP is discussed below.

10.1 Salar Yield Improvement Program Testing

Historic process yield for lithium in the evaporation ponds at the Salar de Atacama have been around 50% (ranging from less than 40% up to the mid-50%). In 2017, Albemarle commissioned K-UTEC to evaluate opportunities to improve on this historic performance. K-UTEC proposed and evaluated six options for improvement, including performing laboratory and pilot scale testing on each. Based on this testwork, Albemarle decided to proceed with two of the six options evaluated. The two selected opportunities for improvement follow:

- Bischofite Treatment Plant: Implementation of a continuously driven washing and comminution/vat leaching operation for bischofite in order to recover the adhering brine and lithium contained in the bischofite salts.
- Li-Carnallite Treatment Plant: Implementation of a continuous Li-Carnallite decomposition by comminution and reactive step using brine.

10.1.1 Bischofite Treatment Testing

Albemarle recently started to place harvested bischofite salts in drainage fields to recover entrained lithium-rich brine. While this recovers a portion of the lithium that would otherwise be lost in this stage of processing/evaporation, there is still significant brine adhered to the bischofite salts post-drainage. The intent of the bischofite treatment process is to further wash this concentrated brine from the bischofite salt using a dilute, natural brine, as well as further dissolution of lithium precipitated in these salts.

K-UTEC completed several tests related to this proposed process upgrade at their laboratory in Sondershausen, Germany. These include an evaluation of drainage performance of the bischofite salt as well as laboratory-level tests and pilot-scale tests on the washing/leaching of the bischofite using an agitated reactor. To complete these tests, Albemarle collected precipitated bischofite salts from the salar operations and transported these salts to K-UTEC's laboratory for evaluation. From a scale perspective, the bischofite drainage test utilized 100 kilograms (kg) of bischofite salt, the pilot scale tests utilized 260 kg of bischofite salt, and the laboratory scale testing utilized 1 kg of bischofite salt. These salts come from the bischofite stockpile, but due to drainage storage before arriving to Sondershausen the LiCl was lower than data collected in the field. Therefore, test work of drainage was carried out in order to emulate the conditions on site. SRK is of the opinion that the bischofite tested is generally representative of bischofite from Albemarle's Salar de Atacama operations.

The bischofite treatment testing utilized brine from extraction well as the wash solution. This brine is characterized as calcium-rich, but no additional information on the wash solution (e.g., lithium, calcium, sulfate, magnesium concentrations) is presented. Therefore, this solution is likely representative of the brine that is sourced from CL-9. The bischofite drainage testing utilized concentrated brine between pond 4A and 3A. This solution is viewed as likely representative of the brine that would typically be entrained in the bischofite salt.

The results of the laboratory and pilot scale Bischofite washing/dissolution testing included 57% lithium recovery at the pilot scale and 79% lithium recovery at the laboratory scale. Lithium/magnesium selectivity (i.e., preference for lithium dissolution) is reported at 85% at pilot scale and 89% at laboratory scale. K-UTEC also evaluated alternatives other than the agitated reactor such as screw dissolution although these tests were inconclusive due to poor test implementation.

Notably, the pilot-scale study results include significantly lower lithium recovery in comparison to the laboratory-scale testwork. K-UTEC believes that this was due to a combination of lower performance of the centrifuge in the pilot scale work and a lower content of lithium in the bischofite salt in the pilot testwork.

The final piece of the testwork is the evaluation of drainage performance on the bischofite salt. This testwork showed a lithium content in adhered brine of around 21% by weight in comparison to around 7% of lithium by weight in the sample received for the testwork.

10.1.2 Lithium-Carnallite Treatment Testing

Albemarle already harvests lithium carnallite salts and washes/leaches them. The key differentiator in the newly proposed lithium-carnallite plant will be the addition of comminution of the salts to increase the efficiency of the leaching. Unlike the bischofite washing, which utilizes a raw brine, the lithium carnallite washing utilizes recycled brine from the bischofite plant increasing the synergy of both new processes. This proposed process leaves a residual bischofite which is then proposed for processing in the proposed new bischofite plant to recover any residual lithium.

As with the bischofite testing, the lithium carnallite testing was completed at laboratory and pilot scale and also went through drainage testing. K-UTEC notes that as with the bischofite testing, it is believed that the lithium carnallite utilized in the testing was collected from disposal dumps which had been subject to washing with rainwater and the sample had limited actual lithium-carnallite (19% with predominant bischofite). Wash solution was concentrated brine sourced from the carnallite pond discharge, which should be representative of the targeted wash solution at an operational level. The pilot testing utilized 240 kg of salt, the laboratory sample sizes were around 0.4 to 0.8 kg and the drainage testing utilized 100 kg.

Results from the lithium-carnallite lab testing were similar to the bischofite recovery in that the pilot scale test reported lithium recovery of around 60% and the laboratory test reported recovery of around 76% with lithium/magnesium selectivity of 97% for both types of tests. Drainage testing suggested adhering brine of around 16% lithium versus 9% lithium on the samples received. Similar comments apply in that the lower yield was attributed by K-UTEC to lower centrifuge performance and different lithium content in salt.

10.1.3 Salar Yield Improvement Program Test Commentary

Based on the results of the laboratory testwork, K-UTEC estimates that the implementation of the SYIP will increase lithium recovery in the salar from current levels to around 65%. Albemarle has adopted this estimate for its assumed performance with the SYIP.

In SRK's opinion, based on the K-UTEC test data, an overall recovery in the 80% range is possible under a best-case scenario for both lithium carnallite and bischofite. However, this is ideal performance and not likely in an operating scenario and therefore a downgrade to the assumption of K-UTEC of 65% is more realistic and a reasonable assumption to use in production forecasts.

Although the improvement to 65% lithium recovery assumed by K-UTEC and Albemarle is reasonable, in SRK's opinion, the current test data has gaps and does not provide a direct correlation to this result. Therefore, in SRK's opinion, Albemarle would benefit from updating its test data to better define the current mass balance, current lithium losses and estimates of potential improvement for the SYIP. This will help refine the design of the SYIP and presents an opportunity to improve the performance of the operation if the maximum recovery potential can be realized.

10.2 Opinion on Adequacy

In SRK's opinion, the recovery data provided by for approximately 40 years of historic production is acceptable and representative of the ongoing operation. SRK notes that the SYIP, as described in the previous paragraphs, does have some risk but accepts that data as reasonable for use in the ongoing project.

11 Mineral Resource Estimates

The Mineral Resource estimate presented herein represents the latest resource evaluation prepared for the Project in accordance with the disclosure standards for mineral resources under §§229.1300 through 229.1305 (subpart 229.1300 of Regulation S-K). Although Albemarle produces byproducts from the Salar de Atacama, including potash, SRK has limited its resource estimate to the dominant economic product of lithium.

11.1 Key Assumptions, Parameters, and Methods Used

This section describes the key assumptions, parameters, and methods used to estimate the mineral resources. The technical report summary includes mineral resource estimates, effective August 31, 2022. The geologic block model is incorporating all relevant exploration data as of June 2022 and there is no additional data since that date. The resource has been depleted to August 31, 2022.

The coordinate system used on this property is World Geodetic System 1984 (WGS84) Universal Transverse Mercator (UTM) Zone 19S. All coordinates and units described herein are done in meters and metric tonnes, unless otherwise noted. The database used for interpolation of brine characteristics has been compiled by Albemarle from analytical information generated by third party laboratory K-Utec.

The Mineral Resources stated in this report are entirely located on mineral title, surface leases, and accessible locations currently held by Albemarle as of the effective date of this report. Detail related to the access agreements or ownership of these titles and rights are described in Section 3 of this report.

11.1.1 Geological Model

To constrain and control the mineral resource, a 3D geological model was required to approximate the geological features relevant to the data and information generated at the current level of study. SRK developed a geological model in collaboration with Albemarle personnel and its consultants (Dr. David Boutt and Dr. LeeAnn Munk). Figure 11-1 shows the geological model's extent. This was done to leverage the site-based expertise and improve the overall model consistency. Geological information supporting the development of the model was incorporated from multiple public sources including:

- CORFO
- SQM
- Albemarle

The geological model is comprised of multiple features which have been modeled to either be independent of each other or, in some cases, may depend on the results from another modeling process. An example of this, is the way in which a structural model may influence the results of the lithology model or the final resource boundaries.

The combined 3D geological models were developed in Leapfrog Geo software (v6.0.2). In general, model development is based on the following:

- Interpreted geophysical data (historic and modern):
  - TEM
  - Seismic
  - Downhole Borehole logging

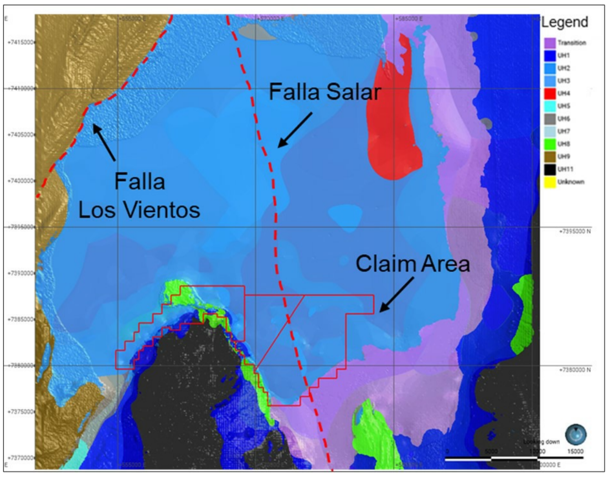
- Surface geologic mapping (historical and modern)
- Interpreted cross sections (historical and modern)
- Surface/downhole structural observations
- Interpreted stratigraphic polylines (surface and sub-surface 3D)

In 2022, SRK updated the geological model using new data and interpretations provided by Albemarle, which included:

- Surface geologic mapping and cross-sections provided by VAI (Vai, 2021); a total of four geologic cross-sections were used to construct the model (B-B', D-D', E-E', and H-H'). The interpretation provided by VAI is simplified compared to the Servicio Nacional de Geologia y Mineria, Carta Geologica de Chile (Niemeyer, 2013) mapping but supports the primary lithologic units identified at Atacama.
- SRK combined similar lithologies into principal groups that correlate the VAI interpretation; these are described in detail in section 6.
- Transition zone boundary that was previously used by SRK for hydrogeologic modeling and displayed in the VAI surface geologic map
- Geophysical section highlighting the location of the Falla Salar and the contacts for UH4 and UH8 (TEM Nano).

As a result, the geological units were redefined, including new volumes, spatial distribution and then, new specific yield values associated to each unit. The main changes are the following:

- Upper halite divided in upper (UH2) and intermediate halite (UH3).
- The new unit Silt, Clay and Salt (UH4) was defined between the upper (UH2) and intermediate halite (UH3).
- The volcanoclastic unit was defined considering the ignimbrite and volcanoclastic deposits.
- Two faults were defined; Falla Los Vientos and Falla Salar, this last one crosses the Albemarle claim area.



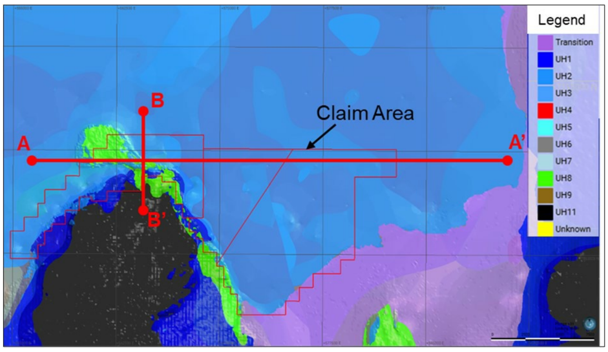
Source: SRK 2022
The extent of the model is the extent of Figure 11-1.

Figure 11-1: Geological Model Extent - Plan View

Lithology

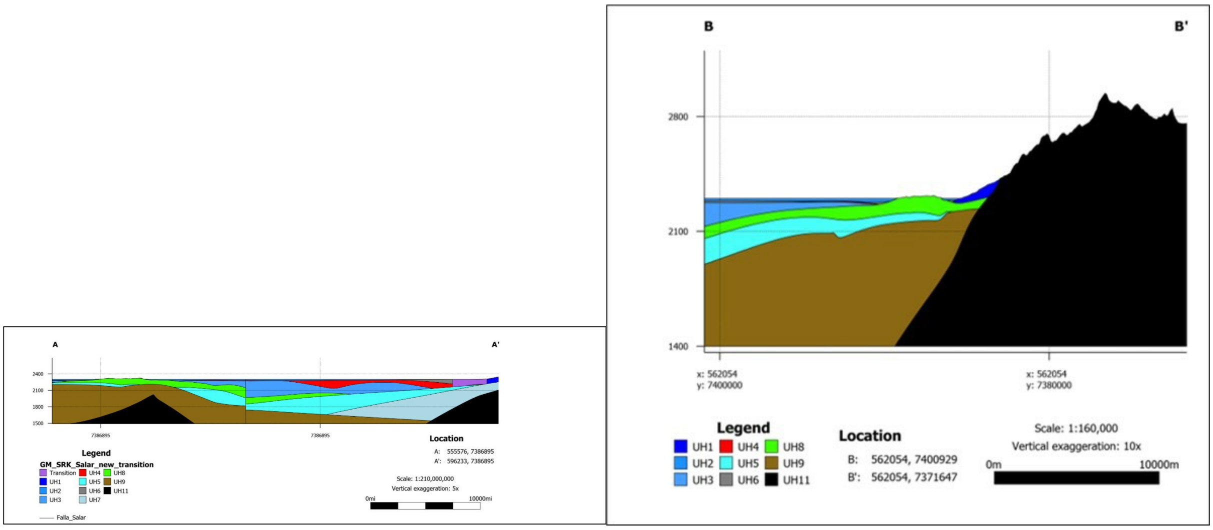
The geological model was developed by first grouping lithology into different hydrogeologic units within Leapfrog Geo: Unconsolidated Sediments (UH1), Upper Halite (UH2), Intermediate Halite (UH3), Silt, Clay and Salt (UH4), Lower Halite (UH5), Silt and Salt (UH6), East Sediments (UH7), Volcanoclastic (UH8), and West Sediments (UH9), Transition zone, and Basement. Geophysical data was digitized to refine upper halite in the eastern zone, ignimbrite, and basement profile contacts. Publicly available cross-sections prepared by SQM were used to digitize the upper surface of the VGC within the regional model. The undifferentiated unit was developed by making a surface constrained by the bottom of all boreholes with geologic data.

The geological model is shown in plan view and cross section view in Figure 11-2 and Figure 11-3 respectively.



Source: SRK 2022

Figure 11-2: Geological Model in Albemarle Claim Areas- Plan View



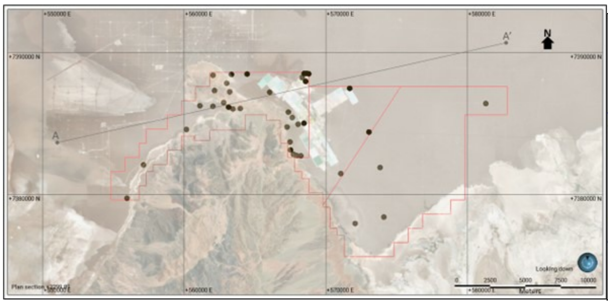
Source: SRK 2022

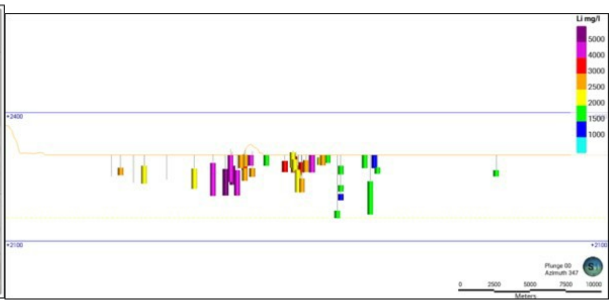
Figure 11-3: Geological Model - Cross Sections

11.1.2 Exploratory Data Analysis

Lithium concentration data is collected only at certain intervals along the borehole. Figure 11-4 shows plan and section views of the updated raw lithium data (mg/l). The spatial distribution of lithium data varies across the property and is concentrated in the claim area A1.

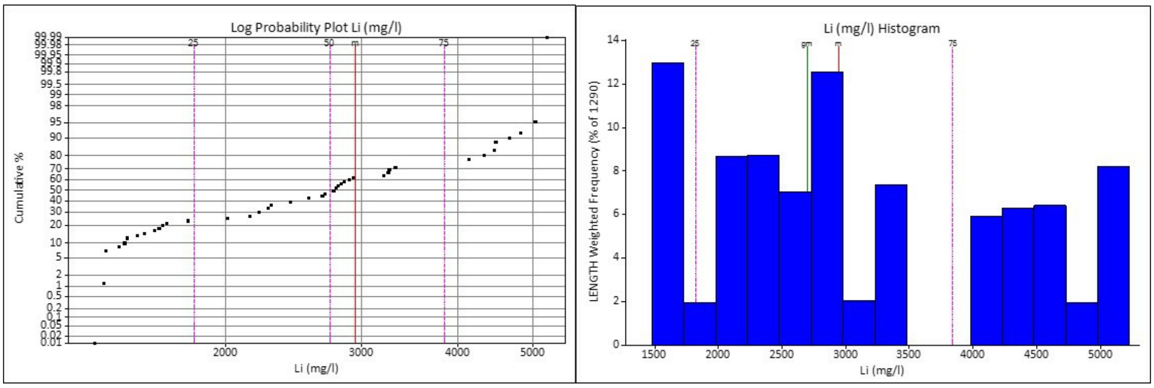
The vertical section view of Figure 11-4 shows the differences in sample size and location within boreholes. Figure 11-5 presents the log probability plot, histogram and the table of statistics of the raw data of lithium.





Source: SRK, 2022
Scales in meters

Figure 11-4: Distribution of Lithium Samples in Plan View (top) and Section View A-A' (bottom, Looking to N-NW) – Borehole Lithium Data Projected to Section A-A' - 30x Vertical Exaggeration

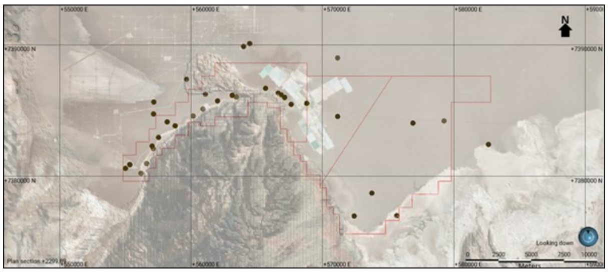


Column	Count	Minimum	Maximum	Mean	Variance	StDev	CV
Li (mg/l)	41	1,354	5,220	2,947	1,499,524	1,225	0.42

Source: SRK, 2022

Figure 11-5: Summary of Raw Sample Statistics of Lithium Concentration – mg/l, Log Probability and Histogram

Similar irregular distribution and variable lengths of the lithium data are observed in the specific yield (Sy) data (from hydraulic tests). A different set of data from the lithium data set was used to evaluate Sy in each lithological unit, including historical data. Figure 11-6 shows the location of the borehole collars that have Sy tests on the property. Section 7-3 present more details of Sy by hydrogeological unit.



Source: SRK, 2022

Figure 11-6: Specific Yield Samples in Plan View

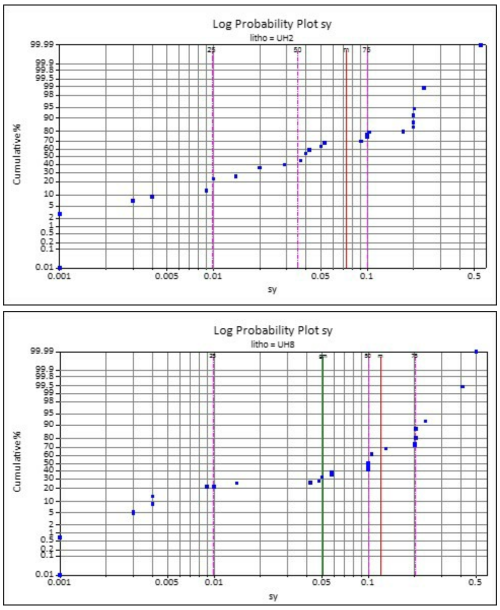
11.1.3 Drainable Porosity or Specific Yield (Sy)

The drainable porosity or Sy measurements do not properly cover all lithologic units and only in two units is there sufficient data to make an estimate, upper halite and volcanoclastic units, where the Sy was estimated. Sy values used for the other lithologic units were based on general information, including studies in Salar de Atacama outside of Albemarle's claim, and QP's experience in similar deposits. The Chapter 7 summarize the Sy values measured in Salar de Atacama. . The statistics of the Sy raw data used in the block model estimations of Sy in the Upper Halite and VGC are shown in Table 11-1. Table 11-2 presents the Sy values assigned to the rest of the lithological units based on literature information. Figure 11-7 presents the Sy probability plots for the lithological units UH2 and UH8.

Table 11-1: Drainable Porosity (Sy) Raw Data - Upper Halite and Vulcanosedimentary Units

Column	Count	Minimum	Maximum	Mean[1]	Variance	StDev	CV
Upper Halite (UH2)							
Sy	25	0.001	0.55	0.074	0.01	0.093	1.31
Vulcanosedimentary Unit (UH8)							
Sy	27	0.0014	0.500	0.123	0.01	0.12	0.98

Source: SRK, 2022
[1] Length weighted statistics



Source: SRK, 2022

Figure 11-7: Probability Plots of Sy - UH2 and UH8 Lithology Units

Table 11-2: Drainable Porosity (Sy) Values Used for Other Lithological Units

Unit	Sy
UH1 (Unconsolidated Deposits)	0.09
UH3 (Intermediate Halita)	0.05
UH4 (Silt, Clay and Salts)	0.02
UH5 (Lower Halite)	0.02
UH6 (Silt and Salt)	0.07
UH9 (Sedimentary West)	0.045
UH11 (Basement)	0.0

Source: SRK, 2022
Values estimated based on available measured data outside of mining claim (if available), literature, comparative values with the other units and QP's experience in similar deposits.

11.2 Mineral Resources Estimates

The primary factors utilized in developing a brine resource estimate include the following:

- Aquifer geometry and limits (volume)
- Drainable porosity (Sy) of the hydrogeological units in the salar
- Lithium concentration

11.2.1 Domains

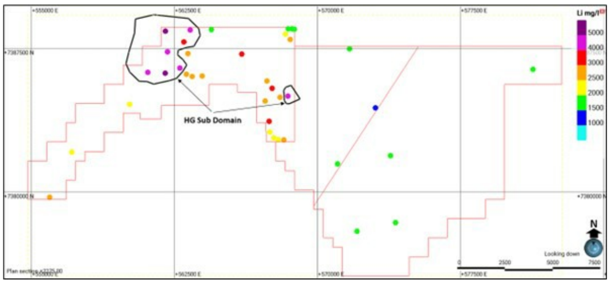
Resource Domain Model

The resource was calculated and limited to the current Albemarle claim area shown in Figure 11-2 (A1, A2, and A3). The total surface area is 16,725.58 ha, including the aquifers and aquitards present in the subsurface and excluding the bedrock.

Based on the knowledge of the deposit, Li populations analysis and the spatial distribution of the Li concentration in Atacama, SRK defined two sub-domains: High and Low lithium concentrations (HG and LG).

The following criteria was considered to define the limits of the domains HG (Figure 11-8) and LG:

- Two populations observed in the probability plot and histogram at approximately 3,500 mg/l Li threshold.
- Spatial distribution of High Li concentration in Peninsula de Chepica
- Influence of operational ponds



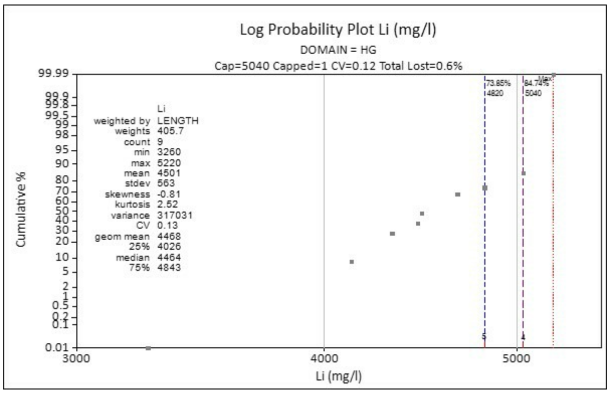
Source: SRK, 2022

Figure 11-8: Spatial Distribution of High Lithium Concentration Sub-Domain

SRK has coded the drilling and block model information into these sub-domains which are stored in the block model under the field "DOMAIN". The statistical analysis and lithium estimation were completed using hard boundaries for the HG and LG sub-domains. The lithological units are not considered sub-domains as they are not influencing the Li concentrations.

11.2.2 Capping and Compositing

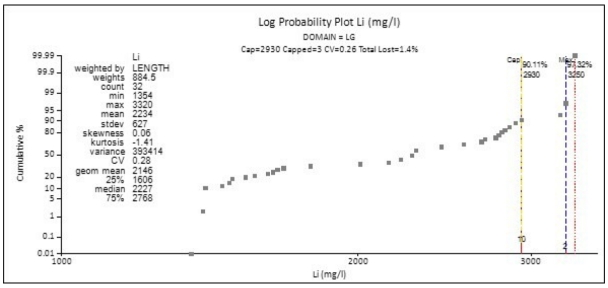
Capping of high-grade outlier data is normally performed where these data points are interpreted to be part of a different population. In SRK's opinion, capping is appropriate at the Salar de Atacama for dealing with high lithium concentration outlier values for the two sub-domains. This included the review of high-yield outlier data to determine whether top cutting or capping was required that may bias or skew data for statistical and geostatistical analyses. Log-probability plots (Figure 11-9 and Figure 11-10) were assessed and a cap at 5,040 mg/l Li was applied to the HG domain and 2,930 mg/l Li for the LG domain. The tables in Figure 11-9 and Figure 11-10 present the impact of the capping on the population statistics of lithium, resulting in one outlier value capped and a reduction of 0.6% and 1.4% of the mean of lithium for the input data in HG and LG sub-domains respectively. The impact to the coefficient of variation is limited to a slight reduction.



Data	Element	Count	Capped	Cap (Li – mg/l)	Percentile	Lost (Li mean)	Mean (mg/l)	Max (mg/l)	Variance	CV
Raw	Lithium	9					4,501	5,220	317,031	0.13
Capped	Lithium	9	1	5,040	84.74%	0.6%	4,473	5,040	276,597	0.12

Source: SRK, 2022

Figure 11-9: Capping Analysis (Probability Plot of Lithium) and Table of Impact of Capping (Statistics- Length weighted) – HG Sub-Domain

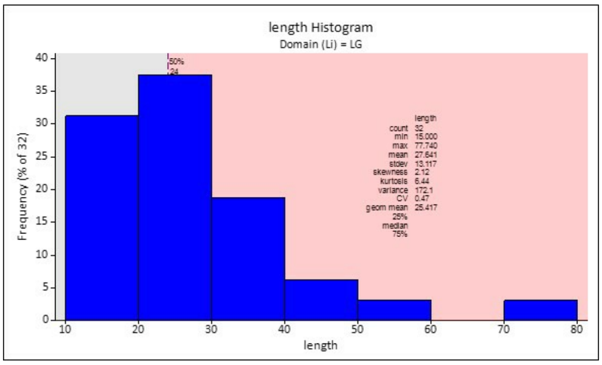


Data	Element	Count	Capped	Cap (Li – mg/l)	Percentile	Lost (Li mean)	Mean (mg/l)	Max (mg/l)	Variance	CV
Raw	Lithium	32					2,234	3,320	393,414	0.28
Capped	Lithium	32	3	2,930	90.11%	1.4%	2,202	2,930	334,392	0.26

Source: SRK, 2022

Figure 11-10: Capping Analysis (Probability Plot of Lithium) and Table of Impact of Capping (Statistics – Length weighted) – LG Sub-Domain

Previous to the grade interpolation, samples need to be composited to equal lengths for consistent sample support. The raw sampling data for lithium is characterized by variable lengths and discontinuous sampling along the boreholes. Figure 11-11 presents the histogram of the raw sample lengths for the LG domain. Given the nature of the hydraulic sampling and the differences in lengths, SRK carried out a number of tests using different lengths of compositing and determined that 25 m and 50 m composites are appropriate for the LG and HG domains respectively. This is based on the nature of sampling in brine projects, which is effectively still sampling a single horizon in which the brine concentrations are assumed to not vary within the sample interval. As a result, an increasing number of composites compared with the number of raw intervals was obtained. The compositing was performed using the compositing tool in Maptek Vulcan software. Table 11-3 shows the comparative statistics for the raw samples and the composites. In general, SRK aims to limit the impact of the compositing to less than 5% change in the mean value after compositing. Changes below 0.5% in the mean values are observed.



Source: SRK, 2022

Figure 11-11: Histogram of Length of Samples of Lithium (mg/l) – LG Domain

Table 11-3: Comparison Raw vs Composite Statistics

Data	Element	Count	Minimum (mg/l)	Maximum (mg/l)	Mean (mg/l)	Variance	StDev	CV
HG Sub-Domain								
Samples	Lithium	9	3,260	5,040	4,473	276,597	525.9	0.12
Composites (50 m)	Lithium	12	3,260	5,040	4,473	267,772	517.0	0.12
LG Sub-Domain								
Samples	Lithium	32	1,354	2,930	2,202	334,392	578.3	0.26
Composites (25 m)	Lithium	39	1,480	2,930	2,204	294,482	542.7	0.25

Source: SRK, 2022
Non weighted statistics

The samples cross geological boundaries but considering that there are not impermeable barriers to limit the groundwater flow, QP considers it unnecessary to break down by geology.

Specific Yield (Sy)

The capping analysis was completed, including the use of probability plots (Figure 11-7) and statistical analysis of the Sy data. As a result, the UH2 raw data was capped to 0.35 and no capping was used for the UH8 data. The capping was applied before the compositing process.

Composites of 25 m were used for the data to estimate Sy into blocks for the Upper Halite and the Volcano sedimentary units, where there is enough data to support the estimation.

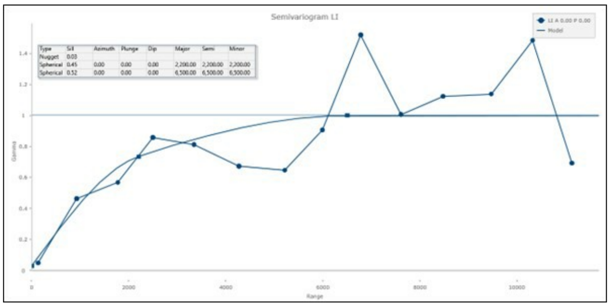
11.2.3 Spatial Continuity Analysis

The spatial continuity of lithium at the Atacama property was assessed through the calculation and interpretation of variography in each sub-domain. The variogram analysis was performed in Vulcan Software (version 12.0.5) using the capped and composited data.

The following aspects were considered as part of the variography analysis:

- Analysis of the distribution of data via histograms
- Downhole semi-variogram was calculated and modeled to characterize the nugget effect
- Experimental semi-variograms were calculated to define directional variograms for the main directions defined from the fan variograms analysis. Results were inconclusive to define anisotropy, due in part to the spatial distribution of the samples.
- Omnidirectional variogram was modeled using the nugget and sill previously defined in the downhole/directional variography.
- The total sill was normalized to 1.0

The dominant anisotropy of lithium cannot be appropriately assessed due to the data distribution across the property. The omnidirectional variogram model was preferred for the neighborhood analysis and estimation. The graphical (Figure 11-12) and tabulated (Table 11-4) semi-variogram for lithium (LG Sub-domain) is provided below. Due to the low quantity of data in the HG-Sub-domain, the variopgraphy couldn't be appropriately completed. The lithium in the HG domain was estimated using the Inverse Distance (power 2) method.



Source: SRK, 2022

Figure 11-12: Experimental and Modeled Omnidirectional Semi-Variogram for Lithium – LG Sub-domain

Table 11-4: Modeled Omnidirectional Semi-Variogram for Lithium

Variable	Rotation	Type	Variance	Range X (m)	Range Y (m)	Range Z (m)
		Nugget	0.03			
Lithium	NA	Spherical	0.45	2,200	2,200	2,200
		Spherical	0.52	6,500	6,500	6,500

Source: SRK, 2022

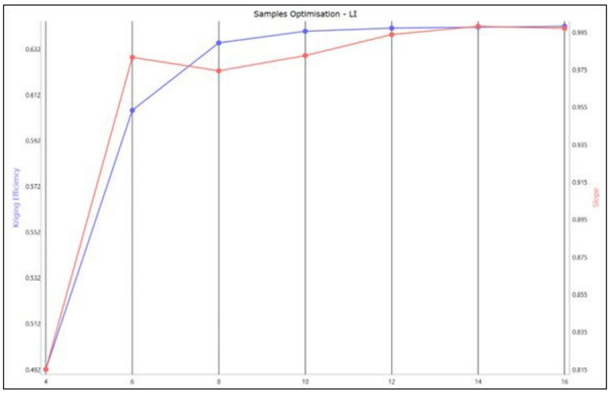
The nugget effect is 3% with maximum range at 6,000 m.

Specific Yield

The distribution and quantity of Sy tests samples per lithology are not sufficient to support an appropriate spatial analysis per lithology. Inverse distance weighted (IDW) estimation methodology was used to estimate Sy in UH2 and UH8 lithological units.

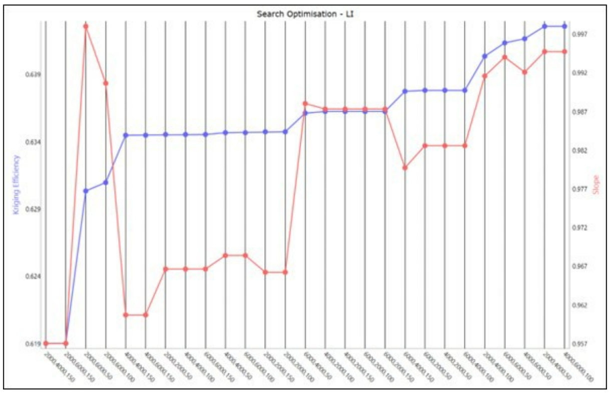
11.3 Neighborhood Analysis

Based on the results of the variography analysis, a neighborhood analysis was completed on the lithium data. This analysis provides a quantitative method of testing different estimation parameters and, by accessing their impact on the quality of the resultant estimate, select the appropriate value of each parameter. The slope or regression value (SOR) and kriging efficiency (KE) were used as the determining factors to optimize the kriging search neighborhood. Factors used in the neighborhood analysis included number of samples (Figure 11-13) and search (Figure 11-14).



Source: SRK, 2022

Figure 11-13: Neighborhood Analysis on Number of Samples for Lithium



Source: SRK, 2022

Figure 11-14: Outputs from the Search Ranges Optimization Analysis

Based on the results of the optimizations and other factors like the spatial distribution of samples and the characteristics of the hydraulic tests, the neighborhood parameters were defined for estimation of lithium at the Atacama property and are summarized in Table 11-5.

Table 11-5: Summary Search Neighborhood Parameters for Lithium

Variable	Pass	SDIST X (m)	SDIST Y (m)	SDIST Z (m)	Rotation	Min # Composites	Max # Composites	Max # Composites per Drillhole
					LG Domain			
Lithium	1	4,000	4,000	50	NA	4	10	2
	2	10,000	10,000	100	NA	1	10	2
					HG Domain			
Lithium	1	4,000	4,000	75	NA	2	8	2
	2	10,000	10,000	100	NA	1	10	2

Source: SRK, 2022

A block size analysis was performed (Figure 11-15). The optimization results with a final block size of 500 m x 500 m x 25 m (X, Y, Z coordinates) used. Besides of this, the analysis considered the distribution and spacing of the data, that is approximately 500 m in the best informed areas. The compositing length of 25 m was an aspect considered to define the extension of the parent cells in elevation, maintaining consistency with it. The block size selected shows reasonable values of slope of regression and kriging efficiency and is appropriate according to the distribution and spacing of the data.

Source: SRK, 2022

Figure 11-15: Outputs from the Block Size Optimization Analysis

11.3.1 Block Model

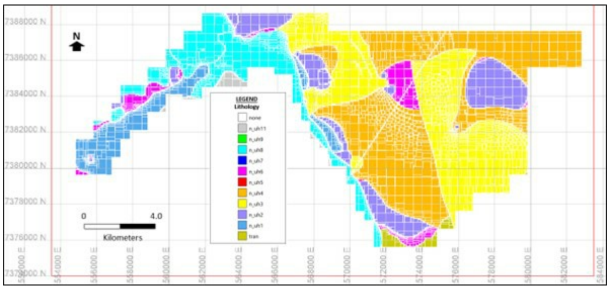
A block model was constructed using Maptek's Vulcan™ software (version 12.0.5.18; Maptek Pty Ltd, 2020) for the purposes of interpolating grade and tonnage. The block model was sub-blocked along geological and mineral claim boundaries. The dimensions of the parent cell size used are 500 m in X, 500 m in Y, and 25 m in Z. The minimum sub-blocks sizes used are 10 m x 10 m 1 m. Grade interpolation was performed on parent cells. The block model limits were defined by the mineral claim polygons with the extents of the block model shown in Figure 11-4. Blocks were visually validated against the 3D geological model and the mineral claim boundaries. Table 11-6 contains the block model parameters.

Table 11-6: Summary Atacama Block Model Parameters

Dimension	Origin (m)	Parent Block Size (m)	Number of Blocks	Min Sub Blocking (m)
X	547,500	500	100	10
Y	7,360,000	500	100	10
Z	2,100	25	24	1

Source: SRK, 2022

The blocks were flagged with the geological units and mineral claims identifiers. Figure 11-16 presents the lithology color coded block model. The values of Sy were assigned into the blocks according to the hydrogeological units. For Upper Halite and the Volcanoclastic units, the Sy values were interpolated into the blocks.



Source: SRK, 2022

Figure 11-16: Plan View of the Atacama Block Model Colored by Lithology (2,275 masl)

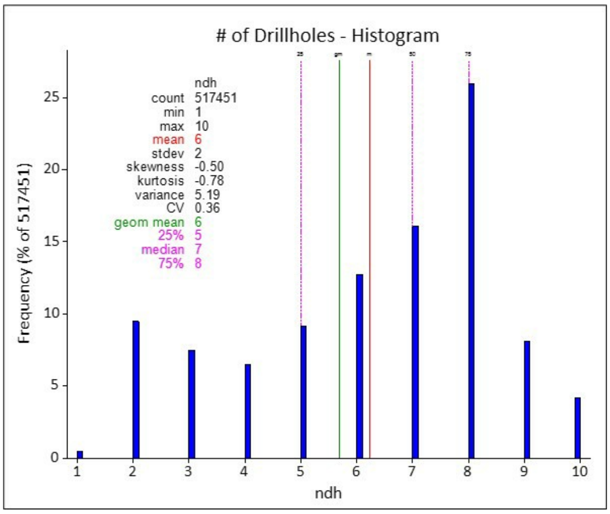
11.3.2 Estimation Methodology

Interpolation of Lithium

SRK used the composited data to interpolate the lithium grades into the block model using Ordinary Kriging (OK) and inverse distance weighting (IDW2 first pass, IDW3 second pass). Nearest neighbor (NN) estimation was performed for validation purposes only. The grade estimations were completed in Maptek's Vulcan™ software (version 12.0.5.18; Maptek Pty Ltd, 2020). The dimensions of the second pass are larger than the range of the lithium variogram, which is why it was used the IDW methodology. The power of three (IDW3) was used to limit excessive dispersion of the Li concentrations.

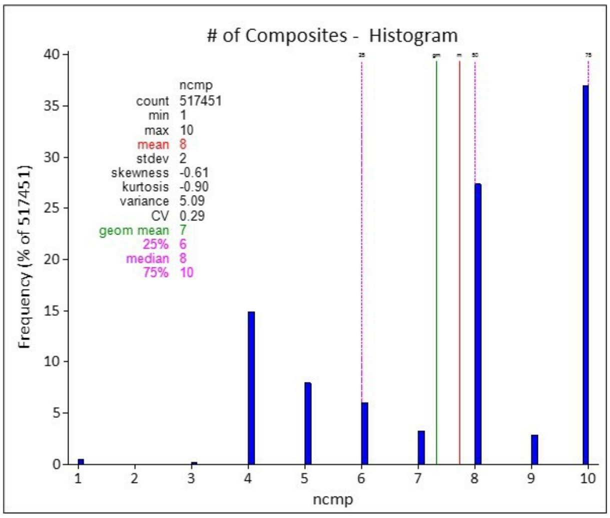
SRK completed OK estimates using the 4,000 m x 4,000 m x 50 m ellipsoid for the first pass and used IDW3 estimates for the second pass using 10,000 m x 10,000 m x 100 m ellipsoid as being most representative of the underlying data and the type of lithium deposit. The power of three was used for IDW to avoid excessive dispersion of Li concentrations.

The images in Figure 11-17 through Figure 11-19 show the results of the estimation in terms of number of boreholes, number of composites and the distances from the blocks to the composites used during the estimation. The majority of the blocks were estimated with two or more drillholes and between four and ten composites. The distance between the blocks and the composites used during the estimation has an average of 3,420 m and in most cases with distances less than 5,000 m. In SRK's opinion, this provides confidence that the estimation methods are appropriate.



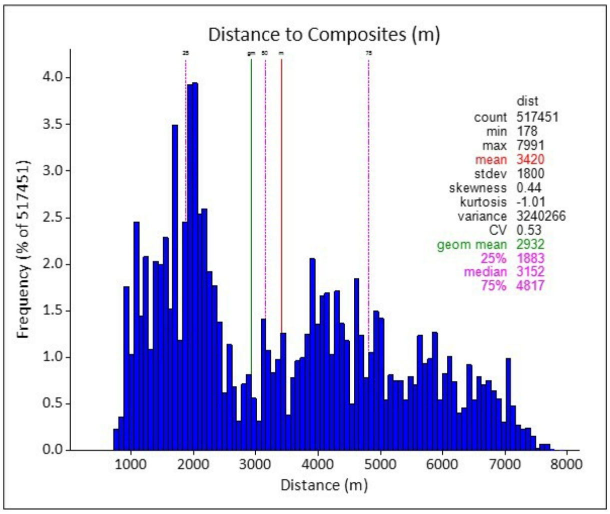
Source: SRK, 2022

Figure 11-17: Histogram of Number of Boreholes Used to Estimate the Block Model



Source: SRK, 2022

Figure 11-18: Histogram of Number of Composites Used to Estimate the Block Model



Source: SRK, 2022

Figure 11-19: Histogram of Average Distance from Blocks to Composites Used in Estimation

It is the QP's opinion that the methodology used in the lithium OK and IDW3 estimate is appropriate for resource model calculations.

Interpolation of Specific Yield (Sy)

SRK used the 25 m composited data to interpolate the Sy values into the block model using IDW2 and a single search pass with the ellipsoid 8,000 m x 8,000 m x 8,000 m. The search ellipse size in Z is large to make sure the estimation of all the blocks inside each lithological units that are characterized by a flattened shape. the Sy values were interpolated using the data of the lithological units Volcano-sedimentary (UH8)) and Upper Halite (UH2) into the blocks flagged accordingly and defining hard boundaries and using the search neighborhood parameters presented in Table 11-7. Sy values were assigned into the blocks of the lithologies that were not interpolated according to the values presented in Table 11-2. The Sy mean grade of the resulting interpolated blocks in the Volcano-sedimentary and Upper Halite units was assigned to the blocks not interpolated in those units.

Table 11-7: Summary Search Neighborhood Parameters for Sy (UH2 and UH8 lithologies)

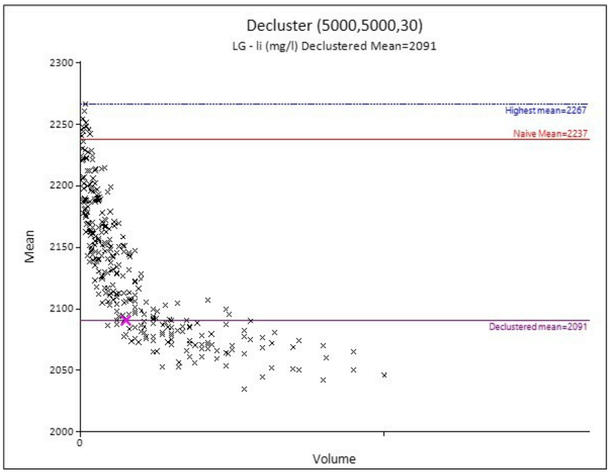
Variable	Pass	SDIST X (m)	SDIST Y (m)	SDIST Z (m)	Rotation	Min # Composites	Max # Composites	Max # Composites per Drillhole
					UH2 and UH8 Lithologies			
Sy	1	8000	8000	8000	NA	2	6	2

Source: SRK, 2022

11.3.3 De-Clustering

A de-clustering cell analysis of the composites was completed to obtain de-clustered statistics for model validation purposes for lithium and Sy. Additionally, the NN estimation of lithium and Sy was used as a spatially de-clustering method for comparative validation.

Figure 11-20 presents an example of the scatter plot (Li average vs Cell Size) obtained for the de-clustering analysis of the lithium composites in the LG domain. Ultimately, a 5,000 m x 5,000 m x 50 m cell size was selected to calculate de-clustered statistics and estimation validation of lithium.



Source: SRK, 2022

Figure 11-20: De-Clustering Analysis Showing Scatter Plot of Cell Size versus Lithium Mean – LG Domain

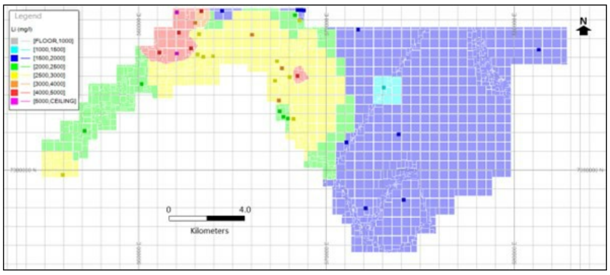
11.3.4 Estimate Validation

SRK undertook a validation of the interpolated model to check that the model represents the input data, the estimation parameters and that the estimate is not biased. Different validation techniques were used, including:

- Visual comparison of lithium grades between block volumes and raw borehole samples
- Comparative lithium statistics of de-clustered composites and the alternative estimation methods (OK, IDW3, and NN)
- Swath plots for lithium mean block and composite sample comparisons
- Visual comparison and swath plots comparison for Sy in blocks estimated using IDW2 and NN in the lithologies Volcano-Sedimentary (UH8) and Upper Halite (UH2).

Visual Comparison

Visual validation of drilling data to estimated block grades was completed in 3D. In general, estimated block grades compared well with acceptable correlation from drilling data. Figure 11-21 shows examples of the visual validations in plan view at 2,225 mamsl.



Source: SRK, 2022

Figure 11-21: Example of Visual Validation of Lithium Grades in Composites Versus Block Model Horizontal Section - Plan View (2,225 mamsl Elevation)

Comparative Statistics

SRK performed a statistical comparison of the de-clustered composites to the estimated blocks to assess the potential for bias in the estimated lithium grades. The comparison included the review of the histograms for lithium and the mean analysis between the blocks and composites from aquifers (Table 11-8).

The mean interpolated lithium values by OK, IDW2 and NN are similar and are slightly lower grade than the de-clustered lithium grade. The comparison between data and the blocks is better in the areas with higher density of data, as shown in swath plots comparing the means by area. The interpolated lithium concentrations using the combined OK and IDW2 has a better correlation with the data and provides information of the interpolation error and quality.

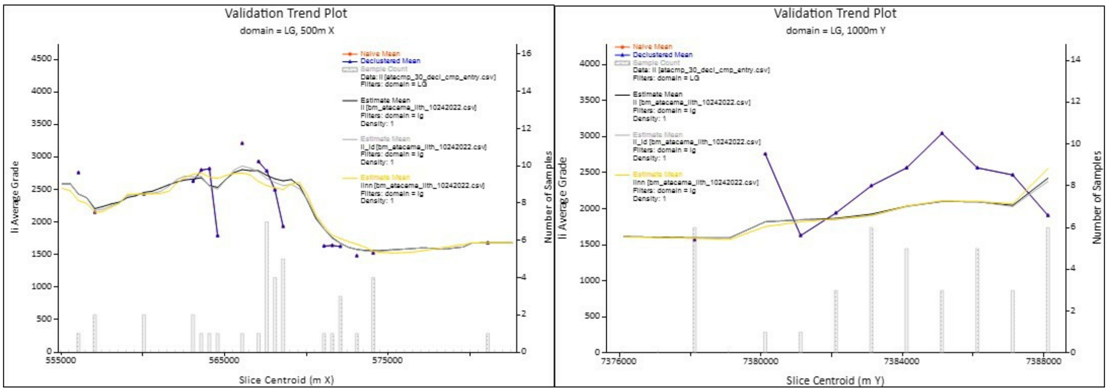
Table 11-8: Summary of Validation Statistics Composites Versus Estimation Methods (Lithium-Aquifer Data)

Statistic	Declustered Sample Data Li (mg/l)	Block Model (OK-1st pass, ID3-2nd pass)	Ordinary Kriging - Block Data (Volume Weighted) Li (mg/l)	Inverse Distance - Block Data (Volume Weighted) Li (mg/l)	Near Neighbor- Block Data (Volume Weighted) Li (mg/l)
DOMAIN - LG					
Mean	2,091	1,945	1,978	1,938	1,942
Std Dev	544	473	450	472	508
Variance	295,974	224,406	202,089	222,602	258,278
CV	0.26	0.24	0.23	0.24	0.26
DOMAIN - HG					
Mean	4,476	4,468	4,471	4,475	4,457
Std Dev	539	278	277	390	468
Variance	290,492	77,146	76,561	151,765	219,245
CV	0.120	0.062	0.062	0.087	0.105

Source: SRK, 2022

Swath Plots

The swath plots of lithium in X and Z coordinates shown in Figure 11-22 represent a spatial comparison between the mean block grades interpolated using alternative methods and the de-clustered composites. The areas of higher variability between the composites and estimates at Atacama occur in the areas of the deposit with lower quantity of data.



Source: SRK, 2022

Figure 11-22: Lithium (mg/l) – LG Domain - Swath Analysis at Atacama (X and Y Coordinates)

The QP's opinion is that the validation through the use of visual comparison, comparative statistics, and swath plots provide a sufficient level of confidence to confirm that the model accurately represents the input data, the estimation parameters are reasonable, and that the estimate is not biased.

11.4 Cut-Off Grade Estimates

The CoG calculations are based on assumptions and actual performance of the Salar de Atacama operation. Pricing was selected based on a strategy of utilizing a higher resource price than is used for the reserve estimate. For the purpose of this estimate, the resource price is 10% higher than the reserve price of US$20,000/t technical grade lithium carbonate, the basis for which is presented in Section 16.1.3. This results in the use of a resource price of US$22,000/t of technical grade lithium carbonate. The QP considers this pricing appropriate for resource estimate considering the market study, life of project (20+ years), and current uncertainty in the market.

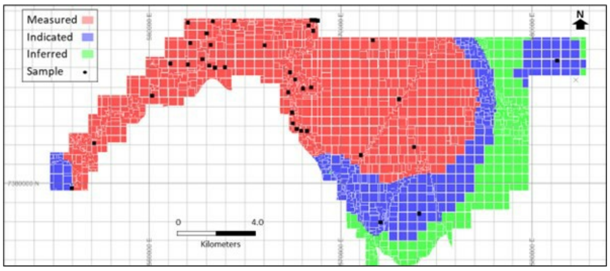
SRK utilized the economic model to estimate the break-even cut-off grade, as discussed in Section 12.3. Applying the US$22,000/t lithium price to this methodology resulted in a break-even CoG of approximately 800 mg/L lithium, applicable to the resource estimate.

11.5 Resource Classification and Criteria

Resources have been categorized subject to the opinion of the QP based on the amount/robustness of informing data for the estimate, consistency of geological/concentration distribution, survey information, and have been validated against long term production information. Other criteria to support the categories of the resource model were based on the normalized variance, sample distribution, lithology (boreholes), and radius of influence from the pumping wells.

- Measured resources were assigned to areas with high confidence in the aquifer, aquitard geometry and historical production behavior. From the kriging distribution quality point of view, the blocks with normalized kriging variance under 0.25 were considered when defining the classification in conjunction with the other criteria mentioned above. Samples collected in a pumping well also represent the brine surrounding at an extent proportional to the hydraulic radius of influence. Considering than several of the production wells have been in operation over 20 years, generating a large radius of influence, the measured resource areas were adjusted to include those zones. Blocks within 25% of the radius of influence are classified as measured. Finally, using the QP's criteria, the distribution of the measured resource was slightly adjusted considering the coverage of boreholes, distribution of lithium samples and the continuity of measured blocks in 3D (Figure 11-23).
- Classification of Indicated resources is done only for those domains with sufficient confidence in the aquifer and aquitard geometry, and sufficient density of the lithium samples. These volumes are very well correlated with the blocks with normalized variance between 0.25 and 0.5. Local inherent variability in the geometry of the aquifers has been considered in this classification and has been manually limited in areas of greater concern.
- Brine hosted aquifers with no or low drill density, and no or low lithium samples, have been classified as Inferred. Inferred also corresponds to the blocks with normalized variance over 0.5. Areas close to the border between the salar nucleus (halite) and transition zones

present less confidence in the lithium concentration's continuity, consequently, were also classified as inferred.



Source: SRK, 2022

Figure 11-23: Model Horizontal Section - Plan View – Blocks Colored by Classification (2,250 masl Elevation)

11.6 Uncertainty

SRK considered a number of factors of uncertainty in the classification of the mineral resource estimation:

- The lack of availability of site-specific data for Sy values in some units results in uncertainty associated with estimates of brine volume potentially available for extraction. To mitigate this uncertainty, the values were based on literature data of similar lithology units, studies in Salar de Atacama outside of Albemarle claim areas, and considering the QP's experience in similar deposits. Additionally, the resource area has a high density of boreholes a good interpretation of the geology, which drives Sy estimates.
- The southeastern zone of the Albemarle claim area is close to the transition zone, which partially covers the upper halite (UH2). The presence of undetected lower lithium concentration brines is a potential risk. To mitigate this uncertainty, part of the resources calculated in this zone were classified as inferred.
- Resource in claim area A3 was calculated with a lower density of brine samples which includes data form 2018. Therefore, the indicated and inferred resources in this area have been increased. A brine sampling campaign in this area will help to increase the measured resources.
- The integration of new information recently collected in the geological model causes the redefinition of the distribution of the geological units in the Atacama. The changes in the volumes of each rock unit, which are directly associated with their specific yield distribution, result in the overall metal quality decreasing. Currently, unit UH4 presents the highest degree of uncertainty in its distribution.

11.7 Summary Mineral Resources

SRK has reported the mineral resources for Salar de Atacama as mineral resource exclusive of reserves. The resources are reported above the elevation of 2,200 mamsl and below the measured water table, which corresponds to the zone of brine with better coverage of sampling, geology and Sy data.

Table 11-9 presents the mineral resource exclusive of reserves. Resource from brine is contained within the resource aquifers with the estimated reserve deducted from the overall resource. This calculation was completed by calculating total lithium (as lithium metal) projected as being pumped from the aquifer in the reserve production forecast. This quantity of lithium (as metal) was directly subtracted from the overall mineral resource estimate. Notably, the resource grade was not changed as part of this exercise. This is because the resource, exclusive of reserve, and reserve do not represent discrete areas of the resource due to the brine aquifer (i.e., the resource) being a dynamic system that moves, mixes and recharges. Therefore, the resource, after extraction of the reserve, in reality would be an entirely new resource, requiring new data and a new estimate. As this is not practical with current data, in the QP's opinion, it is more appropriate to keep the calculation simple and transparent and utilize this approach. Further, as the dynamic resource precludes direct conversion of measured / indicated resources to proven / probable reserves, in the QP's opinion, the most reasonable and defensible approach to allocating depletion of the reserve from the resource is to deplete measured and indicated resource proportionate to their contribution to the combined measured and indicated resource. As measured resources comprise 56% of the combined measured an indicated resource, 56% of the reserve depletion was allocated to measured, with the remainder subtracted from indicated. For comparison, proven reserves comprise approximately 57% of the overall reserve (i.e., measured resource is deducted proportionate to the proven reserve).

Table 11-9: Salar de Atacama Mineral Resource Estimate, Exclusive of Mineral Reserves (Effective August 31, 2022)

	Measured Resource		Indicated Resource		Measured + Indicated Resource		Inferred Resource	
	Contained Li (Tonnes x 1,000)	Brine Concentration (mg/L Li)	Contained Li (Tonnes x 1000)	Brine Concentration (mg/L Li)	Contained Li (Tonnes x 1000)	Brine Concentration (mg/L Li)	Contained Li (Tonnes x 1000)	Brine Concentration (mg/L Li)
Total	470.8	2,390	362.8	1,943	833.6	2,195	236.8	1,617

Source: SRK, 2022

- Mineral resources are reported exclusive of mineral reserves. Mineral resources are not mineral reserves and do not have demonstrated economic viability.
- Given the dynamic reserve versus the static resource, a direct measurement of resources post-reserve extraction is not practical. Therefore, as a simplification, to calculate mineral resources, exclusive of reserves, the quantity of lithium pumped in the life of mine plan was subtracted from the overall resource without modification to lithium concentration. Measured and indicated resource were deducted proportionate to their contribution to the overall mineral resource.
- Resources are reported on an in situ basis.
- Resources are reported above the elevation of 2,200 masl. Resources are reported as lithium metal
- Resources have been categorized subject to the opinion of a QP based on the amount/robustness of informing data for the estimate, consistency of geological/grade distribution, survey information.
- Resources have been calculated using drainable porosity estimated from measured values in Upper Halite and Volcano-sedimentary units, and bibliographical values based on the lithology and QP's experience in similar deposits
- The estimated economic cut-off grade utilized for resource reporting purposes is 800 mg/l lithium, based on the following assumptions:
  - A technical grade lithium carbonate price of US$22,000 / metric tonne CIF La Negra. This is a 10% premium to the price utilized for reserve reporting purposes. The 10% premium applied to the resource versus the reserve was selected to generate a resource larger than the reserve, ensuring the resource fully encompassed the reserve while still maintaining reasonable prospect for eventual economic extraction.
  - Recovery factors for the salar operation increase gradually over the span of 4 years, from the current 40% to the proposed SYIP 65% recovery in 2025. After that point, evaporation pond recovery is relatively constant at 65%. An additional recovery factor of 80% lithium recovery is applied to the La Negra lithium carbonate plant.
  - An average annual brine pumping rate of 414 L/s is assumed to meet drawdown constraint consistent with Albemarle's permit conditions.
  - Operating cost estimates are based on a combination of fixed brine extraction, G&A and plant costs and variable costs associated with raw brine pumping rate or lithium production rate. Average life of mine operating cost is calculated at approximately US$4,155/metric tonne CIF Asia.
  - Sustaining capital costs are included in the cut-off grade calculation and post the SYIP installation, average around US$98 million per year.
- Mineral Resources tonnage and contained metal have been rounded to reflect the accuracy of the estimate, and numbers may not add due to rounding.
  - SRK Consulting (U.S.) Inc. is responsible for the Mineral Resources with an effective date: August 31, 2022.

11.8 Recommendations and Opinion

It is the QP's opinion that the aquifers' geometry, brine chemistry composition, and the Sy of the basin sediments have been adequately characterized to support the resource estimate for Salar de Atacama, as classified.

The mineral resources stated herein are appropriate for public disclosure and meet the definitions of measured, indicated and inferred resources established by SEC guidelines and industry standards. Based on the analysis described in this report, the QP's understanding of resources that are exclusive of reserves, and the project's status of operating since 1984, in the QP's opinion, there is reasonable prospects for economic extraction of the resource.

The current lithium concentration data and Sy data is mostly located in claims areas A1 and A2. A3 in the eastern zone has less information. A similar situation occurs below 100 m depth, where few screen intervals exist, therefore few samples were collected.

SRK recommends implementing a drilling campaign in the aquifers within the claim area A3, focused on collecting Sy values and brine sampling. Rapid Brine Release Capacity (RBRC) samples for porosity test in Lower, intermediate and Lower Halite and Silt and salt unit (if possible); and pumping tests in unconsolidated deposits unit. Also, it is recommended a sample collection campaign from 100 to 150 m in all areas (A1, A2, and A3). The qualified person is of the opinion that, with consideration of the recommendations and opportunities outlined below that any issues relating to all applicable technical and economic factors likely to influence the prospect of economic extraction can be resolved with further work.

12 Mineral Reserve Estimates

This section describes the key assumptions, parameters, and methods used to simulate the movement of lithium-rich brines in Salar de Atacama in the process of their extraction, which is utilized to develop the reserve estimate.

12.1 Numerical Groundwater Model

A geologically based, 3D, numerical groundwater-flow and solute transport model was developed to evaluate the extractability of lithium-rich brine from Salar de Atacama. The model construction is based on an analysis of historical hydrogeologic data conducted by ALB and SRK. A 3D geologic model developed by SRK (Local and Regional models), described in Section 11.1, provides the framework of hydrogeologic units used in the numerical model.

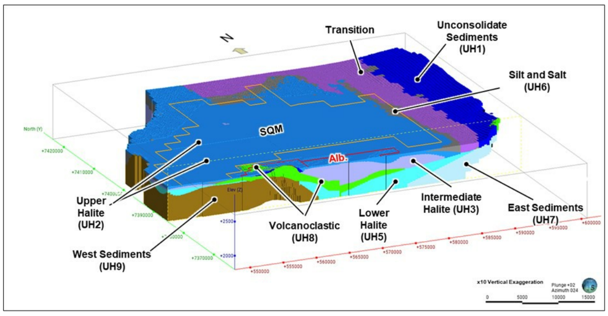
The sequence of modeling activities consists of Calibration, Transition, and Prediction simulations. The time period of each model is described below:

- Calibration: October 1997 to December 2021 (data available for model calibration)
- Prediction: January 2022 to December 2041 (Used for the reserve estimate period)

The Prediction model includes the period of time with measured data between the end of data available for calibration and the beginning of the reserve simulation (January to August 2022). The numerical groundwater flow and transport models were developed using the finite-difference code MODFLOW-UGS with the transport module (Panday et.al, 2013) via the Groundwater Vistas graphical user interface 8.30 Build 20 (ESI, 2017). The model was calibrated to available historical water level and lithium concentration data. The calibrated model was used to evaluate different production wellfield pumping regimes.

12.1.1 Model Domain and Grid

The model domain includes the Nucleus and marginal zone of Salar de Atacama, including halite units, volcanic, and clastic deposits in an area of 2,389.5 km^2 with 899,696 active cells and 19 layers. Model cell sizes vary from 50 m x 50 m to 400 m x 400 m. Model layers vary in thickness having an average of 5 m in the first ten layers to have a good representation for the salar surface units, increasing the thickness for deeper zones. The layers had been adjusted to follow the hydrogeological units (HU) geometry defined in the conceptual model allowing a minimum layer thickness of 2 m and a maximum of 194 m. Figure 12-1 shows the simulated hydrogeological units and breakdown of model layer thicknesses. Model grid and layering was developed to ensure proper representation of the aquifer units within the numerical model and a detail simulation of the pumping well effect within the Albemarle production areas. Figure 12-1 shows an oblique 3D view of the model.

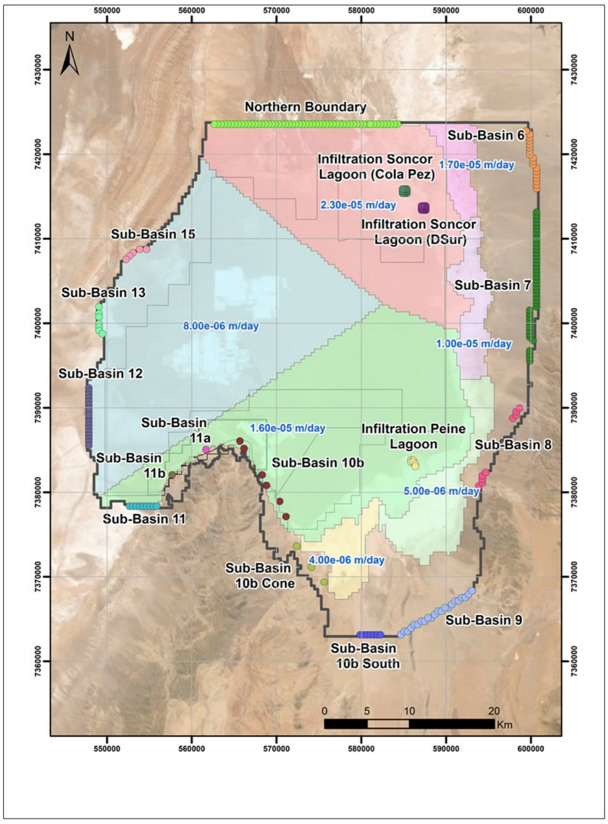


Source: SRK, 2022

Figure 12-1: Oblique 3D View of Numerical Groundwater Model

12.1.2 Flow Boundary Conditions

There are three primary natural groundwater inflow processes at Salar de Atacama: recharge by direct precipitation, indirect recharge on catchments surrounding the salar, and infiltration from lagoon/stream systems. There are two primary natural groundwater outflow processes: groundwater discharges from the salar at lower elevations via evapotranspiration and to surface water bodies (lagoons). A schematic of the key boundary condition types is presented in Figure 12-2. Points in this figure represent locations where lateral inflow and lagoon recharge were simulated, the points are labeled according to the recharge source. Color-shaded areas represent the precipitation-derived recharge areas and rates for the steady state simulation.



Source: SGA, December 2015; SRK 2022
Lateral inflow locations (simulated by injection wells are shown in different colors per Sub-Basin

Figure 12-2: Zones of Direct Recharge and Lateral Groundwater Inflow

Recharge

Direct recharge and lateral recharge location and rates were assumed from previous hydrogeological studies presented to the environmental agencies of Chile (SGA, 2015; and SGA, 2019) and from second update of the salar de Atacama groundwater model for the RCA 21/2016 (VAI, 2021). Direct recharge was simulated in the uppermost active layer as a transient boundary condition, at a monthly temporal resolution. Lateral groundwater recharge was simulated as a transient boundary condition, as injection wells in layers 1 through 18, depending on the lateral recharge location. Minor adjustments were made in the fluxes reported from sub-basins 10 and 11 to represent in more details the lateral recharge from Cordon de Lila. Figure 12-2 shows the distribution of direct recharge and the injection wells used for the lateral recharge simulation. Table 12-1 presents the infiltration rates and lateral inflows used for natural groundwater flow conditions (no pumping).

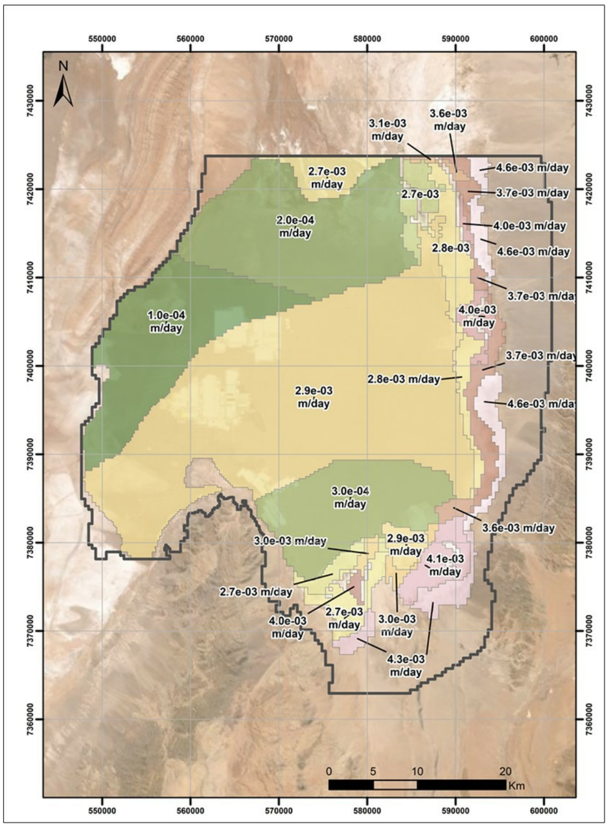
Table 12-1: Recharge Rates and Lateral Inflows Under Natural Conditions

Recharge Component	# Injection Wells		Total Inflow (L/s)
Sub-Basin 6	18	200	
Sub-Basin 7	43	425	
Sub-Basin 8	9	41	
Sub-Basin 9	22	348	
Sub-Basin 10a Cone	3	32	611
Sub-Basin 10a South	7	579	
Sub-Basin 10b	6	5	
Sub-Basin 11	9	90.8	92
Sub-Basin 11a	1	0.4	
Sub-Basin 11b	1	0.7	
Sub-Basin 12	18	10	
Sub-Basin 13	7	92	
Sub-Basin 15	5	7	
Northern Boundary	55	684	
Infiltration Peine Lagoon	6	9.1	
Infiltration Soncor Lagoon (Cola Pez)	9	25.0	25.0
Infiltration Soncor Lagoon (DSur)	9	0	
Total Recharge from Precipitation	**-**	**308**	

Source: VAI 2021; SRK 2022

Evapotranspiration

Evapotranspiration (ET) rates and spatial distribution were initially assumed from the previous environmental model (SGA, 2015 and VAI 2021) and modified during the calibration process. ET rates varied on a monthly basis, and ET was applied from the topographic surface to an extinction depth ranging from 1 to 2 m below the ground surface. Conservatively, lithium mass was removed with ET, to avoid artificial accumulation of lithium at the ground surface in the model and over-estimation of lithium availability. The spatial distribution of maximum ET rates in the model is shown in Figure 12-3.



Source: SGA, December 2015; SRK 2022
Values represent average evaporation rates for natural conditions (no pumping)

Figure 12-3: Zones of Simulated Maximum Evapotranspiration Rate

Lagoon/Stream Systems

Four lagoon/stream networks are identified in Salar de Atacama: Soncor, Aguas de Quelana, Peine, and La Punta – La Brava as shown in Figure 12-2. Soncor and Peine lagoons include infiltration from the surface water corresponding to 25 L/s and 11 L/s, respectively (SGA, 2015, SGA, 2019, and VAI, 2022). Surface water is not thought to infiltrate from the Aguas de Quelana and La Punta – La Brava lagoons.

The lagoon/stream networks are simulated as drain cells. Groundwater discharge rates into the lagoon/stream networks were simulated using the conceptual water balance model (Table 12-2).

Table 12-2: Conceptual Rates of Groundwater Discharges into the Lagoon/Stream Systems

Lagoon/Stream System	Flow (L/s)
Soncor	76
Aguas de Quelana	172
Peine	79
La Punta – La Brava	113

Source: SGA, 2016

Infiltration from the Soncor and Peine lagoons into groundwater were simulated as injection wells in the top layer of the model. Lagoon and stream areas are not assigned as an evaporation zone since water evaporating through those cells is controlled by the drain cells.

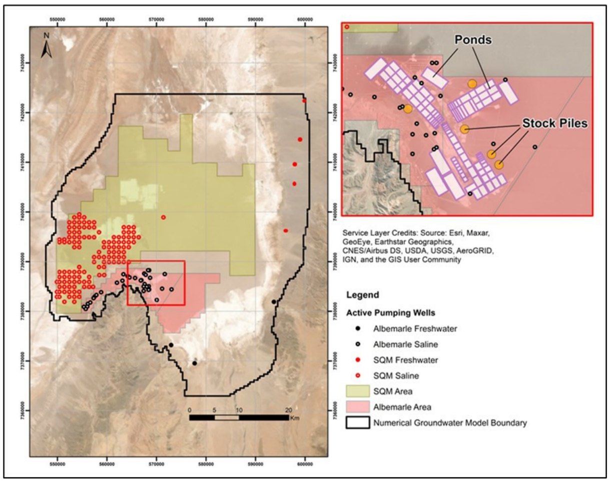
Location of groundwater discharge zones to lagoons, and infiltration from the lagoons are shown in Figure 12-2.

Pumping Wells and Artificial Recharge

Simulation of the historical brine extraction and freshwater wells by Albemarle and SQM are based on the construction details and historical flow rates presented in the environmental reports of Albemarle and SQM (SQM, 2020, SQM 2022 and www.sqmsenlinea.com). Details of the pumping rates in time for calibration and prediction are described in sections 12.1.3 and 12.1.4 below.

SQM brine injection was reported at annual average rates up to 384 L/s (SQM 2022 and www.sqmsenlinea.com). These values were simulated as injection wells in four locations within the SQM property, in layers 1 through 5 of the model.

Albemarle estimates that loss from operational ponds and stockpiles is up to 5% of the total brine pumping rate as leakage to the groundwater system (0.6 to 25 L/s), in addition some ponds has been adjusted with no leakage as part of the calibration process. Figure 12-4 shows locations of pumping wells in Salar de Atacama (historical pumping). The location of artificial injection wells used to simulate leakage from the Albemarle ponds is also shown in Figure 12-4.



Source: SRK, 2022

Figure 12-4: Location of Simulated Pumping Wells and Artificial Recharge Zones (Historical)

Solute -Transport Boundary Conditions

The following lithium concentration values were assumed in the recharge boundary conditions for the solute-transport simulations:

- Lateral recharge from sub-basins (fresh water): 3 to 10 mg/L
- Flows from the North and Southwest boundaries: 1,000 mg/L
- Infiltration from the Soncor and Peine lagoons/stream systems: 700 and 320 mg/L, respectively

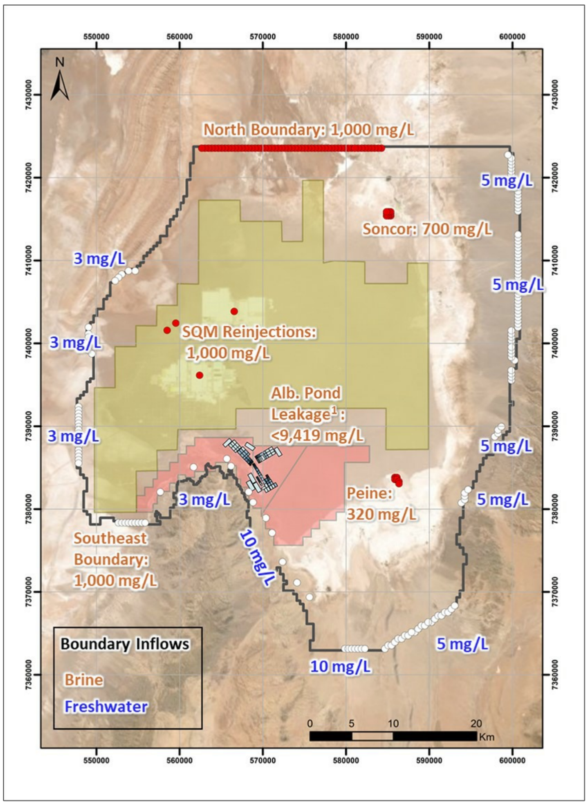
Lithium concentration values mentioned above are constant in time and are based on the hydrochemistry database presented in the environmental reports (SGA, 2019 and SQM, 2020) and in "Hydrogeochemical fluxes and processes contributing to the formation of lithium-enriched brines in a hyper-arid continental basin" (Munk et al., 2018).

Other assumptions for solute transport boundary conditions are as follows:

- Reinjected brines in SQM have concentration 1,000 mg/L of lithium (higher grades are expected in SQM reinjection brines; however, 1,000 mg/L was chosen as a minimum value to limit the "artificial" lithium available for the predicted Albemarle production).

- Seepage from Albemarle operational ponds has lithium concentrations with annual averages ranging between 6,652 to 9,419 mg/L. The adopted values correspond to the measured concentration operational records provided by Albemarle for this study.
- The effect of the direct recharge on the lithium concentration in the salar is negligible.
- Evapotranspiration removes lithium from the model (analogous to chemical precipitation).

Figure 12-5 shows the distribution of solute-transport boundary conditions.



Source: SRK, 2022
Colors in Albemarle ponds are proportional to the leakage concentration

Figure 12-5: Solute-Transport Boundary Conditions

12.1.3 Hydraulic and Solute Transport Properties

The hydrogeologic zones specified in the model were derived from the geologic model developed using the Leapfrog Geo software and described in Section 11.1. Aquifer parameters of hydraulic conductivity, specific yield, and specific storage in addition to the transport parameter of effective porosity are specified by hydrogeologic zone in the model.

Horizontal hydraulic conductivity values used in the model were derived from historical information from Albemarle, SQM, and CORFO as described in Section 7.3 and because of the calibration processes. A summary of hydraulic conductivity values measured per aquifer unit is shown in Table 12-3. This table also presents the final values defined at the end of the calibration process (calibrated values).

Table 12-3: Hydraulic Conductivity Values Used in the Numerical Model Compared with Measured Data

Hydrogeological Unit (UH)	Description	Horizontal Hydraulic Conductivity (K) (m/d)						
		Measured				Calibrated		
		#	Minimum	Maximum	Median [1]	Minimum	Maximum	Median [1]
Transition	Transition	57	0.001	3000	3	0.2	50	7
UH1	Unconsolidate Sediments	28	0.407	156	15.2	0.01	500	10
UH2	Upper Halite	189	0.005	6000	3	0.51	5987	1018.3
UH3	Intermediate Halite	157	0.00003	600	1	0.1	0.1	0.1
UH4	Silt, Clay, and Salt	127	0.00005	1110	4	0.01	0.01	0.01
UH5	Lower Halite	18	0.00006	21.7	0.1	0.072	0.072	0.072
UH6	Silt and Salt	132	0.005	2590	5	1	10	1
UH7	East Sediments	-	-	-	-	0.05	0.05	0.05
UH8	Volcanoclastic	63	0.005	380	0.4	0.3	24.2	0.33
UH9	West Sediments	13	0.006	8	0.3	0.08	0.08	0.08

Source: SRK 2022
= number of tests
[1] Median is the value in the middle of a set of measurements. Also called 50th percentile

Specific yield (Sy) values were also available in the historical records mentioned in Section 7. Sy values used in the model were derived from those values and adjusted during the calibration process. These values are shown in Table 12-4.

No specific storage (Ss) values were measured in Salar de Atacama. Specific storage values used in the model were derived from the QP's experience in similar deposits and as a result of the calibration process.

Table 12-4: Specific Yield and Effective Porosity Values Used in the Numerical Model Compared with Measured Data

Hydrogeological Unit	Description	#	Specific Yield (Sy) Measured Min	Specific Yield (Sy) Measured Max	Specific Yield (Sy) Measured Avg	Specific Yield (Sy) Simulated Min	Specific Yield (Sy) Simulated Max	Specific Yield (Sy) Simulated Avg	Specific Storage (Ss) (1/m) Simulated Min	Specific Storage (Ss) (1/m) Simulated Max	Porosity Simulated Min	Porosity Simulated Max
Transition	Transition		-	-	-	0.05	0.1	0.08	1.00E-06	1.00E-06	0.05	0.1
UH1	Unconsolidated Sediments	10	0.001	0.2	0.05	0.05	0.2	0.13	1.00E-06	1.00E-06	0.05	0.2
UH2	Upper Halite	9	0.001	0.55	0.09	0.08	0.08	0.08	1.00E-06	1.00E-06	0.08	0.08
UH3	Intermediate Halite	25	0.004	0.269	0.07	0.05	0.05	0.05	1.00E-06	1.00E-06	0.05	0.05
UH4	Silt, Clay, and Salt	19	0.003	0.554	0.11	0.01	0.01	0.01	1.00E-06	1.00E-06	0.01	0.01
UH5	Lower Halite	4	0.001	0.32	0.08	0.05	0.05	0.05	1.00E-06	1.00E-06	0.05	0.05
UH6	Silt and Salt	18	0.001	0.34	0.09	0.08	0.08	0.08	1.00E-06	1.00E-06	0.08	0.08
UH7	East Sediments		-	-	-	0.03	0.03	0.03	1.00E-06	1.00E-06	0.03	0.03
UH8	Volcanoclastic	36	0.001	0.558	0.16	0.05	0.2	0.08	1.00E-06	1.00E-06	0.05	0.2
UH9	West Sediments	3	0.003	0.5	0.2	0.03	0.03	0.03	1.00E-06	1.00E-06	0.03	0.03

Source: SRK 2022
= number of tests, Sy measured values over 0.6 has been discarded

Simulated K in most cases ranges between measured maximum and minimum. It should be noted that the calibration period represents a large hydraulic stress in the groundwater system. The numerical model was able to reproduce this stress by using the simulated hydraulic parameters presented in Table 12-3 and Table 12-4. On the other hand, measured values from pumping and packer tests produce a significantly smaller hydraulic stress, and do not necessarily represent the long-term K and Sy values.

The groundwater model did not simulate density-driven groundwater flow. Therefore, a low-K zone (K=0.01 m/d) was implemented in the model at the known freshwater/saltwater interface at the margin of the salar, to reduce mixing of lateral freshwater inflows with salt water, according to the conceptual model.

Solute transport properties have no measured values in Salar de Atacama. Dispersion (transversal, longitudinal, and vertical), diffusion and effective porosity were assumed based on the QP's experience in similar deposits and the calibration process. Table 12-5 present a summary of the simulated solute transport properties. Dispersion and diffusion coefficients were uniformly assigned in the groundwater model.

Table 12-5: Simulated Other Solute Transport Properties

Transport Parameter		Value	Units
Dispersion Coefficient	Longitudinal	50	m
	Transverse	5	m
	Vertical	0.5	m
Molecular Diffusion	Silt, Clay, and Salt	8.64 x 10-5	m^2/day, model units
	Lower Halite	1 x 10-9	m^2/s, standard units

Source: SRK 2022

12.1.4 Model Calibration

Pre-Development Conditions

Lithium mining activities occurred before 1997; however, there are no reliable data of pumping rates, water levels, or lithium concentration for that period. The pre-development model simulates equilibrium conditions before 1997 considering natural groundwater flow conditions only (no pumping). Even though this steady-state model represents a starting point for the calibration process and does not represent a target of calibration by itself, the conceptual hydrologic fluxes in Salar de Atacama (VAI, 2022) were used as calibration targets in this model. Table 12-6 shows the conceptual and simulated fluxes for the pre-pumping natural conditions. The intermedial marginal zone has 41.0% of discrepancy, however it represents a small part of the total flux in the nucleus, which has 2.7% of discrepancy.

Table 12-6: Simulated Hydrologic Fluxes for Steady-State Conditions

ZONE	Inflows (L/s)				Outflow (L/s)		Discrepancy /%)
	Conceptual Hydrologic [1] Balance		Simulated [2]		Conceptual Hydrologic Balance [1]	Simulated [2]	
Subbasins Reporting to Marginal Zone	**Groundwater**	**Stream / Lagoon**	**Groundwater**	**Stream / Lagoon**	**Total**	**Total**	
SubC 6	200	14	200	8.0	214	161	-24.7%
SubC 7	425	7.0	425	6.9	436	388	-11.1%
SubC 8y9	389	9.0	389	5.6	398	384	-3.5%
SubC 10a [1]	611	4.0	611	2.2	615	617	0.4%
Subtotal Marginal Zone	**1,625**	**34**	**1,625**	**22.8**	**1,663**	**1,550**	**-6.8%**
Nucleus							
Intermedial Marginal Zone [2]		59		59	202	285	41.0%
Nucleus [3]		265		262	1,057	1,007	-4.7%
Lateral Recharge from West	207		206				
Lateral Recharge from North	684		684				
Subtotal Nucleus	**891**	**324**	**890**	**321**	**1,259**	**1,292**	**2.6%**
Total Model Area	**2,516**	**358**	**2,515**	**344**	**2,922**	**2,842**	**-2.7%**

Source: [1]VAI, 2021 and [2]SRK, 2022
[1] Sub-basin 10b is not included in the original Hydrologic Balance
[2] Infiltration form Soncor Lagoon (25 L/s) is included
[3] Infiltration form Peine Lagoon (11 L/s) is included

The 3D distribution of lithium concentrations in the model domain, as initial conditions for the transient calibration simulation, were calculated from interpolation of available concentration data. Geochemical data at the Albemarle property are not available prior to the year 1999. Moreover, most monitoring locations had continuous lithium concentration data from recent years only. To achieve a salar-wide distribution of lithium outside the Albemarle claims, a few data points in the shallow subsurface were available from Kunasz and Bell (1979) and several wells from SQM (SQM 2020) with data of 2011.

Samples from years 2011, 1999 and 1979 shows good correlation between them, showing small variation on lithium concentration. For the western area of Albemarle Property (in Chepica Peninsula) data from recent years were included considering information from 2018, 2019 and 2020. This data was included to show the different concentration between upper and lower system which has been exploited in the last years. A total of 448 values were interpolated in 3D space using a kriging technique via the Leapfrog software, considering different interpolations between the upper and lower system. Final lithium distribution for initial concentration conditions was chosen based on the calibration results. Similar procedures were used for initial concentration of Ca and SO4.

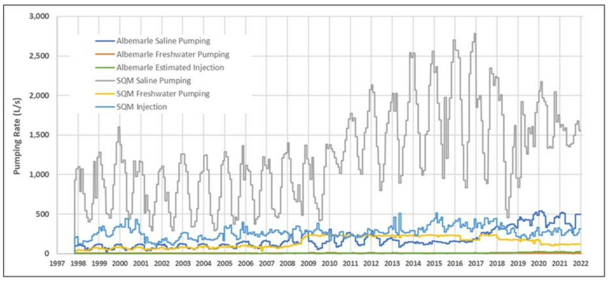
Simulated Historical Operations

The transient calibration model of historical lithium mining activities was simulated from November 1997 through December 2021. Historical water levels, lithium concentration, and achieved pumping rates served as calibration targets.

Groundwater levels from 176 monitoring wells across the entire Salar de Atacama were used for water level calibration, with a total of 48,265 individual water level measurements during the transient calibration period. The total number of monitoring wells has been reduced since previous report because duplicated names have been removed These water level measurements were obtained from an Albemarle historical database included in the 2019 environmental report (SGA, 2019) and Albemarle operational database; and from an SQM environmental report (SQM, 2020).

Lithium concentrations in groundwater were available for 143 monitoring locations, with a total number of 7,038 individual concentration measurements during the transient calibration period. The earliest available concentrate on data was from January of 1999. Lithium concentration data were obtained from the Albemarle historical database (Albemarle, 2022).

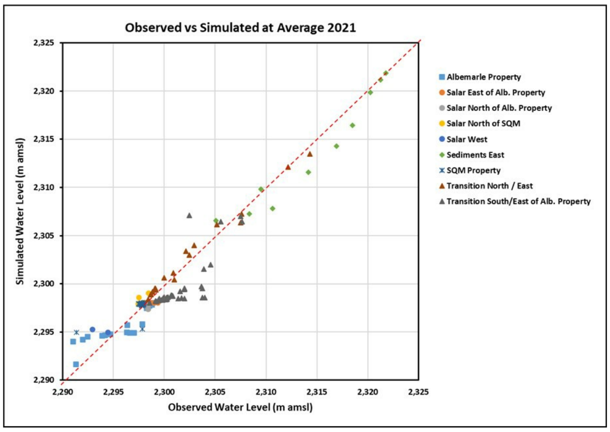
Historical brine pumping from 108 wells and 9 trenches (the number of trenches has been reduced since previous report because duplicated names have been removed) on the Albemarle property were available through December 2021, and from 199 wells on the SQM property through December 2021. Albemarle freshwater withdrawal from three wells was available through December 2021 and SQM freshwater withdrawal from five wells through December 2021. A timeline of historical Albemarle and SQM pumping rates is provided in Figure 12-6, along with SQM brine injection rates (four locations). The total simulated Albemarle pond seepage did not surpass 5% of the total brine pumping rate.



Source: SRK 2022

Figure 12-6: Pumping Rates used for Transient Calibration

Figure 12-7 presents the comparison between observed and simulated water levels at the year 2021 (average data in form of a quality line), i.e., at the end of the transient calibration period. Table 12-7 lists calibration statistics for this period. A notable statistic is the scaled root mean square error (RMSE) of 4.8%. An RMSE statistic below 10% is generally considered as adequate calibration. Several representative hydrographs showing observed and simulated water levels over time are included in Figure 12-8. The top 12 hydrographs are from monitoring locations on the Albemarle property, while the bottom three are from other locations in the salar. Overall, in the QP's opinion, simulated water levels replicate observed water levels well.



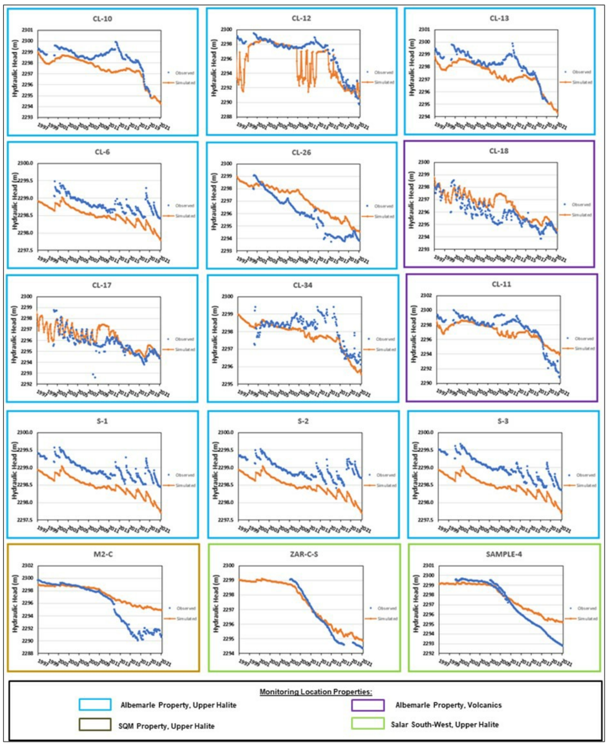
Source: SRK 2022

Figure 12-7: Comparison of Simulated and Observed Water Levels in the Year 2021 (Average Data)

Table 12-7: Statistics of Transient Model Calibration to Observed Water Levels, 2021 Average

Statistical Measure	Definition	Formula	Value
Number of Observations	Number of calibration targets used to guide calibration	n	167
Residual Mean [1] (m)	Arithmetic mean of head residuals	$\overline{R} = \frac{1}{n}\sum_{i=1}^{n} R_i$	0.59
Absolute Residual Mean (m)	Arithmetic mean of the absolute value of head residuals	$\overline{\lvert R \rvert} = \frac{1}{n}\sum_{i=1}^{n} \lvert R_i \rvert$	1.03
Root Mean Square Error (RMSE, m)	Square root of the mean of squared residuals (representing the standard deviation of residual dataset)	$\sqrt{\frac{1}{n}\sum_{i=1}^{n} R_i^2}$	1.47
Minimum Residual (m)	Minimum value of all residuals in the dataset	R_{min}	-4.65
Maximum Residual (m)	Maximum value of all residuals in the dataset	R_{max}	5.42
Range in Observations (m)	Difference between highest and lowest observed values	$(H_{obs})_{max} - (H_{obs})_{min}$	30.80
Scaled RMS Error (%)	Root mean square error normalized to the range in observations	$\frac{RMSE}{(H_{obs})_{max} - (H_{obs})_{min}}$	4.77%

Source: SRK, 2022
[1] Where R is the residual (observed minus simulated)



Source: SRK 2022

Figure 12-8: Water Level Comparison Hydrographs in Select Wells

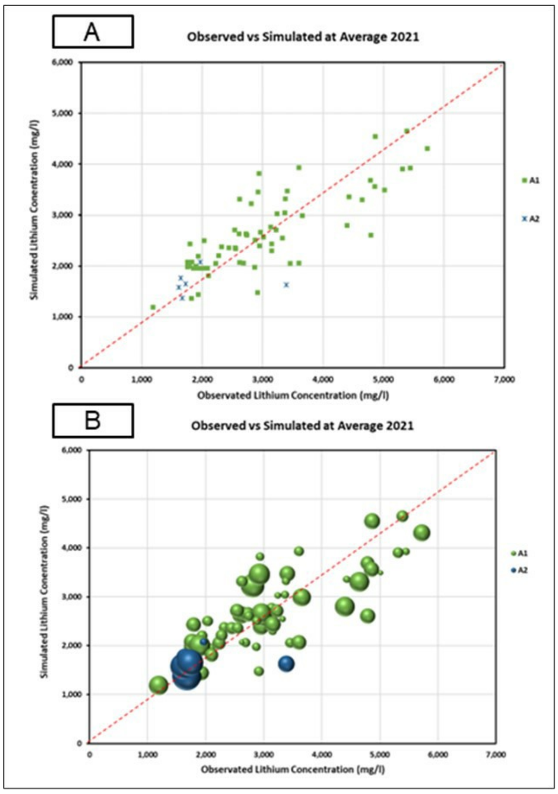
The overall groundwater budget for the end of the transient simulation is presented in Table 12-8. The overall water balance error is 0.86% for the transient calibration period, which support a valid solution for the numerical simulation.

Table 12-8: Water Balance at End of Transient Calibration (Dec 2021)

Flow Component	Flow Rate (L/s)
Inputs to Groundwater System	
Recharge	
Lateral	2,386
Direct Precipitation	-
Lagoon	-
Artificial Injection	
SQM Injection	312
Albemarle Pond Leakage	22
Groundwater Storage Release	1,395
Total	4,116
Outputs from Groundwater System	
Evapotranspiration	1,753
Surface Water Outflow	68
Pumping	
Albemarle Freshwater Extraction	8
Albemarle Brine Extraction	498
SQM Freshwater Extraction	120
SQM Brine Extraction	1,556
Lagoon	5
Groundwater Storage Replenishment	107
Total	4,115
Percent Difference	0.02%

Source: SRK 2022

Figure 12-9 A presents calibration to lithium concentrations for the year 2021, with data points grouped by the monitoring location according to Albemarle productive properties (A1 and A2), and outside the Albemarle property. Figure 12-9 B shows circle sizes corresponding to average operational pumping rates in 2021 at each location (smallest circle sizes indicate monitoring wells without pumping). Table 12-9 provides a statistical summary for this calibration. Overall, the model tends to underpredict lithium concentrations on the Albemarle property for 2021, which suggests a conservative starting point for the predictive simulations.



Source: SRK 2022
A) Calibration Targets on Albemarle Property, B) Targets on Albemarle Property, Circle Size 2021 Averages. A Weighted by Historical Operational Pumping Rate.

Figure 12-9: Observed vs Simulated Lithium Concentrations

Table 12-9: Statistics of Transient Model Calibration to Lithium Concentrations, 2018 Average

Statistical Measure	Definition	Formula	Value
Number of Observations	Number of calibration targets used to guide calibration	n	167
Residual Mean[(1)] (m)	Arithmetic mean of head residuals	$\overline{R} = \frac{1}{n}\sum_{i=1}^{n} R_i$	0.59
Absolute Residual Mean (m)	Arithmetic mean of the absolute value of head residuals	$\overline{\lvert R\rvert} = \frac{1}{n}\sum_{i=1}^{n} \lvert R_i\rvert$	1.03
Root Mean Square Error (RMSE, m)	Square root of the mean of squared residuals (representing the standard deviation of residual dataset)	$\sqrt{\frac{1}{n}\sum_{i=1}^{n} R_i^2}$	1.47
Minimum Residual (m)	Minimum value of all residuals in the dataset	R_{min}	-4.65
Maximum Residual (m)	Maximum value of all residuals in the dataset	R_{max}	5.42
Range in Observations (m)	Difference between highest and lowest observed values	$(H_{obs})_{max} - (H_{obs})_{min}$	30.80
Scaled RMS Error (%)	Root mean square error normalized to the range in observations	$\frac{RMSE}{(H_{obs})_{max} - (H_{obs})_{min}}$	4.77%

Source: SRK 2022
¹ Where R is the residual (observed minus simulated)

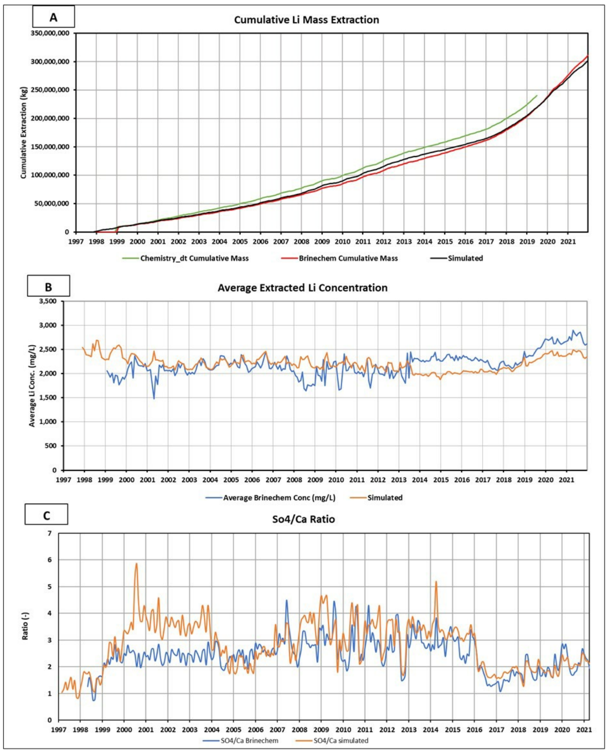
Figure 12-10 A, shows simulated cumulative mass of historically extracted lithium by Albemarle compared to known calculated produced mass from two water quality data databases provided to SRK, showing that simulated value follows the historic accumulated mass. Another measure of the calibration is shown in Figure 12-10 B, where average lithium concentration in the extracted brine is compared in both historical and simulated. The model tends to overpredict concentrations in the beginning of the simulation, when overall pumping rates are low, and underpredicts average concentrations starting in 2014. This underestimation is interpreted to reflect a conservative starting point for the predictive simulations. Figure 12-10 C presents the calibration of the SO4/Ca ratio, where the simulated and measured curves show a high correlation.

The average lithium mass transfer rates in the calibration period are shown in Table 12-10. As expected, pumping wells represent the main loss of lithium mass from groundwater (199,624 kilograms per day [kg/d]), followed by evaporation (79,154 kg/d). The main source of lithium gains in groundwater is groundwater storage, and to a minor degree, the artificial injection and natural lateral recharge.

Table 12-10: Average Lithium Mass Transfer Rate for Calibration Period

Component	Mass Rate (Kg/day)
Lithium Gain in Groundwater	
Boundary Recharge and artificial recharge (ALB ponds and SQM Injection)	95,170
Storage Release	287,440
Total Gain	**382,610**
Lithium Loss in Groundwater	
Pumping wells	199,624
Surface Water (Drain cells)	3,766
Plant Uptake and Chemical Precipitation	79,154
Storage Replenishment	100,036
Total Loss	**382,609**
Percent Difference	0.00%

Source: SRK 2022



Source: SRK 2022
Brinechem is the primary hydro-chemical database prepared by Albemarle. Chemistry_dt is the alternative hydro-chemical data base prepared by Albemarle.

Figure 12-10: Comparison of Measured and Simulated A) Cumulative Lithium Mass Extraction B) Average Lithium Concentration and C)Sulfate Calcium Ratio

Calibration of the model to mass extracted by the production wellfield annually and comparison of simulated to observed lithium concentration versus cumulative production pumping are both reasonable. Calibration of the model to the mass extraction rate at the end of 2021, and to the SO4/Ca ratio also look reasonable. It is SRK's opinion that the numerical model adequately represents the historical and current wellfield production of lithium from the basin and can be used for future production plans to support a reserve estimate.

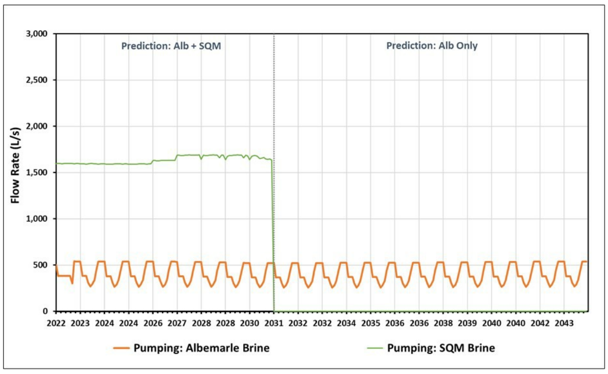
12.1.5 Predictive Simulations

Predictive simulations include the period from January 2022 to September 2022, where measured values are available, and a production plan period from October 2022 to December 2043. The end of the pumping simulation time was defined for modeling purposes and does not represent the legal deadline of pumping (December 2041).

Projected Albemarle brine pumping includes up to 76 active wells, with pumping rates up to 30 L/s for a given well location and from 268 to 540 L/s for the entire system with an annual average of 414 L/s (Albemarle, 2022). Notice that the Albemarle's pumping plan considered a reduction from the maximum legal pumping rate (442 L/s), due to environmental restriction. Details of well location and screen intervals are explained in Section 13.

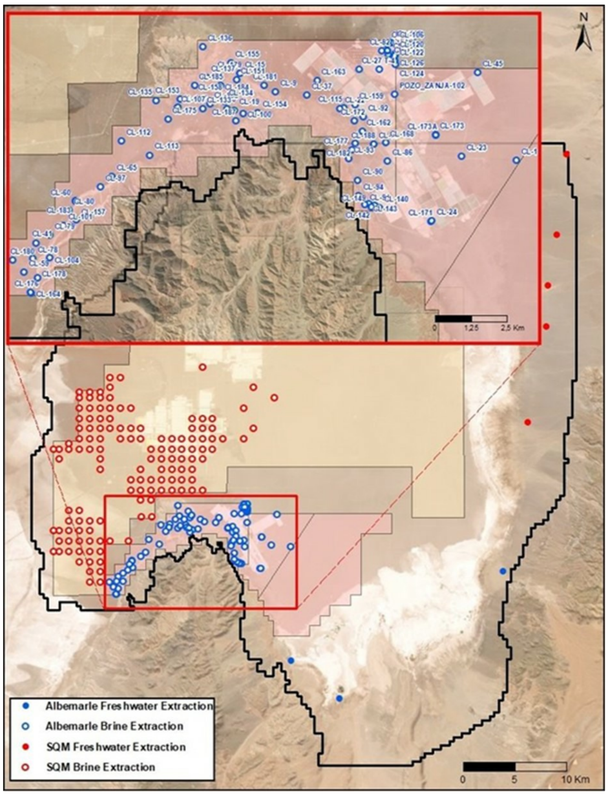
Projected SQM brine pumping rates were used in the predictive model starting in January 2022 and are scheduled to terminate at the end of December 2030 (SQM, 2022). Projected SQM brine pumping includes 199 wells (equivalent pumping wells), with pumping rates up to 152.4 L/s for a given location and from 1600 to 1700 L/s for the entire system.

Brine pumping rates for the Albemarle and SQM properties are shown in Figure 12-11 and well locations are shown in Figure 12-12. Seepage from the Albemarle processing ponds and direct brine injections at the SQM property were not included in the base case predictive simulation. Indirect brine injections at SQM property were considered with values from 312.8 to 388.3 L/s (SQM, 2021).



Source: SRK 2022
The end of pumping date for resource estimate purposes is December 2041

Figure 12-11: Simulated Brine Total Planned Pumping Rates for The Albemarle and SQM Properties



Source: SRK 2022

Figure 12-12: Location of the Pumping Wells at Albemarle and SQM Properties Used for Predictive Simulations

Projected Albemarle freshwater withdrawals were assumed to be constant throughout the predictive simulations (18.0 L/s). Projected SQM freshwater withdrawals correspond to maximum legal flowrate (240 L/s). Projected freshwater pumping rates are listed in Table 12-11.

Table 12-11: Simulated Predictive Freshwater Withdrawals

Owner	Projected Pumping Rate (L/s)
Albemarle	18.0
SQM	240.0

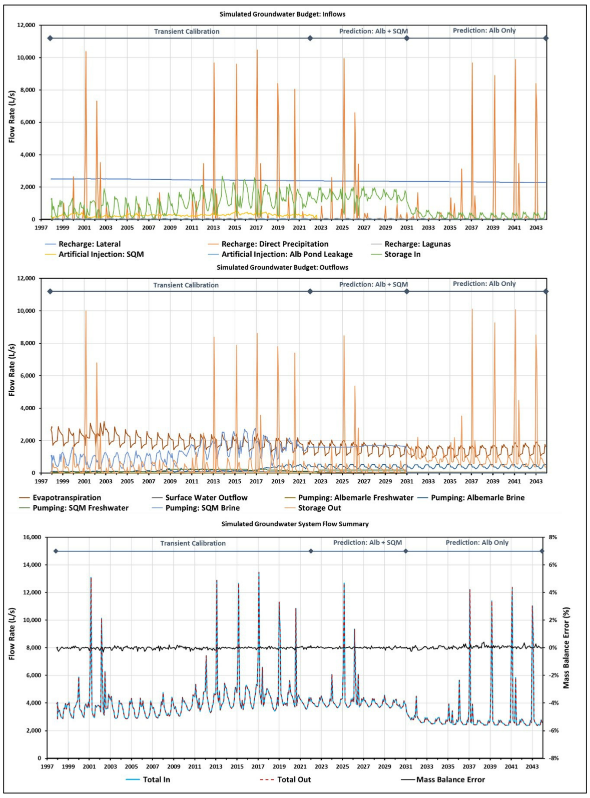
Source: SRK, 2022

A summary of groundwater inflows and outflows at the end of the transient calibration, the end of SQM brine pumping, and at the end of Albemarle pumping are presented in Table 12-12. Recharge inputs to the groundwater system and evapotranspiration outputs vary among the time snapshots because they represent different months of the year. However, decline in evapotranspiration and surface water outflows from December 2021 to December 2041 can be attributed to the decline in water levels in the salar and along its margins. The water balance error averages 0.03% for the predictive model period. Figure 12-13 shows all the components of the water balance in the calibration and predictive periods.

Table 12-12: Groundwater Balance Summary

Flow Component	End of Transient Calibration (Dec 2021)	End of SQM Extraction (Dec 2030)	End of Albemarle Extraction (Dec 2041)
Inflows to Groundwater System			
Recharge			
Lateral	2,386	2,341	2,286
Direct Precipitation	-	-	-
Infiltration from Lagunas	50	-	-
Artificial Injection/Infiltration			
SQM Injection	312	-	-
Albemarle Pond Leakage	22	-	-
Groundwater Storage Release	1,395	1,648	328
Total	**4,116**	**3,989**	**2,613**
Outflows from Groundwater System			
Evapotranspiration	1,753	1,541	1,599
Surface Water Outflow	68	52	56
Lagoon	5	5	5
Pumping			
Albemarle Freshwater	8	18	18
Albemarle Brine	498	520	536
SQM Freshwater	120	176	-
SQM Brine	1,556	1,636	-
Groundwater Storage Replenishment	107	41	401
Total	**4,115**	**3,988**	**2,614**
Percent Difference	0.02%	0.03%	-0.04%

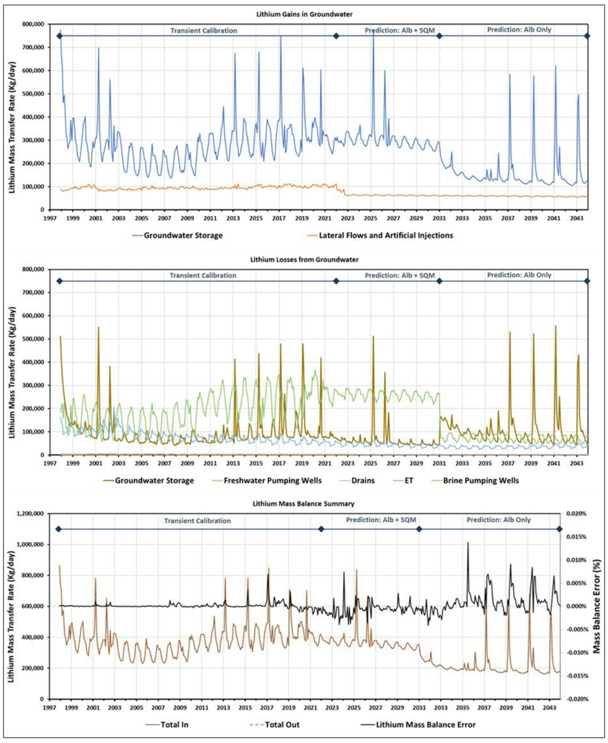
Source: SRK 2022



Source: SRK, 2022
The end of pumping date for resource estimate purposes is December 2041

Figure 12-13:Components of Water Balance for All Simulated Periods

Lithium mass flux components throughout all simulated periods are shown in Figure 12-14 and the distribution of the simulated lithium concentration in Figure 12-15. Solute transport simulation presents a percent difference lower than 0.01% during calibration and predictive model periods.



The end of pumping date for resource estimate purposes is December 2041
Source: SRK 2022

Figure 12-14: Components of Lithium Mass Transfer Rate for All Simulated Periods

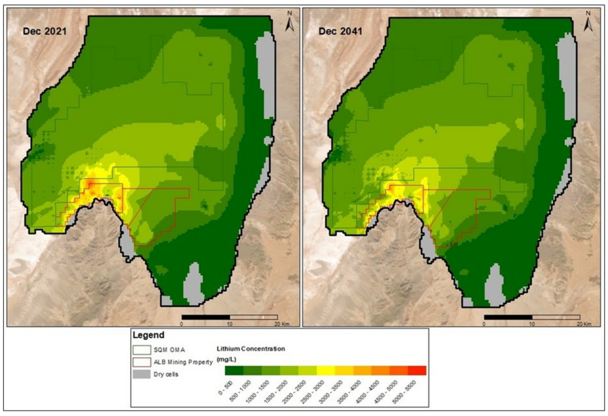


Figure 12-15: Distribution of Simulated Lithium Concentration in the beginning and End of the Prediction Pumping Period

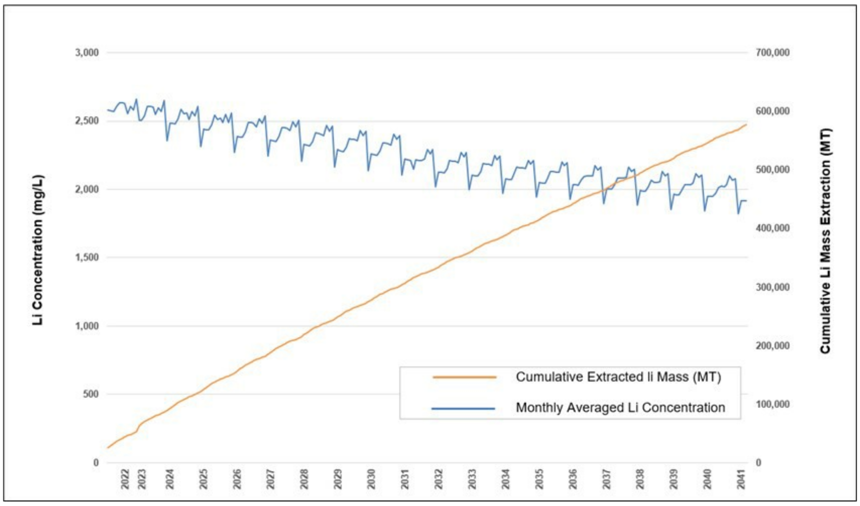
12.2 Mineral Reserves Estimates

Using the hydrogeologic properties of the salar combined with the wellfield design parameters, the rate and volume of lithium projected to be extracted from the Project area was simulated using the predictive model. The predictive model output generated a brine production profile appropriate for the salar based upon the wellfield design assumptions with a maximum pumping rate of 442 L/s (i.e., maximum authorized extraction rate) over a period of 20 years (through March 2042). Albemarle's pumping plan considers 414 L/s to meet the regulatory limits for drawdown. The use of a 20-year period reflects the timing required to extract the full, authorized quota of lithium production. Given the approximately two years delay in timing from pumping to final production, this also is the last year that extraction from the salar can be reasonably expected to still result in lithium produced by the January 1, 2044 expiry of Albemarle's production quota. See Section 16.3.1 for more discussion of the quota and regulatory limits on lithium extraction.

The predicted monthly and annual average extracted lithium concentrations, and the predicted cumulative mass of lithium extracted from groundwater at the Albemarle property are plotted in Figure 12-16. The annual-average lithium concentrations, mass lithium in extracted brine, annual-average pumping rates and annual volumetric brine pumping are summarized in Table 12-13. Additional details on the wellfield design and pumping schedule are discussed in Section 13.

SRK cautions that this prediction is a forward-looking estimate and is subject to change depending upon operating approach (e.g., pumping rate, well location/depth) and inherent geological uncertainty. The schedule includes summaries for observed pumping rates and lithium concentration from September 2020 through the end of August of 2022 as this production is required to support the first 24 months of production in the economic model. This brine is currently going through the evaporation process, is treated as work in process inventory and is reported separately on the reserve table for clarity.

The seasonal concentration fluctuations in Figure 12-17 correspond to seasonal fluctuations in pumping rates. The predictive model simulates a decline of annual-average lithium concentrations from 2,575 mg/L in the last trimester of 2022 to 1,990 mg/L at the end of pumping (December 2041). Annual lithium mass extraction from groundwater is predicted to decline from 33,277 metric tonnes in the year 2023 (first full year of pumping) to 25,536 metric tonnes in the year 2041. The predicted cumulative lithium mass extraction, from September 2022 to December 2041, is 556,850 metric tonnes. Figure 12-17 shows the projected annual mass of lithium extracted by production wellfield.



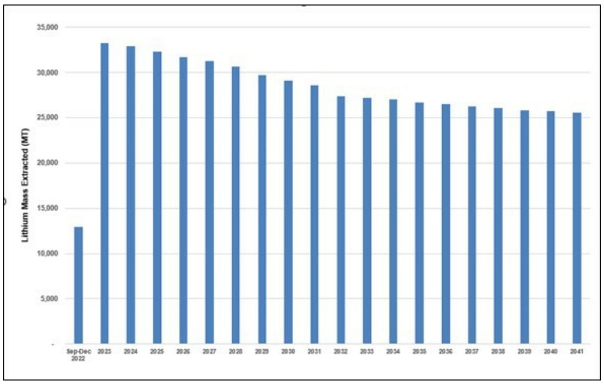
Source: SRK, 2022

Figure 12-16: Projected Wellfield Average Lithium Concentration

Table 12-13: Predicted Lithium and Brine Extractions

Period	Li Mass (Metric Tonnes)	Pumping Rate (L/s)	Pumping Volume (m^3)	Lithium Concentration (mg/L)
Sep-Dec 2022	12,916	460	5,064,910	2,550
2023	33,277	412	13,013,766	2,557
2024	32,909	411	12,996,335	2,532
2025	32,324	411	12,959,754	2,494
2026	31,732	411	12,956,289	2,449
2027	31,242	409	12,921,810	2,418
2028	30,695	407	12,872,642	2,385
2029	29,740	402	12,675,570	2,346
2030	29,106	399	12,591,690	2,312
2031	28,599	398	12,550,719	2,279
2032	27,381	399	12,608,464	2,172
2033	27,214	400	12,624,101	2,156
2034	27,000	401	12,664,693	2,132
2035	26,692	402	12,685,002	2,104
2036	26,552	402	12,734,408	2,085
2037	26,227	404	12,756,126	2,056
2038	26,086	405	12,781,127	2,041
2039	25,865	407	12,843,823	2,014
2040	25,757	407	12,892,951	1,998
2041	25,536	410	12,930,330	1,975
Total	**556,850**	**407**	**248,124,509**	**2,244**

Source: SRK 2022



Source: SRK, 2022

Figure 12-17: Projected Annual Mass of Lithium Extracted by Production Wellfield

12.3 Cut-Off Grades Estimates

Due to the extraction of lithium from the aquifer, combined with mixing of freshwater inflows or low-grade brines, the concentration of lithium in brine pumped from the mineral resource decreases over time. While there is some ability to selectively extract areas of the mineral resource with higher grades by targeting the location of new extraction wells, the impact of dilution cannot be fully avoided. Therefore, as the brine concentration declines over time, the quantity of lithium production, for the same pumping rate, also declines. As lithium brine production operations have relatively high fixed costs, eventually the quantity of lithium contained in the extracted brine is not adequate to cover the cost of operating the business.

As discussed in Section 19, the economic model provides positive operating cash flow for the entire life of the reserve, so it is clear that the entirety of the reserve estimated herein is above the economic cut-off grade, utilizing the assumptions described in that section. This includes the use of a long-term price assumption for technical grade lithium carbonate of US$20,000/t (see Section 16 for discussion on the basis of this assumption).

While the pumping plan supporting this reserve estimate is above the economic cut-off grade for the operation, for the purposes of disclosure and resource estimation, SRK calculated an approximate breakeven cut-off grade for the operation. To calculate the breakeven cut-off grade, SRK utilized the economic model and manually adjusted the input brine concentration downward until the after-tax cash flow hit a value of zero. This estimate effectively includes all operating costs in the business as well as sustaining capital with other inputs such as lower process recovery with lower concentration also being accounted for.

Based on this modeling exercise, SRK estimates that the breakeven cut-off grade at the assumptions outlined in Section 19, including the reserve price of US$20,000 / metric tonne of technical grade lithium carbonate, is approximately 858 mg/l Li (for comparison, the last year of pumping in the approximately 20-year life of mine plan has a lithium concentration of 1,974 mg/l).

12.4 Reserves Classification and Criteria

When estimating brine resources and reserves, different models are utilized to define those resources and reserves. The resource model presents a static, in situ measurement of potentially extractable brine volume whereas the reserve model (i.e., the predictive model) presents a dynamic simulation of brine that can potentially be pumped through extraction wells. As such, the predictive model does not discriminate between brine derived from inferred, measured, or indicated resources. Further, a brine resource is dynamic and is constantly influenced by water inflows (e.g., precipitation, groundwater inflows, pond leakage, etc.) and pumping activities which cause varying levels of mixing and dilution. Therefore, direct conversion of measured and indicated classification to proven and probable reserves is not practical. As the direct conversion is not practical, in the QP's opinion, the most defensible approach to classification of reserves (e.g., proven versus probable) is to utilize a time-dependent approach as the QP has the highest confidence in the early years of the predictive model results, with a steady erosion of that confidence over time.

Therefore, in the context of time-dependent risk, in the QP's opinion, the production plan through the end of 2032 approximately 10.3 years of pumping) is reasonably classified as a proven reserve with the remainder (10.3 years) of production classified as probable. Notably, this results in approximately 57% of the reserve being classified as proven and 43% of the reserve being classified as probable.

For comparison, the measured resource comprises approximately 56% of the total measured and indicated resource. In the QP's opinion, this is reasonable as the overall geological and technical uncertainty for the Salar de Atacama resource and reserve are similar.

12.5 Summary Mineral Reserves

The estimation of mineral reserves herein has been completed in accordance with CFR 17, Part 229 (S-K 1300). Mineral reserves were estimated utilizing a lithium carbonate price of US$20,000/t of technical grade Li_2CO_3. Appropriate modifying factors have been applied as discussed through this report. The positive economic profile of the mineral reserve is supported by the economic modeling discussed in Section 19 of this report.

Table 12-14 presents the Salar de Atacama mineral reserves as of August 31, 2022.

Table 12-14: Salar de Atacama Mineral Reserves, Effective August 31, 2022

	Proven Reserve		Probable Reserve		Proven and Probable Reserve	
	Contained Li (Metric Tonnes x 1000)	Li Concentration (mg/L)	Contained Li (Metric Tonnes x 1000)	Li Concentration (mg/L)	Contained Li (Metric Tonnes Li x 1000)	Li Concentration (mg/L)
In Situ	319.9	2,407	236.9	2,069	556.8	2,247
In Process	23.1	2,741	0	0	23.1	2,741

Source: SRK, 2022

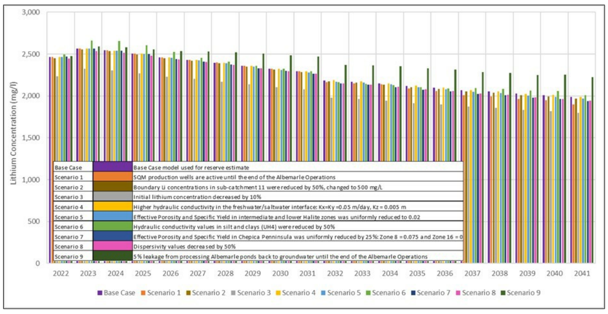
- In process reserves quantify the prior 24 months of pumping data and reflect the raw brine, at the time of pumping. These reserves represent the first 24 months of feed to the lithium process plant in the economic model.
- Proven reserves have been estimated as the lithium mass pumped during Years 2020 through 2030 of the proposed Life of Mine plan
- Probable reserves have been estimated as the lithium mass pumped from 2031 until the end of the proposed Life of Mine plan (2041)
- Reserves are reported as lithium metal
- This mineral reserve estimate was derived based on a production pumping plan truncated in December 31, 2041 (i.e., approximately 20 years). This plan was truncated to reflect the projected depletion of Albemarle's authorized lithium production quota.
- The estimated economic cut-off grade for the Project is 858 mg/l lithium, based on the assumptions discussed below. The truncated production pumping plan remained well above the economic cut-off grade (i.e., the economic cut-off grade did not result in a limiting factor to the estimation of the reserve).
  - A technical grade lithium carbonate price of US$20,000 / metric tonne CIF Asia.
  - Recovery factors for the salar operation increase gradually over the span of 4 years, from the current 40% to the proposed SYIP 65% recovery in 2025. After that point, evaporation pond recovery remains relatively constant at 65%, An additional recovery factor of 80% lithium recovery is applied to the La Negra lithium carbonate plant.
  - An average annual brine pumping rate of 414 L/s is assumed to meet drawdown constraint consistent with Albemarle's permit conditions.
  - Operating cost estimates are based on a combination of fixed brine extraction, G&A and plant costs and variable costs associated with raw brine pumping rate or lithium production rate. Average life of mine operating cost is calculated at approximately US$4,155/metric tonne CIF Asia.
  - Sustaining capital costs are included in the cut-off grade calculation and post the SYIP installation, average around US$98 million per year.
- Mineral reserve tonnage, grade and mass yield have been rounded to reflect the accuracy of the estimate and numbers may not add due to rounding.
- SRK Consulting (U.S.) Inc. is responsible for the mineral reserves with an effective date: August 31, 2022.

In the QP's opinion, key points of uncertainty associated with the modifying factors in this reserve estimate that could have a material impact on the reserve include the following:

- Resource dilution: the reserve estimate included in this report assumes that the salar brine is replenished at its boundaries at certain rates and with certain chemical composition. Changes in the rate of inflows, versus those assumed, will impact the reserve. For example, an increase in the magnitude of lateral flows into the salar could act to dilute the brine and reduce lithium concentrations in extraction wells, primarily in the southwest area of the Albemarle property. Figure 12-18 compares simulations with a decreasing in the lithium concentration in the inflows from sub-catchment 11 (scenarios 2). This scenario shows minimum changes in the predicted average lithium concentration (<1%).
- Initial lithium concentration: The current initial concentration was estimated based on the best historical data available by space distribution and date (up to 2020 sampling campaign), and the calibration process. In order to illustrate the effect of the initial lithium concentration in the predictions, the lithium distribution mentioned above was decreasing by 10%. As a result, the average lithium concentrations decreased by 9 to 10% (Figure 12-18, scenario 3).
- Seepage from processing ponds: the predictive simulations did not consider potential seepage of concentrated brine from the processing pond. Such seepage may have two opposing effects: on one hand loss of lithium mass between extraction from groundwater and production of lithium carbonate at the end of the concentration process, and on the other hand replenishing groundwater with lithium that could be captured by extraction wells. Figure 12-18 compares the annual-averaged lithium concentration in extracted brine, between the base estimate, which does not include pond seepage, and a predictive simulation with pond seepage up to 5% of extracted brine (scenario 9). This example sensitivity simulation predicts that pond seepage would result in average lithium concentrations increase of approximately 12% at the end of production as compared to the base case.
- Freshwater/brine mixing: the numerical model implicitly simulated the density separation of lateral freshwater recharge and salar brine by imposing a low-conductivity zone at the brine-freshwater interface. It is possible that lateral recharge of freshwater into the salar may increase without this restriction, as the water table declines as a result of pumping and reducing the amount of freshwater lost to evaporation at the periphery of the salar. Figure 12-18 compares the base case annual-averaged lithium in extracted brine with a scenario where the hydraulic conductivity at the freshwater/brine interface was increased by half an order of magnitude (scenario 4). This scenario resulted in no material change compared to the base case.
- Hydrogeological assumptions: factors such as specific yield, hydraulic conductivity, and dispersivity play a key role in estimating the volume of brine available for extraction in the wellfield and the rate it can be extracted. Actual contacts between hydrogeological units may not be exactly as represented in the numerical model. These factors are variable through the salar and are difficult to directly measure. Hydraulic conductivities and specific yields lower than assumed in the numerical model would result in reduced pumpability and reduced lithium mass extraction. Specific yields and porosities lower than assumed in the model would lead to faster migration of fresh / brackish water from the edges of the salar and dilution of lithium concentrations in extraction wells. Figure 12-18 compares the base case estimate of annual-averaged extracted lithium with a scenario where the effective porosities in the Chepica peninsula area and the Lower Halite (UH5) were reduced by 25% (scenario

7) and 40% (scenario 5) respectively; the hydraulic conductivity in the Silt, Clay and Salt (UH4) was reduced by 50% (scenario 6); and dispersivity was decreased by 50% (scenario 8) . These scenarios resulted in average lithium concentrations reduction of less than 3% at the end of production as compared to the base case.

- Lithium carbonate price: although the pumping plan remains above the economic cut-off grade discussed in Section 12.3, commodity prices, can have significant volatility which could result in a shortened reserve life.
- Change to SQM pumping plan: the numerical model makes certain assumptions regarding the SQM pumping plan (which terminates at the end of 2030). Overall, SQM has extracted – and is expected to extract – brines at greater rates than Albemarle. SQM pumping has resulted in drawdowns at the salar of up to approximately 14 m in the southwest region of the salar. Enhanced pumping by SQM, or lengthening of the pumping period, may have two effects: reduce available resource in the salar, and draw freshwater at greater rate from the periphery of the salar (dilution effect). Conversely, reduced extraction by SQM would keep available the resources, reducing the dilution effect. Figure 12-18 compares the base case annual-averaged lithium in extracted brine with a scenario where SQM pumping plan continues until December 2041. As a result, the average lithium concentrations decreased by 4% to 5 % at the end of production (Figure 12-18, scenario 1).
- Process recovery: the ability to extract the full lithium production quota within the defined production period relies upon the ability to increase recovery rates of lithium in the evaporation ponds from historic levels of approximately 40% to a target of approximately 65%. This will require updating the process flow sheet at the salar to reduce lithium losses to precipitated salts. In the QP's opinion, the assumed recovery rates are reasonable; however, there remains uncertainty in performance of the new process and any material underperformance to these targets could limit Albemarle's ability to extract its full lithium quota prior to expiry of the quota.
- Lithium production quota: the current production quota acts as a hard stop on the estimated reserve both from a total production mass and time standpoint. The expiry date for production of this lithium is December 31, 2043. If raw brine grades, pumping rates or process recoveries underperform forecasts and Albemarle cannot produce the full quota by 2043, this potential reserve will be lost (i.e., it cannot recover lost production in later years and cannot pump faster than the regulatory limit of 442 L/s to offset any underperformance). Conversely, with lithium grades well above economic cut-off and approximately 30% of the estimated mineral resource converting to reserve, the potential to negotiate an additional production quota with the government of Chile presents an opportunity to increase the current reserve, which is artificially constrained by the current quota.



Source: SRK 2022

Figure 12-18: Comparison of Predicted Extracted Lithium Concentration between Base Case and Sensitivity Scenarios

13 Mining Methods

The extraction method for the reserve is pumping of the raw brine from the aquifer utilizing a network of wells and trenches. This method of brine extraction has been used at the Salar de Atacama since 1984. As will be discussed in detail in Section 14, the extracted brine is concentrated using solar energy in a series of evaporation ponds prior to final processing in the lithium carbonate production plant at La Negra.

The brine extraction equipment includes a number of submersible pumps installed inside the production wells whose diameter is variable, generally between 10 inches and 14 inches. The pumps extract a brine with at rate between 5 and 30 L/s.

Shallow wells generally have a depth between 25 and 50 m. The wells walls are stable and have low risk of collapse, which facilitates the entry of brine into the well, thus reducing load losses. In deep wells, which typically have a depth of around 90 m, a seal is normally installed in the annular space of the upper part to a depth of about 25 to 40 m. A screen section is typically installed at the bottom well interval from around 50 to 90 m.

In RCA 21/2016, which authorized the rate of brine extraction to increase to 300 L/s (achieving the combined 442 L/s combined in areas A1 and A2), the position of pumping wells is not set to pre-determined coordinates. The reason that the coordinates are not fixed in advance is that, as wells degrade from flow depletion, excessive dynamic levels or operational problems, they are replaced and they may be set at the same location or moved if desired to optimize pumping results.

For the deep wells, the provisional authorization to pump 120 L/s up to 200 m deep, which originally was to end in August 2023, has been eliminated by regulators there are therefore no restrictions on the pumping rates on shallow versus deep wells were applied.

HDPE lines, typically 8 inches in diameter from the pumping system feed the pre-concentrator ponds, which are large ponds that regulate the brine chemistry (calcium and sulfate). Another set of HDPE lines, generally 8 inches in diameter, move brine by pumping from the pre-concentration ponds to feed the five evaporation pond systems.

The following elements can be found in the typical scheme of a pumping well:

- Pump
- Impulse pipe
- Valve
- Flow meter
- Split valve
- Backflow valve
- 8-inch HDPE pipe to the ponds

Additional equipment at the pump site include a diesel generator, a pump control panel that monitors the pump's working frequency, perimeter fencing, and a telemetry system. Figure 13-1 and Figure 13-2 show the detail of the pumping equipment.

Source: GWI, 2019

Figure 13-1: Pumping Well Installation

Source: GWI, 2019

Figure 13-2: Surface Pumping Equipment

Other equipment utilized at site to support mining operations is drilling and salt harvesting equipment. Drilling and installation of new production wells is completed by contractors and Albemarle does not own this equipment. Approximately 250 people are assigned to the salar operations, 100 of them directly to the processing operation.

13.1 Wellfield Design

A total of 72 to 76 production wells are modeled to support the annual average permitted brine pumping rate of 442 L/s from 2022 to 2041. The permit details extracting an annual average of 360 L/s from extraction area A1 and an annual average of 82 L/s from the extraction area A2. For reference the A1 and A2 areas can be seen in Figure 7-6.

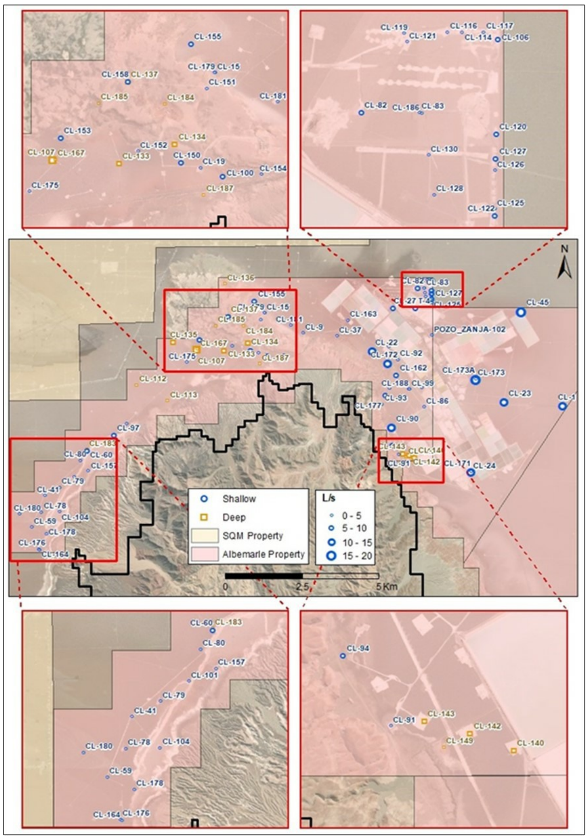
The schedule of active production wells is shown in Table 13-1.

Based on information provided by Albemarle, existing production wells require periodic replacement of approximately 10 wells per year, on average, for the current wellfield. For the purposes of this reserve estimate, SRK has assumed replacement of 10 wells for each full year of production (2021 and 2041 as a trimester assumes three wells). A map showing the predicted locations for the LoM production wells is presented in Figure 13-3.

Table 13-1: Wellfield Development Schedule

Period	Number Active Wells at Start of Period	Number Replacement Wells	Number Wells Removed	Number New Wells	Total Number Wells Drilled	Number Active Wells at End of Year
Sep-Dec 2022	72	3	0	3	6	75
2023	76	10	0	0	10	76
2024	76	10	0	0	10	76
2025	76	10	0	0	10	76
2026	76	10	0	0	10	76
2027	76	10	0	0	10	76
2028	76	10	0	0	10	76
2029	76	10	0	0	10	76
2030	76	10	0	0	10	76
2031	76	10	0	0	10	76
2032	76	10	0	0	10	76
2033	76	10	0	0	10	76
2034	76	10	0	0	10	76
2035	76	10	0	0	10	76
2036	76	10	0	0	10	76
2037	76	10	0	0	10	76
2038	76	10	0	0	10	76
2039	76	10	0	0	10	76
2040	76	10	0	0	10	76
2041	76	10	0	0	10	76

Source: SRK 2022



Source: SRK 2022

Figure 13-3: Predicted Life of Mine Well Location Map and Average Pumping Rate

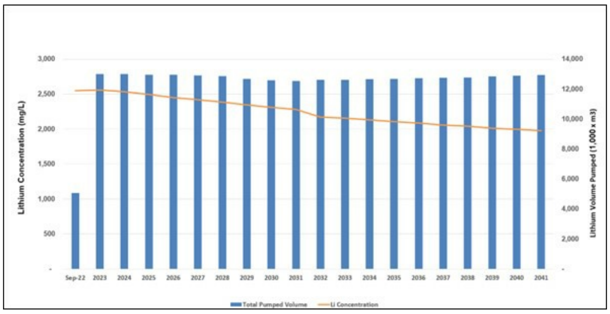
13.2 Production Schedule

A total of 76 wells locations were used to simulate brine production at the Salar de Atacama. The pumping schedule for the simulation is shown on Figure 13-4. Production was maintained at 76 of the wells from year 2024 to end of 2041.

Source: SRK 2022

Figure 13-4: Operational Schedule of Production Wells

Pumping rates per well range from being turned off with no flow up to 30 L/s: only 9 wells pump above 10 L/s. The yearly average total pumping rate for the combined wellfield is 414 L/s. Maximum pumping occurs in January (up to 540 L/s) and minimum pumping in June (268 L/s). Figure 13-5 shows the pumped volume per year.



Source: SRK 2022

Figure 13-5: Pumped Volume and Predicted Lithium Concentration

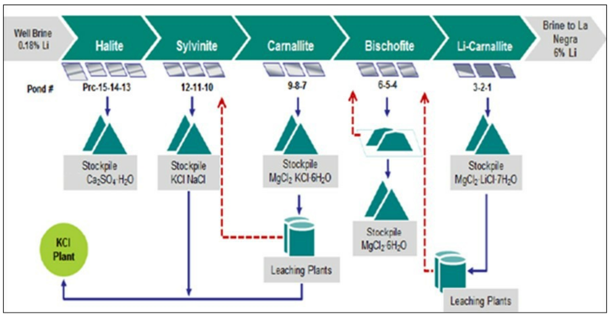
Factors such as mining dilution and recovery are implicitly captured by the predictive numerical model. Reporting of these factors is not practical due to the disconnect between the static resource model and the dynamic predictive model utilized for reserve estimation as well as other factors such as mixing of brine during production.

Simulated pumped volume generates a drawdown of less than 10 m in the pumping wells, it includes simulated drawdown in the model cells and accounts for corrections due to cell-size and estimated well efficiency. Considering the minimum screen bottom in the shallow wells is around 25 m, and that it could be deepened up to 200 m, there is a sufficient saturated thickness to support the planned pumping rate. The open drains in operation with total bottom around 10 m depth must be deepened in the next five years to maintain their pumpability.

14 Processing and Recovery Methods

Albemarle's operations in Chile are in two separate areas, the Salar de Atacama and La Negra. The Salar de Atacama operation extracts lithium brines from groundwater wells. These brines are discharged to solar evaporation ponds to concentrate the lithium brine, which is then transferred to the La Negra plant by tanker truck for processing. The La Negra plant refines and purifies the lithium brines, producing both technical and battery grade lithium carbonate. Albemarle has also historically produced lithium chloride product although it does not forecast this production in the future.

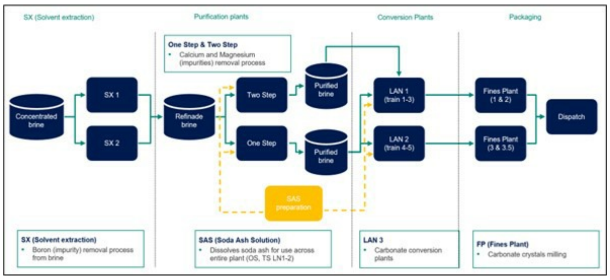
At the salar, the lithium chloride brine concentration process is carried out by solar evaporation in concentration ponds. The objective of the process is to obtain a concentrated lithium chloride brine of around 6% lithium, which is transported to the La Negra chemical plant for further processing. A basic flowsheet for the salar is presented in Figure 14-1. As seen in this figure, beyond the concentration of lithium, there is also a potash (KCl) plant for byproduct potash production. Albemarle also harvests halite and bischofite salts as byproduct production for third party sales.



Source: Albemarle, 2019

Figure 14-1: Salar Process Flow Sheet

The La Negra plant receives the concentrated brine from the salar, and the brine is further processed with several purification steps followed by the conversion of the lithium from a chloride to a lithium carbonate. A basic flow sheet for the La Negra process is presented in Figure 14-2.



Source: Albemarle, 2021

Figure 14-2: La Negra Process Flow Sheet

14.1 Salar de Atacama Processing

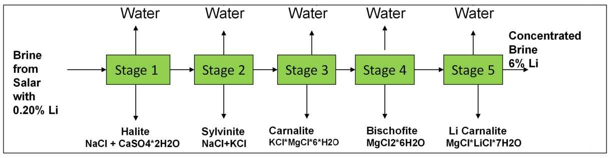
The process of concentrating the raw brine pumped from the aquifer to the concentrated brine shipped to La Negra is made possible by the favorable weather conditions of the Salar de Atacama (the area's evaporation rate is 1,270 to 1,780 millimeters (mm) (50 to 70 inches per year) with very little rainfall most years (10 to 30 mm), but on rare occasions there are heavy storms. The solar radiation in the area is high, the relative humidity as low as 5% and moderately intense winds rise in the afternoons) and the high solubility of the lithium in this type of brine. The process consists of evaporating water from the brine utilizing solar energy, resulting in a fractional crystallization of salts and the progressive increase in the lithium concentration in the brine until reaching the final stage. Figure 14-3 shows a typical evaporation pond.

Source: GWI, 2019

Figure 14-3: Evaporation Ponds

14.1.1 Solar Evaporation

Evaporation ponds are arranged in “systems” of 15 ponds, with five total systems at the operation, for a total of 75 ponds. As the brine progresses through the pond system, sequential evaporation and precipitation removes unwanted deleterious elements and by products through five stages of fractional precipitation (Figure 14-4). The evaporation sequence essentially follows a process of increasing brine concentration from approximately 0.2% Li in the raw brine to 4.3% Li in a series of solar ponds with only limited formation of complex lithium-bearing salts (i.e., limited loss of lithium with most of the losses to bischofite) through precipitation, as shown in Stages 1 through 4 in Figure 14-4. During concentration from 4.3% Li to the final target of around 6% Li (Stage 5), a lithium carnallite salt forms and precipitates. Lithium-rich brines entrained in the bischofite harvest (Stage 4) are drained and recovered and a portion of the entrained lithium-rich brine as well as lithium sulfate precipitate from Stage 5 (lithium carnallite precipitation) is recovered through washing and dissolution with a natural brine.

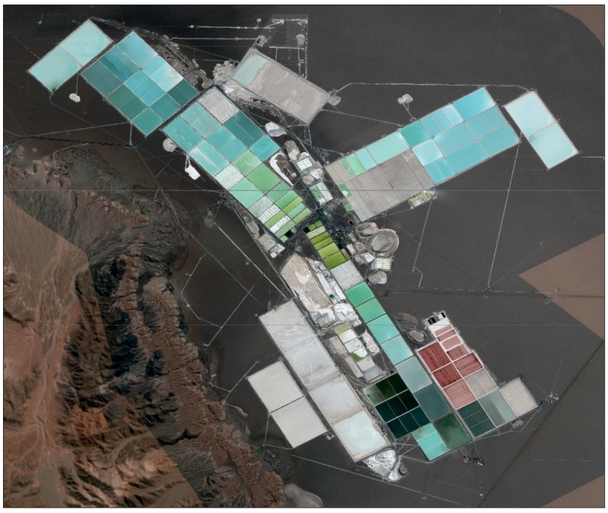


Source: Albemarle, 2019

Figure 14-4: Lithium Brine Evaporation Stages

During the course of solar evaporation, almost all of the sodium and potassium are precipitated and about 95% of the magnesium. By concentrating up to 6% of lithium, saturation of all salts is achieved, and the brine behaves like molten salt of lithium carnallite and bischofite. The 6% Li brine is loaded into trucks and transported to La Negra.

Four km^2 of solar evaporation ponds are required for the current annual production rate of approximately 45,000 t/y of LCE. Expansions to 8.4 km^2 (836 ha) of solar ponds are underway for a brine input flow of 442 L/s with a target of more than 80,000 t/y LCE production, when incorporating the SYIP. The brine concentration process takes 18 to 24 months and is characterized by changing brine colors as the concentration of the desired salts increases and by-products drop out and are harvested (Figure 14-5). Salts that will not be processed for muriate of potash (MOP) are stacked as waste near the ponds.



Source: Albemarle, 2018

Figure 14-5: Aerial View of ALB Evaporation Ponds

One of the key features of the concentration strategy at the salar is the ratio of calcium to sulfate in the brine that is processed in the ponds. The Salar de Atacama brine is generally sulfate-rich although it has areas that are calcium-rich. To limit losses of lithium during the concentration process, a blend of these calcium and sulfate-rich brines must be maintained. By blending the calcium-rich brine with the sulfate-rich brine an initial precipitate of gypsum is formed, removing much of the calcium and reducing the sulfate to a level that prevents significant losses of lithium to sylvinite as $KLiSO_4$. Going forward, based on the life of mine pumping plan, SRK predicts this balance of calcium-rich to sulfate-rich brine will not be maintained. This pumping plan shows a lack of calcium-rich brine starting in 2037. Based on this prediction, SRK has assumed a liming plant will be required at the start of 2037 to add calcium to the system to offset this reduction in calcium content in the blended brine feeding the evaporation ponds, however this could be also solved by optimizing the pumping plan for next years instead of keeping it fixed. SRK notes that modification of this years pumping plan deferred the liming plant 10 years. Given the extended time until this assumed liming plant is required (i.e., five years), Albemarle has yet to complete the metallurgical testwork supporting this addition and the use of lime versus other alternatives (e.g., $CaCl_2$) has not been set as a final decision. However, given the use of lime to reduce sulfate content in lithium brine operations is standard technology (in use at Albemarle's Silver Peak operation as well as Orocobre's Olaroz operation), in SRK's opinion, this approach presents limited risk to future Salar de Atacama operations and this reserve estimate. Further, the current pumping plan has only been optimized to manage the $Ca:SO_4$ ratio for the next 10 years and it may be possible to further delay the need to add calcium to the system with further evaluation (to date, this has not been a priority given it is still a longer-term issue).

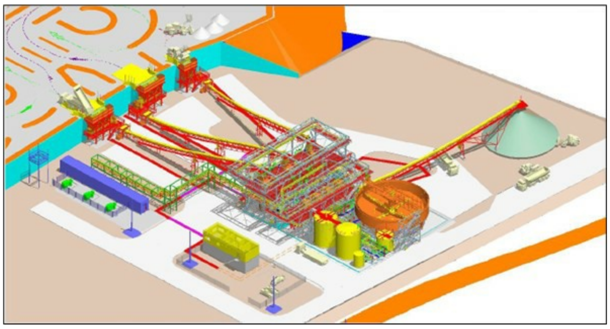
Potash Production

The potash precipitated as sylvinite and carnallite is harvested from the ponds to produce MOP. The production of KCl from the Potash Plant has historically averaged around 136,000 t/y. The production capacity was authorized environmentally through resolutions issued by the Regional Environment Commission of the Second Region. Potash is not included in this reserve estimate or the project economics and therefore the potash plant is not described herein.

14.1.2 Salar Yield Improvement Program

As part of Albemarle's strategy to expand lithium production rates from the current level of around 45,000 t LCE/yr to the targeted level of more than 80,000 t LCE/yr, Albemarle is targeting reducing lithium losses in evaporation ponds from current recovery. Albemarle refers to this strategy as the salar yield improvement program or SYIP. In support of this effort, in 2017, one of which targets recovering lithium from bischofite salts and the second targets recovering additional lithium from the lithium-carnallite salts. Both options utilize a similar strategy, including crushing/milling of the harvested salts before vat leaching with a dilute brine to recover a portion of the entrained lithium while limiting dissolution of the contained magnesium. Figure 14-6 presents the design layout for this facility. Section 10 presents summary information on the metallurgical testwork completed to support this project, but the expectation is that the SYIP will increase process lithium recovery up to a target of around 65%.

The SYIP construction activities are ongoing with the construction completion planned for late Q1 2023 or early Q2 2023. Ramp up is planned to begin in 2024 with the facility fully operational in 2025. Recovery ramp up will be through 2026.



Source: Albemarle, 2019

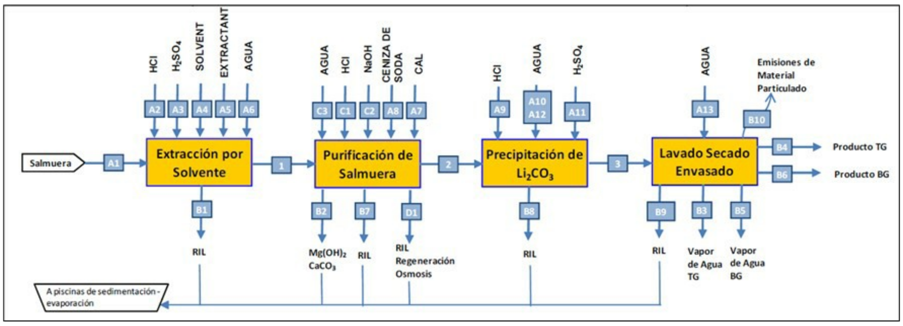
Figure 14-6: SYIP Facility Layout

14.2 La Negra Plant

The last stages of brine purification and the conversion stage to lithium carbonate are carried out at the La Negra Plant. Lithium chloride and both battery and technical grade lithium carbonate have been historically produced at La Negra. Going forward, Albemarle does not plan to produce lithium chloride and will limit future production to technical and battery grade lithium carbonate.

There are currently two process trains in production, La Negra 1 and La Negra 2 which have a production capacity of approximately 45,000 t LCE per year. A third production train, La Negra 3, has been constructed and is forecast to increase the La Negra production capacity to around 84,000 t LCE per year. All three production trains utilize a similar flow sheet. The plant will ramp up through 2024 and 2025 as brine production limitations are debottlenecked.

The primary process steps that occur at La Negra include boron removal with solvent extraction, impurity removal through chemical precipitation, lithium production utilizing chemical precipitation and final washing/drying/packaging (Figure 14-7).



Source: Adenda EIA, SGA, 2015

Figure 14-7: La Negra Flow Sheet

The mass balance for La Negra in its current configuration (i.e., La Negra 1 and La Negra 2) and associated with Figure 14-7 is presented in Table 14-1. As the La Negra 3 flow sheet is similar to La Negra 1 and La Negra 2, scaling up to the future targeted 84,000 tonne per year production rate would generally scale these mass flows proportionately.

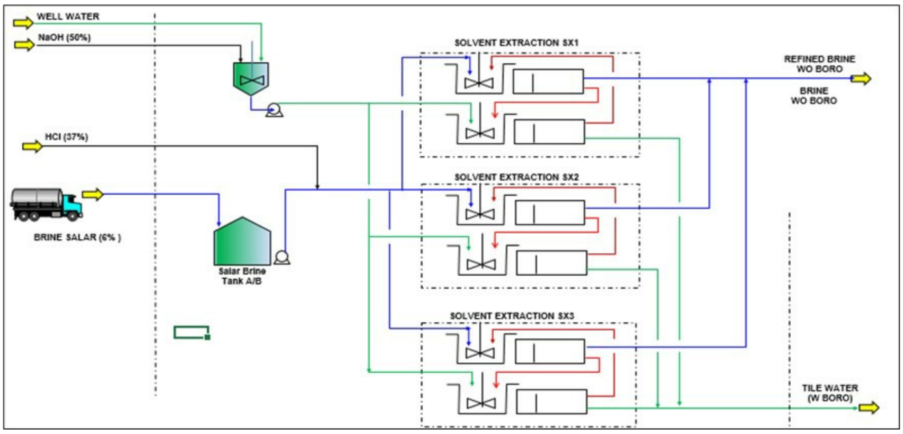
Table 14-1: La Negra Mass Balance

Process	Figure 14-7 Reference	Annual Mass Flow (tonnes)
Brine for solvent extraction	A1	180,000
Hydrochloric Acid HCl for solvent extraction	A2	1,957
H2SO4 Sulfuric Acid for solvent extraction	A3	468
Solvent	A4	131
Extractant	A5	56
Water for solvent extraction	A6	156,000
Lime for purification	A7	7,322
Soda Ash	A8	79,966
HCl Hydrochloric Acid	A9	627
Industrial water	A10	19,021
Sulfuric Acid H2SO4	A11	264
Water dilution	A12	5,430
Water for the treated water system	A13	440,235
Flow	1	182,613
Flow	2	169,297
Flow	3	88,925
RIL Water with Boron	B1	156,000
RIS Mg (OH) 2 / CaCO3	B2	32,629
Water vapor drying Lithium Carbonate TG	B3	16,920
Technical Grade Lithium Carbonate (TG)	**B4**	**25,380**
Dried Water Steam Lithium Carbonate BG	B5	3,526
Battery Grade Lithium Carbonate (BG)	**B6**	**19,980**
Mother Liquor Purge	B7	83,329
Mother Liquor Purge	B8	105,713
Purge Liquor Mother of the wash	B9	463,356
Emissions of Hydrochloric Acid HCl 32%	B10	0.44
Hydrochloric Acid HCl 32%	C1	1,024
50% NaOH Sodium Hydroxide	C2	328
Water for dilution of NaOH and HCl	C3	27,314
Disposal water from the neutralization pond	D1	13,312

Source: Adenda EIA, SGA, 2015

14.2.1 Boron Removal

The concentrated brine from the salar is received at La Negra with a nominal concentration of 0.8% by weight of boron. Boron is considered a contaminant and this boron content needs to be reduced to a value less than 10 ppm. This boron removal stage is completed utilizing a solvent extraction (SX) process (Figure 14-8).



Source: GWI, 2019

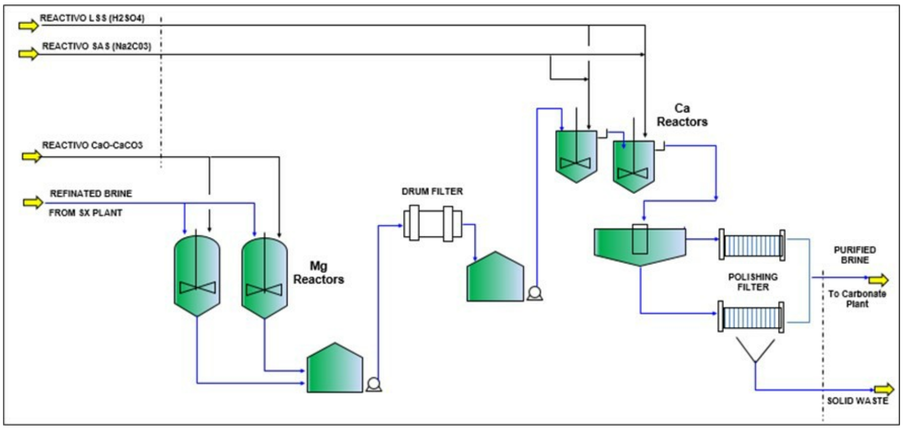
Figure 14-8: Boron Removal Scheme by Solvent Extraction

The concentrated brine is acidified using hydrochloric acid. The acidified brine is mixed with an organic solution of an extractant and a solvent in mixing tanks that maximize the contact between the phases, where the boron is selectively extracted from the aqueous phase of the brine. After the stirring time between the aqueous and organic phases, both immiscible with each other, they are separated in a settler tank.

The purified brine obtained from the settlers goes to the next stage of brine purification. The organic is treated with extraction water in a stripping unit to remove the boron. The low boron organic stream is reused in the extraction stage, with a solvent and extractant make up to compensate for the organic and carryover losses. The wastewater is collected in evaporation ponds.

14.2.2 Calcium and Magnesium Removal

The refined brine obtained in the SX stage must be processed to eliminate the remaining impurities, which are mainly magnesium and calcium. These impurities are removed from the brine through chemical precipitation, settling, filtration (Figure 14-9).



Source: GWI, 2019

Figure 14-9: Scheme Removal of Calcium and Magnesium by Precipitation with CaO and Na_2CO_3

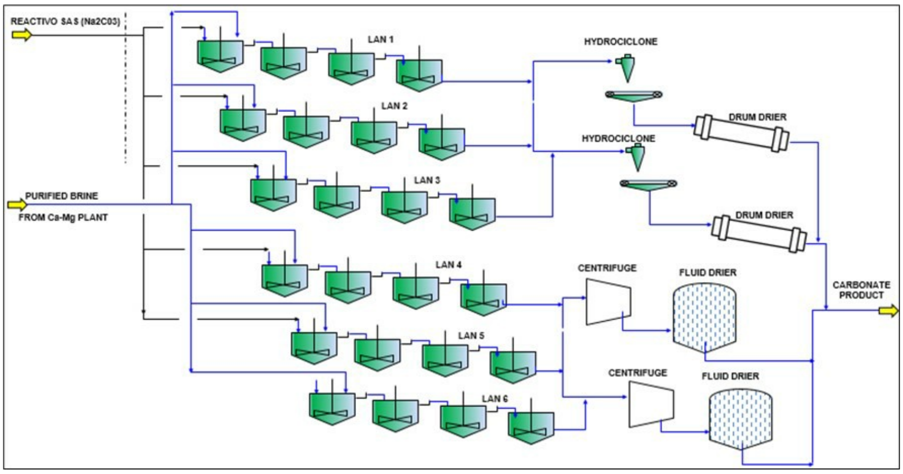
The refined brine from the boron SX enters the magnesium reactor, where it is mixed with lime in a stirred tank to precipitate magnesium as magnesium hydroxide. Then, the suspension is pumped to the calcium reactor, which is also stirred, where it is mixed with a recirculating solution from the carbonation process (mother liquor) and a sodium carbonate solution to precipitate calcium carbonate.

The resulting pulp is sent to a clarifier and the underflow is filtered to recover the lithium chloride solution which feeds the lithium carbonate plant. The overflow goes directly to a finishing filter to remove fine solids. The purified brine is sent to storage tanks for later use. The filtered cake is disposed of as a solid residue.

14.2.3 Lithium Carbonate Precipitation and Packaging

With the boron, calcium and magnesium impurities removed, the brine is ready for the carbonation process, which is utilized to produce lithium carbonate.

The purified brine is divided into a series of trains, each having three stirred reactors in series where the purified brine reacts with sodium carbonate in solution. Each reactor train has a fourth tank at the end that serve as homogenizers, from which the slurry is sent to a solid-liquid separation system utilizing hydrocyclones / filters or centrifuges before drying (Figure 14-10).



Source: GWI, 2019

Figure 14-10: Scheme of Obtaining Lithium Carbonate by Precipitation with Na_2CO_3

Subsequently, the dry product is stored in silos and distributed in the dry area for the manufacture and packaging of the different product formats, both technical grade (TG) and battery grade (BG):

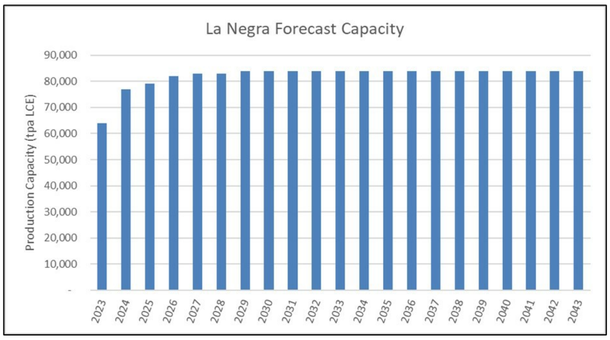
- Li_2CO_3 TG Compacted
- Li_2CO_3 TG Compacted Pharmaceutical Grade
- Li_2CO_3 TG Granule
- Li_2CO_3 TG Fine-60
- Li_2CO_3 TG Fine-140
- Li_2CO_3 BG Fine-40
- Li_2CO_3 TG 1040 Extra Fine Grade
- Li_2CO_3 TG 1040 Fine Grade
- Li_2CO_3 TG Coarse Crystals

14.3 Process Design Assumptions

One of the key limiting factors for Albemarle is the permitted brine extraction rate. Historically, the brine extraction permit allowed for an annual average of 142 L/s. In October 2016, a quarterly increase of 60 L/s began until the new annual average of 442 L/s was reached, which corresponds to the current extraction rate. With this flow, for a 365-day year, approximately 14 million m^3 are extracted from the aquifer, equivalent to 171 kt LCE with an average lithium concentration of 0.20%.

Historically, the recovery of lithium in the salar has been around 50% although this has ranged from 40% to closer to 55%. For the purposes of this reserve estimate, SRK has assumed the current recovery rate of 40% will be maintained through 2023. In 2024, SRK assumes the two salt treatment plants associated with the SYIP will come into operation and forecasts an increase in the lithium recovery rate to 65%. Notably, Albemarle has already added a process to drain the bischofite salts which should improve short-term recovery beyond historic performance. However, data is not available to quantify the performance increase for this drainage process and SRK has therefore maintained historic recovery levels as a conservative approach.

At La Negra, the current process recovery is approximately 80% and SRK has assumed that La Negra maintains this recovery rate. The production of lithium carbonate at La Negra is driven by the concentrated brine dispatched from the salar. As noted above, the current combined La Negra 1/La Negra 2 production capacity is approximately 45,000 t LCE per year. Construction on La Negra 3 is complete with commissioning and ramp-up ongoing. La Negra 3 is forecast by SRK to achieve a full, targeted production capacity of 84,000 t lithium carbonate in 2027 (Figure 14-11). Prior to that time the plant is in ramp up. The 84,000 t/y maximum production capacity is held constant for the remainder of the mine life through 2043.



Source: SRK

Figure 14-11: Forecast La Negra Annual Production Capacity

1.3.1 Process Consumables

Key reagents and associated forecast consumption rates are provided in Table 14-2. Note that these reagents are all utilized at La Negra and can vary depending upon the final product mix produced. While some reagents are consumed at the salar, these are all currently utilized in potash production (excluded from this reserve estimate). In the future, if lime addition is required at the salar to maintain lithium recovery rates, as assumed by SRK (see Section 14.1.1), additional lime will be required beyond that reported in the table. This assumed future lime consumption is variable and based on the forecast SO_4/Ca ratio.

Table 14-2: Current Process Consumables

Item	Consumption Rate
Soda Ash	2.27 tonne/tonne LCE sold
Lime	0.21 tonne/tonne LCE sold
HCl	0.11 tonne/tonne LCE sold
Water	14.3 tonne/tonne LCE sold

Source: SRK, 2022

Other reagents/consumables utilized in the process include the following:

- Caustic soda
- Sulfuric acid
- Solvent
- Extractant
- Flocculants
- Diatomaceous earth
- Oxalic acid

- Barium chloride
- Carbon dioxide
- Lithium hydroxide
- Energy consumption is covered in Section

Personnel at the salar currently utilized in the process component of the operation average around 100 and those at La Negra average around 250.

15 Infrastructure

The project is a mature functioning operation with two separate sites that contain key facilities. Access is fully developed, with the majority accessible by paved major highway and local improved roadways on site. A local air strip services the salar operations. The Antofagasta airport is the nearest major commercial airport servicing the La Negra operation (the Calama airport is the closet major commercial airport to the salar). The infrastructure is in place, operating and provides all necessary support for ongoing operations as summarized in this report.

The salar site contains the brine well fields, brine supply water pipelines to evaporation ponds, primary processing facilities to create a concentrated brine, a phosphate plant that creates a potassium chloride product, camps; including a new camp that is partially constructed and functional with a second phase planned, airfield, access and internal roads, diesel power generated supply and distribution, water supply and distribution, shop and warehouse facilities, administrative offices, change houses, waste salt storage areas, fuel storage systems, security and communications systems. The concentrated brine product is trucked approximately 260 km to the La Negra facility. Future additions to the infrastructure include substation and powerline additions to connect to the local Chilean power system in Q1 or Q2 2023.

The La Negra plant purifies the lithium brine from the Salar Plant and converts the brine into lithium carbonate and lithium chloride. Facilities at the site include the boron removal plant, calcium and magnesium removal plant, lithium carbonate conversion plants, lithium chloride plant, evaporation sedimentation ponds and an “offsite” area where raw materials are warehoused and combined as needed in the processing facilities. Power to the facility is provided by the regional power company via a 110 kV transmission line and distributed throughout the plant to load centers. Piped natural gas provides the energy for heating and steam needs at the facilities. The project is security protected and has a full communication system installed.

Final products from the La Negra plant are delivered to clients by truck, rail, or through two port facilities near the plant.

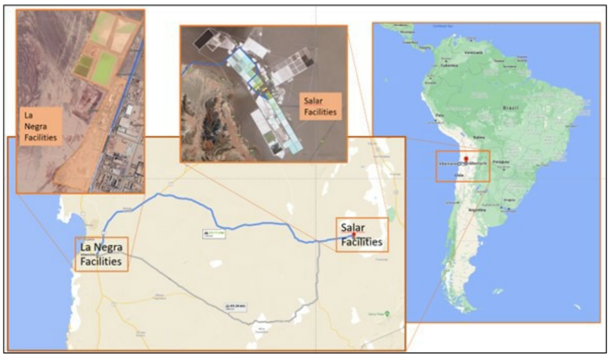
15.1 Access, Roads, and Local Communities

15.1.1 Access

The project is located in north central Chile in the Antofagasta region. Primary access is from Antofagasta or Calama, the major cities in the region. The major plant facilities are at two separate sites. The refining plant site (La Negra) is closest to Antofogasta, near the small community of La Negra. Travel from Antofogasta to the La Negra refining plant site is approximately 20 km southeast on the major paved, four-lane, Chile Route 28. At La Negra, the Albemarle La Negra site is approximately 2 km north from the intersection of Route 28 on the multi-lane, paved, Chile Route 5 (the Panamerican Highway).

From the La Negra plant to the source of the lithium brine at the Salar de Atacama, where the Albemarle salar facilities are located, is approximately 250 km to the east. Access from La Negra is north via Route 5, approximately 75 km, and then east on paved highway B-385 for approximately 175 km. The Albemarle salar site is on the south-central area of the Salar de Atacama.

Figure 15-1 shows the general location of the project.



Source: SRK, 2020

Figure 15-1: General Project Major Facility Location

15.1.2 Airport

Antofagasta has an international airport, but primary flights are national, and it is the primary airport for the region. The city of Calama, located approximately 190 km to the northwest of the salar, has the closest commercial airport to the salar. A smaller airport is located at the salar for direct access. This air strip is located at the south end of the salar facilities. The site air strip is for smaller jets and prop planes and is approximately 2,235 m in length and has a clay surface.

15.1.3 Rail

A rail owned and operated by Ferrocarril de Antofagasta a Bolivia (FCAB) exists about 80 km south of the salar site at Pan de Azucar, connecting to La Negra, approximately 170 km away, that had been used historically for moving concentrated brine. It is no longer used as all brine is trucked directly to La Negra. The La Negra facility does not have access to the rail system as this time.

15.1.4 Port Facilities

Port facilities are located in Antofagasta within 20 km of the La Negra plant. The medium size coastal breakwater port has facilities for both container and bulk transport. The port can accommodate ships over 150 m in length. Figure 15-2 shows the port facilities. An additional port facility is the Port of Mejillones 80 km from La Negra to the south.

Source: Google Earth/SRK, 2020

Figure 15-2: Antofagasta Port

15.1.5 Local Communities

The majority (nearly 95%) of the approximate 450 employees who work at La Negra live in the City of Antofagasta and its suburbs. Antofagasta is the regional capital and major population center, with approximately 440,000 people living there. Employees are bussed approximately 25 km to the La Negra plant.

Personnel who work at the Salar Plant travel from around the region. Table 15-1 shows the regional communities, population, distance to the Salar Plant and approximate number of employees in each community. Nearly 85% of the employees live in Antofagasta, San Pedro de Atacama or Calama. There are 27 communities in the Other Communities category where employees reside with one to four employees living in each community. Figure 15-3 shows the communities where most employees reside. Most employees travel to site by company bus.

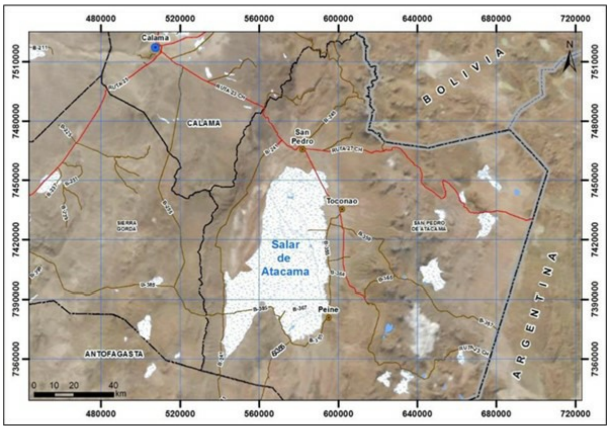
A company camp is located in Peine approximately 30 km east of the Salar Plant. The camp consists of 10 houses with a capacity of 77 persons. There are also 34 single room modules. The 250 people that work on site on various rotations stay at the camp along with approximately 51 contractor personnel. A company bus provides transportation from the camp to site and back.

A second camp known as the Chépica Camp permitted for approximately 600 people is permitted and the first phase has been constructed (350 people) and is use with a second phase (250 additional people) planned as needed with future expansions. The camp is located approximately 2 km to the east of the Salar Plant.

Table 15-1: Regional Community Information for the Salar Plant

City	Number of Employees	Population	Distance to Salar Plant (km)
Antofagasta	101	440,000	250
San Pedro de Atacama	80	4,000	130
Calama	28	150,000	190
Other Communities	41	Varies	Varies
Total	**250**		

Source: SRK, 2020



Source: Albemarle, 2020

Figure 15-3: Regional Communities

There are approximately an additional 50 people that work in the corporate offices in Santiago and support the production activities. Santiago is the capital of Chile and the major population center for the country with a population of approximately 6.8 million in the metro area. Santiago is approximately 1,600 km south of the Salar Plant, traveling through Antofagasta.

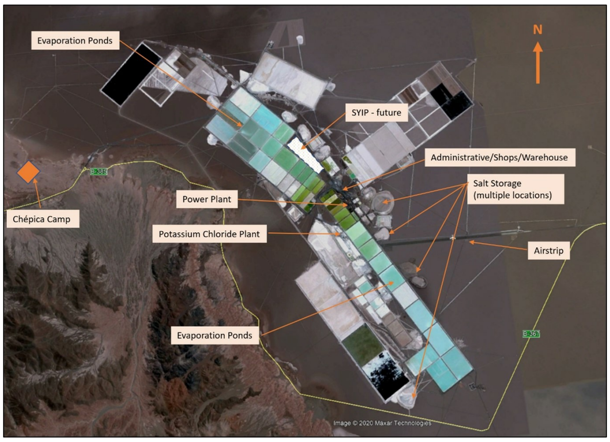
15.2 Facilities

15.2.1 Salar Plant

The Salar Plant located in the mining concession area consists of lithium-rich brine recovery wells, pipeline delivery system to the concentration/evaporation pond systems and two leaching plants that create a concentrated brine product that is shipped by truck to La Negra for further processing. Additionally, a potassium processing and drying plant creates a co-product, potassium chloride also commonly referred to a muriate of potash (MOP).

Other site facilities include the salt harvest storage areas, fuel storage and fueling systems, electrical delivery and distribution systems, airfield, security guard house, warehouses, change room, dining room, administrative office building, maintenance facilities, operations building, and laboratory.

Figure 15-4 shows the Salar Plant layout.



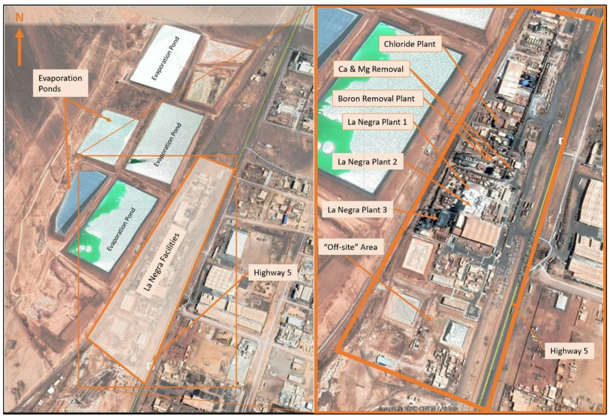
Source: SRK, 2020

Figure 15-4: Salar Plant Facilities

Future expansion work includes the addition of the SYIP (described in Section 14 and a power system upgrade that will add a new 23kV powerline from the Sistema Eléctrico Nacional (SEN) transmission system to a new substation located north of the power plant. The power upgrade is further discussed in Section 15.4.1.

15.2.2 La Negra Plant

The La Negra plant purifies the lithium brine from the Salar Plant and converts the brine into lithium carbonate and lithium chloride. Facilities at the site include the boron removal plant, calcium and magnesium removal plant, lithium carbonate conversion plants, lithium chloride plant, evaporation sedimentation ponds and an “offsite” area where raw materials are warehoused and combined as needed in the processing facilities. Figure 15-5 shows the La Negra Plant facilities.



Source: SRK, 2020

Figure 15-5: La Negra Plant Facilities

Lithium Chloride Conversion Plant

The lithium chloride conversion plant consists of a three-level building, service buildings, control room and supporting equipment buildings. Inside the main building is a system of four reactors with "scrubber", a press filter, storage ponds, a distiller and four cooling towers, a crystallizer, a centrifuge, a rotary dryer and a cooler.

Calcium and Magnesium Removal Plant

The calcium and magnesium removal plant has four reactors for the treatment of calcium and magnesium. In addition, it has a clarifier and solid-liquid separation equipment.

Boron Removal Plant

The plant consists of a multilevel process tower, service buildings, control room, maintenance shop and other minor facilities.

Lithium Carbonate Conversion Plants

The carbonate conversion plant consists of six reactor trains and a serial homogenization reactor, referred to as LAN 1, LAN 2 and LAN 3. In particular, for LAN 1 there is a hydrocyclone plus a filter press. While for the other trains (LAN 2 and LAN 3) there are centrifuges. Rotary-type drying systems are also included in the plant.

Evaporation-Sedimentation Ponds

Five ponds are located on-site for storage of industrial waste (three evaporation and two sedimentation). The ponds cover a total area of 60 ha.

"Off Site" Area

The "Off Site" area includes liquid storage ponds, reverse osmosis plant and preparation reactors.

Dry Area

The dry area of the process facility includes grinding systems, compactors, granulators and storage silos.

Support Facilities

The support facilities include a container yard, water reservoirs, access roads, smaller sheds and maintenance workshops, among others.

15.3 Energy

15.3.1 Power

Salar Area

Power is supplied to the Salar Plant area via on site generation by a central diesel fueled generation plant. The generating plant is 2.4 MW. The generation plan is made up of three Caterpillar C-18 generator sets rated at 508kW each and one Caterpillar C-32 with a capacity of 880 kW. The gensets operate based on load requirements, typically with two to three units operating and one unit on standby. Additionally, 1.7 MW of distributed generation is used on the site with 70 separate small generators used for the individual well pumps. The individual generator sets range from 16 kW to 63 kW in size. The largest number of units are either 16 kW or 24 kW. Finally, there are two 421 kW generator sets located at the Chépica Camp site. This brings the total installed generating capacity to 4.9 MW.

The primary electricity consumption is the potassium plant using nearly 90% of the total electricity on site. Annual consumption for the last three years averaged just over 6 million kWh per year. The Phase 1 addition of the SYIP will add approximately 2 MW additional load.

Table 15-2 shows the percentage use by load center.

Table 15-2: Salar Plant Electricity Consumption by Load Center

Primary Loads	Percent of Total (%)
Potash Plant	87
Carnalite Conversion Plant	0
Lithium Plant	2
Peine	9
Lixiviation Number 1	1
Total	**100%**

Source: Albemarle, 2020

The power system will be upgraded with the addition of a new substation, a 35 km 23 kV transmission line that will tie into the local SEN system at the SS Tap Off West owned by AES Gener, and 6 km of 13.8 kV transmission line on site to support the local distribution system, once this system is connected the diesel power plant will perform as a backup. Construction occurred in 2021/2022 with the tie in scheduled for March of 2023. The connection will reduce the use of diesel significantly.

La Negra

Power is available from the 110 KVA Norte Grande Interconnected System (SING) Network. Local diesel generation is available as a backup system for critical systems. The total installed load on site is approximately 29 MVA.

Table 15-3 shows the primary loads.

Table 15-3: La Negra Primary Electrical Loads

Primary Loads	Installed Capacity (MVA)
Evaporator Terminal	6.5
LAN 3, PF 5.1, PF 5.2, PF 6.1	4.5
LAN 1, Two Step, PF 3, PF 3.5, Central Lab	4.5
LAN 2, PF 4	4
One Step 2	2
One Step , SAS Wetting System	2
SAS Phase Thickening/Dilution, SX3, North Tank Farm, Brine unloading	2
Chloride Plant, SX1	1.5
Sodium Plant, SX 2	1
Cafeteria, Admin offices, contractor facilities, training room, project offices, investigation laboratory	0.5
Truck shop, North Guard Shack, North dining room	0.15
Water Treatment Plant	0.075
Hazardous Waste Storage	0.075
Total	**28.8**

Source: Albemarle, 2020

15.3.2 Natural Gas

Salar Plant

The Salar Plant does not use natural gas or propane.

La Negra Plant

The primary source for process and heating at La Negra is natural gas. The gas is supplied by pipeline. The primary use is for drying and water heating/steam generation. The primary loads are summarized in Table 15-4.

Table 15-4: Primary Natural Gas Loads

Location	Equipment	Make	Energy Min	Energy Max	Energy Units	Gas Pressure	Units	Natural Gas Consumption Min	Natural Gas Consumption Max	Units
Chloride Plant	Direct Dryer	Cleaver Brooks	2,041	20,412	MBTU/h	200	psi	17	18	Nm^3/h
	Boiler	Maxon	750	1,600	MBTU/h			21	45	m^3/h
Plant 1	Hurst Water Boiler	John Zink Co.	12,320	12,600	MBTU/h			349	357	m^3/h
	Terminco Thermopack oil fluid heater	Fulton	0	800	MBTU/h			23	28	m^3/h
	Direct Dryer 1	S/I	0	7,931	MBTU/h				57	m^3/h
	Direct Dryer 2	Etchegoyen	0	3,470	MBTU/h				25	m^3/h
Plant 2	Water heater	North American	0	46,200	MBTU/h	125	psi	330	1308	US gph
	Indirect heater	Cleaver Brooks	3,999	4,000	MBTU/h				113	m^3/h
Plant 3/4	Indirect heater	Stelter & Brinck	2,650	11,400	MBTU/h	11	psi	71	306	Nm^3/h
Total			**21,760**	**108,413**	**MBTU/h**					

Source: Albemarle (modified by SRK), 2020

Propane is not used at the La Negra plant. It is available as a backup fuel sources from Antofagasta by tanker truck.

15.3.3 Fuel

Salar Plant

The Salar Plant has fuel storage on site including two diesel tanks that are 120,000 liters and 60,000 liters. A smaller 15,000 liter tanks hold gasoline. Fuel is supplied by a regional supplier. The fuel is delivered to site by over the road tanker trucks from Antofagasta every other day.

La Negra Plant

The La Negra site has a 20 m^3 diesel tank and several smaller tanks for backup during power outages.

15.4 Water and Pipelines

Albemarle has water rights granted by the General Water Directorate (DGA) for those wells and spring water where fresh water is extracted, which is used as industrial water for the process. The water rights correspond to the water sources located in Tilopozo (8.5 L/s), Tucucaro (10 L/s), and Peine (5 L/s), with a total right to extract 23.5 L/s, of which the Tilopozo spring water and Tucucaro well are currently authorized, for a total of 16.9 L/s. Water from the Peine well is provide by 6 inch HDPE pipe to the Peine camp 20,000 m^3 covered storage pond. The Tilopozo spring water discharges into an 8 inch pipe that reports to a 2,000 m^3 post-processing thickening pond. The Tucucaro well feeds a 6 inch pipe that also discharges to the same post-processing thickening pond. It should be noted that, for brine extraction wells, no groundwater rights are required, as this corresponds to the extraction of a mineral resource.

In La Negra there are two wells that have water rights granted by the DGA for the extraction of 13 L/s. Well 1 North is permitted at 6 L/s and Well 2 South is permitted at 7 L/s. Additional water can be supplied by a local water system.

16 Market Studies

Fastmarkets was engaged by Albemarle through SRK to perform a preliminary market study to support resource and reserve estimates for Albemarle's mining operations This report covers the Salar de Atacama and associated La Negra processing facility. The combined Salar de Atacama/La Negra facilities primarily produce lithium products and the market study supporting this reserve estimate is specific to lithium production.

16.1 Market Information

This section presents the summary findings for the preliminary market study completed by Fastmarkets on lithium.

16.1.1 Lithium Market Introduction

Historically, (i.e., prior to the 2000s), the dominant use of lithium was in ceramics, glasses, and greases. The current lithium market is driven by the battery electric vehicle industry. Demand from lithium-ion batteries currently contributes 81% of total demand. Split into EV's (70%), ESS (4%) and consumer electronics (7%) The remainder (19%) is from ceramics and other traditional applications.

Lithium is currently recovered from hard rock sources and evaporative brines. The predominant hard rock mineral is spodumene, whilst most production from brine operations occurs as lithium chloride (LiCl). For the rest of this document, unless specifically noted, when referring to brine production Fastmarkets will be referring to chloride brines, and when referring to hard rock, again unless specifically noted, Fastmarkets will be referring to spodumene. This is to minimize the complexity of this explanation and given these are the dominant forms of production from both sources, this simplification covers the majority of current and future production sources.

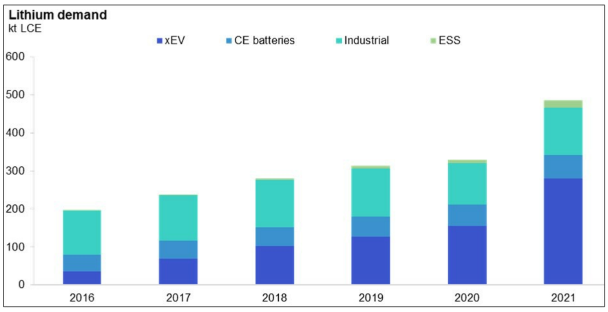
For use in batteries appropriate for electric vehicles, lithium is generally used in either a carbonate or hydroxide form. Current practice allows direct production of lithium carbonate from either brines or hard rock sources, whereas only hard rock sources directly produce lithium hydroxide (brine operations all first produce lithium carbonate which is then converted to hydroxide, if desired). However, there is a reasonable probability that lithium hydroxide will be produced directly from a brine source in the future. For existing producers, the major differences in cost between brine and hard rock include the following:

- Hard rock sources require additional mining, concentrating, and roasting/leaching costs.
- For a final hydroxide product, brine sources first produce a lithium carbonate that requires further conversion costs, whereas hard rock sources can be used to directly produce a lithium hydroxide from a mineral concentrate.
- Brine sources require concentration prior to production, as natural brine solutions are generally too diluted to allow for precipitation of lithium in a salable form.
- Brine sources generally have a higher level of impurities (in solution) that require removal.

Historically, brine producers have had a significant production cost advantage over hard rock producers for lithium carbonate and a smaller cost advantage for lithium hydroxide. New brine producers have relatively high operating costs when compared to traditional hard rock production, especially with respect to the production of lithium hydroxide, so the prior landscape is evolving.

16.1.2 Lithium Demand

In recent years, the lithium industry has gone through an evolution. The ceramic and glass sectors were traditionally the largest source of demand for lithium products globally. However, the development boom in demand for mobile consumer applications reliant upon lithium-ion batteries structurally changed the industry. Much of this change, 2000-2015, was driven by devices such as phones, laptop computers, tablet computers, and other devices (e.g., speakers, lights, drones and wearables, etc.), as well as small mobility devices (e.g., electric bikes). However, the use of lithium in EV's) has quickly become the most important aspect of overall lithium demand, not just within the battery sector of demand, but for lithium demand on whole. This is seen in Figure 16-1, with EV market share rapidly growing in importance and driving overall demand growth in the lithium industry.



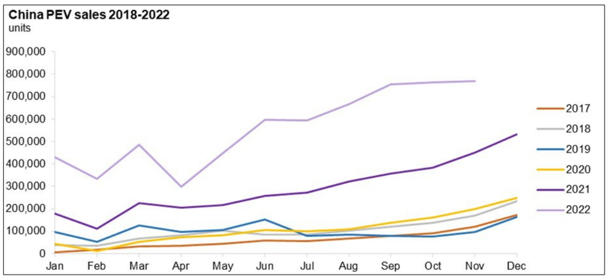
Source: Fastmarkets

Figure 16-1:Historic Lithium Demand

The potential future demand scenarios look extremely strong as the adoption of EV's is happening at a fast pace, governments have accelerated their zero-carbon agendas, towns and cities are introducing emission charges, which is accelerating uptake of EV, especially light commercial EV's and as more power generation comes from renewables, the need for Energy Storage Systems (ESS) will also need to grow at a fast pace. Indeed, lithium demand from ESS application is expected to be bigger than EV's.

But the future landscape could also change, instead of households owning cars, autonomous vehicles may lead to ride hailing and car sharing usage models, battery chemistries are likely to change and different power trains, such as hydrogen, could be adopted.

Nonetheless, acceleration in the growth of the EV industry appears to be unstoppable. Demand growth in 2019 and 2020 were relatively disappointing but were likely driven by external factors (e.g., changes in EV subsidies in jurisdictions such as China, as well as the global COVID-19 pandemic) that have largely moved through the system. Indeed, EV demand in China in the second half of 2020 and throughout 2021 accelerated at a fast pace and have remained strong in 2022 (Figure 16-2). In the first three quarters of 2022, BEV sales were up 89% in China, 69% in the US and 26% in Europe. Figure 16-2 shows the sales in China by year.



Source: CAAM, Fastmarkets

Figure 16-2: China Historic PEV Sales

Ironically, the pandemic and the lockdowns led to significantly less polluted cities and clear skies, which has changed public perceptions about climate change, which combine with government incentives to buy EV's, in an effort to boost economic recovery, have further boosted demand for EV's. Most auto makers and other industry participants have invested heavily to expand into EV production and have accepted that the future is EV's, with many already signaling when they will stop producing internal combustion engine (ICE)- based vehicles. Interestingly, many of Japan's OEMs were reluctant to adopt EV's wholeheartedly, given they had to import energy to produce electricity, but in recent years they have signaled their intent to switch to electric. In Fastmarkets' opinion, many of the barriers to EV's becoming the dominant type of vehicle sales have been lifted, although there are still concerns about availability of raw materials and the cost of EV's.

Several barriers for mass EV adoption persist, with cost being the most significant one. In 2020, Bloomberg New Energy Finance (BNEF) estimated that the battery pack makes up 33% of the total BEV cost. At that time, the cells within the pack made up 75% of the battery pack cost and the cathode active material (CAM) made up around 51% of the cell cost. The CAM is the most expensive component of the entire battery pack. These proportions will now have changed due to high commodity prices and other global economic factors.

Due to a lack of maturity of the lithium battery market, current contract prices are significantly lower than spot market prices. This is expected to change with time. Fastmarkets expects that a move to market-based pricing mechanisms will result in raw material prices settling at a level that is mutually beneficial for both producers and consumers.

For higher-end vehicles, this cost is manageable in the context of the overall vehicle cost. However, for entry level vehicles, the cost of the battery pack remains a hurdle to BEV's being competitive with ICE cars. BNEF state that US$68 per kWh is a rough global benchmark for BEV's becoming cheaper than ICE vehicles.

Fastmarkets' modeling, which considers spot prices for lithium, nickel, manganese, cobalt, and iron phosphate, showed battery pack costs peaked at US$180 to US$190 per kWh for nickel-based chemistries in March 2022 following high lithium hydroxide prices and the nickel price spike. The LFP battery pack cost peaked near US$155 per kWh around the same time, driven by high lithium carbonate prices.

We expect a greater penetration of vehicles fitted with LFP/LMFP battery packs outside of China. LFP/LMFP is a lower cost on a kWh basis, helping to reduce the average fleet battery pack cost and improve cost parity in budget vehicle segments. Improvement in technologies will also help reduce battery pack costs by reducing material intensity (less material = reduced cost) and increasing energy density (higher kWh for the same cost).

We have seen EV's become increasingly popular across developed markets in 2021 and 2022. We expect to see this level of growth sustained due to two factors. Firstly, the variety and availability of EV models have expanded since 2021, making EV's attractive to a greater number of consumers. The second is the introduction, or expansion, of EV-related subsidies and electric mobility strategies by governments in order to increase local EV adoption rates.

That said, two headwinds pose a downside risk to EV adoption in the near term, namely EV prices and range anxiety. Data from Fleet Europe shows that, although EV prices have fallen in China by 52% since 2015, they have risen in the US and Europe by 20% and 14% respectively, making EV's 43% and 27% more expensive than ICE cars in these markets. EV's also remain unaffordable for most consumers in emerging markets where average household incomes are lower, making ICE and used vehicles more attractive. We also expect that range anxiety will continue to limit battery-only-EV (BEV) sales in the near term, particularly in markets where vehicle ownership is necessary for travel, until battery range and charging infrastructure improves. But, where range anxiety is an issue, plug-in-hybrid EV (PHEV) sales are expected to do well.

In Fastmarkets' opinion, raw materials and supply chain limitations are the other potential major risk to widespread EV adoption, given how much longer it takes to build new mine supply, compared with downstream manufacturing capacity. Out of all the battery raw materials, Fastmarkets expects graphite and lithium are the materials that are most likely to constraint battery production, but it is not a given. The risks are generally considered to exist in the nearer term period, as the further out you look, a broader base of producers, who will by then have better knowhow, will be better placed to expand production or use their expertise to help, by partnership or acquisition, other junior miners get into production. In addition, longer term, widespread recycling will likely mitigate this risk. Downstream production (e.g., battery-grade lithium carbonate/hydroxide, cathode precursor, cathodes, batteries, etc.) also appears to have a low risk of creating a bottleneck, as an extensive investment in this manufacturing capacity has already happened and continues. Technological improvements, including direct lithium extraction, DLE, and mining different ore types, like lepidolite and clays, are also expected to speed up the bringing of new supply to the market as well as expand the availability of lithium units, in the case of lepidolite.

Fastmarkets expects near- to mid-term growth in the EV market to remain robust, the biggest near-term threats are the cost-of-living crisis, the higher interest rate environment and the prospect of widespread recession. The International Monetary Fund (IMF) expects one third of the world's economy to be in recession in 2023. Normally, such an economic outlook would dampen the outlook for new vehicle sales, but while Fastmarkets expects total vehicle sales to be negatively impacted, it does not expect EV sales to be impacted. Reasons being, first there are long waiting lists to buy

EV's, these range 3-24 months. Second, EV production that has been constrained by the parts shortages, especially the semiconductor shortage, is expected to recover as more capacity has been built and supply lines have had time to adjust to the disruption caused by Russia's invasion of Ukraine, the latter being a significant manufacturer of auto parts. In addition, the EV market has moved on from being a niche market to being much more mainstream. In addition, it needs to be remembered that EV growth will run parallel with ESS growth, and both will be driving demand for lithium-ion batteries. While Fastmarkets has little doubt the electrification era will unfold at a fast pace, there is no room for complacency. There are risks - technological changes could see hydrogen power trains, with hydrogen being used as a fuel to combust, or to power fuel cells, and other battery chemistries could evolve, such as sodium-ion. In addition, advances in charging could mean EV's could operate with significantly smaller batteries, which in turn would mean the global vehicle fleet needs less battery raw materials. Under these scenarios, demand for lithium from EV's would be curtailed. Overall, Fastmarkets expects lithium-ion batteries will remain essential as the electrification era unfolds at a fast pace.

To quantify potential demand growth, Fastmarkets has constructed a bottom-up demand model, forecasting BEV sales by region, by EV type (BEV, PHEV, Mild-hybrid (MHEV)), which is further broken down by battery size and battery chemistry, from which we calculate the volume of demand for each battery material. The demand side remains extremely dynamic, different battery chemistries, including sodium-ion, LFP LMFP, high nickel, high manganese and others are expected to be utilized by different applications going forward. The main risk for lithium would be if a non-lithium-ion battery gained traction. Again, while we expect non-lithium batteries will find some applications, we expect lithium-ion batteries will dominate.

With governments imposing targets and legislation as to when the sale of ICE vehicles will be banned, strong growth in EV uptake is expected over the next 10-15 years. Fastmarkets' forecast is by 2032, EV sales will reach 50 million, which will mean about 55% of global sales will be EV - highlighting there will still be a lot of room for organic growth ahead.

While the is a lot of focus on EV growth, there is a likely cap on how big the EV market can be. But given the potential for grid scale energy storage, the ESS market is likely to surpass the EV market in the future.

16.1.3 Lithium Supply

Lithium supply is currently sourced from two types of lithium deposit: hard rock (spodumene, lepidolite, and petalite minerals) and concentrated saline brines hosted within evaporite basins (largely salt flats in Chile, Argentina, China and Bolivia). Exploration and technical studies are currently ongoing on three additional types of deposits: hectorite clay deposits, a unique hard rock deposit with a lithium- boron mineral named Jadarite, and other deep brines (e.g., geothermal and oil field). Although extensive study has been completed and much is being invested in these alternate lithium sources, they have not yet been commercially developed, although some are expected to be commercially developed in the not-too-distant future.

Currently (i.e., 2022 production), approximately 45% of lithium produced comes from brines and 55% from hard rock deposits.

Up until 2016, global lithium production was dominated by two deposits: Greenbushes in Australia (hard rock) and the Salar de Atacama in Chile (brine), the latter having two commercial operations on it, Albemarle and SQM. Livent, formerly FMC, was the third main producer in South America with their operation in Argentina. Tianqi Lithium and Ganfeng Lithium were the two main Chinese lithium players, growing domestically and overseas with Tianqi buying a 51% stake in Greenbushes and Ganfeng developing lithium mining and production facilities in China, as well as investing in mines and brine operations in Australia and South America. Since then, many more producers have emerged on the scene, first with the restart of the Mt Cattlin mine in Australia, the brief restart of North American Lithium's La Corne mine in Canada, the expansion at Mt Marion and the start-up of Allkem (formerly Orocobre) brine operation in Argentina. These were then followed by a rush of new production in 2017/18, with AMG's Mibra in Brazil and four new starts in Australia, including Tawana Resources' (later Alita Resources) Bald Hill mine, Altura Mining's Pilgangoora mine, Pilbara Minerals' Pilgangoora mine and Mineral Resources' Wodgina mine. In addition, there were start-up in China, including Qarhan, Taijinaier and Yiliping. In addition, a number of existing producers have expanded production in recent years, including at Albemarle, SQM, Pilbara Minerals, Allkem and Mineral Resources' Mt Marion mine. The result is that production climbed to 528,000 tonnes LCE in 2021, from 186,000 tonnes LCE in 2016. As of mid-2022 there were 27 miners, operating 30 mines/salars, with the average size of production being 16,500 tonnes per year LCE. In 2021, brine accounted for 46%, spodumene 45% and lepidolite and clays 9%. Geographically, in 2021, 41% of lithium raw material was mined in Australia, 32% in South America, 24% in China, with 3% from other countries.

Looking forward, as discussed above, Fastmarkets forecasts that demand will grow significantly. However, supply is also rapidly increasing. Based on Fastmarkets' knowledge of global lithium projects in development, it forecasts that mine supply will grow by 165% between 2021 and 2025, with estimated mine supply reaching 1.4 million tonnes in 2025, from 0.58 million tonnes in 2021. This potential growth in supply is limited to projects that are near production (i.e., projects that are either producing, under construction, or at an advanced stage of development, such as operating demonstration plants and at the point of financing construction). The current price environment and political climate is extremely supportive of bringing on new production, with many governments giving grants, tax breaks and downstream consumers keen to provide support by offering partnerships and offtake agreements. The main headwinds today are social and environmental opposition, while planning and permitting still take time. Given the demand outlook discussed above, Fastmarkets believes it is likely the next-in-line projects come into production and other junior miners will be incentivized to get into production as fast as they can. Our forecast is that there are more than enough potential lithium mines to provide enough supply, the big question is whether the supply can be commercially available in a timely manner.

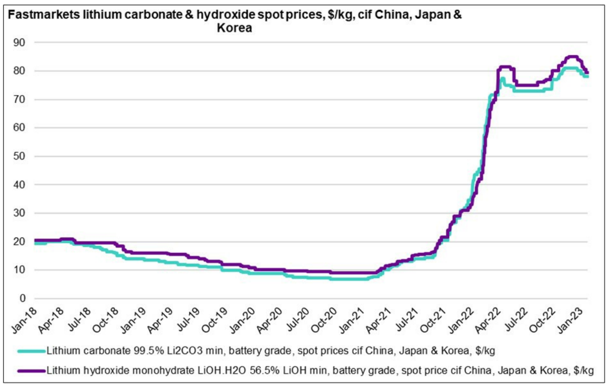
Beyond 2025, the supply pipeline is well stocked with junior miners and their journey to market may well be accelerated as existing miners invest in them, bringing with them their knowhow, finance and management expertise.

16.1.4 Pricing Forecast

Lithium prices reacted negatively to the supply increases that started in 2017/18, with spot prices for battery grade lithium carbonate, CIF China, Japan, Korea (CJK) falling from a peak of US$20 per kg in early 2018, to a low of US$6.75 per kg in the second half 2020. They have since been catapulted higher, averaging US$16.60 per kg in 2021 and US$70.66 in the first eleven months of 2022, with the high price range so far in 2022 being US$80 to US$82 per kg. This surge in prices has been driven by stronger-than-expected demand and a far-from-optimal supply response, which was hampered by the negative fallout from the pandemic and a much slower-than-expected restart of idle production capacity, while new capacity and restarts have suffered the usual ramp-up issues.

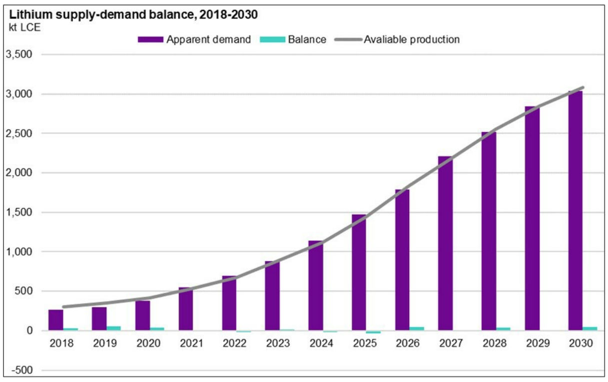
But, as 2022 turns into 2023, another supply response is underway, with some idle capacity restarting, expansions and new mines starting up. This new capacity has been ramping up during

2022 and is expected to continue to do so in 2023, bringing with it much needed additional supply that should alleviate the current supply shortage. Fastmarkets does, however, expect the market to end up being in a small supply surplus in 2023, which should take pressure of prices. Figure 16-3 shows the historic lithium carbonate and lithium hydroxide prices. Figure 16-4 shows the forecast demand-supply balance.



Source: Fastmarkets

Figure 16-3: Historic Lithium Carbonate and Lithium Hydroxide Prices



Source: Fastmarkets

Figure 16-4: Forecast Lithium Supply-Demand Balance

After two years of a deficit market, 2023 is expected to see a significant supply response and the market tightness is expected to ease. Although Fastmarkets expects the market to move into a small surplus of 11,500 tonnes LCE in 2023, the market will still feel tight, and as such the price is expected to remain elevated. Thereafter, the market is expected to be tight and mainly in deficit until 2026, as we move further away from the parts shortages that have been constraining EV production, and therefore lithium demand.

Given the strong demand outlook we envisage a challenge for producers to keep up and bring supply online in a timely manner. Given this challenge, Fastmarkets does not expect prices to drop down below the incentive price anytime soon. In Fastmarkets' opinion, the lithium price will need to exceed the production cost for new projects and provide an adequate rate of return on investment to justify developments.

Near to medium term supply increases will be fueled by traditional sources, including spodumene units from Australia, Africa and the Americas, as well as salar brines in Argentina, Chile and China. Post 2025, an increasing portion of new supply is forecast to come from lower-grade unconventional resources such as lepidolite, geothermal brines and oilfield brines. Based on how Chinese companies have rapidly developed the nickel/cobalt sector in Indonesia, as it strived to secure battery raw materials, Fastmarkets is confident in the ability of the Chinese to do the same in lithium by ramping-up domestic lepidolite production and developing lithium mines in Africa. Both of these are expected to become a significant contribution to global supply.

There is expected to be a period of surplus in the second half of the decade, but as mentioned, a significant amount of new capacity is reliant on the successful implementation of yet mostly unproven DLE technology at unconventional resources, so the forecast presence of some surpluses is not a bad thing. While an 87,100-tonne surplus in 2031 seems a lot now, it will only represent around 3%

of forecast demand. Surpluses will also likely be absorbed by restocking. In addition, experience tells us that even though we have allowed for delays, we are likely to see more issues affecting the delivery of new material into the market - as such, prices are expected to remain elevated. The emergence of more recycled material will provide an extra boost to supply in the later years.

Fastmarkets has provided price forecasts out to 2030 for the most utilized market prices (Table 16-1). These are the battery grade carbonate and hydroxide, CIF China, Japan and Korea. Fastmarkets recognizes that Albemarle's current operations are expected to continue for at least another 20 years, but due to a lack of visibility beyond 2030, there is little reward in attempting to forecast a supply-demand balance and therefore a price forecast beyond this period. We have therefore flatlined our forecast from 2030. Below are the forecasts, provided in both nominal and real terms.

Table 16-1: Forecast Lithium Carbonate and Hydroxide Prices

Prices and Forecast (Base case)	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Lithium carbonate BG CIF China, Japan And Korea spot US$/kg (nominal)	16.6	71.2	63.5	59.0	61.0	42.0	47.8	28.0	33.0	24.0
Lithium carbonate BG CIF China, Japan and Korea spot US$/kg (real 2022)	17.9	71.2	61.3	55.8	56.4	37.9	42.7	24.7	28.6	20.5
Lithium hydroxide BG CIF China, Japan and Korea spot US$/kg (nominal)	17.4	72.9	65.5	61.0	60.0	40.0	48.0	28.0	33.0	24.0
Lithium hydroxide BG CIF China, Japan and Korea spot US$/kg (real 2022)	18.8	72.9	63.2	57.7	55.5	36.1	42.8	24.7	28.6	20.5
Prices and Forecast (High case)										
Lithium carbonate BG CIF China, Japan and Korea spot US$/kg (nominal)	16.6	70.8	76.0	76.0	70.0	65.0	65.0	55.0	55.0	55.0
Lithium carbonate BG CIF China, Japan and Korea spot US$/kg (real 2022)	17.9	70.8	73.4	71.9	64.7	58.7	58.0	48.4	47.7	47.1
Lithium hydroxide BG CIF China, Japan and Korea spot US$/kg (nominal)	17.4	72.2	76.0	76.0	70.0	65.0	65.0	55.0	55.0	55.0
Lithium hydroxide BG CIF China, Japan and Korea spot US$/kg (real 2022)	18.8	72.2	73.4	71.9	64.7	58.7	58.0	48.4	47.7	47.1
Prices and Forecast (Low case)										
Lithium carbonate BG CIF China, Japan and Korea spot US$/kg (nominal)	16.6	70.8	60.0	43.0	40.0	20.0	16.0	12.0	12.0	12.0
Lithium carbonate BG CIF China, Japan and Korea spot US$/kg (real 2022)	17.9	70.8	57.9	40.7	37.0	18.1	14.3	10.6	10.4	10.3
Lithium hydroxide BG CIF China, Japan and Korea spot US$/kg (nominal)	17.4	72.2	60.0	43.0	40.0	20.0	16.0	12.0	12.0	12.0
Lithium hydroxide BG CIF China, Japan and Korea spot US$/kg (real 2022)	18.8	72.2	57.9	40.7	37.0	18.1	14.3	10.6	10.4	10.3

Source: Fastmarkets

Tightness is expected to keep prices well above incentive prices for the whole forecast period, albeit at lower levels than the peaks seen in 2022. Volatility will remain a key theme, as supply increases in waves, we expect periods when supply will be greater than that year's demand, leading to surpluses, and downward pressure on prices.

Post 2030, the continued growth of demand for lithium from EV's and ESS, will require a lithium price that incentivizes new supply to come online to meet this demand. The lithium price will need to exceed the production cost for new projects and provide an adequate rate of return on investment to justify development. Based on our understanding of the cost of bringing new supply online, especially higher-cost units such as lepidolite, whilst also ensuring an adequate rate of return, we believe prices long-term will settle around the US$20 per kg mark. Due to typical price volatility, Fastmarkets expects prices may spike well above or fall well below this level, but from an average pricing perspective, Fastmarkets views this forecast as reasonable.

Fastmarkets recommends that the above price of US$20 per kg for lithium carbonate cf China, Japan and Korea should be utilized by Albemarle for the purpose of reserve estimation.

Our high-case scenario could pan out either if the growth in supply is slower than we expect, or demand growth is faster than expected. The former could happen if the Chinese struggle to make lepidolite mining economically viable, or if DLE technology takes longer to be commercially available. The latter could be seen if the adoption of EV's continues to accelerate, or if demand for ESS grows at a faster pace. However, we do think prices over US$55 to US$60 per kg would be unsustainable over the long term when most of the market is priced basis market prices.

Our low-case scenario could unfold if the current price regime prompts a much faster reaction from producers. This is most likely to be achievable by Chinese producers both domestically and in Africa, considering the strict permitting process in western economies is already delaying project development timelines. Alternatively, or possibly in tandem, we would expect a fast return towards incentive prices if demand did end up being hit by either a recession, a massive escalation in geopolitical events, or a more incapacitating pandemic.

As noted above, Fastmarkets views it likely that there will be short-term volatility in pricing. However, from a longer-term viewpoint, the key points of uncertainty to the average spodumene or lithium carbonate price in this forecast follow:

- EV sales growth – The rate at which EV's are accepted by the general population will be the biggest driver of lithium prices. In the high case scenario, Fastmarkets believes prices of US$30/kg for battery-grade lithium and US$3,000/t for spodumene are realistic for a sustained period to support the almost exponential supply growth required for this scenario beyond 2030.
- Fundamental battery technology – Even with very strong EV demand, if the industry substitutes away from lithium-based technology, it could materially reduce lithium demand resulting in a similar pricing situation to the low-scenario noted above. However, in Fastmarkets' opinion, the probability of this occurring within the forecast period is low considering the performance, practicality and versatility of lithium-based battery technologies and chemistries. Given the very long time to commercialize battery technology, it appears highly unlikely the industry will substitute away from lithium-ion in the forecast period.
- Supply growth beyond 2025 – As shown in Figure 16-3, Fastmarkets expects supply growth to broadly match demand in the period. There is a healthy number of potential projects in the pipeline but there remains uncertainty in the ability for these to come online in a timely manner. We have placed faith in the markets ability to develop alternative deposit types, such as the hectorite clay deposits in Nevada and Mexico, some of the largest occurrences of lithium in the world. At this stage, the only question around development of these deposits is the ultimate timeline on when they can start, especially projects in the US, which are being continually delayed due to NIMBYism and delays in permit issuance. We have allowed for delays, but experience tells us that we are likely to see more issues affecting the delivery of new material into the market. Toward the end of the decade, recycling will become an increasingly important component in filling potential supply gaps, especially in areas which lack inadequate raw material supply (Europe and US).

16.2 Product Sales

The Salar de Atacama is an operating lithium mine. The mine pumps a subsurface brine that is rich in elements targeted for commercial production (e.g., lithium and potassium) as well as other elements generally viewed as deleterious to production but some of which may have some commercial value (e.g., magnesium) to evaporation ponds on the surface of the salar. These evaporation ponds concentrate the brine utilizing solar energy. During the evaporation process, potassium chloride and other byproduct salts (e.g., bischofite) precipitate from the concentrated brine and is harvested on the salar where it is further processed prior to sale. Lithium chloride is concentrated to approximately 6% lithium at which point it is trucked to the La Negra processing facility, located near Antofagasta, Chile where it is further processed into lithium chemicals that include technical grade lithium carbonate and battery grade lithium carbonate. Historically, La Negra has also produced technical grade lithium chloride although it is not currently producing this product.

Specifications for each of these products is provided in Table 16-2 through Table 16-3.

Table 16-2: Technical Grade Lithium Carbonate Specifications

Chemical	Specification	
Li_2CO_3	min.	99.00%
Cl	max.	0.015%
K	max.	0.001%
Na	max.	0.08%
Mg	max.	0.01%
SO_4	max.	0.05%
Fe_2O_3	max.	0.003%
Ca	max.	0.016%
Loss at 550°C	max.	0.75%

Source: Albemarle, 2022

Table 16-3: Battery Grade Lithium Carbonate Specifications

Chemical	Specification	
Li_2CO_3	min.	99.30%
Cl	max.	0.015%
K	max.	0.001%
Na	max.	0.065%
Mg	max.	0.007%
SO_4	max.	0.05%
Fe_2O_3	max.	0.001%
Ca	max.	0.016%
H_2O (110°C)	max.	0.35%

Source: Albemarle, 2022

Historic production rates for each of these products, with brine sourced from the Salar de Atacama, as processed at the La Negra facility are presented in Table 16-4.

Table 16-4: Historic La Negra Annual Production Rates (Metric Tonnes)

	2015	2016	2017	2018	2019	2020	2021
Technical Grade Lithium Carbonate	10,945	10,581	9,822	8,628	5,658	6,829	6,829
Battery Grade Lithium Carbonate	13,323	16,573	20,324	27,998	32,874	35,256	35,895
Technical Grade Lithium Chloride	2,143	1,900	3,209	3,821	1,824	-	-

Source: Albemarle 2021
2015-2020 data reflects actual production, 2021 production is an estimate

Looking forward, Albemarle has recently significantly expanded its production facilities at the salar and La Negra 3 and 4 expansions are operational and ramping-up. The new production capacity for each lithium chemical is provided in Table 16-5. The ability to run La Negra 3 and 4 at full capacity will be dependent on completing the Salar Yield Improvement project at Atacama. Production at capacity is expected to be achieved in 2024.

Table 16-5: Current and Forecast La Negra Production Capacity by Product

	Current Annual Capacity (Tonnes)	Forecast Annual Capacity (Post Completion of La Negra 3) (Tonnes)
Technical Grade Lithium Carbonate	5,925	6,000
Battery Grade Lithium Carbonate	38,576	78,000
Technical Grade Lithium Chloride	3,600	0

Source: Albemarle 2020

To simplify the analysis for the purposes of this reserve estimate, Fastmarkets has assumed that all lithium production from the combined Salar de Atacama/La Negra operation is sold as technical grade lithium carbonate. This is the lowest value product forecast for production and adds a layer of conservatism to the reserve estimate.

The three lithium products from the Salar de Atacama/La Negra operation are all marketable lithium chemicals that can be sold into the open market. However, Albemarle is an integrated chemical manufacturing company that operates multiple downstream lithium processing facilities. Therefore, a proportion of the production from the Salar de Atacama/La Negra operation is utilized to as source product for Albemarle's downstream processing facilities. A breakdown of the volume of Salar de Atacama/La Negra product that is consumed internally for further downstream processing versus sales to third parties is presented in Table 16-6.

Table 16-6: Historic Salar de Atacama Product Consumption

	Production Consumed Internally (Tonnes LCE)	% Production Sold to Third Parties (Tonnes LCE)
Technical Grade Lithium Carbonate	870	6,031
Battery Grade Lithium Carbonate	0	33,154
Technical Grade Lithium Chloride	0	0

Source: Albemarle 2020

While a portion of the production may be consumed internally, for the purposes of this reserve estimate, Fastmarkets has assumed that 100% of the production from the Salar de Atacama/La Negra operation will be sold to third parties. Further, as noted above, although the Salar de Atacama/

La Negra can and does produce higher value battery grade lithium carbonate, Fastmarkets' assumption for the purpose of this reserve estimate is that all production will be sold as the lower value technical grade lithium carbonate. This simplifies the assumptions for the estimate and does not materially impact the magnitude of the reserve estimated herein as the reserve is contract constrained (see Section 16.3.1) and not economically constrained.

16.3 Contracts

As outlined above, the lithium chemicals produced from the Salar de Atacama/La Negra operations are either consumed internally for downstream value-add production or sold to third parties. These sales may be completed in spot transactions, or the chemicals may be utilized to satisfy sales contracts for lithium chemicals held at the consolidated corporate Albemarle level or its affiliates. These contracts are not generally specific to sourcing product from the Salar de Atacama/La Negra, although product sourced from other operations would need to be certified to meet customer quality requirements. Therefore, these contracts are not included in this analysis of reserves at the Salar de Atacama, and this analysis instead assumes a typical market price.

Salar de Atacama/La Negra sell all lithium products to its foreign related party Albemarle US Inc., where their sales and marketing teams provide instructions about specified locations where Chile should deliver the products. Extraction and sales of lithium and other products are regulated by contracts agreed with the Chilean Nuclear Energy Commission (CCHEN) and the Chilean Economic Development Agency (CORFO). These contracts are summarized in Section 16.3.1.

Fastmarkets is not aware of any other material contracts for the Salar de Atacama / La Negra operation.

16.3.1 CCHEN and CORFO Agreements

Decree Law No. 2,886, published on November 14, 1979 and effective January 1, 1979, reserved lithium extraction for the State of Chile. However, the concessions held by Albemarle, for the purposes of producing lithium from the Salar de Atacama were registered in 1977 and therefore are exempt from this law. Nonetheless, under Law No 16,319, establishing the CCHEN, lithium can only be mined by CCHEN or with prior authorization from CCHEN. Under this law, producers of lithium are subject to a production quota that caps total production from the concessions and Albemarle is subject to such a CCHEN production quota. CCHEN also limits the extraction rate of brine from the Salar de Atacama.

In 2016, CCHEN increased the allocated pumping rate for Albemarle at the Salar de Atacama from the prior 142 liters/second (l/s) to 442 l/s. As part of the same agreement, the CCHEN production quota was increased from 200,000 tonnes lithium (as lithium metal), inclusive of historic production to 540,240 tonnes lithium (as lithium metal), again inclusive of historic production.

Further, CORFO was the original owner of the concessions in the Salar de Atacama from which Albemarle's resources and reserves are derived. A predecessor of Albemarle (Foote Mineral Company) entered into an agreement with CORFO in August 1980 to establish production of lithium and other products from these concessions. From this original contract, Albemarle was limited to a total production quota of 200,000 tonnes of lithium (as lithium metal), without an expiry date, and was not required to pay royalties on lithium production. A 1987 agreement with CORFO establishing production of potassium byproduct salts includes a royalty on the production of this product equal to

3% of the sales price for potassium products. The 1980 agreement for lithium extraction was subsequently amended in 2016 to allow for an increase in the production quota of lithium from these concessions. This amendment increased the company's authorized lithium production quota by an additional 262,132 tonnes of lithium (as lithium metal). With approximately 69,083 t remaining from the original quota (as of August 31, 2022), this additional quota results in a total remaining production quota of 331,215 t lithium as lithium metal (1.81 Mt LCE). As the CORFO quota has less allowable lithium production than the CCHEN sales quota, SRK has used the CORFO quota numbers as the limiting factor on this reserve estimate.

As part of the 2016 amendment to the CORFO agreement, Albemarle agreed to additional conditions around its production of lithium, including the following:

- A quota expiry of January 1, 2044 (i.e., any quota not utilized by this date will be forfeited).
- Albemarle agreed to invest in a third lithium carbonate plant in Chile with production capacity of at least 20,000-24,000 t battery grade LCE per year no later than December 31, 2022. If this new battery grade production facility is not in production by December 31, 2022, the new quota will be reduced from 262,132 t to 43,132 t LME. In addition, the quota will expire on December 31, 2035 (i.e., any quota not utilized by this date will be forfeited). Albemarle is completing the new battery grade production facility in the third quarter of 2022 and expects to meet the deadline.).
- Provides for an additional quota of 34,776 t (as lithium metal) to feed a lithium hydroxide plant with production capacity of at least 5,000 metric tons/year should Albemarle construct a lithium hydroxide plant in Chile. Note Fastmarkets has not assumed the development of a lithium hydroxide plant and therefore has not included this quota in its analysis.
- Establishes royalties or commissions paid to CORFO on every tonne of product sold from the Salar de Atacama/La Negra according to the schedule presented in Table 16-7.
- Commencing on January 1, 2017 and continuing for approximately five years (until 31,559 t LME are produced), Albemarle will pay a commission on the production still remaining under the original quota, Thereafter, Albemarle will no longer pay any commissions on the lithium produced at the original 24,000 Mt carbonate plant, allowing Albemarle to produce the then-remaining metric tons of the original quota on a commission-free basis as per the terms of the original agreement with CORFO.
- If Chile develops a local downstream industry that requires battery grade lithium salts, Albemarle agrees to allocate a portion of its production (up to 25%) of those salts for sale to those local downstream producers at a discounted price (relative to Albemarle's export sales price). To date, development of downstream industry has not occurred, and Albemarle is therefore not selling any production at this discounted rate. Fastmarkets has not assumed any future discounted sales associated with this clause in this TRS as it is not aware of any planned or established downstream development.
- Albemarle will annually pay into a fund that will be used to develop R&D to benefit the Atacama, the country of Chile, and local industry. This payment is a fixed amount, inflated each year through the expiry of the quota at the end of 2043.
- Albemarle Limitada makes certain commitments to the local communities in the Atacama to use in local development projects equal to 3.5% of sales from Chilean production.
- Prohibits the sale of products with low value-add (e.g., raw brine, concentrated brine and/or refined brine in any degree of concentration).

- Royalty rates on potassium chloride will follow a sliding scale ranging from 3 to 20% of the sales price.
- Royalty rates on magnesium chloride, bischofite, carnalites, silvenites and halites is set at 10% of sales.

Table 16-7: Updated CORFO Royalty/Commission Rates

Lithium Carbonate		Lithium Hydroxide	
Price Range (US$/tonne)	**Progressive Commission Rate (%)**	**Price Range (US$/tonne)**	**Progressive Commission Rate (%)**
0-4,000	6.8%	0-4,000	6.8
4,000-5,000	8%	4,000-5,000	8
5,000-6,000	10%	5,000-6,000	10
6,000-7,000	17%	6,000-9,000	17
7,000-10,000	25%	9,000-11,000	25
Over 10,000	40%	Over 11,000	40

Source: Albemarle 2017

The royalty/commission rate agreed with CORFO on Albemarle's lithium production (lithium carbonate and other salts, excluding lithium chloride sales) from the combined Salar de Atacama/La Negra operation is calculated on the weighted average of third-party sales (i.e., royalty is calculated based on end-customer price). For the purposes of this reserve estimate, SRK has utilized the US$20,000 per tonne price for technical grade lithium carbonate forecast in Section 16.1.4 and applied the above royalty formula. Note that while the combined Salar de Atacama/La Negra operation will have the capacity to produce approximately 44,000 t of battery grade lithium carbonate (for LN1 and LN2 – 84,000 t considering LN3), for the purpose of simplifying the reserve modeling, SRK has assumed all production is technical grade product. Given Albemarle's production and therefore reserve is limited by its production quota and not economic factors, in SRK's opinion, this simplification will not impact it estimation of reserves for the operation.

17 Environmental Studies, Permitting, Social Factors

The following discusses reasonably available information on environmental, permitting, and social or community factors related to the Salar de Atacama and La Negra operations. Where appropriate, recommendations for additional investigation(s), management actions, or expansion of existing baseline data collection programs are provided.

The section was developed through a desktop review, including information provided by Albemarle, and meetings with relevant Albemarle environmental staff. A site visit could not be conducted due to COVID-19 restrictions.

17.1 Environmental Studies

Baseline studies of environmental conditions, in both operational areas, have been developed since the first permitting efforts were undertaken; 1998 in La Negra, and 2000 at Salar de Atacama. The latest environmental baseline studies at La Negra were for the "Modification Project La Negra Plant Expansion Phase 3" in 2018, and the latest studies for Salar de Atacama " include the EIA for “Modification and improvement solar evaporation system” in 2016. With the ongoing monitoring programs in both locations, environmental studies, such as hydrogeology and biodiversity, are regularly updated.

17.1.1 General Background

La Negra is located in a normal desert climate, characterized by low relative humidity and large variability in daily temperatures. Average annual rainfall is less than 5 mm, and maximum daily rainfall is 48 mm on a return period of 100 years. Although precipitation is scarce, storm events of considerable magnitude can occur.

There are no perennial streams or drainages in the area of La Negra. However, some intermittent or ephemeral drainages occur in the northern area where the process facilities are located. These ephemeral drainages typically only flow following extreme precipitation events.

Salar de Atacama is located in a Marginal High Desert climate. The rainfall regime corresponds to summer rains, and also cyclonic origin rains, although both cases are rare events. Due to the altitude, temperatures are generally colder, with nominal annual temperature fluctuations, but larger daily low and high temperature ranges. Relative humidity is very low.

Average rainfall in Salar de Atacama is around 13 mm, with a maximum daily rainfall of 45 mm on the 100-year events. The Albemarle facilities are located entirely inside the Salar de Atacama, with few to no discernable surface water drainages, as rainwater quickly infiltrates the highly permeability flat saline crust.

Vegetation and wildlife are scare at La Negra. It is located within an industrial area which is in saturation conditions for the daily and annual standard of inhalable particulate matter (PM_{10}). Although there are no surface water courses, there is an aquifer that could be affected by surface water infiltration from the plant facilities. As such, a water quality monitoring program is in place. Air quality, hydrogeology, and water quality have been deemed as key environmental characteristics of the La Negra area and are carried forward for additional discussion below.

The Salar de Atacama basin presents a unique system due to the biodiversity associated with lake and wetland systems that depend on the hydrogeological conditions of the area. There are also indigenous areas and communities in the sector. As such, the key environmental issues at Salar de Atacama include biodiversity, hydrogeology, and socioeconomics, which have been carried forward for additional discussion below.

No cultural inventories of relevance have been registered within the areas of disturbance for either La Negra or Salar de Atacama.

17.1.2 La Negra

Air Quality

As the La Negra plant is located in an industrial area, there are several sources of air pollutant emissions. As noted above, the general area is in saturation conditions for PM_{10} in relation with the Chilean primary daily and annual standards.

For the projects that have been submitted for environmental evaluation at La Negra, the concentrations of inhalable (PM_{10}) and fine particulate matter ($PM_{2.5}$), and combustion gases (CO_x, NO_x, and SO_x) have been modeled, and the conclusions indicate that emissions from the La Negra Plant are not significant in relation to the other activities located within the industrial area. Emissions from the La Negra Plant are related to vehicle traffic and emissions from fixed sources associated with the plant's processes.

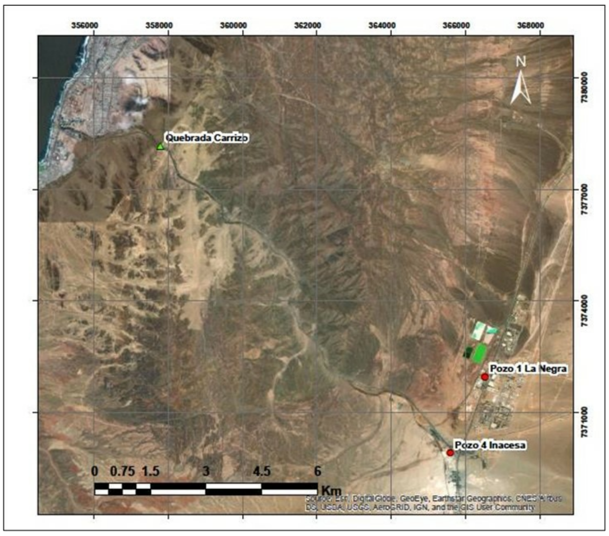
Air quality is monitored at the existing Coviefi, La Negra, and Inacesa stations independent of Albemarle.

Hydrogeology and Water Quality

The La Negra area contains four major hydrogeological units that are composed of alluvial and fluvial deposits of varying ages, and that represent different types of aquifers. In the upper level, the aquifer is of the semi-confined type and thick lithologies predominate in it with alternating levels of silts, clays, and saline layers. In the underlying unit, fines predominate in relation to the other units. In the base, the unit of Old Gravel presents a high hydraulic conductivity since it is formed mainly by gravelly sands and sandy gravels, and whose confinement is defined by the content of fines and the thickness of the superjacent unit in the sector. A lower sedimentary unit, corresponding to the Caleta Coloso Formation and with aquitard characteristics, outcrops mainly to the west of the fault zone, and is not represented in the profiles. The aquifer system overlies a more impermeable unit consisting of slightly fractured rocks of igneous origin belonging to La Negra Formation and Palaeozoic granitic rocks.

As a commitment of the environmental approval resolutions, monthly monitoring of an extensive list of physical and chemical parameters was developed, along with piezometric levels in two wells. (Figure 17-1) The monitoring points are:

- La Negra well (Pozo 1): which corresponds to a groundwater exploitation well located at the La Negra Plant, in compliance with the resolution of water extraction, RE N°354/1989 of the General Water Directorate (DGA).
- Inacesa monitoring well (Pozo 4): which is located in the plant of the same name of the cement company of the same name. It is a large diameter and shallow well. This well is in intermittent operation.
- Quebrada Carrizo: which corresponds to a surface water sampling location at the confluence of the Carrizo spring with the La Negra creek.



Source: Albemarle (2020). Informe de Seguimiento Ambiental. Monitoreo Mensual de Agua Subterránea y Superficial. Sector La Negra – Enero 2020. (Environmental Monitoring Report. Monthly Ground Water Monitoring La Negra Area – January 2020)

Figure 17-1: La Negra Water Quality Monitoring Points

No anomalies or exceedances of Chilean regulations where identified. Notwithstanding this, and according to information provided by Albemarle and historical information, elevated concentrations of some parameters have been detected in the past, mainly in the Quebrada Carrizo, where the groundwater and soils both contain elevated concentrations of several constituents (e.g., arsenic, boron, lithium salts). It has not been established whether these concentrations are the result of Albemarle's operations, third parties' discharges, or natural sources.

17.1.3 Salar de Atacama

Hydrology - Hydrogeology

The Salar de Atacama is located in an endorheic basin with elevations ranging between 2,300 mamsl and 6,200 mamsl, covering an area of approximately 17,300 km^2.

The area of lowest elevation in the basin corresponds to the salt flats (2,300 masl), which has an area of approximately 1,600 km^2. Around the core, there are wetlands and lagoons that cover an area of approximately 1,100 km^2. This area is known as the Marginal Zone. The lagoons are fed by limited surface runoff that reaches them through ephemeral surface drainages and groundwater springs.

The Salar de Atacama basin, and in the area surrounding the Albemarle facilities, there are areas of high sensitivity and ecological value. These are the lagoons located in the Salar's Marginal Zone. These lagoon systems mainly depend on the water contributions mostly coming from the aquifers, which in turn are recharged by the rainfall in the upper part of the basin. These sensitive areas include:

- La Punta-La Brava Lagoon System
- Peine Lagoon System
- Quelana Lagoon System
- Soncor Lagoon System

The brine of the Salar de Atacama is currently being exploited by two mining companies: SQM (at a rate of 1,700 L/s) and Albemarle (at a rate of 442 L/s). This exploitation lowers brine water levels in the salar, which are measured in several monitoring locations. As expected, the brine level drawdown is greatest in those areas closest to the extraction wells, reaching several meters in some cases, and decreasing as the monitoring points move away.

Freshwater in the basin is also exploited. The largest exploitations are linked to mining activity by companies like Minera Escondida (stopped in 2019) and Zaldívar, in the Negrillar and Monturaqui aquifers, in the south of the basin, and SQM along the eastern edge. Albemarle's freshwater rights represent less than one percent of the water rights granted in the basin.

Because of the sensitivity of these hydrologic systems, the environmental analysis of the EIA “Modification and improvement solar evaporation system” required the development of a conceptual and numerical hydrogeological model (SGA, 2015) to evaluate both the direct effects of the project's brine extraction as well as the cumulative effects with other operations in the area. The results of the modeling effort concluded that the EIA “Modification and improvement solar evaporation system” would not have significant effects on the sensitive areas, even under a non-favorable scenario of reduced recharge over the next 25 years.

In general, monitoring data of freshwater aquifer levels indicate that the levels in the system remain within their historical values, allowing for the seasonal fluctuations typical of the Marginal Zone due to the seasonal variation of the evaporation rate. Albemarle’s reports indicate that, in some areas, the above-mentioned larger exploitations of freshwater have produced some reductions in water levels in the vicinity of the Soncor and Aguas de Quelana systems, and upstream of the La Punta-La Brava lagoon system, though without significant effects on the lagoon systems or protected ecosystems being observed thus far.

Considering that the last hydrogeological model available for review that assessed impact to water levels was conducted in 2019, SRK recommends that this assessment be updated, as needed, based on monitoring information available to date.

It is important to note that the water authority is seeking to generate an integrated hydrogeological model of the entire basin, which will be fed by the monitoring information collected by all the companies in the area, and which will allow a comprehensive follow-up of the effects of brine and freshwater extractions on water levels in ecologically sensitive areas.

Biodiversity

Lagoons, wetlands, and saltwater ecosystems have developed in the lower part of the Salar de Atacama basin, particularly on the margins of the salar. These ecosystems contain a high degree of biological diversity in relation to their surroundings. These systems are made up of interconnected lagoons that possess unique characteristics and properties.

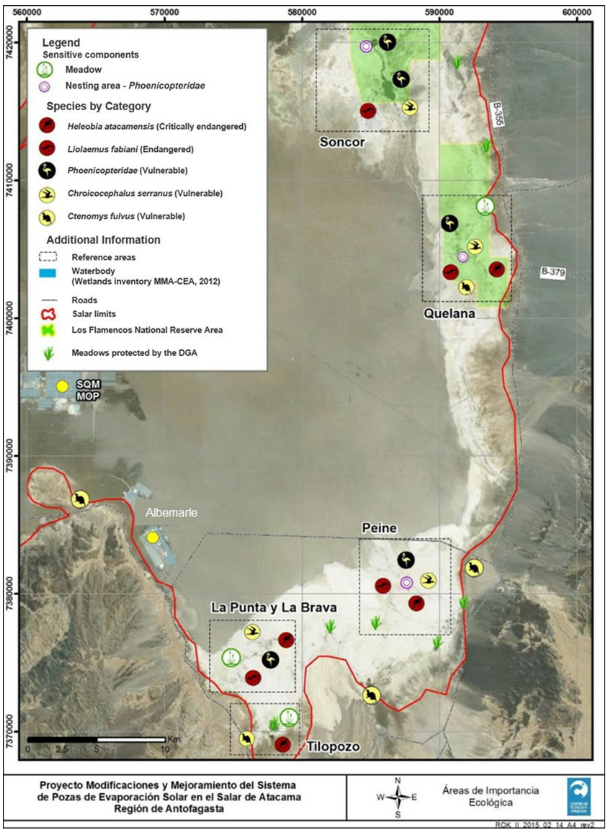
The systems of La Punta-La Brava and Peine in the south, and Aguas de Quelana and Soncor in the east (lagoon systems Soncor, Aguas de Quelana, Peine, La Punta and La Brava) constitute singular areas, given their importance in reproductive terms, their richness and proportion of species with conservation challenges, since inside these areas there occur species whose requirements of habitat are restricted, presenting a high sensitivity to changes in the environment.

Currently, this area has three types of protection, focused on preserving different components of each system. The first is focused on the protection of flamingos and includes the Soncor and Aguas de Quelana lagoon systems. It is established as the Los Flamencos National Reserve managed by the National Forestry Corporation (CONAF), created in 1990. The second is the site protected by the Convention on Wetlands (RAMSAR), which corresponds to the area of Soncor, which was incorporated in 1996, mainly because it is a nesting area for flamingos and migratory species. And finally, the third is Resolution No. 529 of the DGA of the Antofagasta region, which protects 17 wetlands within the Salar de Atacama.

In the Salar de Atacama, surfaces have been identified as having ecological elements and/or attributes, which could be negatively affected by any threat. These include:

- Presence of biological species in conservation category
- Presence of species with local and/or regional endemism
- Unique components
- Breeding areas of endangered species

Figure 17-2 shows the ecologically important areas, according to these criteria. All of the areas associated with the lagoon systems and wetlands of the Salar de Atacama are highly vulnerable, as they represent a significant number of sensitive and endemic species, with the presence of breeding areas for threatened species and the presence of sensitive elements, such as the wetlands.



Source: Centro de Ecología Aplicada (2015). Plan de Manejo Biotico. Prepared for Rockwood Lithium. December 2015. (Biodiversity Management Plan)

Figure 17-2: Sensitive Ecosystems in Salar de Atacama

The ecosystems and organisms found in the various wetlands are dependent on the contribution of groundwater that was structured in the Salar de Atacama basin. Therefore, any extraction that generates significant fluctuations in that water supply, particularly in the freshwater-salt aquifer, has the potential to impact these ecosystems and overall biodiversity.

From the point of view of species in conservation status, the mentioned systems present a high degree of sensitivity due to the presence of threatened species (according to the regulations for the classification of wild species Supreme Decree Nº 29/2011 from the Environment Ministry). Such is the case of the aquatic snail Heleobia atacamensis (Critically Endangered), the Yanez's tree iguana a.k.a. Fabian's lizard Liolaemus fabiani (Endangered), the camelid Vicugna (Endangered), and eight species in the Vulnerable category (Lama guanicoe, Ctenomys fulvus, Vultur gryphus, Rhea pennata tarapacensis, Phoenicoparrus andinus, Phoenicopterus chilensis, Phoenicopterus jamesi, and Chroicocephalus serranus).

Albemarle has developed a functional ecological model of the area, from which it has defined a biological environmental monitoring plan.

In the monitoring report available for review (winter 2018 to summer 2019), the state of the ecosystem is evaluated in the period 2016 to 2019). The results indicate that, in general terms, there is a maintenance of the current ecological state, without variations that constitute significant changes, which could be framed in the cycles of historical variation of the salar ecosystem. SRK recommends that this monitoring report be updated to include more recent data.

In addition to the biological monitoring plan, a Water Monitoring Plan and an Early Warning Plan have also been implemented. The details of these plans are discussed in the environmental monitoring section.

Social Issues and Communities

Salar de Atacama is located in the Antofagasta Region, municipality of San Pedro de Atacama, south-east of the city of Calama. Albemarle facilities at Salar de Atacama are located within an Indigenous Development Area (ADI) called "Atacama La Grande", which has a population belonging to the Atacameña ethnic group.

The economy of the indigenous population is mainly based on primary and secondary economic activities. Cattle raising and agriculture, linked to the ancestral uses and customs of the Atacameña ethnic group, tourism, and handicrafts.

In the municipality of San Pedro de Atacama, the most representative organizations are the indigenous organizations, which have been articulated around the ancestral *ayllus* of the Atacama ethnicity. There are 21 indigenous communities with legal status in San Pedro de Atacama.

Another category of indigenous associativity is that of indigenous associations or groups, which bring together different individuals or communities, from different territories, to develop areas of common interest. There are a total of 18 indigenous associations or groups in the San Pedro de Atacama municipality.

In general, and according to official surveys, the communities and people who live in the villages, identified as Atacameños, are below the poverty level or slightly above it. However, when making a detailed analysis of the situation in each locality, there is an important impact on the local economy produced by tourism (which provides direct resources in the villages), and above all, by the mining activity, where the inhabitants of Toconao, Socaire, and Peine (mainly) work as employees.

The town of Peine is located 27 km from the Albemarle facilities and 108 km from the town of San Pedro de Atacama, at the southern end of the Salar de Atacama. Peine is a town that works as a residential site and as an agricultural production area.

The Salar de Atacama area is also a relevant sector for tourism and is part of the Zone of Tourist Interest (ZOIT) San Pedro de Atacama Area - El Tatio Geothermal Basin.

Albemarle maintains agreements and relationships with all communities and groups in its area of influence.

Considering the presence of indigenous communities in the area, the development projects, that are submitted into the environmental impact assessment system, may require the development of an Indigenous Consultation Process according to Chilean legislation and regulation.

17.1.4 Known Environmental Issues

Any requirement of a brine extraction greater than the one approved (442 L/s) has an uncertain approval success, considering the multi-user conditions in the Salar de Atacama, the sensitivity of the ecosystem, and the synergistic impacts on this ecosystem which concern the environmental and water authorities.

To prevent any unforeseen potential risk, the Early Alert Plan (PAT) could be activated because of the exceedance of an established threshold, which could result in the reduction of the amount of brine authorized for extraction. During the year 2022 the PAT in the aquifer sector was activated.

Albemarle Limitada was sued for environmental damage by the Chilean State Defense Council ("Consejo de Defensa del Estado"), together with two other copper mining companies. The lawsuit seeks to remedy an alleged damaged caused to a wetland area in the Salar the Atacama caused by water extraction. However, this lawsuit does not jeopardize Albemarle's capacity to extract the lithium resources or reserves of the Salar de Atacama.

The Superintendence of the Environment filed charges against Albemarle Limitada alleging non-compliance with conditions, standards and measures established in the Environmental Qualification Resolution No. 21/2016.

Neither litigation is expected to impact Albemarle's capacity to extract the lithium resources or reserves of the Salar de Atacama.

17.2 Environmental Management Planning

The environmental management of the operations in La Negra and Salar de Atacama are developed according to their environmental commitments that have emerged from the projects evaluated and approved by the environmental authority (SEA) and supervised by the Environmental Superintendence (SMA).

Chilean environmental legislation does not consider additional environmental management plans, with the exception of Hazardous Waste Management Plans, required by the health authority, for operations that annually generate more than 12 t of hazardous industrial waste.

According to each operation, and their environmental commitments, the following are the management plans for La Negra and Salar de Atacama facilities:

- La Negra:
  - Water Quality Monitoring Plan
  - Emergency and Contingency Prevention Plan
  - Hazardous Waste Management Plan
- Salar de Atacama:
  - Biodiversity Monitoring Plan
  - Environmental Water Monitoring Plan
  - Early Warning Plan
  - Emergency and Contingency Prevention Plan
  - Hazardous Waste Management Plan

The main environmental management issues for the La Negra and Salar de Atacama facilities are summarized below.

17.2.1 Tailing Disposal

Although Albemarle's operation does not have tailings, per se, it does generate liquid waste at La Negra, which is managed as follows.

The process at the La Negra Plant up to Phase 2, collects solid/liquid waste together (in a wet state) in the existing system of evaporation and sedimentation ponds. Phase 3 considers a waste disposal system that includes the segregation of liquid and solid waste. The solid waste is stored as low moisture solids (collection sites) and the liquid waste is treated as recovery waste to be recycled to the plant using the La Negra Evaporation and Sedimentation Ponds system.

The Lithium Carbonate Plant generates liquid waste, mainly from the SX process. The operation incorporates technology to reuse the mother liquor and thus optimize the use of process water and in turn recover lithium. The water generated in the different stages of the process, including the solutions coming from the cleaning of equipment (HCL or H_2SO_4), is taken to the thermal evaporator and then returned to the process for reuse.

The mother liquor is sent to the thermal evaporation plant or to the solar evaporation system. From the thermal system, a high purity water stream (condensate) is recovered for recycling into the process. The by-products of the thermal evaporation plant are NaCl (salt) and a weak LiCl brine stream that is recycled to the process. In the solar evaporation system, the water is evaporated by solar radiation and the by-product salt is precipitated and accumulated in ponds.

The process of brine concentration by means of solar evaporation ponds generates the precipitation of waste salts that are extracted from the ponds and are currently accumulated in stockpiles. (See waste discussion)

The evaporation/sedimentation ponds are lined with low-permeability PVC geomembrane.

The operation at La Negra has a system of trenches to monitor infiltration. In the event that infiltration is detected, either due to an increase in the piezometric level or changes in the chemical quality of the water attributable to such infiltration, these are captured by the wells, and the relevant studies will be carried out. At the same time, the possible point of infiltration from the pond will be located in order to conduct repairs (as needed).

According to information provided by Albemarle, the plant's water balance was recently updated, and the results indicated that the current and approved facilities may not be enough to handle the future process' liquid waste solutions. As such, a work plan has been defined to provide a solution to this issue in the long term, along with defining and implementing measures in the short term to manage the liquid waste until a final solution is identified and developed. Albemarle is progressing these plans and SRK sees this as a low risk.

17.2.2 Waste Management

La Negra

Process Reagents

The chemical reagents used at Salar de Atacama include: HCl, methyl iso-butyl carbonyl (foaming agent), Crisamine (collector) and Cricell (depressant). These are stored in warehouses authorized by the Health Service, and which comply with the conditions established in the legislation applicable to hazardous substances, where applicable.

Fuels

Salar de Atacama maintains a plant fuel supply, operated by an authorized outside company, which consists of a tank, which complies with the regulations for the storage of liquid fuels for self-consumption ((Supreme Decree Nº 379/86 of the Ministry of Economy)) and is authorized by the Superintendence of Fuels.

Disposal of Non-Hazardous and Hazardous Waste

Domestic solid waste is temporarily stored at a site authorized by the Health Service and transferred for final disposal outside the facilities to an authorized landfill in the region. Non-hazardous waste is segregated at its source and disposed of in a yard (salvage yard) authorized by the Health Service. From here, it is disposed of in authorized locations or reused. Hazardous industrial waste, which includes mainly vehicle batteries, oil filters, rags contaminated with grease and oil, waste oils, paints, contaminated personal protective equipment (PPE), among others, are temporarily disposed of in a warehouse authorized by the Health Service, and then transported to authorized off-site disposal sites.

Residual Salts

The process of brine concentration by means of solar evaporation ponds generates the precipitation of waste salts that remain in the ponds.

The process generates three types of solid salt wastes:

- Ca and Mg carbonates and hydroxides from the brine purification stage
- Ca/Na borates from the boron precipitation (removal) process
- NaCl from the thermal evaporation system

Salar de Atacama

Process Reagents

The chemical reagents used at Salar de Atacama include: HCl, methyl iso-butyl carbonyl (foaming agent), Crisamine (collector) and Cricell (depressant). These are stored in warehouses authorized by the Health Service, and which comply with the conditions established in the legislation applicable to hazardous substances, where applicable.

Fuels

Salar de Atacama maintains a plant fuel supply, operated by an authorized outside company, which consists of a tank, which complies with the regulations for the storage of liquid fuels for self-consumption (Supreme Decree Nº 379/86 of the Ministry of Economy) and is authorized by the Superintendence of Fuels.

Disposal of Non-Hazardous and Hazardous Waste

Domestic solid waste is temporarily stored onsite at a location authorized by the Health Service and later transferred offsite to an authorized landfill in the region for final disposal. Non-hazardous waste is segregated at its source and disposed of in a yard (salvage yard) authorized by the Health Service. From here, it is disposed of in authorized locations or reused. Hazardous industrial waste, consisting of mainly vehicle batteries, oil filters, rags contaminated with grease and oil, used oils, paints, contaminated PPE, among others, are temporarily stored in a warehouse authorized by the Health Service, and then transported to authorized final disposal sites.

Residual Salts

At Salar de Atacama, brine is extracted from wells, and the brine concentration process is through solar evaporation ponds, where the precipitation of waste salts is generated, these waste salts are excavated from the ponds and deposited in stockpiles. As the lithium chloride solution is concentrated, different salts precipitate in each pond, among which include halite, bischofite, carnallite and sylvite. The latter is entered into the Potash Plant to produce KCL and carnallite. Once the brine is concentrated at 6% Li, the brine is sent to La Negra Plant.

17.2.3 Water Management

La Negra

The industrial water used in the operation comes from water acquired from third parties and, to a lesser extent, from two existing wells at the facilities with water rights for up to 6 L/s for one and 7 L/s for the other.

At La Negra, the brine from Salar de Atacama is purified for the extraction of lithium. All solutions are evaporated and/or recirculated to the process. As indicated in the waste section, the updated process water balance indicates that the current facilities are not sufficient to handle the residual solutions, and a long-term solution needs to be identified.

Stormwater runoff, though infrequent, is managed through a series of diversion channels around the plant, ponds, and stockpiles areas.

Salar de Atacama

The freshwater used in the process at Salar de Atacama is extracted from spring water in Tilopozo and wells in, Tucucaro and Peine, with a total water right granted by the DGA of 23.5 L/s. Currently, 16.9 L/s are being consumed in the process.

Albemarle exploits brine from the Salar de Atacama by means of extraction wells, with an authorized exploitation extraction rate of 442 L/s.

As noted above, the extraction of brine and freshwater by Albemarle and other companies in the basin, has the potential to cause groundwater levels to drop which could impact lagoon and wetland systems of high ecological value. Albemarle has an Environmental Water Monitoring Plan (EWMP), a Biodiversity Monitoring Plan, and an Early Warning Plan, oriented to follow up on critical variables, and prevent unexpected effects on these systems that are being monitored. These plans are described in the monitoring section.

17.2.4 Monitoring

La Negra

The monitoring at La Negra is related with the commitments from the main environmental approvals (RCA Nº46/1999 and RCA Nº 278/17). There is an eight-point monitoring program, seven for underground water and one for surface water. For RCA Nº46/1999, monitoring points are La Negra well, Well Nº4 of INACESA, and a spring in Carrizo drainage. Five new wells were added to the monitoring program, with the objective of monitoring eventual infiltrations from the ponds. The parameters measured at these monitoring points are presented in Table 17-1.

Table 17-1: La Negra Water Monitoring Parameters

Parameters	Number of Monitoring Points	Frequency
In situ Parameters		
Water Level		
pH (s.u.)		
Electrical Conductivity (EC)		
Temperature [1]		
In Laboratory		
pH [1]		
EC		
Total Dissolved Solids (TDS)		
Density [1]		
Total alkalinity [1] (reported expressed as CO3)		
Cl dissolved		
SO4 dissolved [1]		
HCO3 dissolved		
NO3 dissolved		
Ca total [1] and dissolved	8 [1]	Monthly
Na total [1] and dissolved		
Mg total [1] and dissolved		
K total [1] and dissolved		
Li total [1]		
B total [1]		
Strontium (Sr) total		
Iron (Fe) total		
Iron (III) [1] (expressed as Fe2O3)		

Source: Albemarle (2020)
[1] Parameters measured for the sample points associated to RCA 46/1999.

Salar de Atacama

Environmental Water Monitoring Plan

At Salar de Atacama, an EWMP has been implemented which includes meteorological, hydrological, and hydrogeological data from both the Salar de Atacama core and its eastern and southern edges, and the Marginal Zone, where the Soncor, Aguas de Quelana, Peine and La Punta-La Brava lagoon systems are located. These data are used to update the numerical model developed to evaluate the behavior and cumulative effects of the different brine and freshwater extraction projects that coexist in Salar de Atacama area.

Monitoring is carried out in four sectors, determined according to their hydrological and hydrogeological characteristics:

- La Punta-La Brava areas
- Peine area
- North and east side of Salar de Atacama
- Salar de Atacama area

A summary of the environmental variables and parameters are presented in Table 17-2.

Table 17-2: Salar de Atacama Environmental Monitoring Points

Environment Component	Environment Variable	Parameters	Number of Measurements	Frequency
Climate and Meteorology	Meteorological Variables	Daily precipitation [mm], Atmospheric temperature [ºC], Evaporation [mm], Atmospheric pressure [mbar]	1	Diary (Continuous)
Hydrology	Surface covered by lagoons	Area in [m^2] of lagoon systems	4	Biannual
	Limnimetric Level of the Lagoons	Water level [meters amsl]	20	Monthly
	Surface flow rate	Flow rate [L/s]	6	Quarterly
	Evapotranspiration	Evaporation rate [mm/day]	22	Quarterly
Hydrogeology	Phreatic levels in brine and freshwater	Depth Level [meters amsl]	125	Monthly
	Saline Interface Position	Electrical Conductivity [µS/cm] v/s Depth [meters amsl]	13	Quarterly
	Brine and Freshwater Pumped Flow	Brine flow rate [L/s]	74	Monthly
		Industrial water flow rate [L/s]	3	Monthly
Water Quality	Chemical quality of surface and groundwater	Physical parameters in situ: pH, EC, temperature, TDS and Dissolved Oxygen (DO). Laboratory physical-chemical parameters: pH, EC, TDS and density. Major elements: Cl, SO_4, HCO_3, NO_3, Ca, Mg, Na, and K. Minor elements and dissolved traces: B, Li, Sr Minor elements and total traces: Al, As, B, Fe, Li, Si, Sr.	40	Quarterly

Source: Albemarle (2020): Answers for internal audit by SRK Consulting

The results database of the water environmental monitoring plan is submitted to the SMA on a quarterly basis, and a consolidated report is delivered annually. In addition, data on brine and freshwater extraction rates are reported online.

Early Warning Plan

The operation has an Early Warning Plan (PAT) whose objective is to timely detect any deviation from baseline conditions. The plan includes status indicators and activation levels or thresholds at specific points, from which measures are activated to mitigate potential impacts.

The PAT is focused on the prevention and control drops in groundwater levels in the Salar de Atacama (brine levels) in points located in front of the Peine and La Punta-La Brava lagoon systems, as well as in the areas that feed these systems, located in the Marginal Zone. The plan also considers the adoption of preventive measures in relation to the activation of some of the Phases foreseen by SQM's PAT in the brine level control points in the in front of the Soncor and Aguas de Quelana systems, where the cumulative effects of the different existing extractions have to be evaluated, if a threshold is exceeded. For this purpose, a specific tool to verify the cumulative effect has been defined in order to validate the overlapping effects on the levels of the basin, considering the extraction of all the operators in the basin.

The execution of the EWMP, together with the actions or preventive measures included in the PAT and the activation of the cumulative effect tool, are used to monitor and mitigate any groundwater level issues in the Salar de Atacama basin and, more importantly, any effect beyond that which has already been predicted through hydrogeological modeling strictly and decisively.

Biodiversity Environmental Monitoring Plan

The Biodiversity Environmental Monitoring Plan (PMB) aims at early detection of any changes in the ecological status in the area of influence of the operation as a result of local, regional, and/or global phenomena. The PMB includes monitoring in the following areas:

- La Punta and La Brava System, including La Punta and La Brava lagoons
- Peine System, including Salada, Saladita and Interna lagoons
- Tilopozo System, formed by the Tilopozo wetlands
- The plan also includes two areas located in the north and east zone of the Salar de Atacama for which lagoon surface areas and flora are monitored:
  - Soncor system, including Barros Negros and Chaxa lagoons
  - Quelana and Aguas de Quelana (both located in the Los Flamencos National Reserve)

Table 17-3 summarizes the parameters and frequency for each of the monitoring points in the PMB.

Table 17-3: Salar de Atacama Biodiversity Monitoring Plan

Component	Sub-component	Frequency	General Variables	Number of Points
Biota	Terrestrial Flora	Biannual	Species composition and coverage	31
	Terrestrial Vegetation	Biannual/ Annual	Distribution and coverage of azonal vegetation	59
	Wildlife	Biannual	Composition, Richness and Abundance	25
	Aquatic flora and fauna	Biannual	Composition, Richness and Abundance	14
	Microbial Mats	Biannual	Characterization/Presence of evaporites and microbialites	16
Soil	Substrate	Biannual	Physics and Chemistry	14
	Sediment	Biannual	Physics and Chemistry	14
Water	Water Quality	Biannual	Physics and Chemistry	14
	Lagoons	Biannual	Phreatic level lagoons	5
	Lagoons	Biannual	Surface of water bodies	-

Source: Albemarle, 2020 (*Respuestas para auditoría interna realizada por SRK Consulting*

Monitoring is conducted on a semi-annual basis (winter and summer), except for active vegetation coverage (according to the NDVI index estimation), which is annual and must be done in post-rain periods, typically after the Altiplanic Winter. With respect to lagoon coverage, the surveys are carried out in the months of August (together with the winter field survey) and December of the calendar year (summer analysis).

A report of each winter and summer survey, and an annual report, are sent to the SMA.

17.2.5 Air Quality

Based on atmospheric emissions studies conducted for various Albemarle projects, the contributions of the La Negra Plant to the total emissions in the area are low in proportion to the other industrial activities.

The environmental management measures to minimize air emissions from the operation at La Negra include:

- Dust collectors in the equipment of Planta La Negra
- Paving of access road (7 km) to the stockpile area
- Installation of bischofite in interior roads
- Waterproofing of salt collection sites and ponds
- Transfer of residual salt in trucks
- Transfer of the final product in airtight containers
- Transfer of brine in watertight cistern trucks
- Paving of 1,002 m of streets in the project's area of influence

An isokinetic measurement for Particulate Matter of 10 microns (PM_{10}) is performed annually by means of the CH-5 method, in at least five emission control equipment per year (four from the Lithium Carbonate recovery section and one from the Soda Ash preparation section), alternating until completing the 15 equipment and continuing with the cycle.

17.2.6 Human Health and Safety

Albemarle has an Occupational Health and Safety Management System. The framework of this system was taken from the System Manual, applicable to the plant at Salar de Atacama. The Salar Plant has a Safety Department and a Joint Hygiene and Safety Committee in accordance with the regulations for mining and safety in Chile. Albemarle also has an integrated management policy for Quality, Environment, Safety and Occupational Health and Sustainability. The system includes an annual audit to verify compliance with the regulations associated with the relevant occupational health and safety regulations, and includes the following preventive management tools:

- Safety meetings
- Inspections and planned observations
- Safe Work Permit
- Safe Work Analysis
- Executive monthly report from the Safety Department
- Hazard Identification and Risk Assessment
- Emergency Plan

Albemarle has an annual risk management program for its contractors and subcontractors, in which all elements of the management system are applied and monitored, including a program for the accreditation of contractors and subcontractors.

17.3 Project Permitting

17.3.1 Environmental Permits

SCL began operating in the Salar de Atacama in 1981 when there was no environmental legislation in Chile. It was not until 1998 that SCL projects were submitted to the Chilean environmental evaluation system, with the facilities in La Negra, and in the year 2000 for the facilities in Salar de Atacama. In 2012, SCL became Rockwood Lithium, which was acquired by Albemarle Corporation three years later (2015).

The environmentally approved operation includes a brine extraction of 442 L/s, the production of 250,000 m^3/year of brine concentrated in solar evaporation ponds with an approximate surface area of 1,043 ha, for a production of 94,000 t/year of LCE. Brine exploitation is authorized until 2043. Any modification of the production and/or extraction, or to any approved conditions, will require a new environmental permit.

The subsequent environmental approvals at La Negra and Salar de Atacama are presented in Table 17-4. The table also provides information about the instrument submitted to the Chilean Environmental Impact System (SEIA). According to Chilean legislation, an Environmental Impact Study (Estudio de Impacto Ambiental or EIA) is required to be submitted by the proponent for new projects or project modifications where significant environmental impacts are expected to occur, and where specific measures for impact avoidance, mitigation, and/or compensation will need to be agreed upon. Alternatively, an Environmental Impact Declaration (Declaración de Impacto Ambiental or DIA) is required to be submitted by the proponent for projects or project modifications that are significant enough to warrant environmental review, but which are not expected to result in significant environmental impacts, as these are defined legally. A Relevance Consultation (Consulta de Pertinencia) must be submitted when the project proponent has doubts or needs clarification on whether a project, activity, or modification must submit to the SEIA.

Table 17-4: Albemarle Projects in the Antofagasta Region with Environmental License

Project Name	Instrument	Location	Legal Approval	Description
Lithium Chloride Plant	EIA	La Negra	RCA N° 024/1998	Diversification of the product portfolio offered to the market through the production of anhydrous lithium chloride, with a production of 3,628 tonnes/year of lithium chloride.
Lithium Chloride Plant Modification	DIA	La Negra	RCA N° 046/1999	Change of the raw materials (lithium carbonate and hydroxide) that feed the Lithium Chloride Plant to refined brine and purified lithium carbonate, in order to reduce the consumption of both hydrochloric acid and lithium hydroxide.
Construction of solarevaporation ponds	DIA	Salar de Atacama	RCA N° 092/2000	Construction of 10 additional wells to the 17 already existing ones, comprising a total area of 680,000 m². The project will allow for an increase in brine production from 60,000 tonnes/year to 80,000 tonnes/year, due to the increase of brines treated, because of the expansion of the well system with a total extraction flow of 113 L/s distributed in 12 pumping wells. Monitoring commitments were established.
Conversion to natural gas	DIA	La Negra	RCA N° 200/2000	Change of the supply of the La Negra Plant from diesel to natural gas by pipeline connection.
Modifications related to the monitoring of lake systems and the project "Construction of solar evaporation ponds"	*Consulta de Pertinencia*	Salar de Atacama	Extent Resolution Nº 165/2003	Resolves that the modifications related to the monitoring of lake systems and the project "Construction of solar evaporation ponds" is not a change of consideration and does not require entering the Environmental Impact Assessment System.
Modification of the "Construction of solar evaporation ponds" project	DIA	Salar de Atacama	RCA N° 3132/2006	The amount of brine production of 80,000 m³ was not achieved, so 3 wells are added to complete two systems of 15 wells each, adding an area of 37 ha and additional brine extraction of 29 L/s, reaching a total of 142 L/s. Monitoring commitments were established.
Modification and improvements of the Operations of La Negra Plant Phase 1	DIA	La Negra	RCA N° 264/2008	Consider the regularization of the increase in the production capacity of the lithium carbonate plant from 45 to 53 million pounds/year and the construction of 5 sedimentation and evaporation ponds with a capacity of 1,330,000 m³ for the disposal of liquid and solid waste. Use of new technologies for process automation.
Construction and habilitation of a pre-concentrator pond.	*Consulta de Pertinencia*	Salar de Atacama	Extent Resolution Nº 373/2008	Resolves that the project presented for the construction and habilitation of a pre-concentrator pond, modification of the projects "Construction of Solar Evaporation Ponds" and "Modification to the Construction of Evaporation Ponds Project", does not require entering the Environmental Impact Assessment System of the Regional Environmental Commission, Antofagasta Region.
Expansion of La Negra Lithium Chloride Plant Phase 2	DIA	La Negra	RCA N° 236/2012	Increase in the production capacity of the Lithium Carbonate Plant from 53 million pounds per year authorized to reach 100 million pounds per year, through the expansion and improvement of the processes of the La Negra Plant.
Recovery of Lithium Brine from the Decanting Ponds	*Consulta de Pertinencia*	Salar de Atacama	Extent Resolution Nº 316/2012	Resolves that the submitted project "Recovery of Lithium Brine from the Decanting Ponds" does not constitute a change of consideration and does not require entering the Environmental Impact Assessment System.
Potash Plant Rockwood Litio Ltda.	DIA	Salar de Atacama	RCA N° 0403/2013	Operation of the Dryer and the construction and operation of a Granulation Plant, both of which will form part of the process to obtain the product potassium chloride.
Removal of nitrate from lithium chloride brine, La Negra Plant	*Consulta de Pertinencia*	La Negra	Extent Resolution Nº 400/2013	Considers standardizing the removal of nitrate from lithium chloride brine by incorporating a second stage of solvent extraction (SX) from refined brine following the boron extraction process, using tributyl phosphate (TBP) as the extractant and a solvent, both of which are confined to a closed system, to be subsequently recirculated to the extraction process.
Research drilling in the Southwest of Salar de Atacama	*Consulta de Pertinencia*	Salar de Atacama	Extent Resolution Nº 614/2013	Drilling of research wells in the protected area, specifically in the aquifer that feeds the wetlands of the southern sector of the Salar de Atacama.

Research drilling in the Southern Sector of the Nucleus of the Salar de Atacama.	*Consulta de Pertinencia*	Salar de Atacama	Extent Resolution Nº 422/2014	Resolves that the project presented "Research drilling in the Southern Sector of the Nucleus of the Salar de Atacama" does not constitute a change of consideration and should not enter the environmental impact assessment system.
Research drilling in the Salar de Atacama Core area	*Consulta de Pertinencia*	Salar de Atacama	Extent Resolution Nº 673/2014	Drilling of research wells and observation wells or piezometers in the Salar de Atacama core area, in addition to the execution of pumping tests to determine the hydraulic properties of the medium.
Use of weak brine from Planta La Negra in process Planta el Salar process.	*Consulta de Pertinencia*	Salar de Atacama y La Negra	Extent Resolution Nº 673/2014	Re-use of 8,030 m^3/m of the supernatant of the solution arranged in the evaporation pond of the La Negra plant towards the productive process of the Salar de Atacama Plant, to be reincorporated in the existing system of solar evaporation ponds. In this way, this brine is concentrated up to 6% of lithium, which will be sent to the La Negra plant to be used in the process.
Modification and improvement solar evaporation ponds system	EIA	Salar de Atacama	RCA N° 021/2016	Considers the increase of the brine extraction flow rate in 300 L/s (total 442 L/s), pumping of 16.9 L/s of water from the Tucucaro and Tilopozo wells, the construction of 2 well systems and 4 pre-concentration wells. The project has a useful life of 25 years. Includes the construction of new solar evaporation surfaces. The project considers increasing the current 326 hectares in an area of 510 hectares, to reach a total area of 836 hectares. Monitoring and an early monitoring plan were committed. The operation of this project started on September 28, 2016.
Phase 3 La Negra Plant Expansion	DIA	La Negra and Salar de Atacama	RCA N° 0279/2017	Increases the production capacity of the Lithium Carbonate Plant located in the La Negra from 45,300 tonnes/year to reach a production of 88,000 tons/year of lithium carbonate, maintaining the production capacity of 4,500 tons/year of lithium chloride (equivalent to 6,000 tons/year of lithium carbonate equivalent (LCE)), thus achieving a total production of 94,000 tonnes/year LCE. In order to achieve this increase in production, modifications are required in the La Negra and Salar de Atacama Plants. The changes in the Salar de Atacama are: New pre-concentrator and a new system of evaporator wells, which will allow a production of 250,000 m^3/year of concentrated lithium brine at 6%, without modifying the amount of brine extraction authorized from the Salar de Atacama (442 L/s). Twelve new salt collection sites, which will allow the precipitated salts of the current evaporation pool systems and the new evaporation pool system (System N° 5) to be disposed of.
Optimizing Efficiency and Sustainability Lithium Recovery Salar de Atacama Plant	*Consulta de Pertinencia*	Salar de Atacama	Extent Resolution 052/2018	Introduces improvements in the process of obtaining concentrated brine through the treatment processes of Bischofite and Li Carnalite, to improve efficiency in the recovery of lithium from 55% to a value in the order of 67%.
Modifications Phase 3 La Negra Plant Expansion	*Consulta de Pertinencia*	La Negra	Extent Resolution 89/2018	Makes modifications in the lithium carbonate processing lines and related services, with the aim of achieving the authorized processing capacity.
Exploration campaign for A2 area and the polygon South-East of the Salar de Atacama	*Consulta de Pertinencia*	Salar de Atacama	Extent Resolution 113/2018	Well drilling and pumping tests for exploration and geotechnical and hydrogeological knowledge of the surrounding of the exploitation areas.
Albemarle Camp, Planta Salar de Atacama	*Consulta de Pertinencia*	Salar de Atacama	Extent Resolution 158/2018	Installation of a new camp to serve a total population of 600 people in 2 phases.
Deepening of brine extraction wells in the Salar de Atacama	*Consulta de Pertinencia*	Salar de Atacama	Extent Resolution 947/2018	Pumping of 120 L/s of brine authorized in zone A1, up to a depth of 200 m, for a period of 5 years.
Modification of the project Phase 3 La Negra Plant Expansion	DIA	La Negra	RCA N° 077/2019	Incorporation of new equipment in La Negra, in order to have an operational improvement and reach the approved production. Regularization and modification of the contour channel.

Expansion of the Salar de Atacama water monitoring network	*Consulta de Pertinencia*	Salar de Atacama	Extent Resolution 323/2019	Construction of 16 boreholes to obtain information on freshwater-salt water levels in order to better understand the hydrogeological behavior in some sensitive sectors, where there is not enough information.
Deep well pumping letter	*Consulta de Pertinencia*	Salar de Atacama	Exempt Resolution 2202299101134	Allows pumping 120 l/s up to 200 m deep from zone A1, until the end of the operation.

Source: Prepared by SRK based on information from Albemarle projects submitted into the Chilean Environmental Impact Assessment System, available at www.sea.gob.cl

Increased brine extraction over what has already been approved (442 L/s), is currently not being considered. Continued pumping of the deep wells was allowed for the life of mine without the need for preparation or submittal of an EIA.

In order to follow the compliance with applicable regulations and the obligations established in the environmental approvals of Albemarle's operations in Chile, a management platform was implemented during 2020.

17.3.2 Operating Permits

In addition to the main environmental permit, there are sectorial permits or operational permits that are required for construction and operation of new facilities or modification to approved facilities. These permits are granted by many different agencies, including the DGA (Dirección General de Aguas), the National Geology and Mining Service (Servicio Nacional de Geología y Minería or SERNAGEOMIN), and the Health Ministry (Ministerio de Salud).

Both La Negra and Salar de Atacama have their primary permits to operate. Table 17-5 shows the types of permits granted for each area. Currently, there are some operational permits which have not yet been granted. These permits are mainly related to new facilities or changes associated to the Phase 3 of the operation.

Table 17-5: Operational Permits for La Negra and Salar de Atacama Albemarle Facilities

Facility/Activity	Area	Permit	Issuing Authority
Evaporation ponds Sedimentation ponds Tailings ponds	La Negra	Disposal of industrial liquid waste	Regional Ministry of Health
Sedimentation ponds	La Negra	Disposal of industrial solid waste	Regional Ministry of Health
All industrial facilities	La Negra Salar de Atacama	Industrial Technical qualification	Regional Ministry of Health
Solid waste storage yards	La Negra Salar de Atacama	Temporary disposal of non-hazardous waste, project and operation	Regional Ministry of Health
Hazardous waste warehouses	La Negra Salar de Atacama	Temporary disposal of hazardous waste, project and operation	Regional Ministry of Health
All areas	La Negra Salar de Atacama	Temporary disposal of domestic wastes, project and operation	Regional Ministry of Health
All areas	La Negra Salar de Atacama	Hazardous waste management plan	Regional Ministry of Health
All areas	La Negra Salar de Atacama	Potable water supply system, project and operation	Regional Ministry of Health
All areas - Sewage treatment plants and sanitary septic system	La Negra Salar de Atacama	Sewage system, project and operation	Regional Ministry of Health
Hazardous substances warehouse	La Negra Salar de Atacama	Storage of hazardous substances	Regional Ministry of Health
Equipment washing area	Salar de Atacama	Liquid waste treatment system	Regional Ministry of Health
Casinos	La Negra Salar de Atacama	Casino operation	Regional Ministry of Health
Transport of food for the Casino	La Negra Salar de Atacama	Sanitary Authorization for Vehicles Transporting Foods that Require Cold Storage	Regional Ministry of Health
Discard salt	Salar de Atacama	Disposal of mining waste	Regional Ministry of Health
Ambulance	La Negra Salar de Atacama	Sanitary transport	Regional Ministry of Health
Polyclinic	La Negra Salar de Atacama	Sanitary authorization for medical procedure room	Regional Ministry of Health
Chloride Pant Fourth Train Plant Carbonate plant	La Negra	Boiler register	Regional Ministry of Health
Stockpiles of discard salts	La Negra Salar de Atacama	Waste dumps	National Service of Geology and Mining
All areas	La Negra Salar de Atacama	Closure plans	National Service of Geology and Mining
Brine extraction	Salar de Atacama	Exploitation method	National Service of Geology and Mining
All plants	La Negra	Electrification Plant	National Service of Geology and Mining

Sedimentation and evaporation ponds	La Negra Salar de Atacama	Hydraulics works	General Directorate of Water
All buildings	La Negra Salar de Atacama	Building permits	Municipality
All constructions	La Negra Salar de Atacama	Favorable report for construction (land use)	Regional Ministry of Agriculture
All buildings	La Negra	Final reception of works	Municipality
All areas	La Negra Salar de Atacama	Limited telecommunications service permit	Undersecretary of communication
All areas	La Negra Salar de Atacama	Declaration of indoor installation of gas and liquid fuels	Superintendence of Electricity and Fuels
All areas	La Negra Salar de Atacama	Internal electrical declaration	Superintendence of Electricity and Fuels
Main stack gas emission natural gas (CO2, NOx, SO2) Wet air stack with particulate emissions	La Negra	Application for Height Certificate for buildings near an airport, airfield, heliport or radio aid	Ministry of Justice
Densimeters	La Negra	Transport of radioactive material	Chilean Nuclear Energy Commission
Plant access	La Negra	Access to public road	Directorate of Roads
Linear infrastructure (lines, fences, posts)	La Negra Salar de Atacama	Use of easements	Directorate of Roads
Crossing Line 23kV with Aqueduct FCAB Crossing HDPE (Tunnel Liner) under FCAB Railway Line Crossing Sewer Line with Aqueduct FCAB	La Negra	Interferences with railroads	Ministry of Economy

Source: Prepared by SRK based in the permit spreadsheet delivered to SRK by Albemarle (2020)

17.3.3 Water Rights

Albemarle has water rights granted by the DGA for those wells and spring water from which freshwater is extracted and used as industrial water for the process. The water rights correspond to spring water located in Tilopozo (8.5 L/s) and the wells located in Tucucaro (10 L/s) and Peine (5 L/s), with a total right to extract 23.5 L/s. The spring water Tilopozo and Tucucaro well are the only water sources currently used for the plant, for a total of 16.9 L/s.

In La Negra, there are two wells that have water rights granted by the DGA for the extraction of 6 L/s and 7 L/s.

It should be noted that, for brine extraction wells, no groundwater rights are required, as this corresponds to the extraction of a mineral resource.

17.4 Plans, Negotiations, or Agreements

Albemarle maintains a Social Management Plan which is part of the guidelines, strategies, and corporate actions for community relations. Within the framework of these guidelines, Albemarle currently has formal agreements, since 2016, with the Council of Atacameño Peoples and with the 18 Indigenous Communities (Atacameñas) that make up the ADI; with the Atacameña Community of Peine, since 2012; with the municipality of San Pedro de Atacama, the Culture and Tourism Foundation of San Pedro de Atacama and the Sports Corporation of the same commune, since 2017.

These agreements, which represent the principal stakeholders of the project's area of influence in the Salar de Atacama, are predicated on constant dialogue through permanent Working Groups (meeting on a monthly basis), in which all the challenges, projects, and/or scopes of the same agreements are presented. These Working Groups are where Albemarle presents proposed projects and socially manages them with all the stakeholders. The Working Groups function, among others, is to be a channel for grievance and/or complaints, in which any participant and/or community member can present their claims. Additionally, there is a web channel and helpline where the community can make complaints (www.IntegrityHelpline.Albemarle.com). Of note is the agreement signed with the 18 indigenous communities that make up the Council of Atacama Peoples which is an agreement of Cooperation, Sustainability, and Mutual Benefit. Through this partnership agreement, Albemarle undertakes to deliver 3.5% of the sales of lithium carbonate and potassium chloride produced at the Salar Plant and to establish joint work for monitoring and surveillance of the Salar de Atacama's environmental resources. The agreement also includes the accompaniment and advice of the Inter-American Development Bank with a view to jointly generate a formula for economic governance of the resources, so that this agreement translates into the institutional strengthening of the indigenous organizations involved.

17.5 Mine Reclamation and Closure

17.5.1 Closure Planning

As mentioned in Section 17.3.2, Albemarle has a closure plan approved by SERNAGEOMIN (National Service of Geology and Mining) in 2019 (Res. Ex. N°287/2019). This closure plan includes all environmental projects approved until 2016, including EIA “Modification and improvement solar evaporation ponds system” (RCA N°021/2016).

An updated closure plan including the projects and its respective environmental permits approved after 2016 was submitted to the authority SERNAGEOMIN. This updated version of the plan is being reviewed by the specialist staff of the authority. It is necessary to wait for approval to include the updated information and the corresponding update of the closure cost and financial warranty in this report in order to comply with regulations. The updated closure plan submitted to the authority does not change the timing of closure and reclamation. The approved closure plan, developed based on the environmental projects approved until 2016, include all the following facilities. The Salar de Atacama facilities are included in Table 17-6 and the La Negra facilities are included in Table 17-7.

Table 17-6: Salar de Atacama Facilities Requirement at Closure

Area	Facility
Extraction wells	Brine extraction wells
Brine	Evaporation ponds Salts stockpiles
Processing plants	Potassium Chloride Plant Potassium Carnalite Plant Bischofite Plant Leaching facility
Auxiliary facilities	Powerhouse Transmission line (HV and MV) Offices and administration

Source: Albemarle, 2022

Table 17-7: La Negra Facilities Requirement at Closure

Area	Facility
Lithium concentrated brine	Storage system
Purification plants	SX Solvent extractions plants Boron removal plant Magnesium and Calcium Removal Plant
Crystallization plants	Lithium Chloride Plant Lithium carbonate plant
Evaporation and sedimentation ponds	Evaporation and sedimentation ponds

To define the closure measures described in the closure plan, a closure risk assessment was developed to ensure physical and chemical stability of the remaining facilities after closure. For all infrastructure, standard activities have been considered. Closure measures included in the closure plan are:

- Pond backfilling, and profiling. Pond's liner removed from slopes and covered in pond's bottom
- Dismantling of all infrastructure
- Demolish of all concrete structures
- Equipment disassembly
- Piping and fitting disassembly (includes piping flushing)
- Dismantling of electric poles and equipment
- Final disposal of all concrete and steel structures
- Ground profiling

Based on these closure measures, a 17-month period has been estimated for the closure execution program in the approved closure plan. The closure execution program considers work fronts for each of the different specialties involved in the dismantling process, as follows: de-energizing activities, equipment dismantling, piping dismantling, steel and concrete dismantling and demolish and at the end, profiling and backfilling as necessary.

The approved closure plan considers post-closure hydrologic, meteorological and water quality monitoring activities at Salar. According to RCA 21/2016, closure activities also comprise monitoring of 225 monitoring points for water quality (40), evapotranspiration (22), brine and groundwater table (124), position of the saline interphase (13), surface water flow (6), limnometric level of lagoons (20) and surface area covered by lagoons and meteorological variables on site. Since many of these locations and parameters are not required for long term post closure monitoring, a revised monitoring plan was proposed in the new closure plan submitted to SERNAGEOMIN for consideration.

17.5.2 Closure Cost Estimate

The closure cost reviewed was prepared to comply with financial assurance requirements of Chilean law. The estimate was prepared based on the approved closure plan and a conceptual estimate of all environmental projects. Note that Albemarle has developed a new closure estimate that is under review by the authorities. The new estimate has not been included in the report as it is still under review.

Albemarle is developing future closure estimates to integrate ICMM guidelines developed for this purpose (Integrated Mine Closure Good Practice Guide, 2nd Edition. ICMM, 2019) and plans to start submitting these plans in 2023.

The total closure costs of La Negra and Salar de Atacama Plants are presented in Table 17-8. Note, these values correspond to financial assurance costs and do not necessarily reflect actual closure costs.

Table 17-8: La Negra and Salar de Atacama Closure Costs[1]

Description	La Negra (US$)	Salar de Atacama (US$)	Total (US$)
Direct cost	12,990,548	12,970,789	25,961,337
Indirect cost	4,582,075	2,586,305	7,168,380
Contingency	4,262,421	3,500,054	7,762,475
Total	**21,835,044**	**19,057,149**	**40,892,193**

Note that La Negra and Salar de Atacama closure plan presents costs including taxes (19% of the total closure cost presented in Table 17-6), as per required by Law 20551.
[1]Closure costs originally estimated in Unidad de Fomento (UF). Fx rates considered as 1 UF = 28,827.5 CLP; 1 US = 775.56 CLP.

As it is shown in Table 17-8 total financial assurance closure costs include direct and indirect costs, as well as the contingencies associated to the engineering level of the estimate. As it was mentioned before, closure costs come from two different estimates: (1) approved closure plan (which represents 65% of the total closure costs), and (2) environmental projects approved after the closure plan was approved (which represents 35% of the total closure costs). Due to this, two different approaches have been considered for the estimate of the closure costs, which are described as follows.

Closure costs estimated in the approved closure plan consider:

- Direct Costs: these costs are considered as all costs related to the execution of the closure measures and works, and they have been estimated as the product of material quantities and unit prices. Unit prices have been estimated including all contractor costs (labor, equipment, and contractor's indirect costs), meanwhile material quantities were estimated from field measurements, and drawings.
- Indirect Costs: these costs have been estimated considering administration, technical inspection, meals, cleaning staff, transport, surveillance and maintenance for a total period of 20 months, which includes execution, mobilization and demobilization of contractors.
- Contingency: contingencies have been estimated based on a range analysis of all variables involved in the cost estimate, ranging from 0% on the most certain items to 52% on the most uncertainty factors.

Closure costs estimated for the environmental projects not included in the approved closure plan consider:

- Direct Costs: the estimate of these costs have been also estimated as the product of material quantities and unit prices. Unit prices have been kept from what has been considered in the approved closure plan, meanwhile material quantities were estimated from drawings or satellite images based on material take-off factors per square meters of constructed areas.
- Indirect Costs: these costs have been estimated as 20% of the direct costs.
- Contingency: contingencies have been estimated as 30% of direct and indirect costs.

17.5.3 Performance or Reclamation Bonding

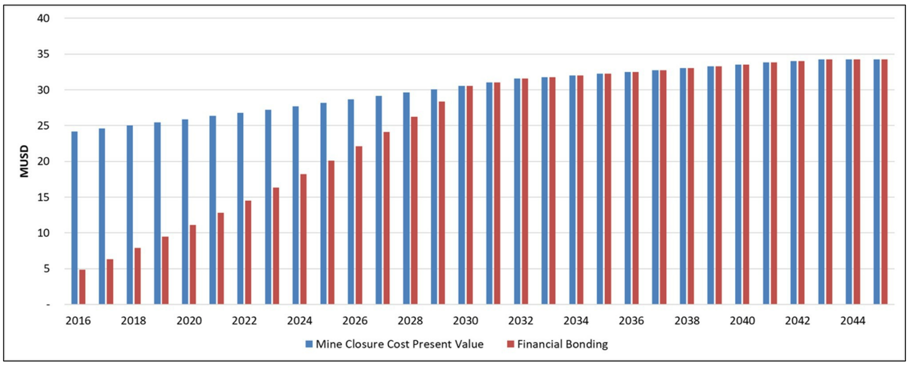
Mine closure regulation in Chile (Law N°20.551) started in 2012, and its beginning marked a milestone in how mining companies in Chile address mine closure. This law specifically requires that all mining companies proposing to begin, continue or restart operations must have an approved closure plan. The mine closure law also requires that closure plans be updated at least every 5 years, and any time a mine (a) obtain environmental approval of a new project that makes significant modification to the mine configuration, (b) obtain environmental approval of a new project that changes the mine closure phase, (c) after restarting its operation, (d) after finishing partial closures, and (e) by request of the SERNAGEOMIN.

Mining companies with extraction rates larger than 10.000 t per month (mining companies with extraction rates lower that 10,000 t per month are required to present a simplified closure plan) must present in their closure plans a detailed description of the mine facilities (in their final configuration), a closure risk assessment and the closure measures proposed, design for those measures, closure costs, and a financial assurance estimate.

Additionally, the mining companies must provide a guarantee that assures the State of Chile the full and timely compliance with the closure obligation established in this law. Albemarle submitted an updated performance bond estimate that is expected to be approved in early 2023.

Financial assurances are intended to guarantee that the Government of Chile will have the necessary funds to implement the approved closure plan in the event of a bankruptcy or abandonment. These bonds must be determined as the net present value of the total closure cost of the mine site, based on the closure cost estimate, which assumes all facilities in their final configuration. Additionally, and considering that closure plans may be presented every five years, the Law N°20.551 requires that the financial assurance must be determined for each operating year, beginning from the year of submittal of the closure plan until the last year of operation.

Albemarle has a mine closure plan in compliance with the mine closure law and approved in 2019, with a financial assurance estimate through year 2045 (Figure 17-3).



Source: Albemarle
Bonding values approved originally stated in Unidad de Fomento (UF). Fx rates considered as 1 UF = 28,827.5 CLP; 1 US = 775.56 CLP.

Figure 17-3: La Negra and Salar de Atacama Financial Bonding Program Approved

As it is shown in Figure 17-3, mine closure law defines a period where the financial assurance posted is lower than the present value of the total closure cost. This period finishes in 2030 when the financial assurance posted will be equal to the present value of the estimated closure liability.

17.5.4 Limitations on the Cost Estimate

The closure cost estimate purpose is to provide the Chilean government an assessment of the closure liabilities at the site and form the basis of financial assurance. This type of estimate typically reflects the cost that the government agency responsible for closing the site if an operator fails to meet their obligation. If Albemarle, rather than the government, closes the site in accordance with their current mine plan and approved closure plan, the cost of closure is likely to be different from the financial assurance cost estimate approved by the government.

There are several costs that are typically included in the financial assurance estimates that would only be incurred by the government, such as government contract administration. Other costs, such as head office costs, a number of human resource costs, taxes, fees, and other operator-specific costs that are not included in the financial assurance cost estimate would likely be incurred by Albemarle during closure of the site. Because Albemarle does not currently have an internal closure cost estimate other than for financial assurances, SRK was not able to prepare a comparison of the two types of closure cost estimates. The actual cost could be greater or less than the financial assurance estimate.

The estimate uses fixed unit rates for different activities and there is no documentation on the basis of those unit rates. Because of this, SRK cannot validate any of the unit rates used in the model or the overall cost estimate. SRK notes that Albemarle reports that the updated plan includes updated unit rate estimates and will evaluate them when approved.

Furthermore, because closure of the site is not expected to start until 2041, the closure cost estimate represents future costs based on current expectations of site conditions at that date. In all probability, site conditions at closure will be different than currently expected and, therefore, the current estimate of closure costs is unlikely to reflect the actual closure cost that will be incurred in the future.

17.6 Plan Adequacy

In SRK's opinion, the operations of Albemarle have adequate plans to address and follow-up the most sensitive and relevant environmental issues, such as hydrogeological/biodiversity issues, and those associated with the indigenous communities in the Salar de Atacama area.

In SRK's opinion, Albemarle adequately follows up on issues related to water quality in the Negra and fluctuations in the water table and potential effects on the sensitive ecosystems around the Salar de Atacama, including analysis of possible cumulative effects given the multiplicity of actors that extract brine and freshwater in the area. The aim of the Early Warning Plan is to promptly detect any deviation from what was indicated in the initial environmental assessment, preventing unforeseen impacts from occurring. Notwithstanding the above, the Salar de Atacama is a complex system and requires constant updating of management tools based on the results of the monitoring programs, and also be attentive to requirements or new tools that the authority may incorporate.

Albemarle maintains relations with all the communities and indigenous groups in the area that, in the QP's opinion, are very good. Any future development or modification of the current conditions of the operation will be subject to an Indigenous Consultation Process; therefore, it is of high importance to maintain this adequate management strategy with these communities.

Management of regulatory and environmental obligations has been recently improved, incorporating a monitoring platform, which was implemented at the end of 2020.

There is an operational issue that could generate regulatory risk, related with infrastructure requirements to adequately manage the liquid solutions that are generated in La Negra's process, which is not possible to manage with the current facilities. Any spill or overflow from the ponds can lead to an environmental non-compliance that can be sanctioned by the Superintendence of the Environment. This issue is being addressed as a priority action by the company to seek a definitive solution in the long term, and also one that allows them to solve the issue in the short term.

17.7 Local Procurement

Regarding the hiring of local labor, Albemarle does not have formal commitments with any local authority; however, currently, 84% of Albemarle workers are from the Antofagasta region and 39% of the workers of the Salar de Atacama area are from nearby communities. Although there is no formal agreement, in the case of the Salar de Atacama, every new job opening is promoted in the area and within the communities. This issue will be incorporated into the community relations policy currently being developed by Albemarle.

18 Capital and Operating Costs

The Salar de Atacama and La Negra are currently in operation, producing technical and battery grade lithium carbonate as well as byproducts. Capital and operating costs are forecast as a normal course of operational planning with a primary focus on short term budgets (i.e., subsequent year). Mid (e.g., five year plan) and long-term (i.e., life of mine) planning are not as detailed although operations do evaluate conceptual long-term performance. As there is not an official mid-term or life of mine budget to rely upon to support estimation of reserves, SRK developed its own long-term operating forecast. SRK developed this forecast based on some of the forecast data utilized at the operation with adjustments made by SRK based on historic operating results. These forecasts account for changes in production rates associated with expansion plans that are largely complete and SRK utilized these adjustments, including modification, as appropriate.

Estimation of capital and operating costs is inherently a forward-looking exercise. These estimates rely upon a range of assumptions and forecasts that are subject to change depending upon macroeconomic conditions, operating strategy and new data collected through future operations. For this report, capital and operating costs are estimated to a PFS-level, as defined by S-K 1300, with a targeted accuracy of +/-25%. However, this accuracy level is only applicable to the base case operating scenario and forward-looking assumptions outlined in this report. Therefore, changes in these forward-looking assumptions can result in capital and operating costs that deviate more than 25% from the costs forecast herein.

18.1 Capital Cost Estimates

Capital cost forecasts are estimated based on (i) a baseline level of sustaining capital expenditures, in-line with historic expenditure levels, adjusted for changing production rates, alignment with forward looking forecasts from the operation and (ii) strategic planning for major capital expenditures.

In reviewing historical costs, there has been significant capital invested in expansion of operations at both the Salar and La Negra over the past seven years. Associated with expanded production rates, general sustaining capital expenditure has also increased. Looking forward, there remains some spend forecast in the remainder of 2022, associated with completion of the La Negra 3 project. With the completion of La Negra 3 in 2022, there remains one material future capital project associated with the reserve as presented here, the SYIP. The SYIP project has been underway for several years and the most significant investment occurs in 2022 and 2023.

The La Negra 3 project is part of a multi-year effort to significantly expand production from the combined Salar de Atacama and La Negra. This expansion targets taking La Negra's annual production capacity from approximately 45,000 t LCE to approximately 84,000 t LCE. Material expenditure on this project initiated around 2016 with a total forecast capital budget of US$773 million (inclusive of US$14.5 million contingency). La Negra 3 expenditure is expected to conclude in 2022 with expenditure of US$4.8 million. Beyond 2022, Albemarle has not forecast any additional expenditure on La Negra 3 as the project will be commissioned.

The SYIP is an ongoing project that is at an earlier stage than La Negra 3. The project is targeting improving recovery rates of lithium from the evaporation ponds from the Salar de Atacama and is discussed in more detail in Section 14.1.2. While initially planned in detail and budgeted in early 2019 the volatile economic environment has yielded cost changes and SRK has accepted the most recent forecast cost for modeling purposes. Based on the currently projected timing and remaining capital estimate, the remaining spend on this project is US$53.5 million, US$50.6 million in the remainder of 2022 and 2023, respectively.

On a longer-term basis, as discussed in Section 14.1.1, due to a projected change in the calcium to sulfate ratio in the raw brine feed, SRK assumes that a liming system will need to be added in the future to manage this ratio and maintain current lithium recovery rates in the evaporation ponds. SRK's life of mine pumping plan requires this plant to be operational by year end 2037. Therefore, SRK has assumed construction of this plant in 2036. As the need for this plant is still uncertain (i.e., further optimization of the pumping plan may better balance calcium and sulfate) and the timing is still several years away, there is no study supporting development of this plant. Therefore, SRK developed a scoping level costs based on benchmarking against recent estimated development cost for a similar plant in the region and escalated costs to current. SRK's cost estimate is US$26.4 million for this liming plant, including a 35% contingency.

Outside of the projects discussed above, for the purpose of forecasting capital to support the reserve estimate, SRK did not include additional expenditure for operational improvement as no improvement is assumed in operating performance relative to historic. Therefore, SRK's remaining sustaining capital forecast includes a direct estimate of replacement/rehabilitation of production wells and a single line item to capture all other miscellaneous sustaining capital.

For the estimate of replacement/rehabilitation of production wells, SRK assumes a typical cost of US$406,000 per well. At steady state, this results in approximately US$4.1 million per year in production well replacement costs.

For a typical annual sustaining capital meant as a catch-all for all other items, SRK assumes that with expanding production and operations, over time, the salar and La Negra will require higher expenditure than historic. Based on Albemarle mid-range forecasts, SRK has assumed a long-term total of approximately US$40 million per year in sustaining capex at the salar, inclusive of well replacement. Deducting the well replacement costs, this results in a non-well replacement average capex of around US$36 million per year at the salar. At La Negra, SRK has assumed an additional US$67 million per year, based on mid-range forecasts.

Table 18-1 presents capital estimates for the next 10 years and the life of the reserve. Total capital costs over this period (September 2022 to December 2045) are estimated at US$2.7 billion in 2022 real dollars.

Table 18-1: Capital Cost Forecast ($M Real 2022)

Period	Total Sustaining Capex				Closure	Total Expansion Projects		Total Capital Expenditure
	La Negra	Liming	Well Replacement/ Expansion	General Wellfield	Closure	La Negra	SYIP	
2022	15.8	-	2.4	7.5	-	1.6	53.5	80.8
2023	82.1	-	4.1	64.8	-	-	50.6	201.6
2024	54.4	-	4.1	37.0	-	-	-	95.5
2025	46.5	-	4.1	36.9	-	-	-	87.5
2026	65.7	-	4.1	36.9	-	-	-	106.7
2027	66.8	-	4.1	36.1	-	-	-	106.9
2028	66.8	-	4.1	36.1	-	-	-	106.9
2029	66.8	-	4.1	36.1	-	-	-	106.9
2030	66.8	-	4.1	36.1	-	-	-	106.9
Remaining LoM (2031 – 2045)	784.6	26.4	44.7	396.8	40.9	-	-	1,293.4
LoM Total	**1,316.3**	**26.4**	**79.6**	**724.1**	**40.9**	**1.6**	**104.1**	**2,293.1**

Source: SRK
2022 capex is September – December only, assumed at 33% of total 2022 spend

18.2 Operating Cost Estimates

Operating costs are site specific (e.g., they do not include corporate overheads although there are overheads for Albemarle Chile). Note that for internal reporting purposes, Albemarle allocates brine production costs to the year the brine is processed (i.e., an approximate 24 month delay from the actual cost being incurred).

As noted above, Albemarle does not have an official long term cost forecast for the operation (2023 is the latest official forecast available, although unofficial internal life of mine outlooks have been developed). Therefore, SRK developed a cost model to reflect future production costs. To develop this cost forecast, SRK worked with site personnel, including reviewing unofficial forecasts, and developed a simplified operating cost model based on fixed and variable costs, adjusted for changes in operations, as appropriate.

In evaluating the historic costs and discussing the cost profile with Albemarle, the majority of the Salar de Atacama/La Negra costs are fixed. However, there are material changes planned for the operation that are expected to change even the fixed cost basis for the operation. These changes include the following:

- Addition of R&D payment contemplated in 2016 agreement
- La Negra III increased production
- Electrical grid connection for the salar
- SYIP at the salar
- Likely long-term requirement to add a liming plant at the salar

For each of these structural changes to the operation, SRK assumed changes to the fixed cost basis. Beyond these fixed cost modifications, SRK also applied variable unit costs to a range of cost inputs. These include the following:

- Raw Materials, Including:
  - Soda Ash (modeled individually)
  - Lime (modeled individually)
  - HCl (modeled individually)
  - Packaging (modeled individually)
  - Other (factored against historic costs)
- Concentrated Brine Transport
- Electricity (partially variable)
- Other Utilities (e.g., natural gas / water)
- Salt Removal (partially variable)
- Waste Disposal
- Maintenance / Repair (partially variable)

For key raw materials, including soda ash, lime, HCl and packaging, as well as for brine transportation, SRK individually calculated unit consumption. The remaining variable costs are calculated based on factoring historic actual costs/production rates. Actual and short range forecast expenditures were provided by Albemarle for soda ash, lime, HCL and brine transport (SRK based the packaging forecast on historic costs, which have been relatively consistent with an escalation observed in short range forecasts). Actual and short range forecast expenditures where then compared against consumption rates to yield unit costs. Unit consumption and costs for these items are presented in Table 18-2.

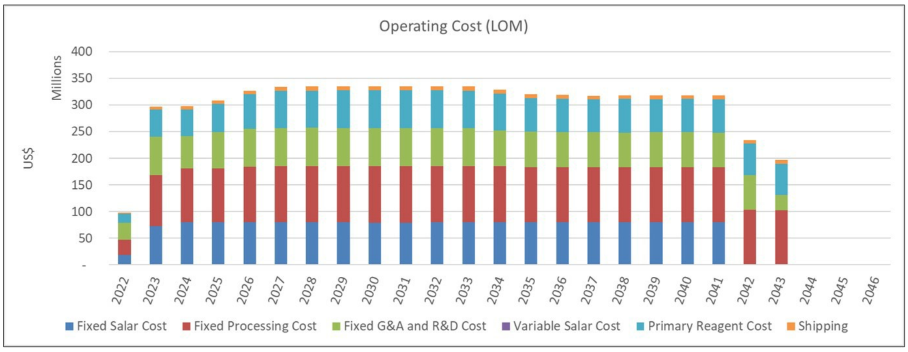
Table 18-2: Key Assumptions, Variable Cost Model

Item	Consumption Rate	Unit Cost
Soda Ash	2.27 tonne/tonne LCE sold	US$320/tonne
Lime	0.21 tonne/tonne LCE sold	US$221/tonne
HCl	0.11 tonne/tonne LCE sold	US$615/tonne
Packaging	Direct application to final product	US$81 /tonne LCE sold
Raw Brine Transport	Assumes 6% Li concentration in transported brine	US$32/tonne

Source: SRK 2022
Lime consumption reported above applicable to La Negra operations, in the long-term, with the assumed requirement to add liming at the salar, the assumed consumption rate increases.

As seen in Table 18-2 soda ash is the most important component of these key variable costs. Albemarle provided the long-term price assumption for soda ash, but SRK has also tested the sensitivity of the project economics to soda ash consumption, as described in Section 0.

Based on this operating cost model, total annual forecast operating costs for the Salar de Atacama/La Negra operations are shown in Figure 18-1.



Source: SRK
2022 costs reflect a partial year (September – December)

Figure 18-1: Total Forecast Operating Expenditure (Real 2022 Basis)

19 Economic Analysis

As with the capital and operating cost forecasts, the economic analysis is inherently a forward-looking exercise. These estimates rely upon a range of assumptions and forecasts that are subject to change depending upon macroeconomic conditions, operating strategy and new data collected through future operations.

SRK has not included the production of byproduct streams into this analysis. However, the operation does produce byproducts that have historically generated approximately US$20 million per year in revenue, net of costs specific to production of those byproducts. As the byproducts are not included in the resource and reserve models, they are not included in the cashflow model.

19.1 General Description

SRK prepared a cash flow model to evaluate Salar de Atacama' reserves on a real, 2022-dollar basis. This model was prepared on an annual basis from the reserve effective date to the exhaustion of the reserves. This section presents the main assumptions used in the cash flow model and the resulting indicative economics. The model results are presented in US$, unless otherwise stated.

All results are presented in this section on a 100% basis, reflective of Albemarle's ownership.

19.1.1 Basic Model Parameters

Key criteria used in the analysis are presented throughout this section. Basic model parameters are summarized in Table 19-1.

Table 19-1: Basic Model Parameters

Description	Value
TEM Time Zero Start Date	Sept 1, 2022
Pumping Life (first year is a partial year)	22
Operational Life (first year is a partial year)	22
Model Life (first year is a partial year)	24
Discount Rate	8%

All cost incurred prior to the model start date are considered sunk costs. The potential impact of these costs on the economics of the operation are not evaluated. This includes contributions to depreciation and working capital as these items are assumed to have a zero balance at model start.

The operational life extends two years beyond the pumping life to allow for recovery of the lithium pumped to the ponds from the wellfield.

Closure costs are incorporated at the end of the operational life.

The selected discount rate is 8% as provided by Albemarle.

19.1.2 External Factors

Pricing

Modeled prices are based on the prices developed in the Market Study section of this report. The prices are modeled as US$20,000/t technical grade Li_2CO_3 over the life of the operation. This price is a CIF Asia price and shipping costs are applied separately within the model.

Taxes and Royalties

As modeled, the operation is subject to a 27% federal income tax rate. All expended capital is subject to depreciation over an eight-year period. Depreciation occurs via straight line method.

As the operation is located in Chile, it is also subject to a Chile Specific Mining Tax at a rate of 5% of gross revenue with deductions for operating costs and depreciations.

gross revenue with deductions for operating costs and depreciations.

The operation is subject to a CORFO royalty on Lithium. The royalty is a progressive gross revenue royalty based on lithium price. The royalty schedule modeled is outlined in Table 19-2. Other royalties such as community payments are included in the operating cost model assumptions.

Table 19-2: Corfo Royalty Scale

LCE Price (US$/t)	Royalty Rate
0-4,000	6.80%
4,000-5,000	8.00%
5,000-6,000	10.00%
6,000-7,000	17.00%
7,000-10,000	25.00%
Over 10,000	40.00%

Source: SRK

Working Capital

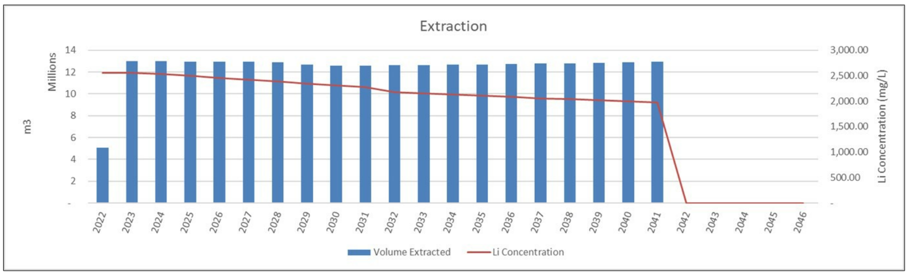
The assumptions used for working capital in this analysis are as follows:

- Accounts Receivable (A/R): 30-day delay
- Accounts Payable (A/P): 30-day delay
- Zero opening balance for A/R and A/P

19.1.3 Technical Factors

Pumping/Extraction Profile

The modeled pumping profile was developed by SRK. The details of this profile are presented previously in this report. No modifications were made to the profile for use in the economic model. The modeled profile is presented in Figure 19-1. Note that 2022 is a partial year.



Source: SRK, 2023

Figure 19-1: Salar de Atacama Pumping Profile (Tabular Data shown in Table 19-9)

A summary of the modeled life of operation pumping profile is presented in Table 19-3.

Table 19-3: Modeled Life of Operation Pumping Profile

Extraction Summary	Units	Value
Total Brine Pumped	**m3 (million)**	**248.1**
Total Contained Lithium	**tonnes**	**556,850**
Average Lithium Grade	mg/l	2,244.24
Annual Average Brine Production	m^3 **(million)**	12.4
Annual Average Brine Production	Acre Feet	10,058

Source: SRK, 2023

Processing Profile

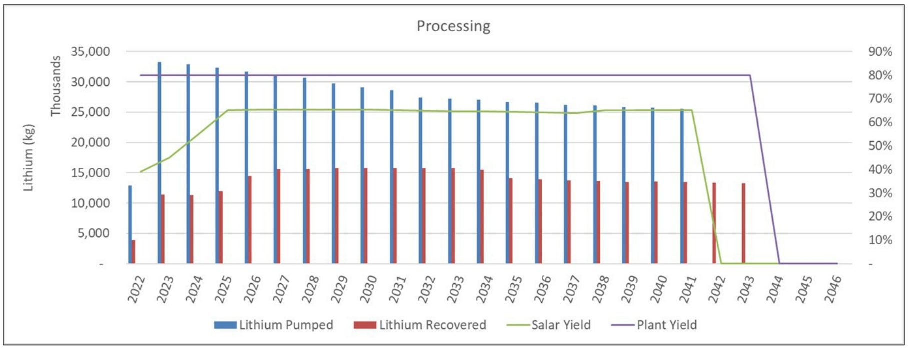
The processing profile is identical to the pumping profile. The material pumped is immediately fed to the processing circuit consisting of evaporation ponds and processing plant.

The production profile is the result of the application of processing logic to the processing profile within the economic model. The recovery curve is hardcoded for the beginning of the modeled operation to reflect actual performance. The recovery curve ramps from 39% to 55% over several years. After 2024, the salar yield is governed by a recovery curve. The following recovery curve was applied to raw brine pumping profile to account for losses in the evaporation ponds:

$$\text{Lithium Pond Recovery} = -19.1880 * (Li\%)^2 + 7.4721 * Li\% - 0.0746$$

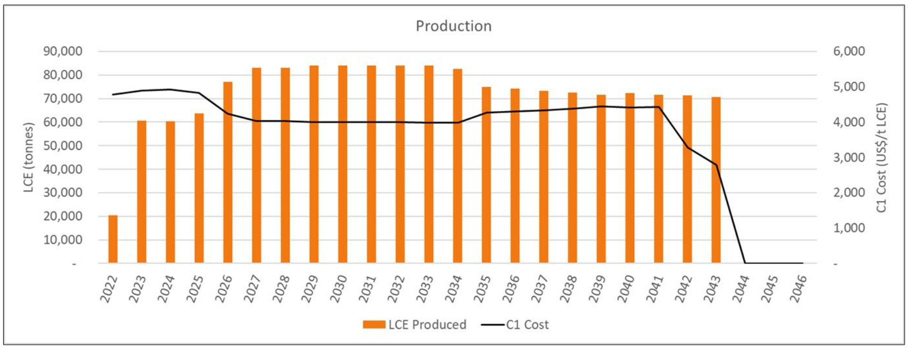
After the assumed start of operations of the liming plant in 2037, SRK has assumed a fixed 65% recovery factor in the evaporation ponds. An additional 80% fixed lithium recovery is applied to account for losses in the lithium carbonate plant.

Final lithium production in the model is delayed by two years from the date of pumping to allow for the brine to concentrate in the evaporation ponds. As a result, the production in the years immediately following the start of the model is based on historical pumping. The modeled processing and production profiles are presented in Figure 19-2 and Figure 19-3.



Source: SRK

Figure 19-2: Modeled Processing Profile (Tabular data shown in Table 19-9)



Source: SRK

Figure 19-3: Modeled Production Profile (Tabular data shown in Table 19-9)

A Summary of the modeled life of operation profile is presented in Table 19-4.

Table 19-4: Life of Operation Processing Summary

LoM Processing	Units	Value
Lithium Processed	tonnes	556,850
Combined Lithium Recovery	%	54.08%
Li_2CO_3 Produced	tonnes	1,603,477
Annual Average Li_2CO_3 Produced	tonnes	72,885

Source: SRK

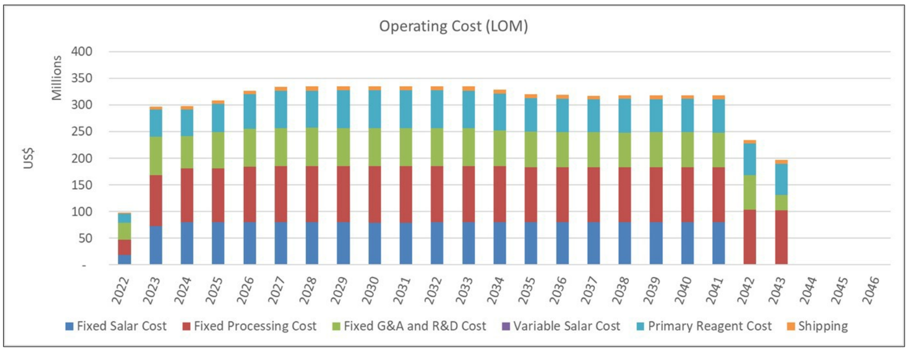
Operating Costs

Operating costs are modeled in US$ and are categorized as utilities, processing and shipping costs. No contingency amounts have been added to the operating costs within the model. A summary of the operating costs over the life of the operation is presented in Table 19-5 and Figure 19-4.

Table 19-5: Operating Cost Summary

LoM Operating Costs	Units	Value
Salar Costs	US$ million	1,525
Processing Costs	US$ million	3,564
Shipping and G&A Costs	US$ million	1,574
Total Operating Costs	US$ million	**6,663**
Royalty Costs	US$ million	8,614
Salar Costs	US$/t Li_2CO_3	951
Processing Costs	US$/t Li_2CO_3	2,223
Shipping and G&A Costs	US$/t Li_2CO_3	981
LoM C1 Cost	US$/t Li_2CO_3	4,155
Royalty Costs	US$/t Li_2CO_3	5,372

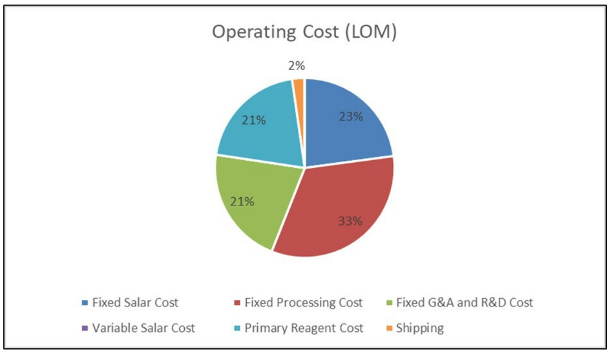
Source: SRK
C1 costs are direct costs, which include costs incurred in mining, processing and G&A (including shipping) categories.



Source: SRK

Figure 19-4: Life of Operation Operating Cost Summary (Tabular data shown in Table 19-9)

The contributions of the different operating cost segments over the life of the operation are presented in Figure 19-5.



Source: SRK

Figure 19-5: Life of Operation Operating Cost Contributions

Salar Cost

The salar cost consists of the operating costs incurred at the salar operation. It is built up from detailed costs described previously in this document and modeled as a fixed cost within the model. However, SRK notes that the fixed cost component is scaled by pumping volumes but is not directly a variable cost.

Processing

Processing costs are operating costs incurred at the La Negra processing facility. These costs are modeled as fixed and variable costs within the model as discussed previously in this document. However, SRK notes that the fixed cost component is scaled by production volumes but is not directly a variable cost.

Key variable cost components were broken out separately as outlined in Table 19-6.

Table 19-6: Variable Processing Costs

Processing Costs	Units	Value
Soda Ash Consumption	t/t Li_2CO_3	2.27
Soda Ash Pricing	US$/tonne	319.98
Lime Consumption	t/t Li_2CO_3	0.21
Lime Pricing	US$/tonne	221.49
HCl Consumption	t/t Li_2CO_3	0.11
HCl Pricing	US$/tonne	615.11
Salar Lime Cost	US$/tonne	253.56

Source: SRK

Shipping and G&A

Shipping costs are variable and are captured at US$94.39/t of LCE produced.

G&A costs are developed from detailed costs and average roughly US$56 million per year when the operation is at full run rate.

R&D payments to the government of Chile are included as fixed costs on schedule outlined in Table 19-7.

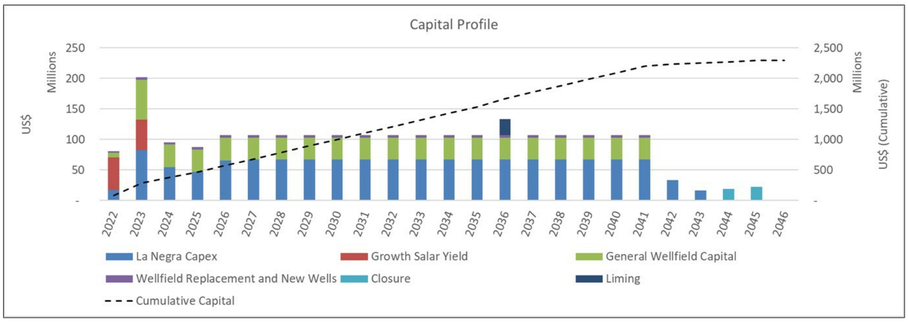
Table 19-7: R&D Costs

Year	US$ Million
2022 (partial)	3.87
2023	11.64
2024	11.67
2025	11.70
2026	11.74
2027	11.77
2028	11.80
2029	11.84
2030	11.88
2031	11.91
2032	11.95
2033	11.99
2034	12.02
2035	12.06
2036	12.10
2037	12.14
2038	12.18
2039	12.22
2040	12.27
2041	12.31
2042	12.35
2043	12.39

Source: Albemarle

Capital Costs

As Salar de Atacama is an existing operation, no initial capital has been modeled. Sustaining capital is modeled on an annual basis and is used in the model as outlined in Section 18.1. Major projects associated with expansion or operational improvement include contingency, as noted in Section 18.1, other sustaining costs do not include contingency. Closure costs are modeled as sustaining capital and are captured as a onetime payment the year following cessation of operations. The modeled sustaining capital profile is presented in Figure 19-6.



Source: SRK

Figure 19-6: Sustaining Capital Profile (Tabular Data shown in Table 19-9)

19.1.4 Results

The economic analysis metrics are prepared on annual after-tax basis in US$. The results of the analysis are presented in Table 19-8. As modeled, at a Lithium Carbonate price of US$20,000/t, the NPV8% of the forecast after-tax free cash flow is US$4,240 million. Note that because Salar de Atacama is in operation and is modeled on a go-forward basis from the date of the reserve, historic capital expenditures are treated as sunk costs (i.e., not modeled) and therefore, IRR and payback period analysis are not relevant metrics.

Table 19-8: Indicative Economic Results

LoM Cash Flow (Unfinanced)	Units	Value
Total Revenue	**US$ million**	**32,069.5**
Total Opex	**US$ million**	**(6,663.0)**
Royalties	US$ million	(8,613.9)
Operating Margin	US$ million	16,792.6
Operating Margin Ratio	%	52%
Taxes Paid	US$ million	(4,872.2)
Free Cashflow	US$ million	9,627.4
Before Tax		
Free Cash Flow	US$ million	14,499.6
NPV at 8%	US$ million	6,529.8
NPV at 10%	US$ million	5,550.9
NPV at 15%	US$ million	3,893.1
After Tax		
Free Cash Flow	US$ million	9,627.4
NPV at 8%	US$ million	4,240.3
NPV at 10%	US$ million	3,583.4
NPV at 15%	US$ million	2,475.4

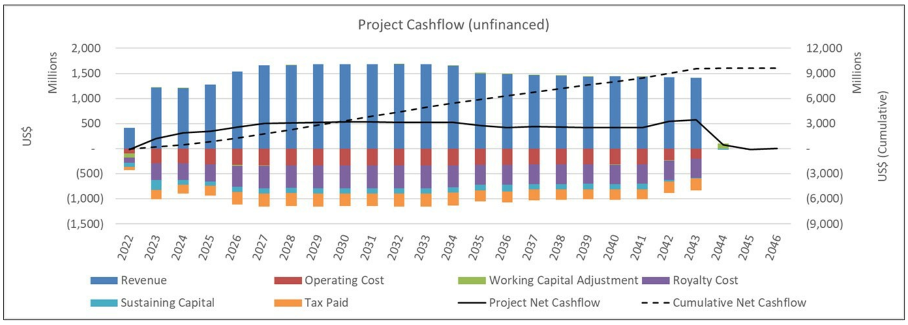
Source: SRK

The economic results and back-up chart information within this section are presented on an annual basis in Table 19-9 and Figure 19-7.

Table 19-9: Annual Cashflow

US$ in millions	**Totals**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Calendar Year		**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Days in Period		**122**	**365**	**365**	**366**	**365**	**365**	**365**	**366**	**365**	**365**	**365**	**366**
Escalation													
Escalation Index		**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Project Cashflow (unfinanced)													
Revenue	32,069.5	409.3	1,214.3	1,208.5	1,275.8	1,542.1	1,660.0	1,660.0	1,680.0	1,680.0	1,680.0	1,680.0	1,680.0
Operating Cost	(6,663.0)	(98.0)	(297.3)	(297.6)	(308.5)	(327.1)	(334.1)	(334.6)	(335.5)	(335.4)	(335.4)	(335.5)	(334.8)
Working Capital Adjustment	0.0	(76.5)	1.2	0.7	(4.8)	(20.4)	(9.1)	0.3	(1.9)	(0.0)	(0.0)	0.3	(0.4)
Royalty Cost	(8,613.9)	(109.9)	(326.2)	(324.6)	(342.7)	(414.2)	(445.9)	(445.9)	(451.2)	(451.2)	(451.2)	(451.2)	(451.2)
Sustaining Capital	(2,293.1)	(80.8)	(201.6)	(95.5)	(87.5)	(106.7)	(106.9)	(106.9)	(106.9)	(106.9)	(106.9)	(106.9)	(106.9)
Other Government Levies	0.0	-	-	-	-	-	-	-	-	-	-	-	-
Tax Paid	(4,872.2)	(65.7)	(189.9)	(180.7)	(189.5)	(242.7)	(264.1)	(259.8)	(260.1)	(256.1)	(255.1)	(258.7)	(258.4)
Project Net Cashflow	9,627.4	(21.8)	200.4	310.8	342.8	431.1	499.9	513.1	524.3	530.3	531.4	528.0	528.2
Cumulative Net Cashflow		(21.8)	178.7	489.5	832.3	1,263.3	1,763.2	2,276.3	2,800.6	3,331.0	3,862.3	4,390.3	4,918.5
Operating Cost (LoM)													
Fixed Salar Cost	1,524.9	17.9	72.4	79.8	79.7	79.7	80.0	79.9	79.6	79.5	79.4	79.5	79.5
Fixed Processing Cost	2,208.0	29.1	96.1	100.7	101.4	104.4	105.7	105.7	105.9	105.9	105.9	105.9	105.9
Fixed G&A and R&D Cost	1,422.2	31.9	72.1	60.7	67.7	70.8	70.9	71.4	71.5	71.5	71.5	71.6	70.9
Primary Reagent Cost	1,356.5	17.2	51.0	50.8	53.6	64.8	69.8	69.8	70.6	70.6	70.6	70.6	70.6
Shipping Cost	151.4	1.9	5.7	5.7	6.0	7.3	7.8	7.8	7.9	7.9	7.9	7.9	7.9
Extraction													
Volume Extracted (m3 in millions)	248.1	5.1	13.0	13.0	13.0	13.0	12.9	12.9	12.7	12.6	12.6	12.6	12.6
Li Concentration (mg/L)	2,244	2,550	2,557	2,532	2,494	2,449	2,418	2,385	2,346	2,312	2,279	2,172	2,156
Processing													
Lithium Pumped (in thousands)	556,850	12,916	33,277	32,909	32,324	31,732	31,242	30,695	29,740	29,106	28,599	27,381	27,214
Lithium Recovered (in thousands)	301,134	3,843	11,402	11,348	11,980	14,480	15,587	15,587	15,775	15,775	15,775	15,775	15,775
Salar Yield		39%	45%	55%	65%	65%	65%	65%	65%	65%	65%	65%	65%
Plant Yield		80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Production													
LCE Produced (in thousands)	1,603	20.5	60.7	60.4	63.8	77.1	83.0	83.0	84.0	84.0	84.0	84.0	84.0
C1 Cost (US$/MT)(in thousands)	4.2	4.8	4.9	4.9	4.8	4.2	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Capital Profile													
La Negra Capex	1,317.9	17.4	82.1	54.4	46.5	65.7	66.8	66.8	66.8	66.8	66.8	66.8	66.8
Growth Salar Yield	104.1	53.5	50.6	-	-	-	-	-	-	-	-	-	-
Liming	26.4	-	-	-	-	-	-	-	-	-	-	-	-
General Wellfield Capital	724.1	7.5	64.8	37.0	36.9	36.9	36.1	36.1	36.1	36.1	36.1	36.1	36.1
Wellfield Replacement and New Wells	79.6	2.4	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
Closure	40.9	-	-	-	-	-	-	-	-	-	-	-	-
Cumulative Capital		80.8	282.5	377.9	465.4	572.1	679.0	785.9	892.8	999.7	1,106.6	1,213.5	1,320.4

US$ in millions	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**
Calendar Year	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**
Days in Period	**365**	**365**	**365**	**366**	**365**	**365**	**365**	**366**	**365**	**365**	**365**	**366**	**365**
Escalation													
Escalation Index	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Project Cashflow (unfinanced)													
Revenue	1,651.2	1,499.4	1,484.5	1,463.6	1,453.0	1,430.4	1,444.6	1,432.3	1,426.4	1,414.2	-	-	-
Operating Cost	(329.3)	(320.2)	(318.9)	(317.5)	(318.3)	(317.6)	(318.4)	(317.7)	(234.6)	(196.7)	-	-	-
Working Capital Adjustment	1.9	11.7	1.4	1.3	0.9	1.8	(0.8)	0.7	(6.3)	(2.1)	100.1	-	-
Royalty Cost	(443.5)	(402.7)	(398.7)	(393.1)	(390.3)	(384.2)	(388.0)	(384.7)	(383.1)	(379.8)	-	-	-
Sustaining Capital	(106.9)	(106.9)	(133.3)	(106.9)	(106.9)	(106.9)	(106.9)	(106.9)	(33.4)	(16.7)	(19.1)	(21.8)	-
Other Government Levies	-	-	-	-	-	-	-	-	-	-	-	-	-
Tax Paid	(252.7)	(219.9)	(216.8)	(211.4)	(208.6)	(203.6)	(206.6)	(204.0)	(228.1)	(239.6)	-	-	-
Project Net Cashflow	520.8	461.4	418.1	436.1	429.8	419.9	423.8	419.7	540.9	579.2	81.0	(21.8)	-
Cumulative Net Cashflow	5,439.3	5,900.7	6,318.8	6,754.9	7,184.7	7,604.7	8,028.4	8,448.2	8,989.0	9,568.2	9,649.2	9,627.4	9,627.4
Operating Cost (LoM)													
Fixed Salar Cost	79.6	79.6	79.7	79.7	79.7	79.8	79.9	80.0	-	-	-	-	-
Fixed Processing Cost	105.6	103.9	103.8	103.5	103.4	103.1	103.3	103.0	102.9	102.6	-	-	-
Fixed G&A and R&D Cost	66.9	66.6	66.0	65.8	65.3	65.7	65.4	65.3	65.0	27.9	-	-	-
Primary Reagent Cost	69.4	63.0	62.4	61.5	63.0	62.2	63.0	62.6	59.9	59.4	-	-	-
Shipping Cost	7.8	7.1	7.0	6.9	6.9	6.8	6.8	6.8	6.7	6.7	-	-	-
Extraction													
Volume Extracted (m3 in millions)	12.7	12.7	12.7	12.8	12.8	12.8	12.9	12.9	-	-	-	-	-
Li Concentration (mg/L)	2,132	2,104	2,085	2,056	2,041	2,014	1,998	1,975	-	-	-	-	-
Processing													
Lithium Pumped (in thousands)	27,000	26,692	26,552	26,227	26,086	25,865	25,757	25,536	-	-	-	-	-
Lithium Recovered (in thousands)	15,505	14,079	13,940	13,743	13,644	13,432	13,565	13,450	13,394	13,279	-	-	-
Salar Yield	65%	64%	64%	64%	65%	65%	65%	65%	-	-	-	-	-
Plant Yield	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	-	-	-
Production													
LCE Produced (in thousands)	82.6	75.0	74.2	73.2	72.7	71.5	72.2	71.6	71.3	70.7	-	-	-
C1 Cost (US$/MT)(in thousands)	4.0	4.3	4.3	4.3	4.4	4.4	4.4	4.4	3.3	2.8	-	-	-
Capital Profile													
La Negra Capex	66.8	66.8	66.8	66.8	66.8	66.8	66.8	66.8	33.4	16.7	-	-	-
Growth Salar Yield	-	-	-	-	-	-	-	-	-	-	-	-	-
Liming	-	-	26.4	-	-	-	-	-	-	-	-	-	-
General Wellfield Capital	36.1	36.1	36.1	36.1	36.1	36.1	36.1	36.1	-	-	-	-	-
Wellfield Replacement and New Wells	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	-	-	-	-	-
Closure	-	-	-	-	-	-	-	-	-	-	19.1	21.8	-
Cumulative Capital	1,427.3	1,534.3	1,667.6	1,774.5	1,881.4	1,988.3	2,095.2	2,202.1	2,235.5	2,252.2	2,271.2	2,293.1	2,293.1

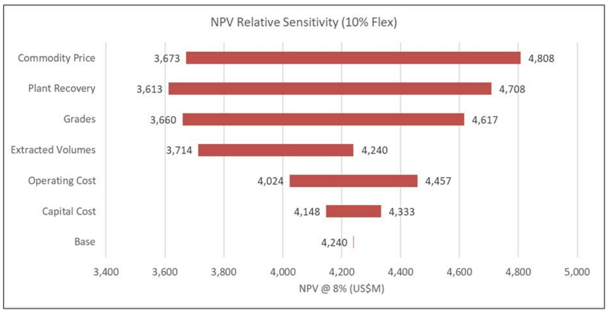


Source: SRK

Figure 19-7: Annual Cashflow Summary (Tabular Data shown in Table 19-9)

19.2 Sensitivity Analysis

SRK performed a sensitivity analysis to evaluate the relative sensitivity of the operation's NPV to a number of key parameters (Figure 19-8). This is accomplished by flexing each parameter upwards and downwards by 10%. Within the constraints of this analysis, the operation appears to be most sensitive to commodity price, plant recovery and lithium grade. Note that the limited upside potential of plant recovery and grades is the result of limiting of plant production to a maximum of 84 kt/y of production in the processing facility.



Source: SRK

Figure 19-8: Relative Sensitivity Analysis

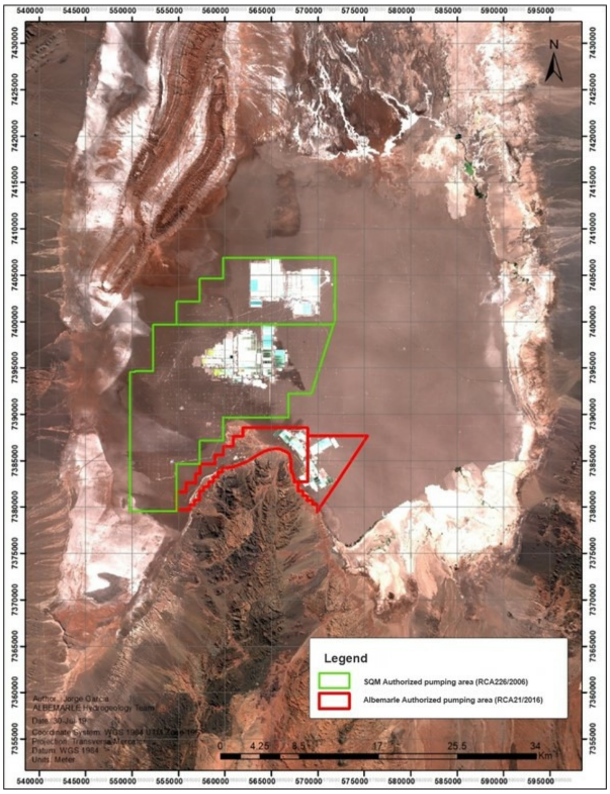
SRK cautions that this sensitivity analysis is for comparative purposes only to show the relative importance of key model input assumptions. The 10% flex is not intended to reflect actual uncertainty for these inputs but instead is maintained as a constant value to maintain comparability. These parameters were flexed in isolation within the model and are assumed to be uncorrelated with one another which may not be reflective of reality. Additionally, the amount of flex in the selected parameters may violate physical or environmental constraints present at the operation.

20 Adjacent Properties

20.1 Adjacent Production

SQM is the other major producer of lithium and potassium in the Salar de Atacama Figure 20-1, Figure 20-2 and Figure 20-3). SQM produces potassium chloride, potassium sulfate, magnesium chloride salts and lithium solutions that are then sent to SQM's processing facilities at the Salar del Carmen, near Antofagasta.

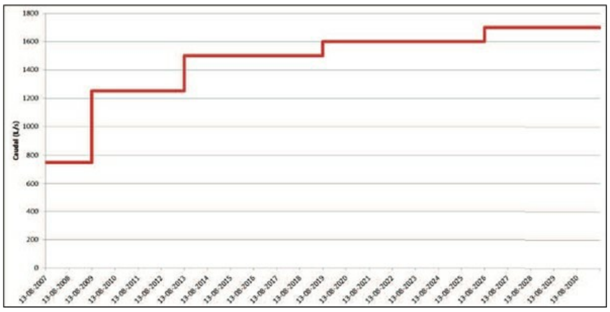
SQM's facilities in the Salar de Atacama are located over the two currently authorized extraction areas, MOP and SOP, as shown in Figure 20-1. SQM's production from the Salar de Atacama is important to Albemarle in multiple ways. The brine resource in SQM's operations is connected Albemarle's which means pumping activities from SQM's concessions impacts brine characteristics and availability in Albemarle's concessions. Further, the combined impact of SQM and Albemarle's brine extraction on the overall salar (as well as water extraction for other uses) is evaluated for environmental and social purposes.



Source: GWI, 2019
SQM, green polygon. Albemarle, red polygon.

Figure 20-1: Environmentally Authorized Brine Extraction Areas in the Salar de Atacama

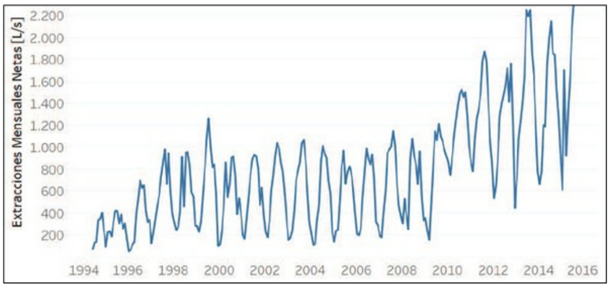
The brine extraction operation by SQM in the Salar de Atacama began in 1996. In 2006 SQM obtained its current Environmental Qualification Resolution (RCA N ° 226/2006) that allows it to increase the pumping of brine in stages up to 1700 L/s ending in the year 2030 (Figure 20-2), when the lease contract of the OMA concessions with CORFO expires.



Source: SQM, Idaea-CSIC, 2017

Figure 20-2: SQM's Brine Extraction Operational Rule

The actual or net extraction of brine by SQM is obtained by subtracting the direct and indirect reinjection flow from the total pumping (Figure 20-3).



Source: SQM, Idaea-CSIC, 2017

Figure 20-3: Historical Series of Net Brine Extraction by SQM

The operational balance of Lithium in the Salar de Atacama by SQM is presented in Table 20-1.

Table 20-1: Operational Balance of Lithium in the Salar de Atacama by SQM

Item	1996-2017 Period	2018-2030 Period (Projected)	1996-2030 Total Period
Total Fresh Brine Extracted (Mm^3)	**737**	**779**	**1516**
Total Lithium Extracted in Brine (Metallic Li Tons)	**1,526,000**	**1,556,000**	**3,082,000**
Lithium in Final Products (Metallic Li Tons)	115,000	315,800	**430,800**

Source: Leónidas Osses, 2019

20.1.1 SQM Reserves

In the 20-F Report published by SQM for 2018, the estimates of base reserves of potassium, sulfate, lithium and boron in the Salar de Atacama are presented. SQM's mining exploitation concessions cover an area of 81,920 ha, geological exploration, brine sampling and geostatistical analyzes are carried out. SQM estimates that the proven and probable lithium reserves, as of December 31, 2018, in accordance with the cut-off grade (established at 0.05%), geological exploration, brine sampling and geostatistical analysis up to a depth 300 m within our exploitation concessions are shown in Table 20-2.

Table 20-2: SQM Lithium Reserves Estimates

	Proven Reserves MMtons	**Probable Reserves MMtons**	**Total Reserves MMtons**
Li metal	4.56	3.99	8.55

FORM 20-F: United States Securities and Exchange Commission. Washington, D.C. 20549. Annual Report corresponding to section 13 or 15 (d) of the Securities Exchange Law of 1934. For the year ended December 31, 2018. SQM S.A.

- The metric tons of lithium considered in the proven and probable reserves are shown before losses due to evaporation processes and metallurgical treatment. The recoveries of each ion depend on the composition of the brine, which changes over time and the process applied to produce the desired commercial products.
- Recoveries for lithium range from 28% to 40%.

To complement the information on reserves, SQM has an environmental qualification resolution (RCA 226/06) that defines a maximum extraction of brines until the end of the concession (December 31, 2030).

Considering the maximum authorized brine production rates, SQM has carried out hydrogeological simulations by means of numerical flow and transport models, to estimate the change in the volume and quality of the brine during the life of the project, considering the infrastructure of existing and projected wells. Based on these simulations, a total of 1.24 Mt of lithium and 14.9 Mt of potassium will be extracted from producing wells. On the other hand, the proven and probable in situ base reserve, within the authorized environmental extraction area (RCA N°226/2006), corresponds to 4.33 Mt of lithium and 30.4 Mt of potassium.

20.2 Water Rights of Other Companies

Within the framework of the environmental evaluation of the Albemarle project "Modifications and Improvement of the Solar Evaporation Ponds System in the Salar de Atacama", approved by RCA No. 021/2016, an analysis of the water rights in the Salar de Atacama basin shows a total of 300 water use rights constituted within the basin, including underground and surface rights, which total a flow of 5,107 L/s.

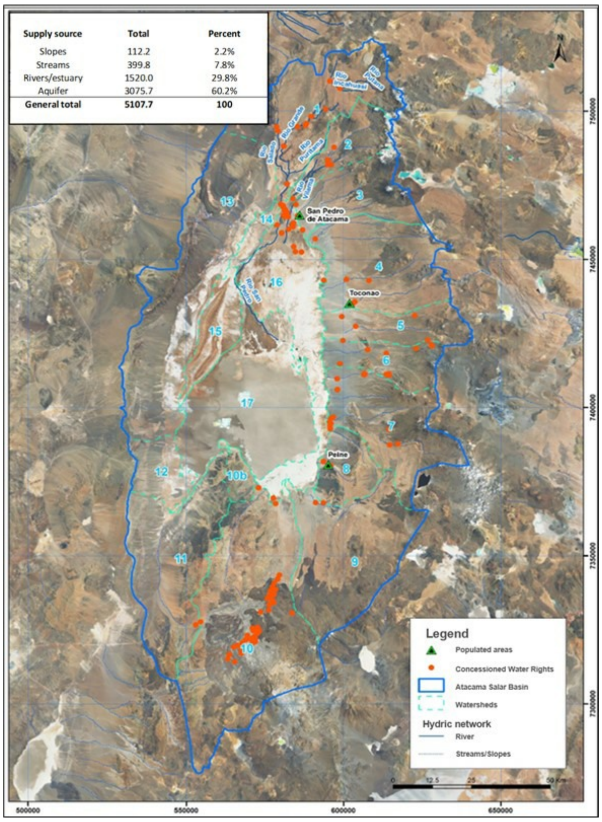
Table 20-3 shows the average flows granted according to the nature of the water resource where the main exploitation comes from the underground resource (60%), leaving about 39% to the rights to use water of a superficial and current nature.

Table 20-3: Flows Granted According to the Nature of the Water

Nature of Water Resource	Total (lps)	Percent (%)
Groundwater	3,075.7	60.2
Surface and current	1,972.0	38.6
Surface and detained	60.0	1.2
General Total	**5107.7**	**100**

Source: SGA, 2015

Figure 20-4 presents the flow data according to its supply source and its spatial distribution. It is observed that the main source that sustains the granted water use rights corresponds to the aquifer system, around the town of San Pedro de Atacama, as well as the Eastern Edge of the Salar and the southern end of the Basin. Regarding surface sources, the main rights are in the tributary rivers of the San Pedro and the Rio Vilama in the North sector of the Basin. Other surface sources, such as streams and slopes, are mainly concentrated throughout the eastern fringe of the Basin.



Source: SGA, 2015

Figure 20-4: Spatial Distribution of Concessioned Water Rights in the Salar de Atacama Basin

Granted water use rights are intended to be used in the following manner: it is observed that 53 files correspond to mining use with a total of 2,315 L/s, 24 to irrigation with a total of 1,572 L/s, one to industrial use with 8.5 L/s, 28 to other uses with 388.5 L/s, two to drinking/domestic use/sanitation with a total of 5.5 L/s and 47 records do not present information regarding this item (blank).

This distribution of the flows granted in the Salar del Atacama basin according to the use of the waters is shown in Table 20-4.

Table 20-4: Concessioned Water Rights by Water Use

Water Use	Total (lps)	Percent (%)
Domestic/Public/Sanitation	5.5	0.1
Industrial	8.5	0.2
Other	388.5	7.6
Agricultural	1,572.8	30.8
Mining	2,315.3	45.3
Not defined (blank)	817.1	16
General Total	**5,107.7**	**100**

Source: SGA, 2015

The companies Minera Escondida (MEL), Minera Zaldívar (CMZ), SQM and Albemarle have rights to use water constituted in the brackish aquifer of the eastern and southern edge of the Salar, this data is reported to different authorities.

In the case of MEL and CMZ, the extraction of water in the south of the basin, both companies have a collaboration agreement that allows MEL to access the extraction information carried out by CMZ. MEL concentrates this activity in the Monturaqui sector and CMZ carries it out in the Negrillar sector. According to the information obtained from the DGA and after analyzing both the names of the applicants and the spatial location specified in the files, it was obtained that the water use rights granted in total identified for both companies are close to 1,720 L/s.

SQM, for its part, has rights to use water for a maximum flow of 450 L/s, which is distributed in 10 wells located on the eastern edge of the Salar. Of these rights, five have been recently granted, which is an increase in the authorized flow from 240 L/s to the 450 L/s. The data available indicates that current exploitation is very close to the total use of the flow granted to the five wells currently operating, which is 240 L/s. Of the new water use rights granted, there is no certainty of the start of their exploitation, and they are conditional on being granted the corresponding environmental authorization.

21 Other Relevant Data and Information

SRK is not aware of other relevant data and information that is not included elsewhere in this report.

22 Interpretation and Conclusions

22.1 Geology and Resources

The property is well known in terms of descriptive factors and ownership. Geology and mineralization are well-understood through decades of active mining. The status of exploration, development, and operations is advanced and active. Assuming that exploration and mining continue at Salar de Atacama in the way that they are currently being done, there are no additional recommendations at this time.

.Lithium concentration data from the brine sampling exploration data set was regularized to equal lengths, for constant sample support (Compositing). Lithium grades were interpolated into a block model using ordinary kriging (OK) and inverse distance weighting (IDW3) methods. Results were validated visually and via various statistical comparisons. The estimate was depleted for current production, categorized in a manner consistent with industry standards and statistical parameters. Mineral resources have been reported above a cut-off grade supporting reasonable potential for eventual economic extraction of the resource.

SRK has reported a mineral resource estimation which, in its opinion, is appropriate for public disclosure and accounts for long-term considerations of mining viability. The mineral resource estimation could be improved with additional infill program (drilling and brine sampling).

22.2 Mining and Mineral Reserves

Mining operations have been established at the Salar de Atacama over its more than 35-year history of operation. Reserve estimates have been developed based on a predictive hydrogeological model that estimates brine production rates and associated lithium concentrations over time. In the QP's opinion, the mining methods and predictive approach for reserve development are appropriate for the Salar de Atacama.

However, in the QP's opinion, there remains opportunity to further refine the production schedule. This optimization should focus on the balance between calcium and sulfate concentration in the production brine. Maintaining an optimum blend of calcium-rich and sulfate-rich brine improves process recovery in the evaporation ponds. SRK's current assumption is an optimum balance in these contaminants is lost in 2037 and has assumed the additional capital and operating cost expenditure associated with installation and operation of a liming plant is required. However, if additional calcium-rich brine can be sourced in the pumping plan, these assumed expenses could potentially be delayed or avoided altogether.

22.3 Metallurgy and Mineral Processing

In the QP's opinion, the long operating history and associated knowledge and information provide appropriate support for development of operating predictions for this reserve estimate. The notable deviation from historic practice is the SYIP.

Albemarle is currently planning on developing the SYIP in the next few years. Historic testwork associated with this project has gaps in sample representativity and support for projected mass balances. SRK recommends updating these test results with more representative samples and a more thorough evaluation of associated mass balances with the potential to further optimize the

SYIP performance and reduce risk in ramp up and performance. Nonetheless, in the QP's opinion, the projected performance for the SYIP is reasonable.

SRK has assumed that a liming plant will be required starting in 2026 to offset a reduction in calcium-rich brine available for blending. If further optimization of the life of mine pumping plan is not possible (i.e., the sulfate to calcium ratio cannot be reduced by alternative pumping strategy), Albemarle will need to add calcium to the evaporation pond system to avoid additional lithium losses in the ponds. Albemarle should start conceptual evaluation of this calcium addition (whether through liming as assumed by SRK or alternative options) so that if / when this plant is required, Albemarle will have an appropriate design developed for installation.

22.4 Infrastructure

The project is a mature functioning operation with two separate sites that contain key facilities. The infrastructure is in place, operating and provides all necessary support for ongoing operations as summarized in this report. No significant risks associated with the Project are identified in this report.

22.5 Environmental/Social/Closure

22.5.1 Environmental Studies

Baseline studies, in both operational areas, have been developed since the first environmental studies for permitting were submitted; 1998 in La Negra, and 2000 at Salar de Atacama. With the ongoing monitoring programs in both locations, environmental studies, such as hydrogeology and biodiversity, are regularly updated.

The Salar de Atacama basin presents a unique system due to the biodiversity associated with lake and wetland systems that depend on the hydrogeological conditions of the area. There are also indigenous areas and communities in the sector. As such, the key environmental issues at Salar de Atacama include biodiversity, hydrogeology, and socioeconomics.

La Negra is located within an industrial area which is in saturation conditions for the daily and annual standard of inhalable particulate matter (PM_{10}). Although there are no surface water courses, there is an aquifer that could be affected by potential infiltrations from the plant facilities. As such, a water quality monitoring program is in place. Air quality, hydrogeology, and water quality have been deemed as key environmental characteristics of the La Negra area.

22.5.2 Environmental Management Planning

The operations of Albemarle have adequate plans to address and follow-up the most sensitive and relevant environmental issues, such as hydrogeological/biodiversity issues, and those associated with the indigenous communities in the Salar de Atacama area.

22.5.3 Environmental Monitoring

Albemarle adequately follows up on issues related to water quality in the Negra and fluctuations in the water table and potential effects on the sensitive ecosystems around the Salar de Atacama, including analysis of possible cumulative effects given the multiplicity of actors that extract brine and freshwater in the area. The aim of the PAT is to promptly detect any deviation from what was indicated in the initial environmental assessment, preventing unforeseen impacts from occurring.

Notwithstanding the above, the Salar de Atacama is a complex system and requires constant updating of management tools based on the results of the monitoring programs, and also be attentive to requirements or new tools that the authority may incorporate.

22.5.4 Permitting

Albemarle has the environmental permits for an operation with a brine extraction of 442 L/s, a production of 250,000 m^3/year of brine concentrated in solar evaporation ponds with an approximate surface area of 1,043 ha, for a production of 94,000 t/y of LCE. Brine exploitation is authorized until 2041. Any modification of the production and/or extraction, or to any approved conditions, will require a new environmental permit.

22.5.5 Closure

Albemarle has also an approved closure plan (Res. Ex. N°287/2019), which includes all environmental projects approved until 2016, including EIA “Modification and improvement solar evaporation system” (RCA N°021/2016). This closure plan considers a life of mine until 2041 where the brine pumping ends in accordance with the approved environmental permit.

Due to new environmental approvals not included in the approved closure plan, Albemarle submitted a new closure plan that addressed additional facilities and clarified closure plans.

22.6 Capital and Operating Costs

The capital and operating costs for the Salar de Atacama operation have been developed based on actual project costs. In the opinion of the QP, the cost development is acceptable for declaration of mineral reserves. However, the operation itself lacks detailed life of operation planning and costing. As such, the forward looking costs incorporated here are inherently strongly correlated to current market conditions. Due to the recent Covid-19 pandemic and economic uncertainty, the currently global economic environment can charitably be described as ‘somewhat chaotic’, and any forward looking forecast based on such an environment carries increased risk.

The QP strongly recommends continued development and refinement of a robust life of operation cost model. In additional to further refinement of the cost model, the QP also recommends that close watch be kept on the economic environment with an eye toward continuous updates as the market environment continues to evolve.

22.7 Economic Analysis

The Salar de Atacama operation is forecast to have a 24-year life with the first modeled year of operation being a partial year to align with the effective date of the reserves.

As modeled for this analysis, the operation is forecast to produce 1.7 Mt of technical grade lithium carbonate, on average, per year over its life. At a price of US$20,000/t technical grade lithium carbonate, the NPV at 8% of the modeled after-tax cash flow is US$4,240 million.

The operation is expected to generate positive cashflow during every full year in which it is pumping or processing brine on the schedule and at the costs and process outlined in this report (excluding the first partial year which is distorted due to being a partial year), supporting the economic viability of the reserve under the assumptions evaluated.

An economic sensitivity analysis indicates that the operation's NPV is most sensitive to variations in commodity price, plant recovery and lithium grade.

23 Recommendations

23.1 Recommended Work Programs

23.1.1 Geology, Resources and Reserves

- Phased Re-Log of Coreholes: Drillholes within the concessions area were re-logged by ALB based on experience, inherent knowledge and available data including logs, core photos, etc. Drillholes outside of the concessions area do not have this background support and are limited to tabulated data extracted from previous reporting. SRK recommends developing a phased approach to re-logging coreholes outside of the concession area. Using similar codes as the local model, re-log 10 to 25 coreholes using this approach and identify if this method can be expanded to the remaining coreholes.
- Structural Model: There is extensive historic and modern data related to the structural conditions within the Atacama project. However, this data has not been compiled into a robust structural model that can be used on current and future modeling efforts and compilation of this structural model will potentially improve associated modeling.
- Field campaign in the aquifers within the claim area A3, focused on collecting K (hydraulic testing) and Sy values (through diamond drilling and core sampling) and brine samples.
- Sample collection campaign including depths from 100 to 150 m in claim areas A1, A2, and A3.
- Sample collection campaign in the western of the salar. The target is to identify the grade of dilution of lithium, calcium and sulfate as results of the lateral recharge from southern sub-basins.
- Update of groundwater numerical model with the new collected information (Geology, hydrogeology and brine concentration), and update the predictions.
- Evaluate opportunity to maintain a lower ration of sulfate to calcium in the raw brine feed to the evaporation ponds for a longer period of time (i.e., increase proportion of calcium-rich brine pumped) with a target of improving process recovery and delaying or removing the need to develop a liming plant.

23.1.2 Mineral Processing and Metallurgical Testing

- In SRK's opinion, while the assumptions for the SYIP project are reasonable, there remains gaps in the supporting test data including questions on representativity of samples and reliability of mass balances. Therefore, SRK recommends another round of testwork with a focus on better quantifying the performance of the SYIP prior to start of full development activities.
- Based on the life of mine pumping plan developed by SRK, the ration of sulfate to calcium will reach a point in the future where sulfate cannot be adequate reduced which will result in additional lithium losses in the evaporation ponds. To mitigate the potential for these losses, SRK has assumed the addition of a liming plant, available for operations in 2026, to add calcium to the system. While it may be possible to modify the pumping plan to delay or eliminate the need for this calcium addition, given the currently projected requirement is approximately five years out, SRK recommends beginning conceptual studies on addition of this plant prior to transitioning to full characterization and development (if the production plan cannot be modified).

23.1.3 Environmental/Closure

- Considering that the last hydrogeological model available for review and used in the assessment of impacts to water level and to the sensitive ecosystems of the area, was conducted in 2015 (and subsequent biannual updates), SRK recommends that this assessment be updated based on monitoring information available to date.
- It is recommended to follow ICMM guidelines developed for this purpose (Integrated Mine Closure Good Practice Guide, 2nd Edition. ICMM, 2019). SRK understands that Albemarle is moving toward international standards and plans and will start submitting plans in 2023.

23.2 Recommended Work Program Costs

Table 23-1 summarizes the costs for recommended work programs.

Table 23-1: Summary of Costs for Recommended Work

Discipline	Program Description	Cost (US$ Thousands)
Mineral Resource Estimates	Infilling Drilling Program to obtain brine and porosity samples over a two year period	4,000
Mineral Reserve Estimates	Update numerical groundwater model if additional drilling and sampling is completed	200
Processing and Recovery Methods	Updated SYIP testing, including mass balance and preliminary evaluation of liming plant.	300
Infrastructure	No work programs recommended – mature functioning project with required infrastructure in place, programs already included in operating budget.	0
Cost model	Continued development and refinement of a cost model in light of a fluid economic environment.	60
Closure	Update the closure plan to reflect the full life of mine plan. Prepare a detailed, internal closure cost estimate the reflects the owner-performed cost of closure.	130
Total US$		**$4,690**

Source: SRK, 2022

24 References

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25 Reliance on Information Provided by the Registrant

The Consultant's opinion contained herein is based on information provided to the Consultants by Albemarle throughout the course of the investigations. Table 25-1 of this section of the Technical Report Summary will:

(i) Identify the categories of information provided by the registrant;

(ii) Identify the particular portions of the Technical Report Summary that were prepared in reliance on information provided by the registrant pursuant to Subpart 1302 (f)(1), and the extent of that reliance; and

(iii) Disclose why the qualified person considers it reasonable to rely upon the registrant for any of the information specified in Subpart 1302 (f)(1).

Table 25-1: Reliance on Information Provided by the Registrant

Category	Report Item/Portion	Portion of Technical Report Summary	Disclose why the Qualified Person considers it reasonable to rely upon the registrant
Legal Opinion	Sub-sections 3.1, and 3.2	Section 3	Albemarle has provided a document summarizing the legal access and rights associated with leased surface and mineral rights. This documentation was reviewed by Albemarle's legal representatives. The Qualified Person is not qualified to offer a legal perspective on Albemarle's surface and title rights but has summarized this document and had Albemarle personnel review and confirm statements contained therein.
Discount Rates	19.1.1	19 Economic Analysis	Albemarle provided discount rates based on a benchmarking of publicly available information for 54 lithium mining project studies. The median value of the benchmarking dataset is 8%. SRK typically applies discount rates to mining projects ranging from 5% to 12% dependent upon commodity. SRK views the selected 8% discount rate as appropriate for this analysis.
Tax rates and government royalties	19.1.2	19 Economic Analysis	SRK was provided with tax rates and government royalties for application within the model. These rates are in line with SRK's understanding of the tax regime at the project location.
Exchange Rate	18.1 18.2 19.1.1 19.1.2 19.1.4	19 Economic Analysis and 18 Operating and Capital Costs	Information was received from Albemarle in US$. As the operation is located in Chile, Costs will be incurred in Chilean Pesos. SRK has accepted the US$ basis from Albemarle. This should be modeled explicitly in future iterations.
Remaining Quota	3.2	Property Description	Albemarle provided SRK with the authorized quota in lithium metal remaining as of August 31, 2022
Material Contracts	16.3	Contracts	Albemarle provided summary information regarding material contracts for disclosure. SRK does not have legal expertise to evaluate these contracts or their materiality and has relied upon Albemarle for this reason.

Signature Page

This report titled "SEC Technical Report Summary, Pre-Feasibility Study, Salar de Atacama, Región II, Chile" with an effective date of August 31, 2022, was prepared and signed by:

SRK Consulting (U.S.) Inc. ***(Signed)*** **SRK Consulting (U.S.) Inc.**

Dated at Denver, Colorado
February 14, 2023

Exhibit 96.3

SEC Technical Report Summary
Pre-Feasibility Study
Silver Peak Lithium Operation
Nevada, USA

Effective Date: September 30, 2022
Report Date: February 14, 2023

Report Prepared for

Albemarle Corporation

4350 Congress Street
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Report Prepared by

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SRK Project Number: USPR000574

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List of Abbreviations

The metric system has been used throughout this report. Tonnes are metric of 1,000 kg, or 2,204.6 lb. All currency is in U.S. dollars (US$) unless otherwise stated.

Abbreviation	Definition
°F	degrees Fahrenheit
3D	three dimensional
AFA	acre feet per annum
Albemarle	Albemarle Corporation
AOC	Administrative Order on Consent
APP	Avian Protection Program
BAPC	Bureau of Air Pollution Control
BAQP	Bureau of Air Quality Planning
BEV	battery electric vehicle
BLM	bureau of land management
BNEF	Bloomberg New Energy Finance
CAD	computer aided drafting
CBST	clear brine surge tank
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cm	centimeters
CoG	cut off grade
DOE	U.S. Department of Energy
EA	Environmental Assessment
EMS	Fire/Emergency Medical Services
EPA	Environmental Protection Agency
ERP	Emergency Response Plan
ESCO	Esmeralda County Public Works
FPPC	Final Plans for Permanent Closure
ft	foot/feet
FWS	Fish and Wildlife Service
GIS	geographic information system
gpm	gallons per minute
HEV	hybrid electric vehicle
hp	horsepower
ICE	internal combustion engine
ID2	Inverse Distance weighting
KE	kriging efficiency
km2	square kilometers
kV	kilovolt
KWh	kilowatts per hour
LAS	Lower Ash System
LCE	lithium carbonate equivalent
LGA	Lower Gravel Aquifer
Li	lithium
LiCl	lithium chloride
LiOH	lithium hydroxide
LoM	life of mine
m	meters
m^3/y	cubic meters per year

MAA	Main Ash Aquifer
masl	meters above sea level
mg/L	milligrams per liter
MGA	Marginal Gravel Aquifer
mi	miles
mi2	square miles
MRE	Mineral Resource Estimation
MWh	megawatts per hour
NAC	Nevada Administrative Code
NDEP	Nevada Division of Environmental Protection
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NEPA	National Environmental Policy Act
NN	nearest neighbor
NRS	Nevada Revised Statutes
OK	Ordinary Kriging
PCS	Petroleum Contaminated Soil
PFS	Pre-feasibility Study
ppm	parts per million
QA/QC	Quality Assurance/Quality Control
R&PP	Recreation and Public Purposes
RC	reverse circulation
RCE	Reclamation Cost Estimate
RCRA	Resource Conservation and Recovery Act
RCRA	Resource Conservation and Recovery Act
SAS	Salt Aquifer System
SEC	Securities and Exchange Commission
SEC	SRK Consulting (U.S.), Inc.
SOR	slope or regression value
SPLO	Silver Peak Lithium Operations
SRCE	Standardized Reclamation Cost Estimator
SUV	sport utility vehicles
SWReGAP	Southwestern Regional Gap Analysis Program
Sy	specific yield
t	tons
t/y	tonnes per year
TAS	Tufa Aquifer System
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TPPC	Tentative Plans for Permanent Closure
VSQG	very small quantity generator
WPCP	Water Pollution Control Permit

1 Executive Summary

This report was prepared as a prefeasibility study (PFS)-level Technical Report Summary (TRS) in accordance with the Securities and Exchange Commission (SEC) S-K regulations (Title 17, Part 229, Items 601 and 1300 until 1305) for Albemarle Corporation (Albemarle) by SRK Consulting (U.S.), Inc. (SRK) on the Silver Peak production site (Silver Peak). The purpose of this report is to support public disclosure of mineral resources and mineral reserves at Silver Peak for Albemarle's public disclosure purposes. This report is an update of the previous report titled "SEC Technical Report Summary, Pre-Feasibility Study, Silver Peak Lithium Operation, Nevada, USA. Amended Date December 16, 2022".

1.1 Property Description

The Silver Peak Lithium Operation (SPLO) is in a rural area approximately 30 miles (mi) southwest of Tonopah, in Esmeralda County, Nevada, United States. It is located in Clayton Valley, an arid valley historically covered with dry lake beds (playas). The operation borders the small unincorporated town of Silver Peak, NV. Albemarle extracts lithium-rich brine from the playa at the SPLO to produce lithium carbonate.

Albemarle holds four types of claims in the Silver Peak area: Millsite Claims, Patented Claims, Unpatented Claims, and Unpatented Junior Claims.

Albemarle's mineral rights in Silver Peak, Nevada consist exclusively of its right to extract lithium brine, pursuant to a settlement agreement with the U.S. government, originally entered into in June 1991 by one of its predecessors. Pursuant to this agreement, Albemarle has rights to all of the lithium that can be removed economically. Albemarle or their predecessors have been operating at the Silver Peak site since 1966. The SPLO site covers a surface of approximately 15,301 acres, 10,826 acres of which are patented mining claims owned through a subsidiary. The remaining acres are unpatented mining claims for which claim maintenance fees are paid annually. In connection with the operations at Silver Peak, Albemarle has been granted by the Nevada Division of Water Resources rights to pump water in the Clayton Wash Basin area.

1.2 Geology and Mineralization

The Silver Peak Lithium Operation is located in Clayton Valley. The structural geology that forms Clayton Valley, and principal faults within and around the valley, are influenced by two continental-scale features:

- The Basin and Range province
- Walker Lane fault zone

The valley is located within the Basin and Range province, which extends from Canada through much of the western United States and across much of Mexico. The Province is characterized by block faulting caused by extension and subsequent thinning of the earth's crust. In Nevada, this extensional faulting forms a region of northeast-southwest oriented ridges and valleys. This faulting is responsible for the overall horst and graben structure of Clayton Valley.

It is hypothesized that the current levels of lithium dissolved in brine originate from relatively recent dissolution of halite by meteoric waters that have penetrated the playa in the last 10,000 years. The halite formed in the playa during the aforementioned climatic periods of low precipitation and that the concentrated lithium was incorporated as liquid inclusions into the halite crystals.

The lithium resource is hosted as a solute in a predominantly sodium chloride brine. As such, the term 'mineralization' is not wholly relevant, as the brine is mobile and can be affected by pumping of groundwater and by local hydrogeological variations (e.g., localized freshwater lenses in near-surface gravel deposits being affected by rainfall, etc.).

1.3 Status of Exploration, Development and Operations

The primary mechanism of exploration on the property has been drilling, mainly production wells, for the past 50 years. Other means of exploration, such as limited geophysics, have been considered or applied over the years.

Drilling methods during this time include cable tool, rotary, and reverse circulation (RC) with the results of geologic logging and brine sampling being used to support the geological model and mineral resource.

For the purposes of this report, it is SRK's opinion that active brine pumping, exploration drilling, and geophysical surveys provide the most relevant and robust exploration data to support the current mineral resource estimation (MRE). Historical brine pumping and sampling are the most critical of the non-drilling exploration methods applied to this model and MRE.

1.4 Mineral Resource

Mineral resources have been estimated by SRK. SRK generated a 3D geological model informed by various data types (drillhole, geophysical data, surface geologic mapping, interpreted cross sections, and surface / downhole structural observations) to define and delimit the shapes of aquifers which host the Lithium (Li).

Lithium concentration data from the brine sampling exploration data set were regularized to equal lengths for constant sample volume (Compositing). Lithium grades were interpolated into a block model using ordinary kriging (OK) methods. Results were validated visually and via various statistical comparisons. The estimate was depleted for current production and categorized in a manner consistent with industry standards and statistical parameters. Mineral resources have been reported using a revised pumping plan, based on economic and mining assumptions to support the reasonable potential for eventual economic extraction of the resource. A cut-off grade (CoG) has been derived from these economic parameters and the resource has been reported above this cut-off. Current mineral resources, exclusive of reserves, are summarized in Table 1-1.

Table 1-1: Silver Peak Mineral Resource Estimate, Exclusive of Mineral Reserves (Effective September 30, 2022)

	Measured Resource		Indicated Resource		Measured + Indicated Resource		Inferred Resource	
Total	Contained Li (Tonnes x 1000)	Brine Concentration (mg/L Li)	Contained Li (Tonnes x 1000)	Brine Concentration (mg/L Li)	Contained Li (Tonnes x 1000)	Brine Concentration (mg/L Li)	Contained Li (Tonnes x 1000)	Brine Concentration (mg/L Li)
	14.0	153	36.2	144	50.2	146	89.5	121

Source: SRK, 2022

- Mineral resources are reported exclusive of mineral reserves. Mineral resources are not mineral reserves and do not have demonstrated economic viability.
- Given the dynamic reserve versus the static resource, a direct measurement of resources post-reserve extraction is not practical. Therefore, as a simplification, to calculate mineral resources, exclusive of reserves, the quantity of lithium pumped in the life of mine plan was subtracted from the overall resource without modification to lithium concentration. Measured and indicated resource were deducted proportionate to their contribution to the overall mineral resource.
- Resources are reported on an in situ basis.
- Resources are reported as lithium metal
- The resources have been calculated from the block model above 740 masl
- Resources have been categorized subject to the opinion of a QP based on the amount/robustness of informing data for the estimate, consistency of geological/grade distribution, survey information.
- Resources have been calculated using drainable porosity estimated from bibliographical values based on the lithology and QP's experience in similar deposits
- The estimated economic cut-off grade utilized for resource reporting purposes is 50 mg/l lithium, based on the following assumptions:
  - A technical grade lithium carbonate price of US$22,000/metric tonne CIF North Carolina. This is a 10% premium to the price utilized for reserve reporting purposes. The 10% premium applied to the resource versus the reserve was selected to generate a resource larger than the reserve, ensuring the resource fully encompassed the reserve while still maintaining reasonable prospect for eventual economic extraction.
  - Recovery factors for the wellfield are $= -206.23*(\text{Li wellfield feed})^2 + 7.1903*(\text{wellfield Li feed}) + 0.4609$. An additional recovery factor of 78% lithium recovery is applied to the lithium carbonate plant.
  - A fixed brine pumping rate of 20,000 afpy, ramped up from current levels over a period of five years.
  - Operating cost estimates are based on a combination of fixed brine extraction, G&A and plant costs and variable costs associated with raw brine pumping rate or lithium production rate. Average life of mine operating costs is calculated at approximately US$6,200/metric tonne lithium carbonate CIF North Carolina.
  - Sustaining capital costs are included in the cut-off grade calculation and include a fixed component at US$7.0 million per year and an additional component tied to the estimated number of wells replaced per year and other planned capital programs.
- Mineral Resources tonnage and contained metal have been rounded to reflect the accuracy of the estimate, and numbers may not add due to rounding.
- SRK Consulting (U.S.) Inc. is responsible for the Mineral Resources with an effective date: September 30, 2022.

1.5 Mining Methods and Mineral Reserve Estimates

As a sub-surface mineral brine, the most appropriate method for extracting the reserve is by pumping the brine from a network of wells. This method of brine extraction has been in place at Silver Peak for over 50 years.

Raw brine extraction rates are currently limited by evaporation pond capacity and the number of extraction wells. However, the lithium carbonate production plant has excess capacity and Albemarle has water rights exceeding current pumping rates. Therefore, consistent with Albemarle's strategic plan for the Silver Peak operation, SRK has assumed increasing the capacity of the wellfield and the evaporation ponds to sustain brine extraction rates at the maximum level of water rights held by Albemarle (20,000 acre feet per year (afpy).

To develop a life of mine production plan, SRK simulated the movement of lithium-rich brine in the alluvial sediments of Clayton Valley using a predictive numerical groundwater flow and transport model. The model was calibrated to available historical water level and lithium concentration data. The predictive model output generated a brine production profile, based upon the wellfield design assumptions, with a maximum pumping rate of 20,000 afpy over a period of 50 years.

To support increasing the brine pumping rate to 20,000 afpy, Albemarle has increased the number of active production wells to 63 that are active in July 2022 or coming online in 2022. The mine plan evaluated for the reserve estimate decreases the number of active production wells from these 63 to 49 wells active by the end of 2027 and an eventual peak of 45 wells in 2052. The number of wells decreases due to shallower but less productive MAA wells becoming unpumpable and being replaced by deeper but more productive LGA wells.

As there is a disconnect between the static resource model and the dynamic predictive model utilized for reserve estimation, as well as other factors such as mixing of brine during production, a direct conversion of measured and indicated resources to proven and probable reserves is not possible. Therefore, given that the uncertainty and associated risk linked with the pumping plan are time dependent (i.e., consistently increasing through the simulation period), in SRK's opinion as the QP opinion, the most appropriate method to quantify the reserve and allocate proven and probable classification is by taking a time-dependent approach. Based on the QP's experience and the production history for Silver Peak, brine production through 2027 (approximately 5.5 years) can be appropriately classified as proven reserves within a total life of mine through 2052 (i.e., truncating the model simulation at approximately 30 years) with these remaining production years classified as probable reserve. Truncating the mine plan at the end of 2052 results in a pumping plan that extracts approximately 60% of the lithium contained in the total measured and indicated mineral resource (inclusive of reserves). The application of proven reserves through 2027 results in approximately 20% of the reserve being classified as proven. For comparison, the measured resource comprises approximately 28% of the total measured and indicated resource.

Table 1-2 shows the Silver Peak mineral reserves as of September 30, 2022.

Table 1-2: Silver Peak Mineral Reserves, Effective September 30, 2022

	Proven Mineral Reserves		Probable Mineral Reserves		Total Mineral Proven and Probable Reserves	
	Contained Li (Metric Tonnes x 1,000)	**Li Concentration (mg/L)**	**Contained Li (Metric Tonnes x 1,000)**	**Li Concentration (mg/L)**	**Contained Li (Metric Tonnes Li x 1,000)**	**Li Concentration (mg/L)**
In Situ	12.0	94	56.3	95	68.3	95
In Process	1.3	104	-	-	1.3	104

Source: SRK, 2022

- In process reserves quantify the prior 24 months of pumping data and reflect the raw brine, at the time of pumping. These reserves represent the first 24 months of feed to the lithium process plant in the economic model.
- Proven reserves have been estimated as the lithium mass pumped during the Partial Year 2022 through 2027 of the proposed Life of Mine plan
- Probable reserves have been estimated as the lithium mass pumped from 2028 until the end of the proposed Life of Mine plan (2052)
- Reserves are reported as lithium metal.
- This mineral reserve estimate was derived based on a production pumping plan truncated at the end of year 2052 (i.e., approximately 29.5 years). This plan was truncated to reflect the QP's opinion on uncertainty associated with the production plan as a direct conversion of measured and indicated resource to proven and probable reserve is not possible in the same way as a typical hard-rock mining project.
- The estimated economic cut-off grade for the Silver Peak project is 57 mg/l lithium, based on the assumptions discussed below. The production pumping plan was truncated due to technical uncertainty inherent in long-term production modeling and remained well above the economic cut-off grade (i.e., the economic cut-off grade did not result in a limiting factor to the estimation of the reserve).
  - A technical grade lithium carbonate price of US$20,000/metric tonne CIF North Carolina.
  - Recovery factors for the wellfield are = $-206.23*(Li\ wellfield\ feed)^2 + 7.1903*(wellfield\ Li\ feed) + 0.4609$. An additional recovery factor of 78% lithium recovery is applied to the lithium carbonate plant.
  - A fixed brine pumping rate of 20,000 afpy, ramped up from current levels over a period of five years.
  - Operating cost estimates are based on a combination of fixed brine extraction, G&A and plant costs and variable costs associated with raw brine pumping rate or lithium production rate. Average life of mine operating costs is calculated at approximately US$6,200/metric tonne lithium carbonate CIF North Carolina.
  - Sustaining capital costs are included in the cut-off grade calculation and include a fixed component at US$7.0 million per year and an additional component tied to the estimated number of wells replaced per year and other planned capital programs.
- Mineral reserve tonnage, grade and mass yield have been rounded to reflect the accuracy of the estimate (thousand tonnes), and numbers may not add due to rounding.

In the QP's opinion, key points of uncertainty associated with the modifying factors in this reserve estimate that could have a material impact on the reserve include the following:

- Resource dilution: The reserve estimate included in this report assumes the brine aquifer is extracted at a rate of 20,000 afpy, in accordance with Albemarle's maximum water rights at Silver Peak. Historic pumping rates are lower, on average, than this level and pumping at this higher rate could result in more freshwater dilution than predicted in the model simulation. Higher dilution levels may result in a shorter mine life (i.e., lower reserve) or require pumping at lower rates. While the same amount of lithium potentially could be extracted over a longer timeframe at the lower pumping rate, the associated reduction in lithium production on an annual basis could increase the cut-off grade for the operation and potentially reduce the mineral reserve.
- Aquifer Pumpability: The pumpability of an aquifer is an assessment of the simulated water level in the model's production wells to estimate when the well will likely no longer be operable due to water levels in the well dropping below the pump intake. Comparison of simulated to measured water levels using the limited historical water level data available were used to devise adjustment factors for evaluating aquifer pumpability, allowing for a conservative estimate on when wells would no longer be operable. Inaccurate estimates of aquifer pumpability may result in wells becoming inoperable earlier or require pumping at lower rates.

- Hydrogeological assumptions: Factors such as specific yield and hydraulic conductivity play a key role in estimating the volume of brine available for extraction in the wellfield and the rate it can be extracted. These factors are variable through the project area and are generally difficult to directly measure. Significant variability, on average, from the assumptions utilized in the predictive model could materially impact the estimate of brine available for extraction and associated concentration. Model sensitivity analyses were completed on key wellfield assumptions as discussed in Section 12. As shown in these figures, the ranges evaluated in these analyses resulted in lithium concentrations ranging from 80 to 95 mg/l, compared to a base-case of 89 mg/l, at the end of the 30-year reserve life. However, these analyses do not fully quantify all potential uncertainty and wider variability in these parameters or changes in other parameters may result in more significant deviation in the base case than those shown in the sensitivity analyses.
- Lithium carbonate price: Although the pumping plan remains above the economic cut-off grade discussed in Section 12.2.2, commodity prices, including technical grade lithium carbonate can have significant volatility which could result in a shortened reserve life.
- Extension of the pumping plan beyond 2052: In the QP's opinion, the predictive model presents adequate confidence in the results to support a reserve estimate through 2052. However, the model continued to predict lithium concentrations above the economic cut-off grade discussed in Section 12.2.2 for the full 50-year simulation profile. This suggests opportunity remains to extend the mine life and associated reserve beyond the current assumptions.

1.6 Mineral Processing and Metallurgical Testing

Silver Peak is an operating mine. At this stage of operations, the facility relies upon historic operating performance to support its production projections. Therefore, no metallurgical testwork has been relied upon to support the estimation of reserves documented herein.

The processing methodology utilizes traditional solar evaporation to concentrate and remove impurities from the lithium-rich brine extracted from the resource. This concentrated brine is then further purified in the processing facilities and chemically reacted to produce a technical grade lithium carbonate.

In the pond system the brines are concentrated by the solar evaporation of water, which leads to the precipitation of salts (primarily sodium chloride) when the saturation level of the solution is reached. Brine flows from one pond to another, typically through flow points cut in the dikes separating one pond from another, or pumped where elevation differential requires, as evaporation increases the total dissolved solids (TDS) content.

SRK estimates the current evaporation pond capacity is adequate to support approximately 16,420 afpy sustained brine extraction rate. However, Albemarle is currently planning to expand this capacity, including new ponds and rehabilitating existing evaporation ponds not currently in use (by removal of existing halite mass) to increase the evaporation pond capacity to sustain approximately 20,000 afpy.

When the lithium concentration reaches levels suitable for feed to the lithium carbonate plant, approximately 0.54% lithium, the brine is pumped to the carbonate plant. The concentrated brine feed goes through additional impurity removal through chemical precipitation before final precipitation of lithium carbonate (Li_2CO_3) in the reactor system. The final product is dried before packaging for sale.

Process recovery is estimated based on historical operational performance through a combination of a fixed 78% recovery rate for the lithium carbonate plant and a variable pond recovery factor, based on raw brine lithium concentration, that averages around 51% over the reserve life.

The nameplate capacity of the lithium carbonate plant is listed as 6,000 t/y Li_2CO_3. However, in recent years Silver Peak has demonstrated that the plant is capable of producing higher than that. In 2018, the plant produced approximately 6,500 tonnes Li_2CO_3.

1.7 Infrastructure

Access to the site is by paved highway off major US highways. Employees travel to the project from various communities in the region. There is some employee housing in the unincorporated town of Silver Peak, where the project is located. The site includes large evaporation ponds, brine wells, salt storage facilities, administrative offices and change house, laboratory, processing facility, propane and diesel storage tanks, water supply and storage, utility supplied power transmission lines feed power substations and distribution system, liming facility, boiler and heating system, packaging and warehousing facility, miscellaneous shops, and general laydown yard. All infrastructure needed for ongoing operations is in place and functioning. There will be some additional evaporation pond capacity added in the next three years.

1.8 Environmental Permitting, Social, and Closure

The SPLO was originally constructed and commissioned in 1964, significantly pre-dating most environmental statutes and regulations, including the federal National Environmental Policy Act of 1969 (NEPA) and subsequent water, air, and waste regulations. Baseline data collection as part of environmental impact analyses was limited, though some hydrogeological investigations were performed as part of project development. The U.S. Department of Energy (DOE) conducted a limited NEPA Environmental Assessment (EA) in 2010 which analyzed the impact to a limited number of environmental resources. These are supplemented by studies conducted around and within Clayton Valley, but not specifically for the SPLO. The studies have included:

- Air quality
- Site hydrology/hydrogeology
- Groundwater quality
- General wildlife
- Avian wildlife
- Botanical inventories
- Cultural inventories

In addition, the SPLO currently has a permitting action before the Bureau of Land Management (BLM) for which subsequent baseline reports have been prepared for use in a new EA or Environmental Impact Statement (EIS) and include numerous additional baseline studies, detailed further in Section 17.

There are currently no known environmental issues that could materially impact Albemarle's ability to extract SPLO resources or reserves. Currently proposed permitting actions are likely to be approved but have the potential to impact the overall Project schedule depending on the process selected by the BLM in its authorization role and disclosure requirements.

Comprehensive environmental management plans have been prepared as part of both state and federal permitting authorizing mineral extraction and processing operations for the SPLO. The state environmental management plans were prepared as part of the Water Pollution Control Permit (WPCP) authorization and updated by Albemarle in 2021 as part of its renewal application. Several of the federal management plans were updated and re-submitted as part of the SPLO Amended Plan of Operations (Albemarle, 2022) most overlap with state counterparts. Site-wide monitoring of the SPLO is accomplished on multiple levels and across various regulatory programs.

The site is located in EPA Region 9 and operates as a conditionally exempt small quantity generator under the Resource Conservation and Recovery Act (RCRA) waste regulations. The facility typically generates little or no hazardous waste. All non-hazardous solid waste generated at the plant is disposed of in a permitted on-site landfill. There are no known off-site properties with areas of contamination or Superfund sites within the immediate vicinity of the facility.

While not tailings in the traditional hard rock mining sense, the SPLO does generate a solid residue that requires management during operations and closure. The lime treatment of the brines results in the production of a solid consisting principally of magnesium hydroxide and calcium sulfate, which is collected and deposited for final storage in the Lime Solids Pond. Toxicity Characteristic Leaching Procedure (TCLP) analysis of the lime solids conducted in October 1988, indicated below detection levels for cadmium, chromium, lead, mercury, selenium, and silver, but detectable non-hazardous levels of arsenic (0.02 milligrams per liter [mg/L]) and barium (0.08 mg/L). More recent analyses were not available.

The SPLO includes both public and private lands within Esmeralda County, Nevada, and therefore falls under the jurisdiction and permitting requirements of Esmeralda County, the State of Nevada, and the federal government through the BLM. All current permits and authorizations appear to be in good standing and/or are under review for renewal.

The SPLO currently controls a total duty of 21,448 acre-feet per annum in the Clayton Valley hydrographic basin, a basin that has been "designated" by the Nevada Division of Water Resources (NDWR) but has no preferred uses.

Mine Closure

Albemarle/Silver Peak has approved mine reclamation closure plans prepared in accordance with both state (NAC 445A, NAC 519A) and federal (43 CFR §3809.401) regulations. These plans have been reviewed and approved by the Nevada Division of Environmental Protection (NDEP) and the BLM. The closure plan for the site includes activities required to create a physically and chemically stable environment that will not degrade waters of the state. Because this site is not a typical mining operation, the primary activities include closure of wells, removal of all pumps, piping and processing facilities, closure of the evaporation ponds, demolition of buildings and closure of roads. The site is located in a denuded salt playa, so revegetation criteria are minimal.

The agencies received and approved an updated Reclamation Cost Estimate (RCE) for the SPLO on September 3, 2020, in support of a three-year bond review and update, in the amount of US$8,164,980. This estimate be based on government supplied labor rates and predefined third-party unit rates for equipment and materials. These are updated each year by the NDEP.

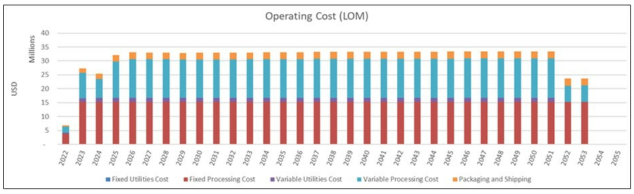
1.9 Summary Capital and Operating Cost Estimates

Silver Peak is an operating lithium mine. Capital and operating costs are forecast as a normal course of operational planning with a primary focus on short term budgets (i.e., subsequent year). Silver Peak currently utilizes mid (e.g., five year plan) and long-term (i.e., LoM) planning. Given the limited current mid and long-term planning completed at the operation, SRK developed a long-term forecast for the operation based on historic operating results. SRK's capital expenditure forecast is provided in Table 1-3 and its operating cost forecast is provided in Figure 1-1.

Table 1-3: Capital Cost Forecast ($M Real 2022)

Period	Wellfield	General Sustaining	Pond Rehabilitation and Construction	Liming	Closure	Total Sustaining Capex
2022 (partial)	-	6.7	2.0	2.0	-	10.7
2023	2.7	30.8	25.9	7.7	-	67.0
2024	2.7	31.0	30.5	-	-	64.3
2025	3.9	10.5	20.7	-	-	35.1
2026	2.7	10.5	7.1	-	-	20.3
2027	2.7	7.0	69.6	-	-	79.3
2028	2.7	7.0	-	-	-	9.7
2029	2.7	7.0	-	-	-	9.7
2030	2.7	7.0	-	-	-	9.7
2031	2.7	7.0	-	-	-	9.7
Remaining LoM (2032 – 2054)	55.2	154.0			-	209.2
LoM Total	**80.6**	**278.5**	**155.8**	**9.7**	**8.2**	**532.7**

Source: SRK, 2022
2022 capex is October – December only



Source: SRK, 2022
Note 2022 costs reflect a partial year (October– December)

Figure 1-1: Total Forecast Operating Expenditure (Tabular Data shown in Table 19-7)

Estimation of capital and operating costs is inherently a forward-looking exercise. These estimates rely upon a range of assumptions and forecasts that are subject to change depending upon macroeconomic conditions, operating strategy and new data collected through future operations. For this report, capital and operating costs are estimated to a PFS-level, as defined by S-K 1300, with a targeted accuracy of +/-25%. However, this accuracy level is only applicable to the base case operating scenario and forward-looking assumptions outlined in this report. Therefore, changes in these forward-looking assumptions can result in capital and operating costs that deviate more than 25% from the costs forecast herein.

1.10 Economics

As with the capital and operating cost forecasts, the economic analysis is inherently a forward-looking exercise. These estimates rely upon a range of assumptions and forecasts that are subject to change depending upon macroeconomic conditions, operating strategy and new data collected through future operations.

The operation is forecast to have a 32-year life with the first modeled year of operation being a partial year to align with the effective date of the reserves.

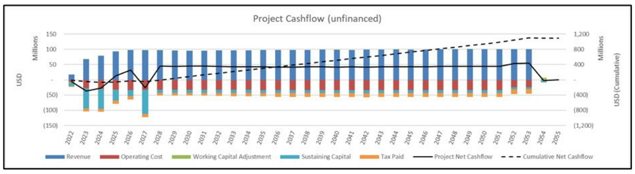
The economic analysis metrics are prepared on annual after-tax basis in US$. The results of the analysis are presented in Table 1-4. At a technical grade lithium carbonate price of US$20,000/t, the net present value, using an 8% discount rate, (NPV at 8%) of the modeled after-tax free cash flow is US$270 million. Note that because Silver Peak is in operation and is modeled on a go-forward basis from the date of the reserve, historic capital expenditures are treated as sunk costs (i.e., not modeled) and therefore, IRR and payback period analysis are not relevant metrics.

Table 1-4: Indicative Economic Results

LoM Cash Flow (Unfinanced)	Units	Value
Total Revenue	US$ million	3,007.1
Total Opex	US$ million	(1,007.5)
Operating Margin	US$ million	1,999.6
Operating Margin Ratio	%	66%
Taxes Paid	US$ million	(372.7)
Free Cashflow	US$ million	1,094.2
Before Tax		
Free Cash Flow	US$ million	1,466.9
NPV at 8%	US$ million	392.8
NPV at 10%	US$ million	298.9
NPV at 15%	US$ million	161.4
After Tax		
Free Cash Flow	US$ million	1,094.2
NPV at 8%	US$ million	270.1
NPV at 10%	US$ million	198.4
NPV at 15%	US$ million	94.2

Source: SRK, 2022

A summary of the cashflow on an annual basis is presented in Figure 1-2.



Source: SRK, 2022

Figure 1-2: Annual Cashflow Summary (Tabular Data shown in Table 19-7)

1.11 Conclusions and Recommendations

1.11.1 Geology

The property is well known in terms of descriptive factors and ownership. Geology and mineralization are well-understood through decades of active mining. The status of exploration, development, and operations is very advanced and active. Assuming exploration and mining continue at Silver Peak in the way that they are currently being done, there are no additional recommendations at this time.

1.11.2 Mineral Resource Estimates

SRK has reported a mineral resource estimation which is appropriate for public disclosure and long-term considerations of mining viability. The mineral resource estimation could be improved with additional infill program (drilling, core sampling, and brine sampling).

1.11.3 Mining Methods and Mineral Reserve Estimates

Mining operations have been established at Silver Peak over its more than 50-year history of operation. Reserve estimates have been developed based on a predictive hydrogeological model that estimates brine production rates and associated lithium concentrations over time. In the QP's opinion, the mining methods and predictive approach for reserve development are appropriate for Silver Peak.

However, in the QP's opinion, there remains opportunity to further refine the production schedule. It is likely that there remains opportunity to increase lithium concentration in the brine by optimizing well locations (both in the existing wellfield and with new well development). This may include the use of deeper extraction wells. Therefore, SRK recommends Silver Peak evaluate these optimization opportunities to test the potential for improvement.

1.11.4 Mineral Processing and Metallurgical Testing

In order to evaluate an increase recovery within the pond system, SRK recommends assessing the feasibility of lining some evaporation ponds.

1.11.5 Infrastructure

The infrastructure is established and functioning. There is no significant remaining infrastructure needed to support ramp up or ongoing operations, other than additional pond capacity as noted in the report.

1.11.6 Environmental, Permitting, Social, and Closure

While the SPLO predates all state and federal environmental statutes and regulations, the operation follows all currently required permits and authorizations. Environmental management and monitoring are an integral part of the operations and is completed on several levels across a number of permits.

There are currently no known environmental issues that could materially impact Albemarle's ability to extract SPLO resources or reserves. Current permitting efforts, could, however, impact the overall Project schedule.

SRK recommends that the lime solids produced during beneficiation and deposited in cells upon the playa, be more comprehensively characterized under today's standard practice, as the last testing of this material was conducted in 1988.

Closure

Albemarle/SPLO has approved mine reclamation closure plans prepared in accordance with both state and federal regulations. The most recently approved reclamation plans and financial assurance cost estimates were approved in 2020.

Because Albemarle does not currently have an internal closure cost estimate, SRK recommends Albemarle develop an independent closure plan to ascertain the cost of a comprehensive internal closure effort. Furthermore, because closure of the site is not expected until 2054, the closure cost estimate represents future costs based on current expectations of site conditions at that date. In all probability, site conditions at closure will be different than currently expected and, therefore, the current estimate of closure costs is unlikely to reflect the actual closure cost that will be incurred in the future.

1.11.7 Economics

The operation is expected to generate positive cashflow during every full year in which it is pumping or processing brine on the schedule and at the costs and process outlined in this report except for 2023, 2024 and 2027 during which significant capital expenditure is expected (positive operating cash flow is still generated).

An economic sensitivity analysis indicates that the operation's NPV is most sensitive to variations in lithium carbonate price, lithium recovery and brine grade.

2 Introduction

This TRS was prepared in accordance with the SEC S-K regulations (Title 17, Part 229, Items 601 and 1300 through 1305) for Albemarle by SRK on SPLO. Albemarle is 100% owner of the SPLO project.

2.1 Terms of Reference and Purpose

The quality of information, conclusions, and estimates contained herein are consistent with the level of effort involved in SRK's services, based on i) information available at the time of preparation and ii) the assumptions, conditions, and qualifications set forth in this report. This report is intended for use by Albemarle subject to the terms and conditions of its contract with SRK and relevant securities legislation. The contract permits Albemarle to file this report as a TRS pursuant to the SEC S-K regulations, more specifically Title 17, Subpart 229.600, item 601(b)(96) - TRS and Title 17, Subpart 229.1300 - Disclosure by Registrants Engaged in Mining Operations. Any other uses of this report by any third party is at that party's sole risk. The responsibility for this disclosure remains with Albemarle.

The purpose of this TRS is to report mineral resources and mineral reserves for SPLO. This report is prepared to a pre-feasibility standard, as defined by S-K 1300. This report is an update of the previous report titled "SEC Technical Report Summary, Pre-Feasibility Study, Silver Peak Lithium Operation, Nevada, USA. Amended Date December 16, 2022".

The effective date of this report is September 30, 2022.

2.2 Sources of Information

This report is based in part on internal Company technical reports, previous internal studies, maps, published government reports, Company letters and memoranda, and public information as cited throughout this report and listed in the References Section 24.

Reliance upon information provided by the registrant is listed in Section 25 when applicable.

2.3 Details of Inspection

Table 2-1 summarizes the details of the personal inspections on the property by each qualified person or, if applicable, the reason why a personal inspection has not been completed.

Table 2-1: Site Visits

Expertise	Date(s) of Visit	Details of Inspection	Reason Why a Personal Inspection has Not Been Completed
Infrastructure	August 18, 2020	SRK site visit with inspection of evaporation ponds, liming area, administrative area, and processing plant and packaging area.	
Environmental	July 20, 2020	SRK Site visit with inspection of evaporation ponds, liming area, administrative area, and exterior of processing plant and packaging area.	
Mineral Resources	August 18, 2020	SRK site visit with inspection of evaporation ponds, liming area, administrative area, and core storage area	
Mineral Reserves and Mining Methods	August 18, 2020 September 20, 2022	SRK site visit with inspection of evaporation ponds, liming area, administrative area, and core storage area	
Process	August 18, 2020	SRK site visit with inspection of evaporation ponds, liming area, administrative area, and processing plant and packaging area.	
Process/Infrastructure	September 20, 2022	SRK site visit with inspection of evaporation ponds, inspection of sampling procedures, SPLO lab analysis procedures, and administrative area	
Mineral Processing	June 13, 14, 2022	SRK site visit with evaporation pond and playa inspection, meetings on ponds	

2.4 Report Version Update

The user of this document should ensure that this is the most recent TRS for the property.

This report is an update of the previous report titled "SEC Technical Report Summary, Pre-Feasibility Study, Silver Peak Lithium Operation, Nevada, USA. Amended Date December 16, 2022".

2.5 Qualified Person

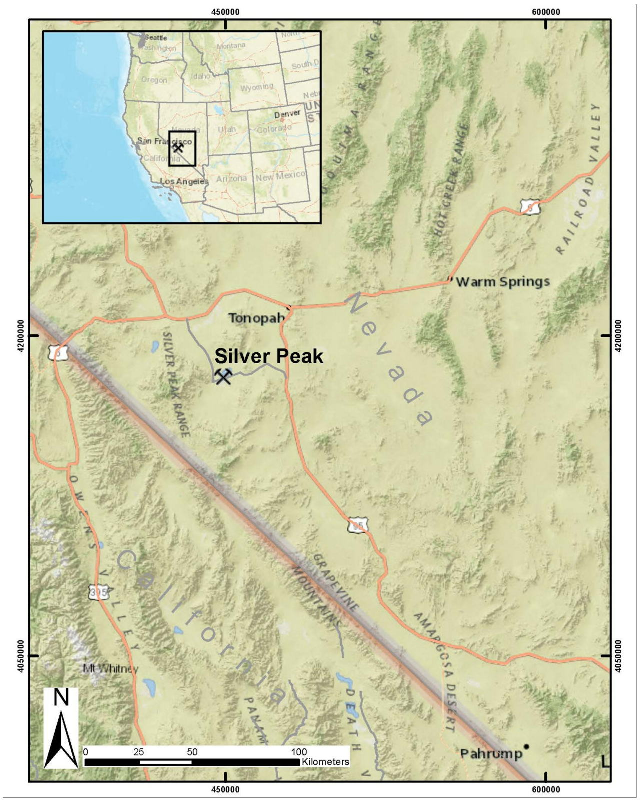
This report was prepared by SRK Consulting (U.S.), Inc., a third-party firm comprising mining experts in accordance with § 229.1302(b)(1). The marketing section of the report, (Chapter 16) was prepared by Fastmarkets, a third party firm with lithium market expertise in accordance with § 229.1302(b)(1). Albemarle has determined that SRK and Fastmarkets meet the qualifications specified under the definition of qualified person in § 229.1300. References to the Qualified Person (or QP) in this report are references to SRK Consulting (U.S.), Inc. and Fastmarkets, respectively, and not to any individual employed at SRK.

3 Property Description

3.1 Property Location

The SPLO is in a rural area approximately 30 mi southwest of Tonopah, in Esmeralda County, Nevada, United States at the approximate coordinates of 37.751773° North and 117.639027° West. It is located in the Clayton Valley, an arid valley historically covered with dry lake beds (playas). The operation borders the small unincorporated town of Silver Peak, NV (Figure 3-1). Albemarle extracts lithium-rich brine from the playa at the SPLO to produce lithium carbonate. The site covers approximately 15,301 acres and is dominated by large evaporation ponds on the valley floor, some in use and filled with brine while others are dry and unused. Actual surface disturbance associated with the operations is 7,390 acres, primarily associated with the evaporation ponds. The manufacturing and administrative activities are confined to an area approximately 20 acres in size, portions of which were previously used for silver mining through the early 20th century.

A general layout of the mining claims is shown in Figure 3-2.



Source: SRK, 2021

Figure 3-1: Regional Location Map – Silver Peak, Nevada

3.2 Mineral Title

Albemarle holds the following type of claims in the Silver Peak area:

- Millsite Claims
- Patented Claims
- Unpatented Claims
- Unpatented Junior Claim

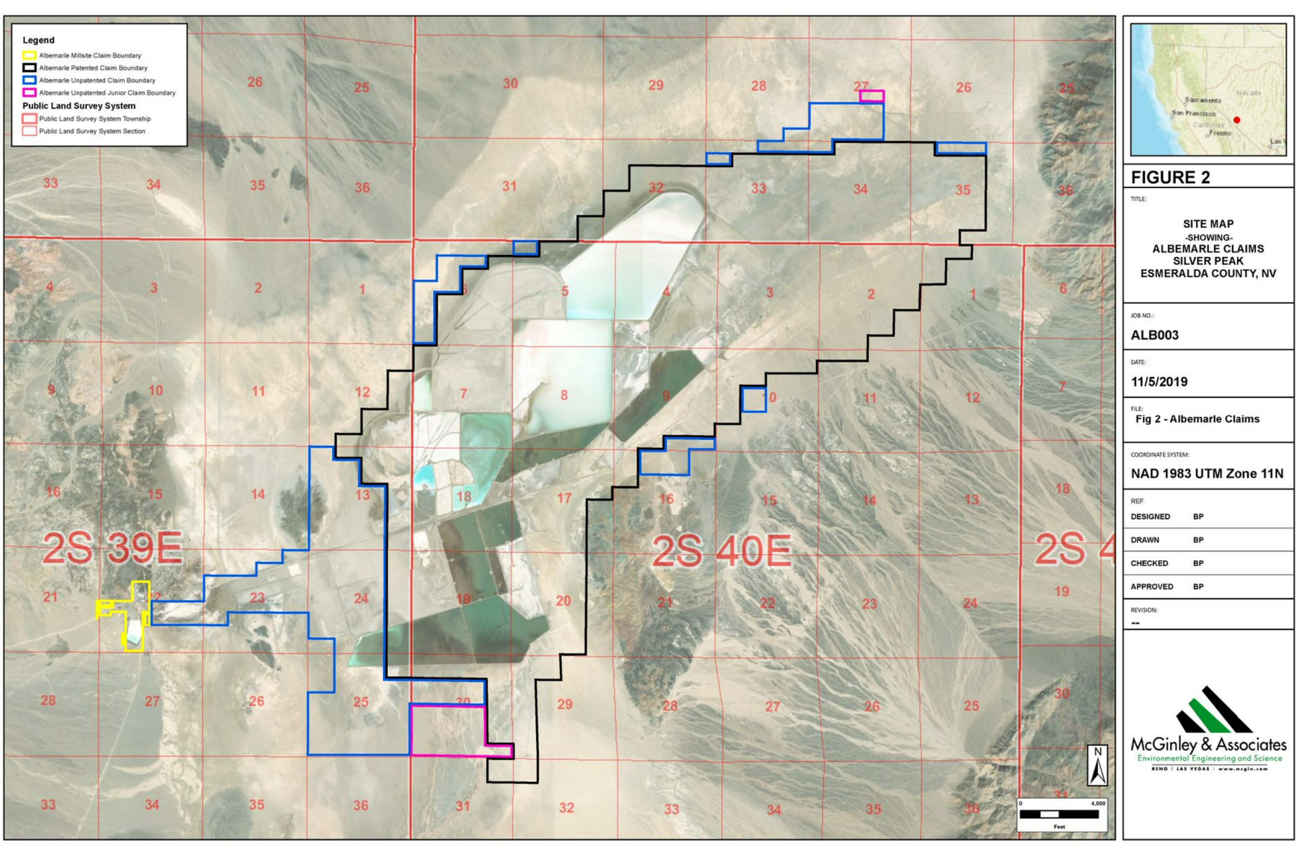
Patented Mining Claim

A patented mining claim is one for which the Federal Government has passed its title to the claimant, making it private land. A person may mine and remove minerals from a mining claim without a mineral patent. However, a mineral patent gives the owner exclusive title to the locatable minerals. It also gives the owner title to the surface and other resources. This means that the owner of the patented claim owns the land as well as the minerals.

Unpatented Mining Claim

An Unpatented mining claim is a particular parcel of Federal land, valuable for a specific mineral deposit or deposits. It is a parcel for which an individual has asserted a right of possession. The right is restricted to the extraction and development of a mineral deposit. The rights granted by a mining claim are valid against a challenge by the United States and other claimants only after the discovery of a valuable mineral deposit, as that term is defined by case law. This means that the owner of an unpatented claim within which a discovery of a valuable mineral deposit has been made has the right of exclusive possession for mining, including the right to extract minerals. No land ownership is conveyed.

Figure 3-2 shows the general location of the different claim types. Table 3-1 through Table 3-3 summarize the claims by type.



Source: McGinley and Associates, 2019

Figure 3-2: Albemarle Claims – Silver Peak

Table 3-1: Unpatented Placer and Millsite Claims

Name of Claim	BLM Serial No.	Acres in Claim	Payment Due to the BLM (US$)
CFC # 11	N MC 809490	20	165
CFC # 12	N MC 809491	20	165
CFC # 13	N MC 809492	20	165
CFC # 14	N MC 809493	20	165
CFC # 15	N MC 809494	20	165
CFC # 16	N MC 809495	20	165
CFC # 17	N MC 809496	20	165
CFC # 18	N MC 809497	20	165
CFC # 19	N MC 809498	20	165
CFC # 20	N MC 809499	20	165
CFC # 21	N MC 809500	20	165
CFC # 22	N MC 809501	20	165
CFC # 23	N MC 809502	20	165
CFC # 24	N MC 809503	20	165
CFC # 25	N MC 809504	20	165
CFC # 26	N MC 809505	20	165
CFC # 27	N MC 809506	20	165
CFC # 28	N MC 809507	20	165
CFC # 29	N MC 809508	20	165
CFC # 30	N MC 809509	20	165
CFC # 31	N MC 809510	20	165
CFC # 32	N MC 809511	20	165
CFC # 33	N MC 809512	20	165
CFC # 34	N MC 809513	20	165
CFC # 35	N MC 809514	20	165
CFC # 36	N MC 809515	20	165
CFC # 37	N MC 809516	20	165
CFC # 38	N MC 809517	20	165
CFC # 39	N MC 809518	20	165
CFC # 40	N MC 809519	20	165
CFC # 41	N MC 809520	20	165
CFC # 42	N MC 809521	20	165
CFC # 43	N MC 809522	20	165
CFC # 44	N MC 809523	20	165
CFC # 45	N MC 809524	20	165
CFC # 46	N MC 809525	20	165
CFC # 47	N MC 809526	20	165
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CFC # 58	N MC 809537	20	165
CFC # 59	N MC 809538	20	165
CFC # 60	N MC 809539	20	165
CFC # 61	N MC 809540	20	165
CFC # 62	N MC 809541	20	165
CFC # 63	N MC 809542	20	165
CFC # 67	N MC 809543	20	165
CFC # 68	N MC 809544	20	165

CFC # 69	N MC 809545	20	165
CFC # 70	N MC 809546	20	165
CFC # 71	N MC 809547	20	165
CFC # 72	N MC 809548	20	165
CFC # 73	N MC 809549	20	165
CFC # 74	N MC 809550	20	165
RLI # 79	N MC 1078344	20	165
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RLI # 122	N MC 1086808	20	165
RLI # 123	N MC 1086809	20	165
RLI # 124	N MC 1086810	20	165
RLI # 125	N MC 1086811	20	165
RLI # 126	N MC 1086812	20	165
RLI # 127	N MC 1086813	20	165
RLI # 128	N MC 1086814	20	165
RLI # 129	N MC 1086815	20	165

RLI # 130	N MC 1086816	20	165
RLI # 131	N MC 1086817	20	165
RLI # 132	N MC 1086818	20	165
RLI # 133	N MC 1086819	20	165
RLI # 134	N MC 1086820	20	165
ALB # 1	N MC 1189566	20	165
ALB # 2	N MC 1189567	20	165
ALB # 3	N MC 1189568	20	165
ALB # 4	N MC 1189569	20	165
ALB # 5	N MC 1189570	20	165
ALB # 6	N MC 1189571	20	165
ALB # 7	N MC 1189572	20	165
ALB # 8	N MC 1189573	20	165
ALB # 9	N MC 1189574	20	165
ALB # 10	N MC 1189575	20	165
ALB # 11	N MC 1189576	20	165
ALB # 12	N MC 1189577	20	165
ALB # 13	N MC 1189578	20	165
ALB # 14	N MC 1189579	20	165
ALB # 15	N MC 1189580	20	165
ALB # 16	N MC 1189581	20	165
ALB # 17	N MC 1189582	20	165
ALB # 18	N MC 1189583	20	165

Source: Albemarle, 2020

Table 3-2: Mill Site Patented Claims

Name of Claim	Number	Township	Range	
FM #1	22	T2S	R39E	
FM #2	22	T2S	R39E	
FM #3	22	T2S	R39E	
FM #4	22	T2S	R39E	
FM #5	22	T2S	R39E	
FM #6	22	T2S	R39E	
FM #10	22	T2S	R39E	
FM #11	22	T2S	R39E	
FM #13	22	T2S	R39E	
FM #14	22	T2S	R39E	
FM #15	22	T2S	R39E	
FM #16	22	T2S	R39E	
FM #17	22	T2S	R39E	
FM #18	22	T2S	R39E	
FM #20	22	T2S	R39E	
FM #21	22	T2S	R39E	
FM #22	22	T2S	R39E	
Total Mill Site Claims				**17**

Source: Albemarle, 2020

Table 3-3: Wellfield Patented Claims

Name of Claim	Number	Township	Range
LI-31-D	31	T1S	R40E
LI-31-D-CASS	31	T1S	R40E
LI-32-A-CASS	32	T1S	R40E
LI-32-A-DOE	32	T1S	R40E
LI-32-A-ENID	32	T1S	R40E
LI-32-A-FRAN	32	T1S	R40E
LI-32-B-CASS	32	T1S	R40E
LI-32-B-DOE	32	T1S	R40E
LI-32-C	32	T1S	R40E
LI-32-C-ANN	32	T1S	R40E
LI-32-C-BETH	32	T1S	R40E
LI-32-C-CASS	32	T1S	R40E
LI-32-C-DOE	32	T1S	R40E
LI-32-C-FRAN	32	T1S	R40E
LI-32-C-GERT	32	T1S	R40E
LI-32-C-HEIDI	32	T1S	R40E
LI-32-D	32	T1S	R40E
LI-32-D-ANN	32	T1S	R40E
LI-32-D-BETH	32	T1S	R40E
LI-32-D-CASS	32	T1S	R40E
LI-32-D-ENID	32	T1S	R40E
LI-32-D-FRAN	32	T1S	R40E
LI-32-D-GERT	32	T1S	R40E
LI-32-D-HEIDI	32	T1S	R40E
LI-33-A-BETH	33	T1S	R40E
LI-33-A-CASS	33	T1S	R40E
LI-33-A-DOE	33	T1S	R40E
LI-33-A-ENID	33	T1S	R40E
LI-33-A-FRAN	33	T1S	R40E
LI-33-A-GERT	33	T1S	R40E
LI-33-B-BETH	33	T1S	R40E
LI-33-B-CASS	33	T1S	R40E
LI-33-B-DOE	33	T1S	R40E
LI-33-B-ENID	33	T1S	R40E
LI-33-B-FRAN	33	T1S	R40E
LI-33-C	33	T1S	R40E
LI-33-C-ANN	33	T1S	R40E
LI-33-C-BETH	33	T1S	R40E
LI-33-C-CASS	33	T1S	R40E
LI-33-C-DOE	33	T1S	R40E
LI-33-C-FRAN	33	T1S	R40E
LI-33-C-GERT	33	T1S	R40E
LI-33-C-HEIDI	33	T1S	R40E
LI-33-D	33	T1S	R40E
LI-33-D-ANN	33	T1S	R40E
LI-33-D-BETH	33	T1S	R40E
LI-33-D-CASS	33	T1S	R40E
LI-33-D-ENID	33	T1S	R40E
LI-33-D-FRAN	33	T1S	R40E
LI-33-D-GERT	33	T1S	R40E
LI-33-D-HEIDI	33	T1S	R40E
LI-34-A	34	T1S	R40E
LI-34-A-BETH	34	T1S	R40E
LI-34-A-CASS	34	T1S	R40E
LI-34-A-DOE	34	T1S	R40E

LI-34-A-ENID	34	T1S	R40E
LI-34-A-FRAN	34	T1S	R40E
LI-34-A-GERT	34	T1S	R40E
LI-34-A-HEIDI	34	T1S	R40E
LI-34-B-ANN	34	T1S	R40E
LI-34-B-BETH	34	T1S	R40E
LI-34-B-CASS	34	T1S	R40E
LI-34-B-DOE	34	T1S	R40E
LI-34-B-ENID	34	T1S	R40E
LI-34-B-FRAN	34	T1S	R40E
LI-34-B-GERT	34	T1S	R40E
LI-34-C	34	T1S	R40E
LI-34-C-ANN	34	T1S	R40E
LI-34-C-BETH	34	T1S	R40E
LI-34-C-CASS	34	T1S	R40E
LI-34-C-DOE	34	T1S	R40E
LI-34-C-FRAN	34	T1S	R40E
LI-34-C-GERT	34	T1S	R40E
LI-34-C-HEIDI	34	T1S	R40E
LI-34-D	34	T1S	R40E
LI-34-D-ANN	34	T1S	R40E
LI-34-D-BETH	34	T1S	R40E
LI-34-D-CASS	34	T1S	R40E
LI-34-D-ENID	34	T1S	R40E
LI-34-D-FRAN	34	T1S	R40E
LI-34-D-GERT	34	T1S	R40E
LI-34-D-HEIDI	34	T1S	R40E
LI-35-A-ENID	35	T1S	R40E
LI-35-A-FRAN	35	T1S	R40E
LI-35-A-GERT	35	T1S	R40E
MG-12-A-CASS	12	T2S	R39E
MG-12-A-DOE	12	T2S	R39E
MG-12-C-DOE	12	T2S	R39E
MG-12-D	12	T2S	R39E
MG-12-D-ANN	12	T2S	R39E
MG-12-D-BETH	12	T2S	R39E
MG-12-D-CASS	12	T2S	R39E
MG-12-D-ENID	12	T2S	R39E
MG-12-D-FRAN	12	T2S	R39E
MG-12-D-GERT	12	T2S	R39E
MG-13-A	13	T2S	R39E
MG-13-A-BETH	13	T2S	R39E
MG-13-A-CASS	13	T2S	R39E
MG-13-A-DOE	13	T2S	R39E
MG-13-A-FRAN	13	T2S	R39E
MG-13-A-GERT	13	T2S	R39E
MG-13-A-HEIDI	13	T2S	R39E
MG-13-B-ANN	13	T2S	R39E
MG-13-D	13	T2S	R39E
MG-13-D-ANN	13	T2S	R39E
MG-13-D-BETH	13	T2S	R39E
MG-13-D-CASS	13	T2S	R39E
MG-24-A	24	T2S	R39E
MG-24-A-BETH	24	T2S	R39E
MG-24-A-CASS	24	T2S	R39E
MG-24-A-DOE	24	T2S	R39E
MG-24-D	24	T2S	R39E

MG-24-D-ANN	24	T2S	R39E
MG-24-D-BETH	24	T2S	R39E
MG-24-D-CASS	24	T2S	R39E
MG-25-A	25	T2S	R39E
MG-25-A-BETH	25	T2S	R39E
NA-1-B	1	T2S	R40E
LI-35-B	35	T1S	R40E
LI-35-B-BETH	35	T1S	R40E
LI-35-B-CASS	35	T1S	R40E
LI-35-B-DOE	35	T1S	R40E
LI-35-B-ENID	35	T1S	R40E
LI-35-B-FRAN	35	T1S	R40E
LI-35-B-GERT	35	T1S	R40E
LI-35-C	35	T1S	R40E
LI-35-C-ANN	35	T1S	R40E
LI-35-C-BETH	35	T1S	R40E
LI-35-C-CASS	35	T1S	R40E
LI-35-C-DOE	35	T1S	R40E
LI-35-C-FRAN	35	T1S	R40E
LI-35-C-GERT	35	T1S	R40E
LI-35-C-HEIDI	35	T1S	R40E
LI-35-D-FRAN	35	T1S	R40E
LI-35-D-GERT	35	T1S	R40E
LI-35-D-HEIDI	35	T1S	R40E
NA-1-B-ANN	1	T2S	R40E
NA-1-B-FRAN	1	T2S	R40E
NA-1-B-GERT	1	T2S	R40E
NA-2-A	2	T2S	R40E
NA-2-LOT 6	2	T2S	R40E
NA-2-A-BETH	2	T2S	R40E
NA-2-A-CASS	2	T2S	R40E
NA-2-A-DOE	2	T2S	R40E
NA-2-A-ENID	2	T2S	R40E
NA-2-A-FRAN	2	T2S	R40E
NA-2-A-GERT	2	T2S	R40E
NA-2-A-HEIDI	2	T2S	R40E
NA-2-LOT 7	2	T2S	R40E
NA-2-B	2	T2S	R40E
NA-2-B-ANN	2	T2S	R40E
NA-2-B-BETH	2	T2S	R40E
NA-2-B-CASS	2	T2S	R40E
NA-2-B-DOE	2	T2S	R40E
NA-2-B-ENID	2	T2S	R40E
NA-2-B-FRAN	2	T2S	R40E
NA-2-B-GERT	2	T2S	R40E
NA-2-C	2	T2S	R40E
NA-2-C-ANN	2	T2S	R40E
NA-2-C-BETH	2	T2S	R40E
NA-2-C-CASS	2	T2S	R40E
NA-2-C-DOE	2	T2S	R40E
NA-2-C-FRAN	2	T2S	R40E
NA-2-C-GERT	2	T2S	R40E
NA-2-C-HEIDI	2	T2S	R40E
NA-2-D-ANN	2	T2S	R40E
NA-2-D-FRAN	2	T2S	R40E
NA-2-D-GERT	2	T2S	R40E
NA-2-D-HEIDI	2	T2S	R40E

NA-3-A	3	T2S	R40E
NA-3-A-BETH	3	T2S	R40E
NA-3-A-CASS	3	T2S	R40E
NA-3-A-DOE	3	T2S	R40E
NA-3-A-ENID	3	T2S	R40E
NA-3-A-FRAN	3	T2S	R40E
NA-3-A-GERT	3	T2S	R40E
NA-3-A-HEIDI	3	T2S	R40E
NA-3-B	3	T2S	R40E
NA-3-B-ANN	3	T2S	R40E
NA-3-B-BETH	3	T2S	R40E
NA-3-B-CASS	3	T2S	R40E
NA-3-B-DOE	3	T2S	R40E
NA-3-B-ENID	3	T2S	R40E
NA-3-B-FRAN	3	T2S	R40E
NA-3-B-GERT	3	T2S	R40E
NA-3-C	3	T2S	R40E
NA-3-C-ANN	3	T2S	R40E
NA-3-C-BETH	3	T2S	R40E
NA-3-C-CASS	3	T2S	R40E
NA-3-C-DOE	3	T2S	R40E
NA-3-C-FRAN	3	T2S	R40E
NA-3-C-GERT	3	T2S	R40E
NA-3-C-HEIDI	3	T2S	R40E
NA-3-D	3	T2S	R40E
NA-3-D-ANN	3	T2S	R40E
NA-3-D-BETH	3	T2S	R40E
NA-3-D-CASS	3	T2S	R40E
NA-3-D-ENID	3	T2S	R40E
NA-3-D-FRAN	3	T2S	R40E
NA-3-D-GERT	3	T2S	R40E
NA-3-D-HEIDI	3	T2S	R40E
NA-4-A	4	T2S	R40E
NA-4-A-BETH	4	T2S	R40E
NA-4-A-CASS	4	T2S	R40E
NA-4-A-DOE	4	T2S	R40E
NA-4-A-ENID	4	T2S	R40E
NA-4-A-FRAN	4	T2S	R40E
NA-4-A-GERT	4	T2S	R40E
NA-4-A-HEIDI	4	T2S	R40E
NA-4-B	4	T2S	R40E
NA-4-B-ANN	4	T2S	R40E
NA-4-B-BETH	4	T2S	R40E
NA-4-B-CASS	4	T2S	R40E
NA-4-B-DOE	4	T2S	R40E
NA-4-B-ENID	4	T2S	R40E
NA-4-B-FRAN	4	T2S	R40E
NA-4-B-GERT	4	T2S	R40E
NA-4-C	4	T2S	R40E
NA-4-C-ANN	4	T2S	R40E
NA-4-C-BETH	4	T2S	R40E
NA-4-C-CASS	4	T2S	R40E
NA-4-C-DOE	4	T2S	R40E
NA-4-C-FRAN	4	T2S	R40E
NA-4-C-GERT	4	T2S	R40E
NA-4-C-HEIDI	4	T2S	R40E
NA-4-D	4	T2S	R40E

NA-4-D-ANN	4	T2S	R40E
NA-4-D-BETH	4	T2S	R40E
NA-4-D-CASS	4	T2S	R40E
NA-4-D-ENID	4	T2S	R40E
NA-4-D-FRAN	4	T2S	R40E
NA-4-D-GERT	4	T2S	R40E
NA-4-D-HEIDI	4	T2S	R40E
NA-5-A	5	T2S	R40E
NA-5-A-BETH	5	T2S	R40E
NA-5-A-CASS	5	T2S	R40E
NA-5-A-DOE	5	T2S	R40E
NA-5-A-ENID	5	T2S	R40E
NA-5-A-FRAN	5	T2S	R40E
NA-5-A-GERT	5	T2S	R40E
NA-5-A-HEIDI	5	T2S	R40E
NA-5-B-ANN	5	T2S	R40E
NA-5-B-BETH	5	T2S	R40E
NA-5-B-CASS	5	T2S	R40E
NA-5-B-DOE	5	T2S	R40E
NA-5-B-ENID	5	T2S	R40E
NA-5-B-FRAN	5	T2S	R40E
NA-5-B-GERT	5	T2S	R40E
NA-5-C	5	T2S	R40E
NA-5-C-ANN	5	T2S	R40E
NA-5-C-BETH	5	T2S	R40E
NA-5-C-CASS	5	T2S	R40E
NA-5-C-DOE	5	T2S	R40E
NA-5-C-FRAN	5	T2S	R40E
NA-5-C-GERT	5	T2S	R40E
NA-5-C-HEIDI	5	T2S	R40E
NA-5-D	5	T2S	R40E
NA-5-D-ANN	5	T2S	R40E
NA-5-D-BETH	5	T2S	R40E
NA-5-D-CASS	5	T2S	R40E
NA-5-D-ENID	5	T2S	R40E
NA-5-D-FRAN	5	T2S	R40E
NA-5-D-GERT	5	T2S	R40E
NA-5-D-HEIDI	5	T2S	R40E
NA-6-A-BETH	5	T2S	R40E
NA-6-A-CASS	6	T2S	R40E
NA-6-A-DOE	6	T2S	R40E
NA-6-A-ENID	6	T2S	R40E
NA-6-A-FRAN	6	T2S	R40E
NA-6-C-ANN	6	T2S	R40E
NA-6-C-BETH	6	T2S	R40E
NA-6-C-CASS	6	T2S	R40E
NA-6-C-DOE	6	T2S	R40E
NA-6-D	6	T2S	R40E
NA-6-D-ANN	6	T2S	R40E
NA-6-D-BETH	6	T2S	R40E
NA-6-D-CASS	6	T2S	R40E
NA-6-D-ENID	6	T2S	R40E
NA-6-D-FRAN	6	T2S	R40E
NA-6-D-GERT	6	T2S	R40E
NA-6-D-HEIDI	6	T2S	R40E
NA-7-A	6	T2S	R40E
NA-7-A-BETH	7	T2S	R40E

NA-7-A-CASS	7	T2S	R40E
NA-7-A-DOE	7	T2S	R40E
NA-7-A-ENID	7	T2S	R40E
NA-7-A-FRAN	7	T2S	R40E
NA-7-A-GERT	7	T2S	R40E
NA-7-A-HEIDI	7	T2S	R40E
NA-7-B	7	T2S	R40E
NA-7-B-ANN	7	T2S	R40E
NA-7-B-BETH	7	T2S	R40E
NA-7-B-CASS	7	T2S	R40E
NA-7-B-DOE	7	T2S	R40E
NA-7-B-ENID	7	T2S	R40E
NA-7-B-FRAN	7	T2S	R40E
NA-7-B-GERT	7	T2S	R40E
NA-7-C	7	T2S	R40E
NA-7-C-ANN	7	T2S	R40E
NA-7-C-BETH	7	T2S	R40E
NA-7-C-CASS	7	T2S	R40E
NA-7-C-DOE	7	T2S	R40E
NA-7-C-FRAN	7	T2S	R40E
NA-7-C-GERT	7	T2S	R40E
NA-7-C-HEIDI	7	T2S	R40E
NA-7-D	7	T2S	R40E
NA-7-D-ANN	7	T2S	R40E
NA-7-D-BETH	7	T2S	R40E
NA-7-D-CASS	7	T2S	R40E
NA-7-D-ENID	7	T2S	R40E
NA-7-D-FRAN	7	T2S	R40E
NA-7-D-GERT	7	T2S	R40E
NA-7-D-HEIDI	7	T2S	R40E
NA-8-A	8	T2S	R40E
NA-8-A-BETH	8	T2S	R40E
NA-8-A-CASS	8	T2S	R40E
NA-8-A-DOE	8	T2S	R40E
NA-8-A-ENID	8	T2S	R40E
NA-8-A-FRAN	8	T2S	R40E
NA-8-A-GERT	8	T2S	R40E
NA-8-A-HEIDI	8	T2S	R40E
NA-8-B	8	T2S	R40E
NA-8-B-ANN	8	T2S	R40E
NA-8-B-BETH	8	T2S	R40E
NA-8-B-CASS	8	T2S	R40E
NA-8-B-DOE	8	T2S	R40E
NA-8-B-ENID	8	T2S	R40E
NA-8-B-FRAN	8	T2S	R40E
NA-8-B-GERT	8	T2S	R40E
NA-8-C	8	T2S	R40E
NA-8-C-ANN	8	T2S	R40E
NA-8-C-BETH	8	T2S	R40E
NA-8-C-CASS	8	T2S	R40E
NA-8-C-DOE	8	T2S	R40E
NA-8-C-FRAN	8	T2S	R40E
NA-8-C-GERT	8	T2S	R40E
NA-8-C-HEIDI	8	T2S	R40E
NA-8-D	8	T2S	R40E
NA-8-D-ANN	8	T2S	R40E
NA-8-D-BETH	8	T2S	R40E

NA-8-D-CASS	8	T2S	R40E
NA-8-D-ENID	8	T2S	R40E
NA-8-D-FRAN	8	T2S	R40E
NA-8-D-GERT	8	T2S	R40E
NA-8-D-HEIDI	8	T2S	R40E
NA-9-A	9	T2S	R40E
NA-9-A-BETH	9	T2S	R40E
NA-9-A-CASS	9	T2S	R40E
NA-9-A-DOE	9	T2S	R40E
NA-9-A-ENID	9	T2S	R40E
NA-9-A-FRAN	9	T2S	R40E
NA-9-A-GERT	9	T2S	R40E
NA-9-A-HEIDI	9	T2S	R40E
NA-9-B	9	T2S	R40E
NA-9-B-ANN	9	T2S	R40E
NA-9-B-BETH	9	T2S	R40E
NA-9-B-CASS	9	T2S	R40E
NA-9-B-DOE	9	T2S	R40E
NA-9-B-ENID	9	T2S	R40E
NA-9-B-FRAN	9	T2S	R40E
NA-9-B-GERT	9	T2S	R40E
NA-9-C	9	T2S	R40E
NA-9-C-ANN	9	T2S	R40E
NA-9-C-BETH	9	T2S	R40E
NA-9-C-CASS	9	T2S	R40E
NA-9-C-DOE	9	T2S	R40E
NA-9-C-FRAN	9	T2S	R40E
NA-9-C-GERT	9	T2S	R40E
NA-9-C-HEIDI	9	T2S	R40E
NA-9-D-ANN	9	T2S	R40E
NA-9-D-BETH	9	T2S	R40E
NA-9-D-CASS	9	T2S	R40E
NA-9-D-FRAN	9	T2S	R40E
NA-9-D-GERT	9	T2S	R40E
NA-9-D-HEIDI	9	T2S	R40E
NA-10-A	10	T2S	R40E
NA-10-A-BETH	10	T2S	R40E
NA-10-A-GERT	10	T2S	R40E
NA-10-A-HEIDI	10	T2S	R40E
NA-10-B	10	T2S	R40E
NA-10-B-ANN	10	T2S	R40E
NA-10-B-BETH	10	T2S	R40E
NA-10-B-CASS	10	T2S	R40E
NA-10-B-ENID	10	T2S	R40E
NA-10-B-FRAN	10	T2S	R40E
NA-10-B-GERT	10	T2S	R40E
NA-10-C-GERT	10	T2S	R40E
NA-10-C-HEIDI	10	T2S	R40E
NA-11-B	10	T2S	R40E
NA-11-B-ANN	11	T2S	R40E
NA-16-B	11	T2S	R40E
NA-16-B-FRAN	16	T2S	R40E
NA-16-B-GERT	16	T2S	R40E
NA-17-A	16	T2S	R40E
NA-17-A-BETH	17	T2S	R40E
NA-17-A-CASS	17	T2S	R40E
NA-17-A-DOE	17	T2S	R40E

NA-17-A-ENID	17	T2S	R40E
NA-17-A-FRAN	17	T2S	R40E
NA-17-A-GERT	17	T2S	R40E
NA-17-A-HEIDI	17	T2S	R40E
NA-17-B	17	T2S	R40E
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NA-17-B-CASS	17	T2S	R40E
NA-17-B-DOE	17	T2S	R40E
NA-17-B-ENID	17	T2S	R40E
NA-17-B-FRAN	17	T2S	R40E
NA-17-B-GERT	17	T2S	R40E
NA-17-C	17	T2S	R40E
NA-17-C-ANN	17	T2S	R40E
NA-17-C-BETH	17	T2S	R40E
NA-17-C-CASS	17	T2S	R40E
NA-17-C-DOE	17	T2S	R40E
NA-17-C-FRAN	17	T2S	R40E
NA-17-C-GERT	17	T2S	R40E
NA-17-C-HEIDI	17	T2S	R40E
NA-17-D-ENID	17	T2S	R40E
NA-17-D-FRAN	17	T2S	R40E
NA-17-D-GERT	17	T2S	R40E
NA-17-D-HEIDI	17	T2S	R40E
NA-18-A	18	T2S	R40E
NA-18-A-BETH	18	T2S	R40E
NA-18-A-CASS	18	T2S	R40E
NA-18-A-DOE	18	T2S	R40E
NA-18-A-ENID	18	T2S	R40E
NA-18-A-FRAN	18	T2S	R40E
NA-18-A-GERT	18	T2S	R40E
NA-18-A-HEIDI	18	T2S	R40E
NA-18-B	18	T2S	R40E
NA-18-B-ANN	18	T2S	R40E
NA-18-B-BETH	18	T2S	R40E
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NA-18-C	18	T2S	R40E
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NA-18-D-CASS	18	T2S	R40E
NA-18-D-ENID	18	T2S	R40E
NA-18-D-FRAN	18	T2S	R40E
NA-18-D-GERT	18	T2S	R40E
NA-18-D-HEIDI	18	T2S	R40E
NA-19-A	19	T2S	R40E
NA-19-A-BETH	19	T2S	R40E

NA-19-A-CASS	19	T2S	R40E
NA-19-A-DOE	19	T2S	R40E
NA-19-A-ENID	19	T2S	R40E
NA-19-A-FRAN	19	T2S	R40E
NA-19-A-GERT	19	T2S	R40E
NA-19-A-HEIDI	19	T2S	R40E
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NA-19-B-ANN	19	T2S	R40E
NA-19-B-BETH	19	T2S	R40E
NA-19-B-CASS	19	T2S	R40E
NA-19-B-DOE	19	T2S	R40E
NA-19-B-ENID	19	T2S	R40E
NA-19-B-FRAN	19	T2S	R40E
NA-19-B-GERT	19	T2S	R40E
NA-19-C	19	T2S	R40E
NA-19-C-ANN	19	T2S	R40E
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NA-19-C-DOE	19	T2S	R40E
NA-19-C-FRAN	19	T2S	R40E
NA-19-C-GERT	19	T2S	R40E
NA-19-C-HEIDI	19	T2S	R40E
NA-19-D	19	T2S	R40E
NA-19-D-ANN	19	T2S	R40E
NA-19-D-BETH	19	T2S	R40E
NA-19-D-CASS	19	T2S	R40E
NA-19-D-ENID	19	T2S	R40E
NA-19-D-FRAN	19	T2S	R40E
NA-19-D-GERT	19	T2S	R40E
NA-19-D-HEIDI	19	T2S	R40E
NA-20-A-ENID	20	T2S	R40E
NA-20-A-FRAN	20	T2S	R40E
NA-20-A-GERT	20	T2S	R40E
NA-20-A-HEIDI	20	T2S	R40E
NA-20-B	20	T2S	R40E
NA-20-B-ANN	20	T2S	R40E
NA-20-B-BETH	20	T2S	R40E
NA-20-B-CASS	20	T2S	R40E
NA-20-B-DOE	20	T2S	R40E
NA-20-B-ENID	20	T2S	R40E
NA-20-B-FRAN	20	T2S	R40E
NA-20-B-GERT	20	T2S	R40E
NA-20-C	20	T2S	R40E
NA-20-C-ANN	20	T2S	R40E
NA-20-C-BETH	20	T2S	R40E
NA-20-C-CASS	20	T2S	R40E
NA-20-C-DOE	20	T2S	R40E
NA-20-C-FRAN	20	T2S	R40E
NA-20-C-GERT	20	T2S	R40E
NA-20-C-HEIDI	20	T2S	R40E
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NA-20-D-FRAN	20	T2S	R40E
NA-20-D-GERT	20	T2S	R40E
NA-20-D-HEIDI	20	T2S	R40E
NA-29-B	29	T2S	R40E
NA-29-B-ANN	29	T2S	R40E
NA-29-B-BETH	29	T2S	R40E
NA-29-B-ENID	29	T2S	R40E
NA-29-B-FRAN	29	T2S	R40E
NA-29-B-GERT	29	T2S	R40E
NA-29-C	29	T2S	R40E
NA-29-C-FRAN	29	T2S	R40E
NA-29-C-GERT	29	T2S	R40E
NA-29-C-HEIDI	29	T2S	R40E
NA-30-A	30	T2S	R40E
NA-30-A-BETH	30	T2S	R40E

NA-30-A-CASS	30	T2S	R40E
NA-30-A-DOE	30	T2S	R40E
NA-30-A-GERT	30	T2S	R40E
NA-30-A-HEIDI	30	T2S	R40E
NA-30-B	30	T2S	R40E
NA-30-B-ANN	30	T2S	R40E
NA-30-B-BETH	30	T2S	R40E
NA-30-B-GERT	30	T2S	R40E
NA-30-D-ANN	30	T2S	R40E
NA-30-D-BETH	30	T2S	R40E
NA-30-D-CASS	30	T2S	R40E
NA-31-A	30	T2S	R40E
NA-31-A-BETH	30	T2S	R40E
NA-32-B	30	T2S	R40E
NA-32-B-GERT	30	T2S	R40E
Total Wellfield Claims			**536**

Source: Albemarle, 2020

3.3 Encumbrances

SRK is not aware of any encumbrances on the Silver Peak properties.

3.4 Royalties or Similar Interest

The State of Nevada levies a tax against mining operations within the state which effectively functions like a royalty. The tax is called the Nevada Net Proceeds Tax. The tax operates on a slide scale and determined by the ratio of net proceeds to the gross proceeds of the operation on an annual basis. The sliding tax rate scale is outlined in Table 3-4.

Table 3-4: Nevada Net Proceeds Tax Sliding Scale

Net Proceeds as a Percentage of Gross Proceeds	Rate of Tax (%)
Less than 10%	2.0
10% or more but less than 18%	2.5
18% or more but less than 26%	3.0
26% or more but less than 34%	3.5
34% or more but less than 42%	4.0
42% or more but less than 50%	4.5
50% or more	5.0

Source: SRK, 2021

The tax is levied on net proceeds of the operation which is obtained by deducting operating costs and depreciation expenses from gross proceeds.

As Silver Peak is located in Nevada, the operation is subject to this tax.

3.5 Other Significant Factors and Risks

Extraction of the brine resource from the SPLO requires state water rights. The SPLO water rights have a total combined duty for Mining and Milling and Domestic purposes not to exceed 21,448 acre-feet per annum (AFA) in the Clayton Valley hydrographic basin. On December 4, 2017, all water rights were transferred to Albemarle U.S., Inc.

The NDWR is responsible for quantifying existing water rights; monitoring water use; distributing water in accordance with:

- Court decrees
- Reviewing water availability
- Reviewing the construction and operation of dams (among other regulatory activities)

Water appropriations, which are important to the SPLO given the hydrographic groundwater basin in which the operations are located (Hydrographic Area No. 143 – Clayton Valley) has been “designated” (NDWR Order No. O-1275), but has no preferred uses, are handled through the NDWR and the State Engineer’s Office.

Groundwater basins are typically designated as needing increased regulation and administration by the State Engineer when the total quantity of committed groundwater resources (water rights permits) approach or exceed the estimated perennial yield (average annual groundwater recharge) from the basin. By designating a basin, the State Engineer is granted additional authority in the administration of the groundwater resources within the designated basin. Designation of a water basin by the State Engineer does not necessarily mean that the groundwater resources are being depleted, only that the appropriated water rights exceed the estimated perennial yield. Actual groundwater use the perennial yield to Clayton Valley is estimated to be 24.1 million cubic meters per year (m^3/y) (19,500 AFA) (Rush, 1968), and the quantity of committed groundwater resources (underground water rights permits) amounts to 29.3 million m^3/y (23,747 AFA). Of this amount, 28.5 million m^3/y (23,100 AFA) are committed for mining and milling purposes (NDWR, 2020). In light of these quantities, groundwater resources in the Clayton Valley hydrographic basin have been over appropriated, and there is no unappropriated groundwater available from the basin. While the State Engineer often considers the groundwater used for mining and milling activities to be a temporary use of water, which would not cause a permanent effect on the groundwater resource, the State Engineer has determined that for lithium production from brine, the actual mining is the mining of water and has declined to determine that such mining is a temporary use. (State Engineer’s Ruling No. 6391, dated April 21, 2017, p. 11). NDWR’s report titled Nevada Statewide Assessment of Groundwater Pumpage Calendar Year 2013 indicates that 19.02 million m^3 (15,422 AFA) were pumped in 2013 (NDWR, 2013); the exact quantity consumed or returned to the aquifer is unknown but is likely less than the reported pumping volume. Based upon this report, Clayton Valley is not currently being over drafted or over pumped, however with Albemarle’s expected increased use to the full beneficial use of its water rights, Clayton Valley will be pumped at or over its perennial yield.

On October 4, 2018, an AOC was made and entered into by and between the NDWR and the Office of the State Engineer and Albemarle. The AOC found that, while Albemarle and its predecessors have proceeded in good faith and with reasonable diligence to perfect all of its water rights applications, Albemarle has not yet completed application of the totality of its water to a beneficial use. The intent of the AOC is:

- To regulate the drilling and plugging of wells for water so as to minimize threats to the State of Nevada water resources
- To provide a path forward for Albemarle to obtain necessary permits for production wells to use its Water Rights and property rights
- To establish a process and schedule for Albemarle to plug inactive wells

- To establish a process and schedule for Albemarle to realign its water permits and wells in order to obtain well permits to bring the Silver Peak Operation into conformity with contemporary Nevada laws and regulations
- To document Albemarle's due diligence during the Effective Period [of the AOC], for purposes of NRS § 533.380(3)
- To resolve the Request to Investigate Alleged Violations and AV 209
- To ensure compliance with applicable Nevada laws and regulations

Albemarle continues to work with the NDWR and State Engineer to ensure compliance with the AOC. As of the Effective Date of the AOC, all of Albemarle's water rights are in good standing with the State Engineer. However, there is currently an active lawsuit challenging Albemarle's allocation of water rights. As this is a legal matter, SRK is not in a position to comment on any risk associated with this lawsuit.

SRK is not aware of any other significant factors or risk that may affect access, title, or the right or ability to perform work on the property.

4 Accessibility, Climate, Local Resources, Infrastructure and Physiography

4.1 Topography, Elevation and Vegetation

Clayton Valley contains a remnant playa that was deposited by the cyclic transgression and regression of ancient seas. The valley is a known closed basin and is structurally faulted downward with its average elevation being lower than all the immediately surrounding basins. The Clayton Valley watershed is about 500 square mi (mi^2) in area.

There is a relatively flat vegetation free valley floor referred to as the playa, and its slope is generally less than 2 ft/mi. Its area is about 20 mi^2. All brine wells and solar evaporation ponds are within the vegetation free playa area. The basic subsurface geology in the playa area consists primarily of playa, lake and alluvial sediments composed of unconsolidated Clastic and chemical sedimentary deposits.

These sediments are dominated by clay, silt, and minor occurrences of volcanic ash, halite, gypsum, and tufa. The surface geology is composed primarily of clays. There are several gravelly alluvial fans which originate from rock outcroppings at the edges of the basin and are interbedded and interfingered with the playa sediments.

4.2 Means of Access

The project is located in south central Nevada, USA between the large cities of Reno and Las Vegas. The unincorporated town of Silver Peak, where the project is located, is accessed by paved highway from the north and by improved dirt road to the east. The project administration offices and plant are located on the south side of town. The project can also be accessed from the east from Goldfield. There are numerous dirt roads that provide access to the project from Tonopah to the north. The closest airport is located in Tonopah with major airports in Reno and Las Vegas. The closest rail is located approximately 90 mi to the north, but is a private rail operated by the Department of Defense.

4.3 Climate and Length of Operating Season

The mean annual temperatures vary from the mid 40° to about 50° Fahrenheit (F). In western Nevada, the summers are short and hot, but the winters are only moderately cold. Long periods of extremely cold weather are rare, primarily because the mountains east of the Clayton Valley act as a barrier to the intensely cold continental arctic air masses. However, on occasion, a cold air mass spills over these barriers and produces prolonged cold waves.

There is strong surface heating during the day and rapid nighttime cooling due to the dry air, resulting in wide daily ranges in temperature. After hot days, the nights are usually cool. The average range between the highest and the lowest daily temperatures is approximately 30° to 35°F. Daily ranges are usually larger in summer than the winter. Summer temperatures above 100°F occur rather frequently. Humidity is usually low.

Nevada lies on the eastern side of the Sierra Nevada Range, a mountain barrier that markedly influences the climate of the state. One of the greatest contrasts in precipitation found within a short distance in the United States occurs between the western slopes of the Sierras in California and the valleys just to the east of this range. The prevailing winds are from the west, and as the warm moist air from the Pacific Ocean ascends the western slopes of the Sierra Range, the air cools, condensation takes place, and most of the moisture falls as precipitation. As the air descends the eastern slope, it is warmed by compression, and very little precipitation occurs. The effects of this mountain barrier are felt not only in the west but throughout the state, with the result that the lowlands of Nevada are largely desert or steppes. The valley floor of Clayton Valley is estimated to receive 7.6 to 12.7 centimeters (cm) (3 to 5 inches) of average annual precipitation while the highest mountain elevations are estimated to receive up to 38.1 cm (15 inches) of average annual precipitation (Rush, 1968).

Monthly average evaporation rates vary seasonally. In the warmer summer months, evaporation rates are as high as 15.2 cm (6 inches) per month. In the cooler winter months, evaporation is less than 1.3 cm (0.5 inches) per month. Annual evaporation for Silver Peak is approximately 89 cm per year.

4.4 Infrastructure Availability and Sources

Albemarle owns and operates two freshwater wells located approximately 2 mi south of Silver Peak, near the Esmeralda County Public Works (ESCO) fresh water well that provides process water to the boilers, firewater system and makeup water for process plant equipment. The ESCO well provides potable water for the project.

Electricity for the Project is provided by NV Energy. Two 55 kilovolt (kV) transmission lines feed the Silver Peak substation. One line connects to the Millers substation NE of Silver Peak and the other line connects to Goldfield to the east through the Alkali substation. A 55 kV line continues south from the Silver Peak substation to connect to the California power system.

The majority of the personnel who work at Silver Peak live locally in the communities of Silver Peak, Tonopah, and Goldfield, with the majority living in Tonopah. Albemarle has company housing and a camp area for recreational vehicles or campers in Silver Peak. Others travel to work from other regional communities. Tonopah is the closest community with full services to support the Project.

Materials, supplies, and services are available locally from Tonopah. Other supplies, materials, and services are available from regional sources including Las Vegas, Reno, and Salt Lake City.

5 History

5.1 Previous Operations

Albemarle and its predecessors have operated the lithium brine production facility at Silver Peak, Nevada, on a continuous basis since the mid-1960s. The array of production wells is complex because lithium brines are extracted from six different aquifer systems. The six aquifers have been sequentially brought online over the 50 plus years of operation.

The extended operating period of the mine has provided an opportunity for long term collection of data on brine levels and produced brine volumes and grades.

The aquifers in Clayton Valley have been the source of lithium for the Silver Peak operation since the mid 1960's through the development and operation of production wells. The aquifers that have provided the lithium bearing brines are very dynamic systems that have been classified into six different confined and semi-confined aquifer systems. They include the Main Ash Aquifer (MAA), Salt Aquifer System (SAS), Lower Ash System (LAS), Marginal Gravel Aquifer (MGA), Tufa Aquifer System (TAS) and Lower Gravel Aquifer (LGA). Throughout the history of the in situ mining operations, all of these aquifers have played important roles in the lithium brine resource, with the MAA being the most developed and extensively exploited aquifer system over the years.

Since the MAA was the primary aquifer system developed over the first half of the mine's history, the SPLO operation assumed that the lithium concentration decline/regression trend was predominantly represented by the MAA. Any other aquifer systems being exploited were considered supplemental, and only provided a subordinate influence in the lithium concentrations. The general composite lithium concentration decline/regression trend line equation, developed from the historical data, would then be used to project out approximately 15 years to estimate the lithium concentrations based on similar production rates from the wellfield. In the past, this method has been fairly accurate in providing conservative estimates of the longevity of the in situ mining operation before the economic lithium concentration limit was reached from the brine production.

As new aquifer systems were discovered and exploited, the number of wells developed in the MAA started to decline, bringing about a less accurate ore reserve calculation each time. By 2008, only 42% (16) of the wells in the wellfield were producing from the MAA. The MGA, LAS, and LGA also generated 42% of the wellfield wells during that time.

SPLO timeline as follows:

- 1912: Sodium and potassium brine discovered in Clayton Valley, NV
- 1936: Leprechaun Mining secures first mining and milling water rights
- 1950s: Leprechaun Mining discovers lithium in groundwater
- 1964s: Foote Mineral Co. acquires land in Clayton Valley
- 1966: Lithium mining operations begin
- 1967: Lithium carbonate first produced
- 1981: US Federal Court of Claims determines that lithium is locatable
- 1988: Cyprus Amax Minerals acquires Foote Mineral
- 1991: BLM acknowledges that Cyprus has the right to mine lithium within the patented area
- 1998: Chemetall Purchases Cyprus Foote Mineral Co.
- 2004: Rockwood Specialties Group buys Chemetall Foote Corp.

- 2015: Albemarle buys Rockwood Lithium, Inc.

5.2 Exploration and Development of Previous Owners or Operators

As noted above, Silver Peak has been mined/pumped for over 50 years and features an extensive exploration and operational history. Exploration work has included drilling (rotary, reverse circulation, and diamond core), core and brine sampling, geological mapping, geophysics.

Development work has generally included construction activities related to the evaporation ponds and pumping wellfield.

6 Geological Setting, Mineralization, and Deposit

6.1 Regional Geology

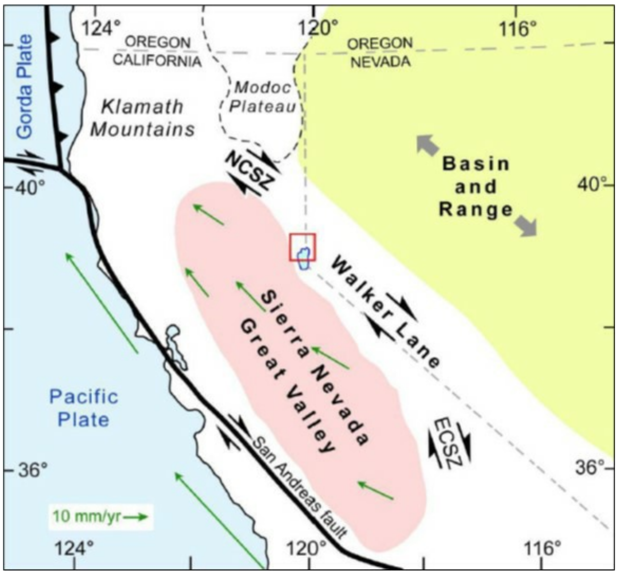
The SPLO is located in Clayton Valley, Nevada. The structural geology that forms Clayton Valley, and principal faults within and around the valley, are influenced by two continental-scale features:

- The Basin and Range province
- Walker Lane fault zone

The valley is located within the Basin and Range province, which extends from Canada through much of the western United States and across much of Mexico. It encompasses virtually all of Nevada. The Province is characterized by block faulting caused by extension and subsequent thinning of the earth's crust. Especially in Nevada, this extensional faulting forms a region of northeast-southwest oriented ridges and valleys. This faulting is responsible for the overall horst and graben structure of Clayton Valley.

The timing of major extension periods varies throughout the province. In eastern Nevada, highly extended terrains were formed during the Oligocene epoch (23 to 34 million years ago). During this period, the mountain blocks shifted, tilted, and rose along major and minor fault lines relative to valley blocks, which dropped. The dropped valleys became the focal locations for enhanced accumulation of sediments from the surrounding mountains. Closed basins like Clayton Valley became accumulation points for clastic sediments and evaporites as water accumulated in the low areas of the basins and then evaporated. The Basin and Range province is also characterized by volcanic activity caused as the thinning of the crust allowed magma to rise to the surface.

In southern Nevada, the structural features of Basin and Range formation were further influenced by the Walker Lane fault zone. The Walker Lane accommodates displacement transferred inland from the margin between the Pacific and North American plates (Figure 6-1). This transfer results in a set of northwest transcurrent faults that are estimated to account for between 20 and 25% of the relative motion between the two plates. As a result of being in this transition zone, Clayton Valley and areas to the northwest and southeast are situated in a complex zone of deformation and faulting.



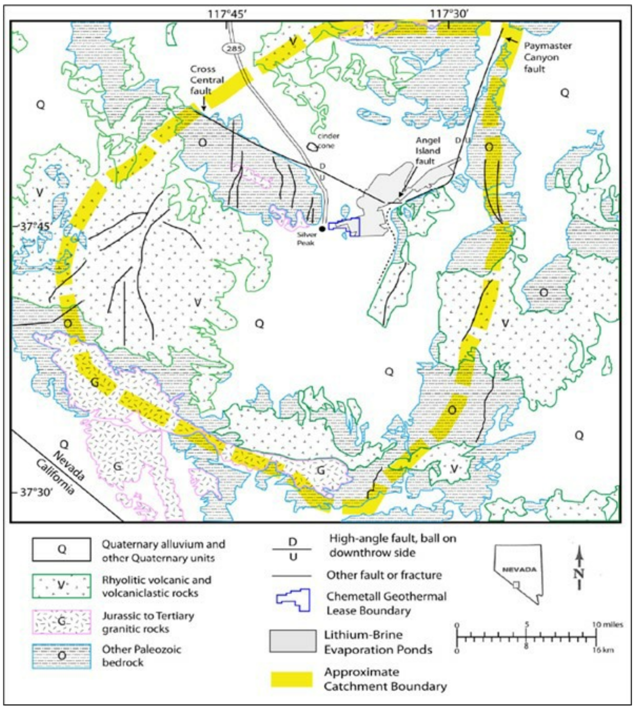
Source: Lindsay, 2011

Figure 6-1: Configuration of the Basin and Range Province and the Walker Lane Fault Zone, Relative to the Nevada Border

Geology around Clayton Valley is shown in Figure 6-2. The oldest rocks in the vicinity of Clayton Valley are of Precambrian age, and they are conformably overlain by Cambrian and Ordovician rocks. (Davis et al., 1986). Newer rocks, which still pre-date the Basin and Range formation, include Paleozoic marine sediments and Mesozoic intrusive rocks.

Tertiary volcanic rocks in the area originated from two volcanic centers. The Silver Peak Center was primarily active from 4.8 to 6 million years ago, and a center at Montezuma Peak was active as long as 17 million years ago. Tertiary sedimentary rocks are exposed around Clayton Valley to the west (Silver Peak Range), north (Weepah Hills) and low hills to the east. All these rocks are included in the Esmerelda Formation and include sandstone, shale, marl, breccia, and conglomerate. They are intercalated with volcanic rocks. These rocks were apparently deposited in several Miocene-era basins (Davis et al., 1986).

Figure 6-2 (from Zampirro, 2004) shows the major faults in the vicinity of Clayton Valley. Mapping by Burris includes representation of faults that are more limited in extent, as well as age and degree of certainty in delineation (Burris, 2013). Zampirro (2004) indicates the majority of basin drop and displacement has occurred at the Angel Island and Paymaster Canyon faults along the southeastern edge of the basin. He also suggests these faults are a barrier to flow into the basin and they preserve brine strength by preventing freshwater inputs. In addition, Zampirro suggests the Cross Central Fault acts as a barrier to north-south flow across the playa, as inferred by lithium mapping.



Source: IESE, 2011, Zampiro, 2004

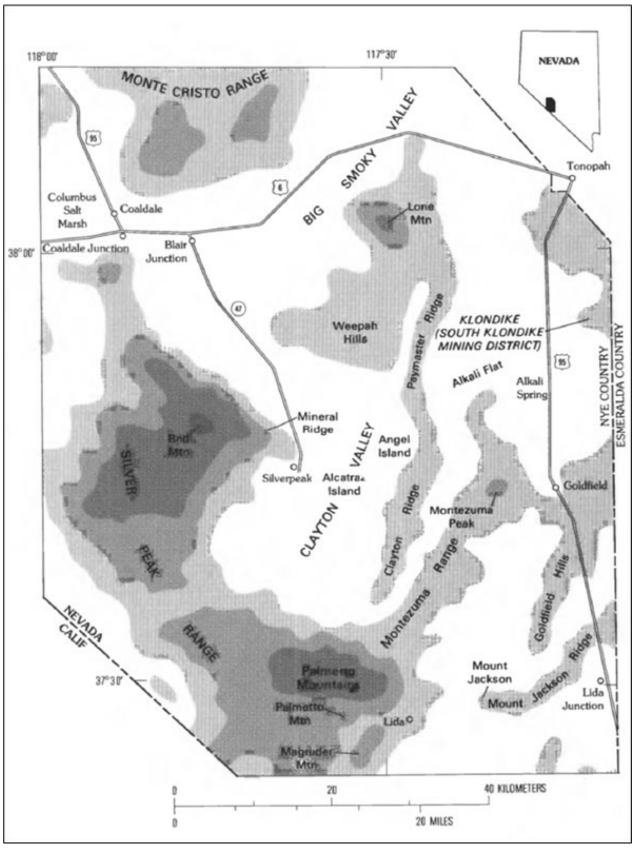
Figure 6-2: Generalized Geology of the Silver Peak Area

6.2 Local and Property Geology

From GWI, 2016:

Physical features in the vicinity of Clayton Valley are shown in Figure 6-3, from Davis et al. (1986). The central part of the valley contains the flat-lying playa, which is approximately 10 mi long, 3 mi wide and 32 mi2 in area (Meinzer, 1917). The playa surface is at an elevation of 4,270 ft above sea level, which is lower than both the Big Smoky Valley to the northwest and the Alkali Spring Valley to the northeast. The valley itself is formed by surrounding ridges and elevated areas including the following, with reference to Figure 6-3:

- *Weepah Hills to the north (maximum elevation 8,500 ft. at Lone Mountain)*
- *Paymaster Ridge and Clayton Ridge to the east; these ridges separate Clayton Valley from Alkali Spring Valley, located to the northeast*
- *The Montezuma Range (maximum elevation 8,426 ft. at Montezuma Mountain) is located a few km east of Clayton Ridge*
- *Palmetto Mountains to the south*
- *Silver Peak Range to the southwest and west (maximum elevation more than 9,000 ft.)*
- *An elevated zone of alluvium defines Clayton Valley to the northwest, and is the basis for separating Clayton Valley from Big Smoky Valley, located to the northwest and north*
- *Between the flat-lying playa and the various ridges shown on Figure 6-3, there are relatively gentle slopes composed of alluvium, which extend onto the playa to varying degrees. The alluvial slopes are broadest to the southwest.*
- *The flat playa surface is disrupted by several bedrock mounds (bedrock "islands"), Goat and Alcatraz Islands, in the western part of the valley that rise over 300 ft above the playa surface.*



Source: Davis and Vine, 1986

Figure 6-3: Major Physiographic Features that Form Clayton Valley

6.2.1 Geology of Basin Infill

Davis et al. (1986) indicates the basin deposits are best understood in terms of deposition in extended climatic periods of relatively high and low precipitation (pluvial and inter-pluvial). The wetter periods saw deposition of fine-grained materials (muds) in the valley center in a lake environment, grading out to fluvial and deltaic sands and muds, and then to beach sands and gravels on the valley margins. Lower energy deposits dominated in the drier periods, with deposition of muds, silt, sand and evaporites in the center of the basin, with a relatively sharp transition to higher energy sand and gravel alluvial deposits on the boundary. The surficial geology of Clayton Valley is shown on Figure 6-4. The alluvial deposits at the surface along the boundary of the valley tend to contain fresh water and are not considered a lithium bearing unit for purposes of the mineral deposit.

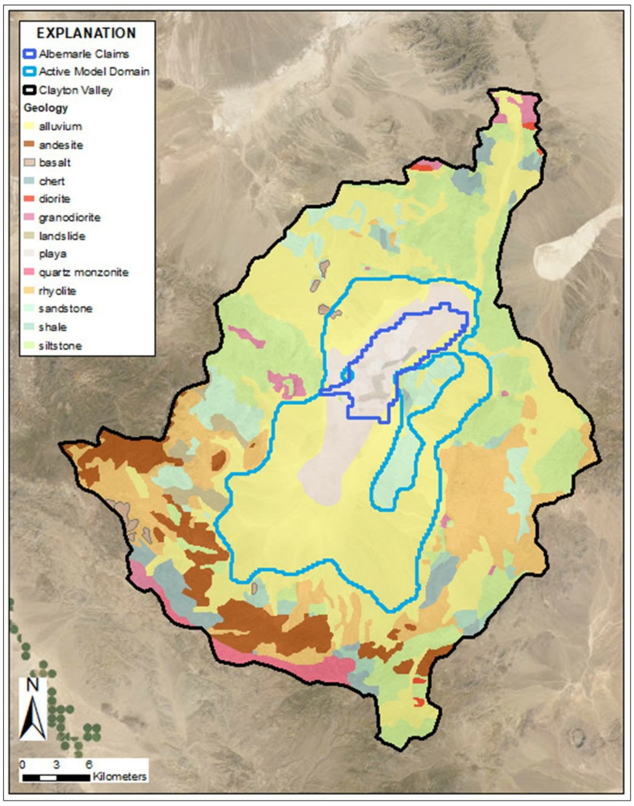
Davis and Vine (1979) suggest that throughout the Quaternary, the northeast arm of the playa was the primary location of subsidence and, therefore, of deposition. They suggest the occurrence of thick evaporite layers and muds are indicative of the lake drying up during the low precipitation periods. They also note the lake in Clayton Valley was likely shallow, relative to historic lakes in other Great Basin valleys, which are estimated to be as deep as 650 ft.

Tuff and ash beds interbedded in the basin infill materials indicate an atmospheric setting of pyroclastic material associated with large-scale volcanic eruptions along the western coast of the continent. Zampirro (2005) suggests the most likely source of the primary air falls and re-worked ash deposits is the Long Valley caldera located approximately 100 mi northwest of Clayton Valley with the main eruption period occurring 760,000 years before present. The ash beds of the Lower Aquifer System (LAS) represent re-sedimented ash-fall associated with multiple, older volcanic events (Davis and Vine, 1979). Table 6-1 lists the different hydrogeologic units present in Clayton Valley. A simplified stratigraphic column of the hydrogeologic units listed in Table 6-1 is presented in Figure 6-5.

Table 6-1: Summary of Hydrogeologic Units

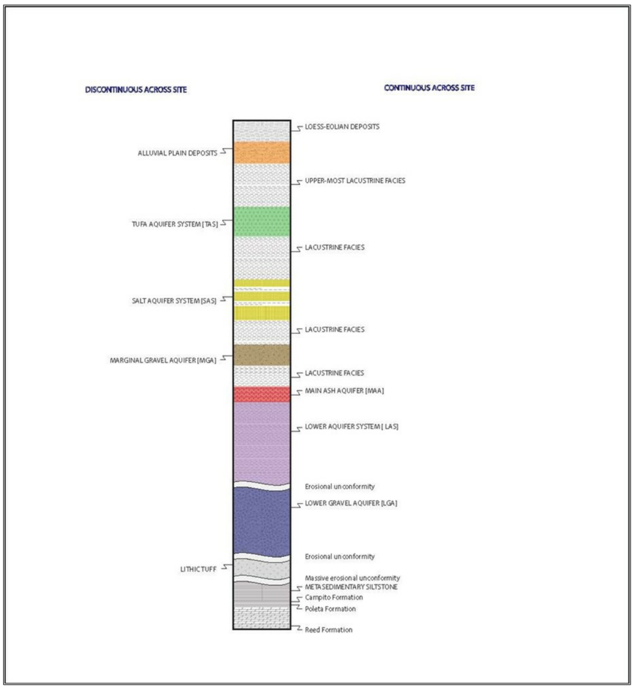
Hydrogeologic Unit	Description	Character
1	Surficial Alluvium	Aquifer
2	Surficial/Near Surface Playa Sediments	Aquitard
3	Tufa Aquifer System (TAS)	Aquifer
4	Upper Lacustrine Sediments	Aquitard
5	Salt Aquifer System (SAS)	Aquifer
6	Intermediate Lacustrine Sediments	Aquitard
7	Marginal Gravel Aquifer (MGA)	Aquifer
8	Intermediate Lacustrine Sediments	Aquitard
9	Main Ash Aquifer (MAA)	Aquifer
10	Lower Lacustrine Sediments	Aquitard
11	Lower Aquifer System (LAS)	Aquifer
12	Basal Lacustrine Sediments	Aquitard
13	Lower Gravel Aquifer (LGA)	Aquifer
14	Bedrock	Base of Playa Sediment

Source: SRK, 2021



Source: SRK, 2021; Nevada Bureau of Mines and Geology, University of Nevada, Reno, 2020

Figure 6-4: Surficial Geology in Clayton Valley



Source: WSP, 2022

Figure 6-5: Stratigraphic Column for the Silver Peak Site

Continued basin expansion during and after deposition resulted in normal faulting throughout the playa sedimentary sequence. Mineral Deposit

The lithium resource is hosted as a solute in a predominantly sodium chloride brine, and it is the distribution of this brine that is of relevance to this report. As such, the term ‘mineralization’ is not wholly relevant, as the brine is mobile and can be affected by pumping of groundwater, and by local hydrogeological variations. Davis et al. (1986) suggest that the current levels of lithium dissolved in brine originate from relatively recent dissolution of halite by meteoric waters that have penetrated the playa in the last 10,000 years. They suggest that the halite formed in the playa during the aforementioned climatic periods of low precipitation and that the concentrated lithium was incorporated as liquid inclusions into the halite crystals. They are not specific about the ultimate source of the lithium.

Zampirro (2004) points to the lithium-rich rhyolitic tuff on the eastern margin of the basin as a possible source of the lithium in brine (see Figure 6-2). In this regard, he agrees with previous authors (Kunasz, 1970; Price et al., 2000). He also notes the potential role of geothermal waters, either in leaching lithium from the tuff, or transporting lithium from the deep-seated magma chamber that was the source for the tuff.

In evaluating results from isotopic analysis of water and brine samples from throughout Clayton Valley, Munk et al. (2011) identified a complex array of processes affecting brine composition, depending on location. For brine from the Shallow Ash System, they identified a process that was consistent with that suggested above by Davis et al. (1986). Their results support a process whereby lithium was co-concentrated with chloride and then trapped in precipitated sodium chloride (halite) crystals.

However, in brine samples from other locations they found evidence that lithium did not co-concentrate with chloride, and that it was introduced to the brine at levels that were already elevated. Their results were consistent with lithium leached from hectorite (a lithium-bearing clay mineral), and they identified two possible mechanisms for accumulation in the basin. The first process involves contact between water and hectorite to the east of the basin, with subsequent transport into the basin. The second involves leaching of hectorite within the basin deposits, where it formed through alteration of volcanic sediments.

Previous work at the Site and in Clayton Valley has resulted in the definition of a six lithium-bearing aquifer system (Zampirro, 2003), as described below from depth to surface. A shows the plan view and location of two cross-sections (Figure 6-6A and Figure 6-6B) created by SRK based on its updated geological model.

LGA

The LGA is the deepest aquifer and consists of gravel with a sand and silt matrix interlayered with clean gravel. It is considered alluvial material formed from the progradation of alluvial fans into the basin. Gravel clasts are limestone, dolomite, marble, pumice, siltstone, sandstone. Zampirro (2003) reports thicknesses from 25 to over 350 ft thick. Ten wells drilled in 2021 and 2022 reached the base of the LGA. Thickness of the LGA in these ten wells ranged from approximately 105 to approximately 620 feet.

LAS

This unit consists of air-fall and reworked ash, likely from multiple volcanic sources (Davis and Vine, 1979). The individual ash beds within the LAS are variably continuous and can occur as lenses or discontinuous beds and extensive units. Zampirro (2003) reports that this unit ranges from 350 to 1,000 ft below ground surface. It is interpreted to be moderately continuous north of the Cross Central Fault. An inferred origin for some of the thinner lenses may be as pluvial events carrying reworked ash possibly from surrounding highland areas into the lake environment. Permeability in the LAS is limited due to narrow lenses of ash of lesser continuity.

MAA

This unit consists of air-fall and reworked ash. Particles range in size from submicroscopic to several inches or more (ash to pumice). The Long Valley caldera eruption and ash from the Bishop Tuff (760,000 years b.p.) is presumed to be the source of the MAA. Zampirro (2003) reported thicknesses of 5 to 30 feet (ft) and the depth to MAA ranges from 200 ft in the southwest to over 750 ft in the northeast. The MAA is considered a marker bed because of its continuity throughout the northeastern part of the playa.

MGA

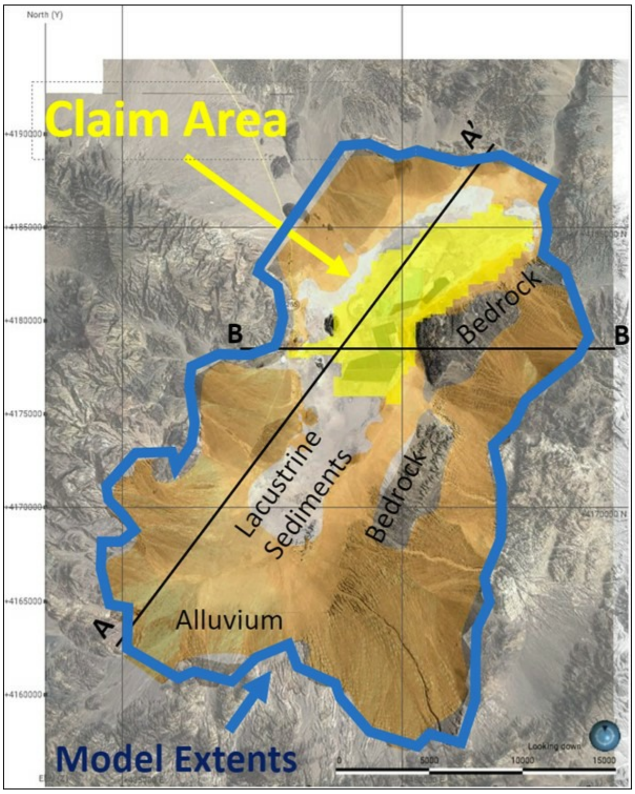
The sediments of this unit are silt, sand, and gravel. The MGA is interpreted to be alluvial fan deposits along the east-northeast trending faults (Angel Fault and Paymaster Fault) where the majority of basin drop has occurred (see Figure 6-2). Gravels were presumed to erode from the bedrock in the footwall of the fault (Zampirro, 2003). The faults are interpreted to act as hydraulic barriers between the brines and freshwater.

TAS

The TAS lies in the northwest sector of the playa. It consists of travertine deposits, likely from either (a) subaqueous vents that discharged fluid into the ancient lake, or (b) surficial hot spring terraces composed of $CaCO_3$. Limited drillholes indicate ring-like tufa or travertine formation (Zampirro, 2003).

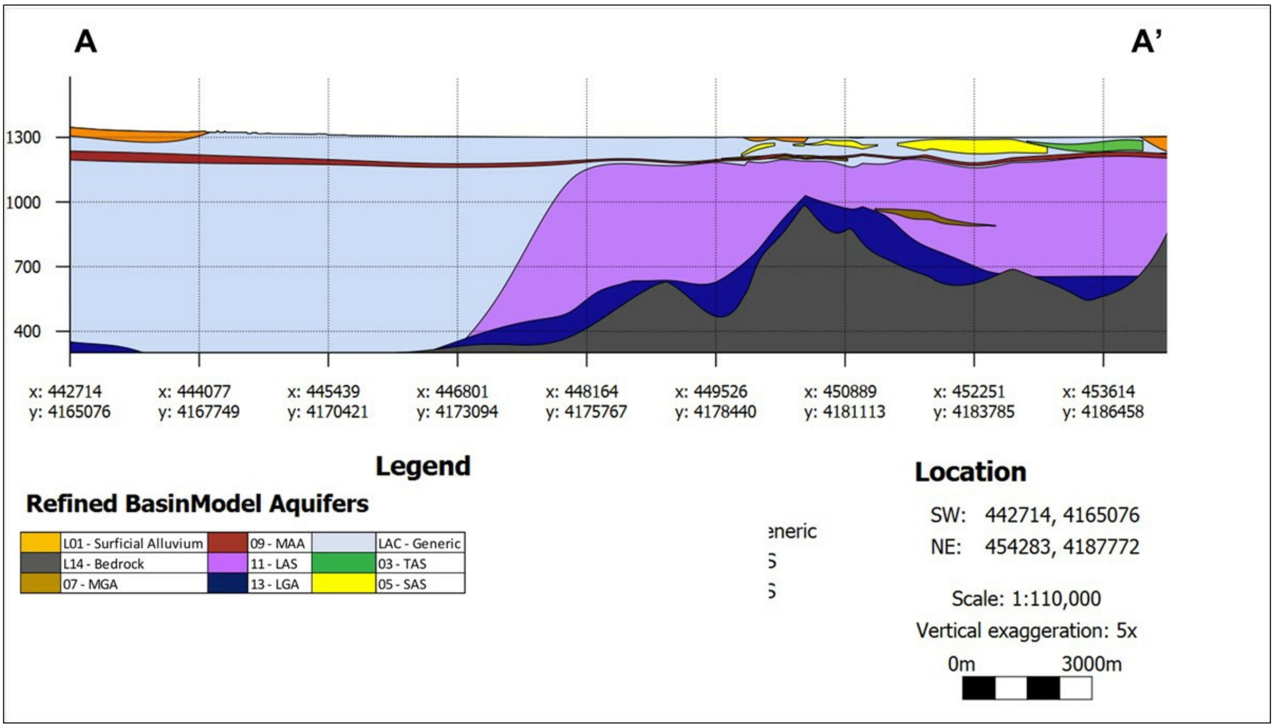
SAS

The SAS lies in the northeastern portion of the playa coincident with the lowest point of the valley. The SAS was formed by deposition in an arid lake and precipitation of salts (evaporites), primarily halite, from ponded water. It Includes lenses of salts from fractions of an inch to 70 ft in thickness with interbeds of clay, some silt and sand with minor amounts of gypsum, ash and organic matter. Some dissolution caverns are present, which can develop into sinkholes when pumped. Salt likely precipitated in lowland standing water by concentration of minerals through evaporation. Deeper salt beds are more compact.



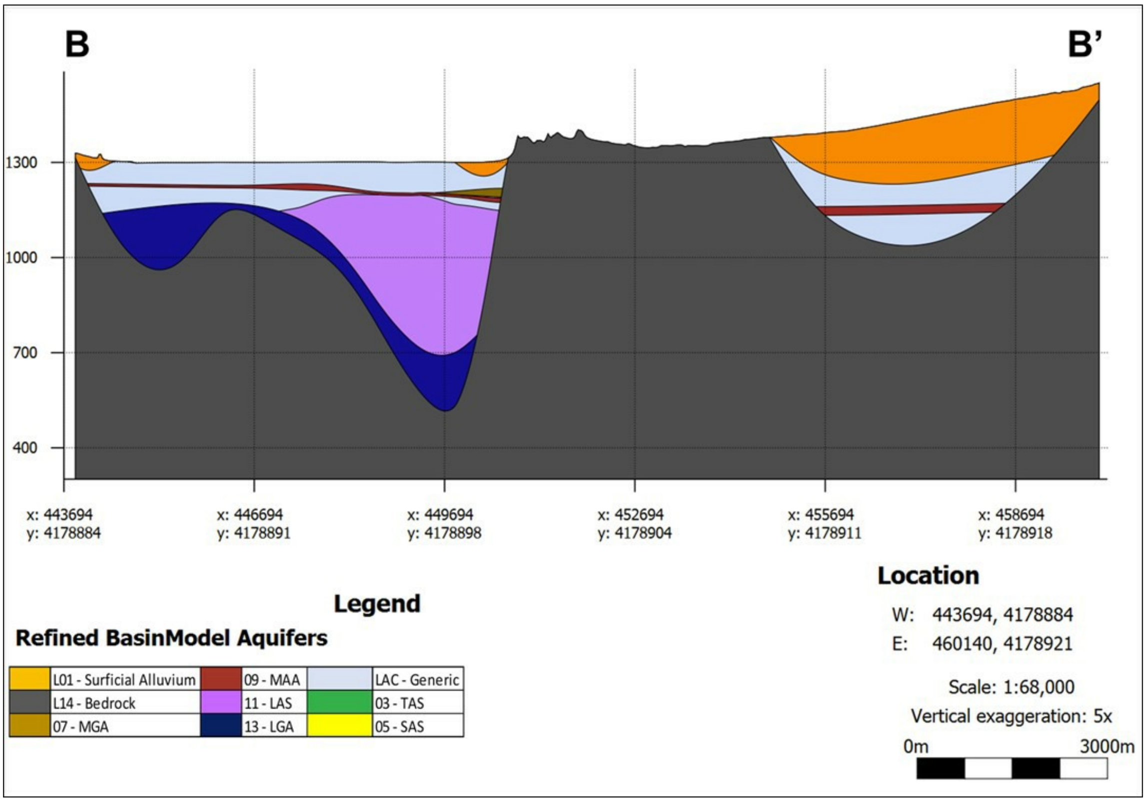
Source: SRK, 2022

Figure 6-6: Plan View of Basin with Cross-section Locations



Source: SRK, 2022

Figure 6-6A: Cross-Section A-A through the Silver Peak Property (W-E)



Source: SRK, 2022

Figure 6-6B: Cross-Section B-B through the Silver Peak Property SW-NE

7 Exploration

7.1 Exploration Work (Other Than Drilling)

The primary mechanism of exploration on the property has been drilling, mainly production wells, for the past 50 years. Additionally, other means of exploration, such as limited geophysics, have also been applied over the years (GWI, 2017).

For the purposes of the resource and reserve estimate in this report, it is SRK's opinion that active brine pumping, exploration drilling, and geophysical surveys provide the most relevant and robust exploration data for the current mineral resource estimation. Historical brine pumping and sampling are the most critical of the non-drilling exploration methods applied to this model and mineral resource estimation, as detailed in Section 11 of this report.

The area around the current SPLO has been mapped and sampled over several decades of modern exploration work. While other nearby exploration targets have been identified and developed over the years, they are not included in the mineral resources disclosed herein and are not relevant to this report.

Previous exploration at the Property was completed by Rodinia in 2009 and 2010 and by Pure Energy in late 2014 and early 2015. The current phase of exploration by PEM includes work conducted from late 2015 through June 15, 2017. The total work program completed at the Property to date has Site data collection campaigns included various geophysical methods for both surface and drillhole which included the following:

- Transient Electromagnetic (TEM)
- Controlled source electromagnetic and audio-frequency magnetotellurics (CSEM and CSAMT)
- Resistivity and induced polarization (IP)
- Gravity
- Seismic reflection
- Borehole nuclear magnetic resonance (BMR/NMR)

Recent geophysical surveys include a program conducted in the summer of 2016 consisting of three seismic surveys in the southern and central portions of the Albemarle claims. Hasbrouck Geophysics Inc. collected and processed the seismic data and Dr. LeeAnn Munk (University of Alaska Anchorage) provided geologic interpretations. Dr. Munk's geologic and aquifer top interpretations were provided to GWI and MSI on October 18, 2016.

7.1.1 Significant Results and Interpretation

SRK notes that this property is not at an early stage of exploration, that results and interpretation from exploration data is supported in more detail by extensive drilling and active pumping from production wells.

7.2 Exploration Drilling

Drilling at Silver Peak has been ongoing for over fifty years. Drilling has been primarily for production wells with limited drilling dedicated to exploration of other areas within the claims.

7.2.1 Drilling Type and Extent

Drilling methods during this time include cable tool, rotary, and RC with the results of geologic logging and brine sampling being used to support the geological model and mineral resource. The drillhole database has been compiled from several contracted drilling companies. The original cable tool drilling dates back to 1964 and the most current drilling in the database is as recent as 2019. Drilling by SPLO has been conducted for both exploration and production wells. A breakdown of the number of exploration and production wells with total meters drilled is shown in Table 7-1. 182 of the production wells had pumping records. It is SRK's understanding that several factors contributed to a well not being used for production after being drilled: some did not meet SPLO's standards (concentrations too low or too many solids in the brine) or the drilling contractor did not meet the agreed upon construction requirements, so the well was abandoned and another drilled.

Table 7-1: Drill Campaign Summary

Primary Purpose	# Holes Drilled	Total Meters Drilled[1]
Exploration	160	more than 28,000
Production	258	more than 37,000

Source: SRK, compiled from Albemarle records, 2021
[1] Total depth of many early drillhole was not recorded

Historical Drilling

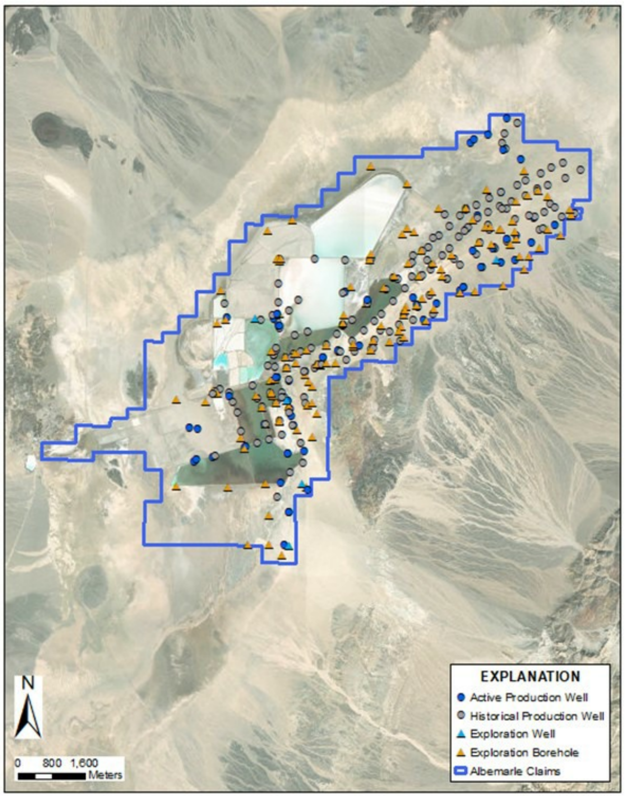
Between January 1964 and December 2019, 182 production wells have been used to extract brine from within the current Albemarle claims. Early on, the production wells were drilled to primarily target the MAA unit. Records for these early wells often include the target aquifer but do not always include the lithology observed during drilling nor the construction information for the well. Over time, as more units were discovered, production wells were added to extract brine from those units. The number of production wells per target aquifer are listed in Table 7-2.

Table 7-2: Production Well Target Aquifers

Target Aquifer	# Holes Drilled
MAA	94
LAS	23
SAS	22
TAS	7
LGA	5
MGA	3
MAA/LAS	11
MGA/MAA	9
LAS/LGA	6
SAS/MAA	2

Source: SRK, 2021

The exploration drillholes, exploration wells, and production wells drilled for the project are shown in Figure 7-1. Exploration drillholes were drilled for aid in the design of future production wells. These exploration drillholes were not converted to exploration wells for long-term monitoring. The five exploration wells at Silver Peak completed in 2017 are discussed in the next section.

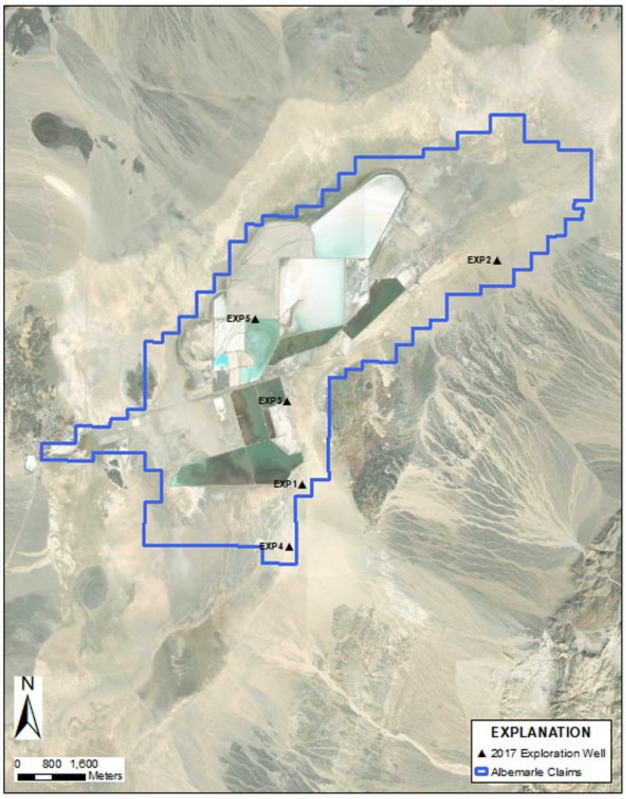


Source: SRK, 2021

Figure 7-1: Property Plan Drill Map

2017 Exploratory Drilling

Following recommendations from the GWI/MSI CM Report (2016a), SPLO drilled five deep exploratory core holes (exploration wells) to evaluate both the hydrogeologic conditions and the groundwater chemistry of the deeper zones in the basin. The five core holes include EXP1, EXP2, EXP3, EXP4, and EXP5. The five core holes were equipped with vibrating wireline piezometers to enable future monitoring of brine piezometric levels at depth. These wells were strategically located to collect depth-specific brine samples and to verify results of seismic surveys conducted in 1981 and 2016 (Munk, 2017). Locations of the five EXP wells are shown on Figure 7-2.



Source: SRK, 2021

Figure 7-2: Location of 2017 Exploration Boreholes for the SPLO

2020 Drilling

SPLO drilled four new production wells during 2020. Geology, water levels, and brine chemistry were evaluated as part of the program. The new wells are located in the northeastern and southeastern areas of mine property (Figure 7-3). A summary of the completion information for the new wells is presented in Table 7-3.

Table 7-3: New 2020 Production Wells

Well ID	Easting (m)	Northing (m)	Aquifer	Top of Screen (m bgs)	Bottom of Screen (m bgs)
3	450,206	4,177,276	MAA	112	163
8	456,119	4,183,602	MGA	47	111
15	448,350	4,179,530	MAA	70	107
22	455,303	4,185,184	TUFA	176	188

Source: SRK, 2021
Abbreviations: m = meters, bgs = below ground surface

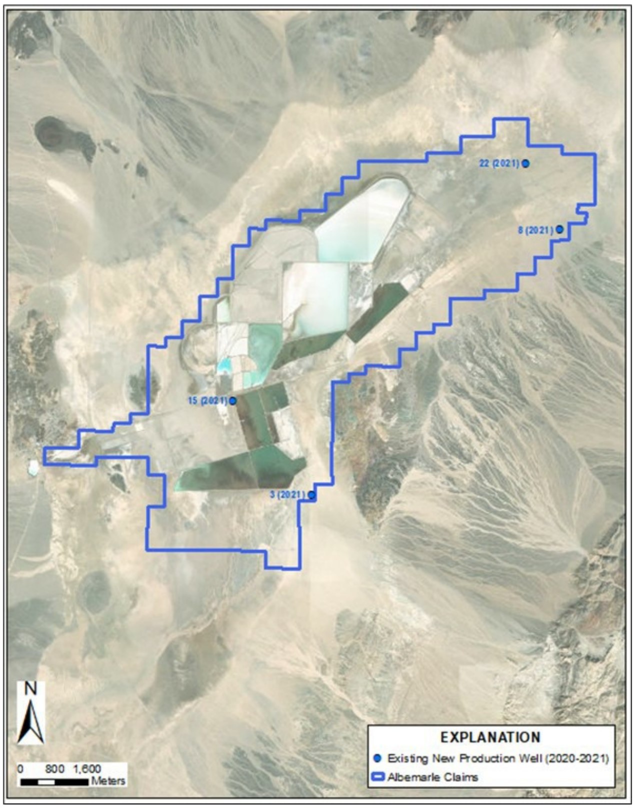
2021 Drilling

SPLO drilled 22 new and replacement production wells during late 2021 and early 2022. Geology, water levels, and brine chemistry were evaluated as part of the program. The new wells are located throughout the mine property (Figure 7-4). A summary of the completion information for the new wells is presented in Table 7-4.

Table 7-4: New and Replacement 2021 Production Wells

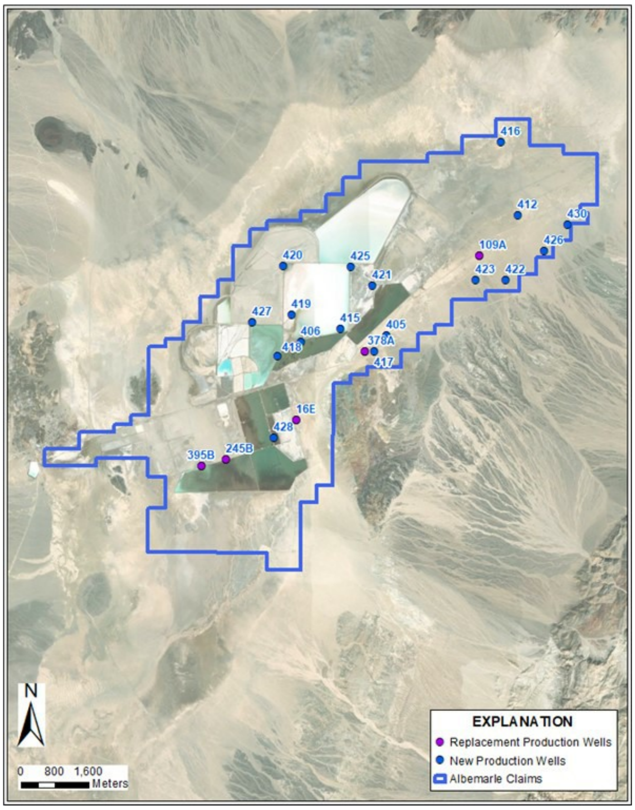
Well ID	Easting (m)	Northing (m)	Aquifer	Top of Screen (m bgs)	Bottom of Screen (m bgs)
16E	449,822	4,179,102	MAA	101	108
109A	454,165	4,183,005	MAA	210	221
245B	448,167	4,178,171	LGA	231	268
378A	451,452	4,180,729	LAS/LGA	384	494
395B	447,566	4,178,004	LGA	152	213
405	451,957	4,181,101	MAA	104	110
406	449,934	4,180,948	MAA	69	75
412	455,080	4,183,962	MAA	219	232
415	450,871	4,181,267	MAA/LGA	224 317	256 354
416	454,684	4,185,685	MAA	71	129
417	451,684	4,180,731	MAA	125	137
418	449,386	4,180,611	LGA	439	530
419	449,727	4,181,584	MAA/LAS	58 82	70 119
420	449,512	4,182,759	MGA/LGA	356	610
421	451,623	4,182,288	MAA	99	105
422	454,789	4,182,414	MGA	361	459
423	454,080	4,182,410	LGA	759	826
425	451,131	4,182,735	MGA/LGA	403 610	586 616
426	455,712	4,183,109	LGA	750	872
427	448,777	4,181,410	LGA	399	558
428	449,285	4,178,667	MAA	91	98
430	456,259	4,183,729	MGA/MAA	183 229	201 244

Source: SRK, 2022
Abbreviations: m = meters, bgs = below ground surface



Source: SRK, 2021

Figure 7-3: New 2020 Production Wells



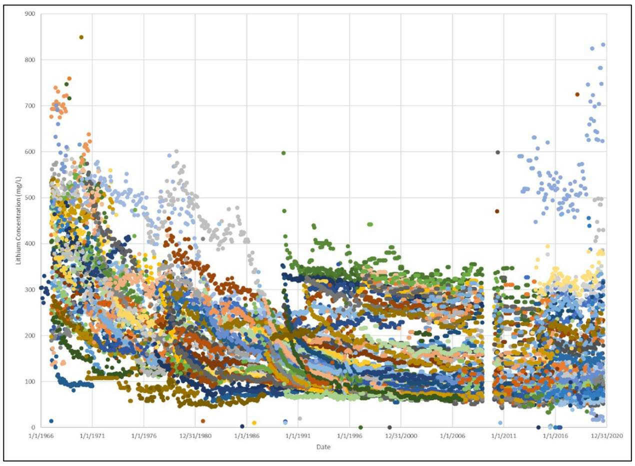
Source: SRK, 2022

Figure 7-4: New and Replacement 2021 Production Wells

7.2.2 Sampling

Historical Sampling

The majority of samples collected historically were collected from the production wells that were active during that time period. Samples were collected from sampling ports located near the wellhead of each production well. Figure 7-5 shows results of the historical samples collected from the production wells since pumping started in 1966. The different colors represent assay results from the different production wells over time. These samples were used for calibration of the numerical flow and transport model but were not used for development of the resource model. Since the historical samples were analyzed on-site, SRK chose to only use samples analyzed at an independent laboratory for the resource estimate.



Source: Compiled by SRK, 2021

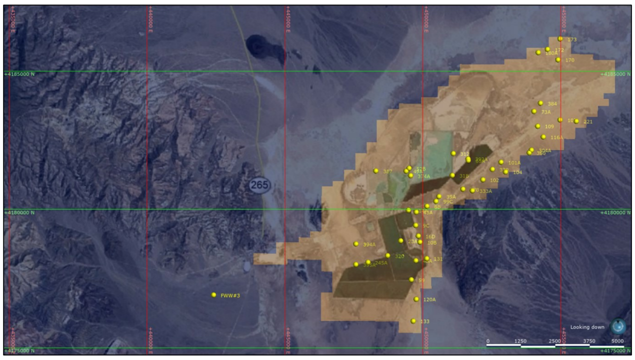
Figure 7-5: Lithium Concentrations from Historical Production Well Samples

2017 Exploration Program Sampling

During the 2017 exploration drilling program, water and/or brine samples were collected with the IPI wireline packer system. Depth specific samples were collected in each borehole. The goal was to collect samples in fluid bearing zones at least 2 to 3 ft thick. Duplicate samples were collected to allow for analysis by both the SPLO lab (internal) and SGS lab (external), details of the laboratories are discussed in more detail in Section 8.2 of this report. These samples provided knowledge of lithium concentrations in the deeper zones of the basin. These lithium concentrations were utilized in SRK's current resource estimate analysis.

2020 Sampling

Per SRK's request, samples were collected from the active production wells during August 2020. In total, 46 wells were sampled. Duplicate samples were collected to allow for analysis by both the SPLO lab and ALS labs (discussed in section 8 in more detail). The 2020 samples were used for both SRK's current resource estimate and for verification of the historical samples analyzed by the SPLO lab. 2020 Sampling locations are shown on Figure 7-6.



Source: SRK, 2020

Figure 7-6: 2020 Sampling Locations

In 2022, a new sampling campaign was conducted in order to update the resource estimate. However, the results were not available from the lab in time to be included in this report.

7.2.3 Drilling, Sampling, or Recovery Factors

SRK is not aware of any material factors that would affect the accuracy and reliability of any results from drilling, sampling, and recovery.

7.2.4 Drilling Results and Interpretation

The drilling supporting the MRE has been conducted by a reputable contractor using industry standard techniques and procedures. This work has confirmed the presence of lithium in the brine of Clayton Valley. The database used for this technical report includes 414 holes drilled directly on the Property, 160 exploration holes and 254 total production wells (not all are still active). Four new production wells were drilled by SPLO during 2020 bringing the total number of production wells to 258.Twenty-two replacement and new production wells were drilled by SPLO in late 2021 and early

2022 bringing the total number of production wells to 280 total production wells drilled to date (not all are still active). Geology, water levels, and brine chemistry were evaluated as part of the program. Drillhole collar locations, downhole surveys, geological logs, and assays have been verified and used to build a 3D geological model and in grade interpolations. Geologic interpretation is based on structure, lithology, and alteration as logged in the drillholes.

In SRK's opinion, the drilling operations were conducted by professional contractors using industry best practices to maximize representativity of the core. SRK notes that the core was handled, logged, and sampled in an acceptable manner by professional geologists, and that, the drilling is sufficient to support a mineral resource estimation.

In SRK's opinion, historical sampling was conducted by trained staff or consultants using industry practices designed to ensure collection of samples representative of the brine being extracted by the production wells and of the brine encountered at depth during drilling of the 2017 exploration program. It is also SRK's opinion that the 2017 exploration well sampling and the 2020 production well sampling are sufficient to support a mineral resource estimation.

7.3 Hydrogeology

As described above, Clayton Valley contains six primary lithium-bearing aquifers (TAS, SAS, MGA, MAA, LAS, and LGA). The remaining sediments in the basin are lacustrine sediments or shallow alluvial sediments on the basin margins. Groundwater generally flows from the basin boundaries toward the center of the basin. Pumping via production wells to extract lithium from the brine aquifers has been ongoing for over 50 years.

Hydraulic Conductivity

Various pumping tests have been conducted during the historical operations period to evaluate the permeability of each aquifer unit. These results were reviewed and provided initial values for use in the numerical groundwater flow and transport model. Table 7-5 provides a summary of the statistics about the historical testing.

Table 7-5: Summary of Pumping Tests at Silver Peak

Tested Aquifer(s)	Number of Tests	Minimum (m/d)	Maximum (m/d)	Arithmetic Mean (m/d)	Geometric Mean (m/d)	Median (m/d)
TAS	4	6.8	107	69	47	82
SAS	2	0.2	0.8	0.5	0.4	0.5
MGA	4	0.3	3.4	1.6	1.2	1.4
MGA/MAA[1]	4	1.4	6.2	3.7	3.1	3.7
MAA	21	0.6	21	7.2	5.3	6.4
MAA +[1]	3	0.2	12	4.3	1.0	0.4
MAA/LAS[1]	3	0.1	0.8	0.4	0.3	0.4
MAA/LGA[1]	1	3.2	3.2	3.2	3.2	3.2
MGA/LGA[1]	2	1.1	1.2	1.1	1.1	1.1
LAS	11	0.03	3.0	0.6	0.2	0.2
LAS/LGA[1]	4	0.2	1.3	0.6	0.5	0.5
LGA	6	0.9	3.6	2.1	1.8	1.9

Source: SRK, 2022
Abbreviations: m/d = meters per day
[1] Some pumping tests were conducted in wells screened across multiple aquifers

Specific Yield

Specific yield (Sy), or drainable porosity, has not been directly tested or analyzed by Albemarle in Clayton Valley. Literature values of specific yield for the different alluvial sediment types present in the basin were reviewed and are shown in Table 7-6. For improved defensibility of the model and of the resource estimate, a value between the mean and the minimum was used for each aquifer unit.

Table 7-6: Summary of Literature Review of Specific Yield

Hydrogeologic Unit	Description	Character	Source	Type	Minimum (%)	Maximum (%)	Mean (%)	Number of Analyses	Drainable Porosity/Specific Yield (Resource Model) (%)
			Johnson, 1967	Medium Sand	15	32	26	17	
1	Surficial Alluvium	Aquifer	Morris & Johnson, 1967	Medium Sand	16.2	46.2	32	297	20
			Fetter, 1988	Medium Sand	15	32	26	---	
			Johnson, 1967	Clay	0	5	2	15	
2	Surficial/Near Surface Playa Sediments	Aquitard	Morris & Johnson, 1967	Clay	1.1	17.6	6	27	1
			Fetter, 1988	Clay	0	5	2	---	
3	Tufa Aquifer System (TAS)	Aquifer	Morris & Johnson, 1967	Limestone	0.2	35.8	14	32	7
4	Upper Lacustrine Sediments	Aquitard	Same range as Surficial/Near Surface Playa Sediments						1
			Johnson, 1967	Clay	0	5	2	15	
5	Salt Aquifer System (SAS)	Aquifer	Morris & Johnson, 1967	Clay	1.1	17.6	6	27	1
			Fetter, 1988	Clay	0	5	2	---	
			LAC 43-101	Salt	0	5			
6	Intermediate Lacustrine Sediments	Aquitard	Same range as Surficial/Near Surface Playa Sediments						1
			Johnson, 1967	Silt	3	19	8	16	
7	Marginal Gravel Aquifer (MGA)	Aquifer	Morris & Johnson, 1967	Silt	1.1	38.6	20	266	15
			Fetter, 1988	Silt	3	19	18	---	
8	Intermediate Lacustrine Sediments	Aquitard	Same range as Surficial/Near Surface Playa Sediments						1
9	Main Ash Aquifer (MAA)	Aquifer	Morris & Johnson, 1967	Tuff	2	47	21	90	11
10	Lower Lacustrine Sediments	Aquitard	Same range as Surficial/Near Surface Playa Sediments						1
11	Lower Aquifer System (LAS)	Aquifer	Johnson, 1967	Sandy Clay	3	12	7	12	5
12	Basal Lacustrine Sediments	Aquitard	Same range as Surficial/Near Surface Playa Sediments						1
			Johnson, 1967	Medium Gravel	13	26	23	23	
13	Lower Gravel Aquifer (LGA)	Aquifer	Morris & Johnson, 1967	Medium Gravel	16.9	43.5	24	13	18
			Fetter, 1988	Medium Gravel	13	26	23	---	
14	Bedrock	Base of Playa Sediment							

Source: SRK, 2020

8 Sample Preparation, Analysis and Security

8.1 Sample Collection

Silver Peak trained staff regularly collect brine samples in bottles at the wellhead and take them to their internal laboratory on site.

The collection of brine from operating production wells is performed monthly. For those wells not in operation, samples are collected once the well is operational. When a well stops operating, samples are no longer collected. The on-site laboratory analyzes monthly samples of brine from each well to determine average wellfield lithium values. Lithium values are plotted monthly to check for variation in brine being extracted by each well and by the wellfield.

- Sampling Procedure:
  - Samples are collected over no more than a two-day period
  - Samples are collected from all operating wells:
    - Collect monthly sample bottles from lab or at liming
    - All bottles are labeled with the appropriate well name
    - All bottles are labeled with the appropriate well name
    - While checking wells, the pond operator will collect a sample at each active well listed on the Weekly Well Sheet
    - Well samples:
      - Open sample valve to rinse sand and built-up salt out of the sample valve
      - Open sample valve all the way to wash out the valve and elbow
      - Empty old brine from properly labeled sample bottle
      - Rinse the bottle with brine from the well using the valve to control the flow
      - Do not turn off the valve in the process until bottle is full
      - Cap the bottle and put back in tray
      - Check off the well number on the Weekly Well Sheet
      - Put away all tools used and proceed to next well
      - Repeat above steps for each active well
    - When all samples of operating wells are collected, take the samples to the lab
    - Turn in all paperwork to supervisor
  - Samples should be collected following a down for repair status (DFR)
  - Once well is restarted, samples should be collected for a period of three days
  - Samples are to be taken to the lab with the morning pond samples

Brine samples are securely stored inside locked containers on the secured Albemarle site.

8.2 Sample Preparation, Assaying and Analytical Procedures

SPLO maintains a laboratory, the SPLO lab, on-site for analysis of samples as part of operations. The SPLO lab is owned by the Company and has not been certified. Analyses requiring use of a certified laboratory are sent off site. Brine samples collected from the ponds and wells are run as needed per the department supervisor and are listed below:

- Ponds - Li, Ca, Mg, S, Na, and K are run when requested
- Wells - Li, Ca, Mg, S, Na, and K

All sample preparation and analytical work is undertaken at the operation's on-site laboratory under the following procedures.

- Pond Samples:
  - Filter each sample using a Whatman #2 filter
  - Tare a plastic 100 mL volumetric flask on an analytical balance
  - Using a plastic transfer pipet, add ~0.2g of sample to the flask
  - Record the sample weight
  - Using a volumetric pipet or a bottle-top dispenser, add 2 mL of concentrated HCl to the flask
  - Dilute the flask to volume with DI water and mix thoroughly
- Well Samples:
  - Filter each sample using a Whatman #2 filter
  - Tare a plastic 100 mL volumetric flask on an analytical balance
  - Using a plastic transfer pipet, add ~1.0g of sample to the flask
  - Record the sample weight
  - Using a volumetric pipet or a bottle-top dispenser, add 2 mL of concentrated HCl to the flask
  - Dilute the flask to volume with DI water and mix thoroughly

Sample analysis performed by the on-site laboratory outlined below:

- Set up the instrument to run method SPICP
- Standardize the method using standards SPICP-1, SPICP-2, SPICP-3, SPICP-4, and SPICP-5. The correlation coefficient for each element should be >0.999. The intercept for each element should be close to zero
- Enter sample name, weight, and dilution into the Sample Information File
- Analyze the sample by the method selected

The SPLO lab uses Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES) method for the determination of lithium, sodium, potassium, calcium, magnesium, and sulfate in Silver Peak pond and well samples.

As previously stated the on-site SPLO laboratory is not certified. For all EPA analysis and reporting, Albemarle is required to use a certified lab. Currently, Albemarle uses the WET Lab in Sparks NV, which is independent of the Company and EPA certified for analyses and reporting submitted to the EPA. The QP notes that the use of an uncertified laboratory is not considered to be best practice and there will always remain a risk of lower quality results from the laboratory. To reduce the risk the use of external laboratories for quality control checks is advised.

8.3 Quality Control Procedures/Quality Assurance

The mineral resource estimated and presented herein is based solely on production well samples collected in 2020 analyzed by ALS laboratories located in Vancouver, Canada, which is an independent laboratory from the Company. Samples collected in 2017 while drilling the EXP wells analyzed by SGS Laboratory located in Lakefield, Ontario. Both of these laboratories are independent of the company and are established ISO-certified. SGS Laboratory is accredited by the Standards Council of Canada (SCC) and conforms to the requirements of ISO/IEC 17025 for specific tests. SPLO sampling is exclusively utilized for calibrating the numerical model for the estimation of reserves.

8.3.1 Historical Samples – On-Site Laboratory

Operations personnel continuously collect brine samples at both wellheads and ponds. These samples are sent to the on-site laboratory for testing. Early in Silver Peak production, duplicates were taken for all brine samples collected from ponds and wells and sent to a third-party laboratory. Currently, the samples are only tested on site.

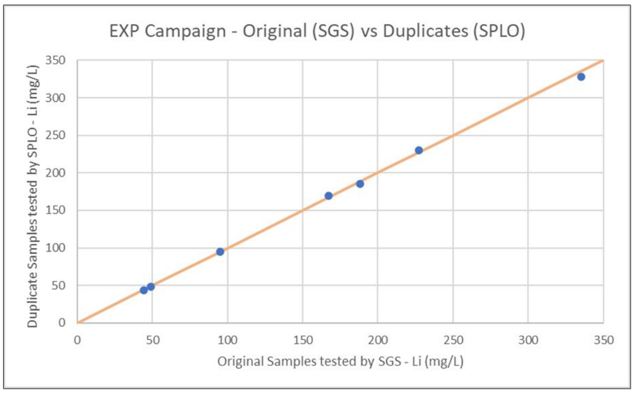
The historical brine samples collected at pumping well heads were used for a qualitative indication of brine grade persistence over the prolonged pumping periods. They were also used quantitatively in developing the grade interpolations as input to the numerical groundwater model.

SRK notes that, while comprehensive QAQC or independent verification of sampling has not been a continuous part of the SPLO lab, that the Silver Peak operation has been producing lithium from brines for 50 plus years. Production has continuously been consistent with reserve planning from the brine reservoir. The QP notes that this continuous production and reasonable performance has significant weight in the confidence determination for the current mineral resource and reserve. Based on this, SRK considers the supporting data and information of sufficient quality to support Measured, Indicated, and Inferred mineral resources.

8.3.2 2017 EXP Campaign – SGS Laboratory

As described in Section 7.2.2, during the 2017 EXP drilling campaign (consisting of five drillholes, EXP1 through EXP5) brine samples were collected at depth specific intervals. Duplicate samples were collected to allow for analysis by both the SPLO lab and SGS labs. A total of 56 samples were collected, including seven duplicates that were sent to the SPLO on-site laboratory for comparison.

Figure 8-1 shows the comparison between the original sample results from the SGS Laboratory vs. the assay results from duplicates tested at the SPLO on-site laboratory. The difference in Li concentration results is +-2% at a maximum in some samples.



Source: SRK, 2021

Figure 8-1: Comparison of Duplicates Results – 2017 EXP Drilling Campaign

The field duplicate data for lithium at both SGS and SPLO confirms that the brine samples are homogeneous, and that the data from the EXP campaign can be considered to be representative.

8.3.3 2020 Sampling – ALS Laboratory

During 2020, Albemarle collected, on SRK's behalf, brine samples from 46 wells that were sent to ALS Laboratory in Vancouver, Canada for testing. Duplicates were collected in every well and analyzed at the SPLO laboratory for comparison, see Section 9.1 for details on this comparison.

8.4 Opinion on Adequacy

SRK has reviewed the sample preparation, analytical, and Quality Assurance/Quality Control (QA/QC) practices employed by consultants for samples analyzed by SGS lab and by Albemarle for samples analyzed by ALS lab to support the resource estimate. SRK has also reviewed the sample preparation, analytical, and the QA/QC practices employed by Albemarle for samples analyzed by the on-site SPLO lab to support calibration of the numerical model. SRK notes the following:

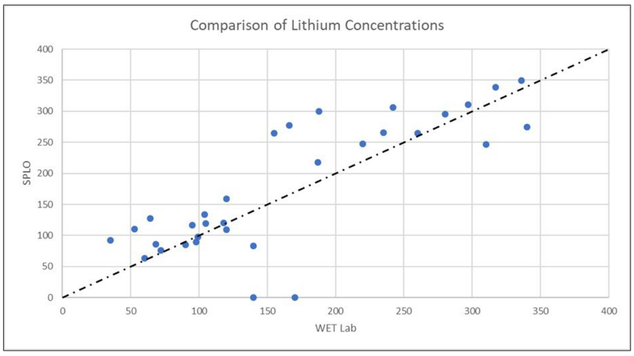
The data supporting the mineral resource and reserve estimates at Silver Peak have not been fully supported by a robust QA/QC program. This potentially introduces a risk in the accuracy and precision of the sample data. However, this risk has been mitigated through consistency of results from recent samples analyzed by both an independent third-party laboratory (ALS) and the on-site SPLO lab. The risk has also been mitigated through the inherent confidence derived from 54-year history of consistent feed to the processing plant producing lithium carbonate at Silver Peak. It is the QP's opinion that the results are therefore adequate for the intended use in the associated estimates.

9 Data Verification

9.1 Data Verification Procedures

The primary data verification process was completed through August 31, 2020. This provided SRK perspective on the analytical methodology, logging, sampling criteria, chain of custody, and other important factors as they were designed and addressed throughout data collection.

SRK advocated for collection of independent sampling to support the mineral resources based on a comparison of previous sampling results between the SPLO lab to an external lab. Silver Peak operations annually sends samples to the Western Environmental Testing (WET) Laboratory and submits the results to the U.S. Environmental Protection Agency (EPA) as part of their permit agreements. SRK compared the nearest time window of sampling from SPLO to these annual WET lab submissions for the purposes of data verification. Lithium concentrations from these samples were significantly different from lithium concentrations analyzed by the SPLO lab, as shown in Figure 9-1. Analytical methodologies utilized for the WET lab are different than those used by SPLO, and this could be a source of the differences in analysis results. Therefore, the WET lab samples were not used as part of the resource or reserve estimate analyses.



Source: SRK, 2020
Units: mg/L

Figure 9-1: Comparison of Historical Lithium Concentrations, SPLO Lab to EPA WET Lab

As described in 7.2, in August 2020, SRK requested Albemarle to collect a set of additional brine samples from the active production wells for independent verification of results from the on-site laboratory. These samples were collected in duplicates. One sample per well was sent to ALS Laboratory in Vancouver, Canada (an independent laboratory to the Company), and its duplicate was sent to the on-site Albemarle laboratory for comparison. ALS Vancouver has extensive experience with lithium analysis for both exploration and metallurgy projects.

Brine samples were shipped to ALS, where they were received, weighed, prepared, and assayed. Sample preparation was completed using the process detailed in Table 9-1.

Table 9-1: Sample Preparation Protocol by ALS

ALS Code	Description
WEI-21	Received Sample Weight
LOG-22	Sample login – Rcd w/o barcode
SND-ALS	Send samples to internal laboratory

Source: ALS, 2020

Analysis completed by ALS focused on lithium but included a 15-element analysis package as described in Table 9-2. The associated elements and detection limits are available on the ALS website and in the analytical package catalogue.

Table 9-2: ALS Primary Laboratory Analysis Methods

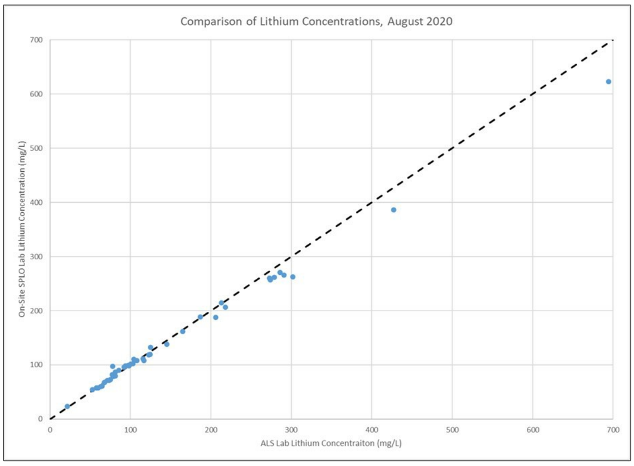
Method Code	Description	Instrument
ME-ICP15	Lithium Brine Analysis – ICPAES	ICP-AES

Source: ALS, 2020

SRK visited the on-site laboratory at Silver Peak on August 18, 2020 and September 2022. The QP considers that the field methods and analytical procedures in this study are rigorous and appropriate for estimating resources and reserves.

The historical samples analyzed during the more than 50-year production period were not used for SRK's current resource estimate analysis; they were used to calibrate the numerical flow and transport model developed to simulate a reserve estimate. These samples were used to ensure that the numerical model adequately represents changes in groundwater flow and lithium concentrations between 1966 and June 2022. There is no way to independently verify all the historical data.

To verify the methods used by the SPLO lab, SRK requested that SPLO collect duplicate samples in August 2020 as described in Section 7.2. Percent difference between lithium concentrations for each set of samples ranged from 0.1% to 23.0% with an average of 4.7%. Lithium concentrations from samples analyzed by the on-site SPLO lab are compared to those analyzed by the ALS lab in Figure 9-2. The overall match of results between the two labs provided confidence that the analysis methods used by the SPLO lab were consistent with methods used by the external lab, ALS, and that the SPLO lab yielded results adequate for use in calibrating the numerical model. There is an apparent bias in the results from the ALS lab at concentrations larger than approximately 250 mg/L. Though this may mean that the SPLO lab is under-representing the amount of lithium in wells with concentrations larger than 250 mg/L, these do not have a material effect on their use in calibrating the numerical model. SRK has limited the impact of samples greater than 250 mg/L utilizing high yield limit restrictions in the estimation, and notes that very few samples overall greater than this value contribute to the estimation.



Source: SRK, 2020

Figure 9-2: Comparison of Lithium Concentrations, August 2020

9.2 Limitations

The primary data supporting the mineral resource estimation are drilling and brine sampling. SRK was provided analytical certificates in both locked PDF format and Excel (csv) spreadsheets for the August 2020 brine sample data used in the mineral resource estimation. Verification was completed by compiling all the spreadsheet analytical information and cross referencing with the analytical database for the project. This comparison showed no material errors but represents only the ALS portion of the sampling dataset.

All the data collected historically could not be independently verified. However, verification of the samples collected in August 2020 and analyzed by an independent lab provided confidence in the methods used and results of samples analyzed by the on-site SPLO lab.

9.3 Opinion on Data Adequacy

In SRK's opinion, the data is adequate and of sufficient quality to support mineral resource and reserve estimations. Data from SGS labs and ALS labs, independent certified labs with experience analyzing lithium, were used for developing the resource estimate. 54 years of historical sampling at production wellheads and at ponds that supported a consistent feed to the processing plant producing lithium carbonate provides additional verification of the historical data used for calibration of the numerical model.

10 Mineral Processing and Metallurgical Testing

Silver Peak is an operating mine with more than 50 years of production history. At this stage of operation, the facility relies upon historic operating performance to support its production projections and, therefore, no metallurgical testwork has been relied upon to support the estimation of reserves documented herein. In the QP's opinion over 50 years of production history is adequate to define the recoveries and operating performances at the current level of study.

11 Mineral Resource Estimates

The Mineral Resource estimate presented herein represents the latest resource evaluation prepared for the Project in accordance with the disclosure standards for mineral resources under §§229.1300 through 229.1305 (subpart 229.1300 of Regulation S-K).

11.1.1 Geological Model

In constraining the MRE, an updated geological model was constructed to approximate the geological features relevant to the estimation of Mineral Resources, to the degree possible, given the data and information generated at the current level of study. As a result, the model defined hydrogeological units based on geology and hydraulic properties. GWI/Matrix Solutions developed a detailed geological model to aid in both exploration and production planning. SRK revised and further developed this model to provide a basis for the MRE, in collaboration with GWI/Matrix Solutions geologists and Albemarle personnel, to leverage the site-based expertise and improve the overall model consistency.

The geological model is composed of multiple features which have been modeled to either be independent of each other or, in some cases, may depend on the results from another modeling process.

The combined three dimensional (3D) geological model was developed in Leapfrog Geo software (v5.1.1). In general, model development is based on the following:

- Interpreted Geophysical Data (historic and modern)
  - TEM
  - CSAMT
  - Seismic
  - Downhole
- Drillhole Data
- Surface Geologic Mapping (historic and modern)
- Interpreted cross sections (historic and modern)
- Surface/downhole structural observations
- Interpreted polylines (surface and sub-surface 3D)

In SRK's opinion, the level of data and information collected during both the historical and modern exploration efforts is sufficient to support the geological model and the MRE.

Hydrogeological Units

The geological model within the patented and unpatented mining claims was developed from borehole logging, geological mapping, and geophysical interpretations. Outside of the mining claim boundaries the geological model was developed using geophysical interpretations, geological mapping, limited drill core data, and assumptions based on information from within the mining claim boundaries. Figure 11-2 shows the geological model domain.

Units are generalized for model purposes to those which have similar hydrogeological characteristics which may be relevant to the project and any downstream mining studies. The following hydrogeological units were modeled:

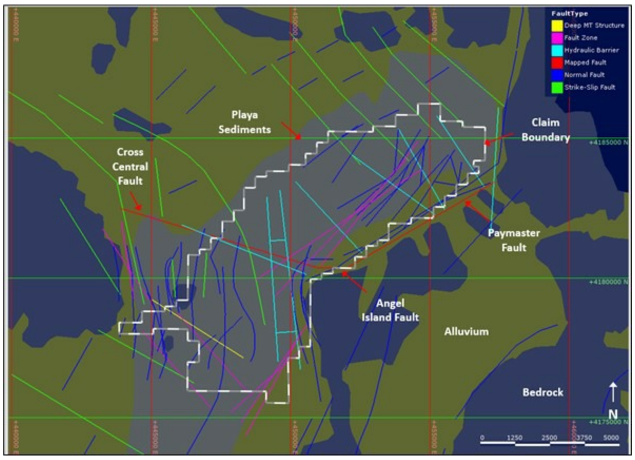
- Surficial Alluvium

- TAS
- SAS
- MGA
- MAA
- LAS
- LGA
- Lacustrine Sediments
- Bedrock

The top of bedrock is the lowest extent of the modeled aquifers. Surface outcrop maps and geophysical interpretation informed the modeled bedrock contact surface outside of the mining claim boundaries, where there are few subsurface data sources. Aquifer thickness, continuity, and extent, as defined by available data, were applied to build the geological model. The conceptual geological model presented in Section 6, above, guided the construction of the 3D volumes of the hydrogeological units). Generally, the coarse deposits that comprise the gravel aquifers occur on the basin margins, while the fine-grained deposits occur in the center of the basin. Figure 11-3 and Figure 11-4 show geological cross-sections within the geological model domain.

Structural Setting

The structural understanding within the project area is primarily inferred with the exception of the Paymaster, Cross Central, and Angel Island Faults (see Figure 6-2). Inferred structures are shown on Figure 11-1 generated from seismic, resistivity, and gravity surveys. Currently structures are not incorporated into the geologic model.

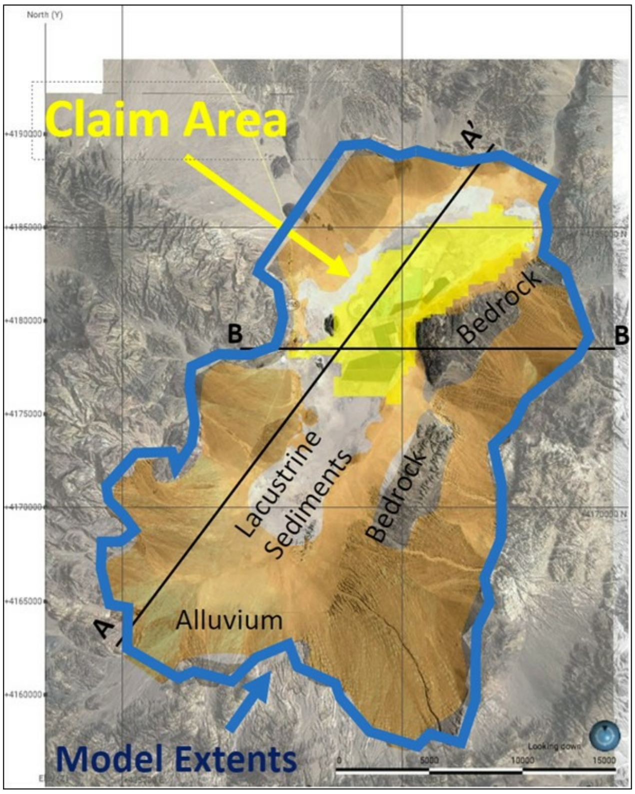


Source: SRK, 2021

Figure 11-1: Structural Setting - Silver Peak

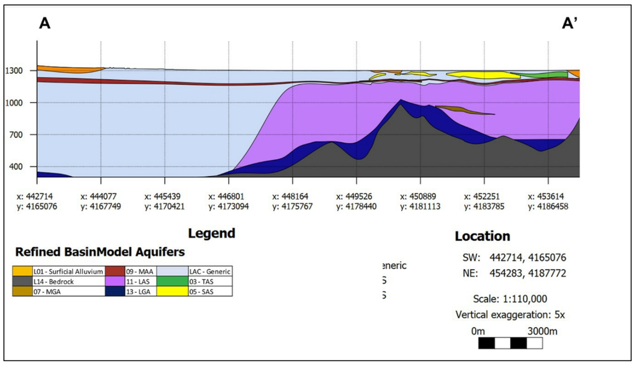
Resource Domain Model

The resource was calculated using the current claim areas 1, 2, and 3 to limit the extension of the block model. The total surface area is 5,381.9 ha including the aquifers and aquitards presents in the subsurface and excluding the bedrock.



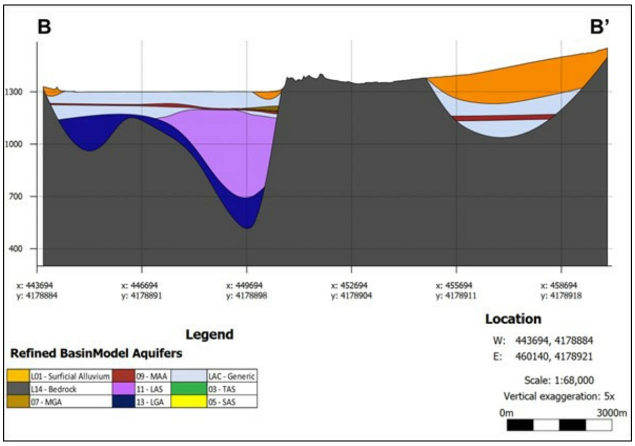
Source: SRK, 2020

Figure 11-2: Geological Model Domain



Source: SRK, 2022

Figure 11-3: Cross-Section A-A through the Silver Peak Property (W-E)



Source: SRK, 2022

Figure 11-4: Cross-Section B-B through the Silver Peak Property SW-NE

11.2 Key Assumptions, Parameters, and Methods Used

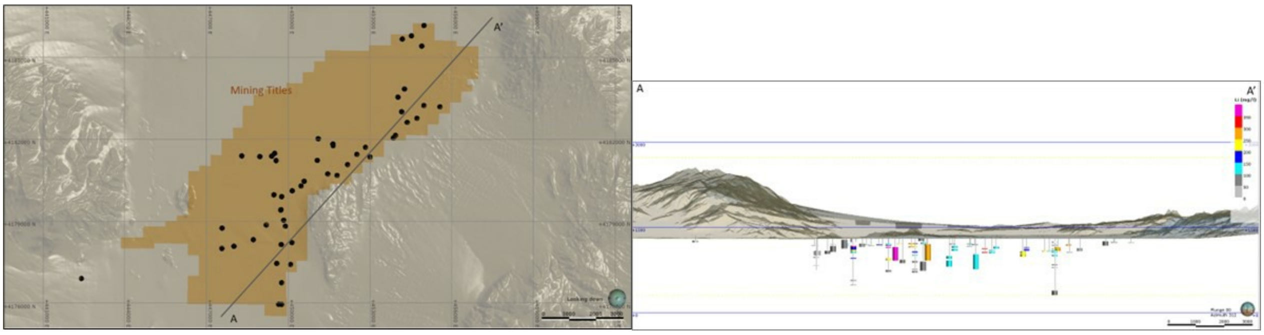
This section describes the key assumptions, parameters, and methods used to estimate the mineral resources. The technical report summary includes mineral resource estimates, effective September 30, 2022.

The coordinate system used on this property and for this MRE is NAD 1983 UTM. All coordinates and units described herein are done in meters and metric tons, unless otherwise noted. This is consistent with the coordinate systems for the project and all descriptions or measurements taken on the project.

The Mineral Resources stated in this report are entirely located on Albemarle’s patented and unpatented mining claim property boundaries and accessible locations currently held by Albemarle as of the effective date of this report. All conceptual production wells used to estimate brine resources have been limited to within these boundaries as well. Detail related to the access, agreements, or ownership of these titles and rights are described in Section 3 of this report.

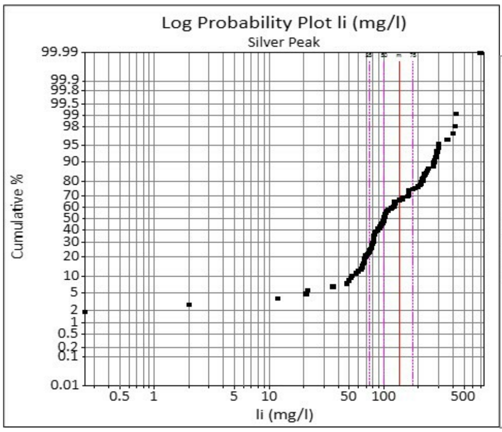
11.2.1 Exploratory Data Analysis

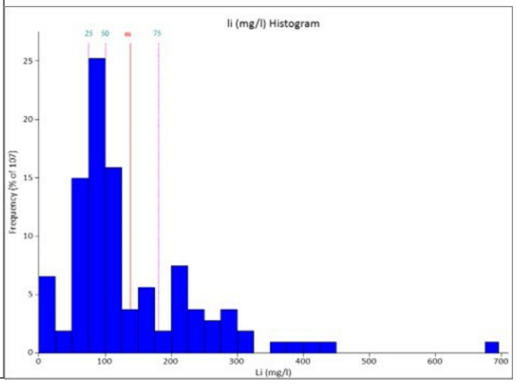
The raw dataset of lithium concentrations is characterized by sampling at certain points along the bore hole. shows the location of the drillholes in plan view and the raw lithium data (mg/l) in the sectional view. The distribution of the information is heterogeneous across the property and is primarily focused on the southeastern margin of the playa. The plan view presented in the upper image of Figure 11-5, the differences in sample lengths and the distribution of them in elevation can be seen. Figure 11-6 presents the log probability plot, histogram, and statistics of the raw data of lithium.



Source: SRK, 2020
Scales in meters

Figure 11-5: Drillhole Locations in Plan View (top) and Lithium Samples in Sectional View A-A’ (bottom)





Column	Count	Minimum	Maximum	Mean	Variance	StDev	CV
Li (mg/l)	107	0	694	137.925	11,278	106.2	0.77

Source: SRK, 2020

Figure 11-6: Summary Raw Sample Statistics of Lithium Concentration – mg/l, Log Probability and Histogram

11.2.2 Drainable Porosity or Specific Yield (Sy)

The drainable porosity or Sy in Silver Peak was estimated from literature values based on each lithology and the QP's experience in similar deposits. The values used in the resource analysis are shown in Table 7-6. The Sy values were assigned to each block in the block model according to lithology.

11.3 Mineral Resources Estimate

The parameters for a brine resource estimation are:

- Aquifer geometry (volume)
- Drainable porosity or Sy of the hydrogeological units in the deposit.
- Lithium concentration

Resources may be defined as the product of three parameters listed above. Silver Peak estimated resources were defined as mineral resources exclusive of mineral reserves.

Lithium concentration samples description and analysis are shown, as part of the interpolation methodology used. Block model details and validation process are also described.

11.3.1 Compositing and Capping

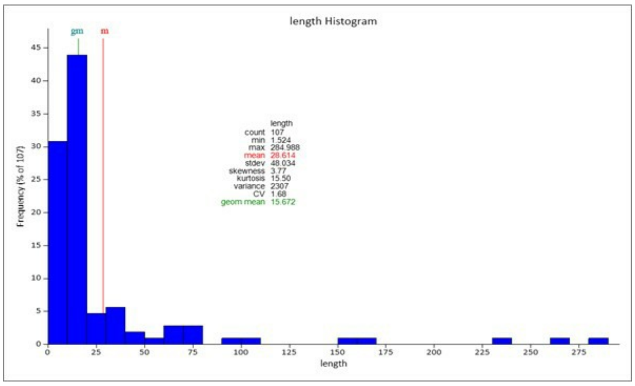
High grade capping is normally performed where data used for an estimation are considered to be part of a different population. Capping is designed to limit the impact of these outliers by reducing the grades of outliers to some nominal value that is more comparable to the majority of the data. The capping technique is appropriate for dealing with high grade outlier values, in this case the lithium concentration. The data was verified, and hydraulic test results were analyzed including the review of high-yield outlier data to determine whether top cutting or capping was required that may bias or skew data for statistical and geostatistical analyses. The hydrogeological aspects related to this type of lithium deposit were considered. Based on the analysis of the statistical information (log-probability plot) and due to the fact that high concentration values were considered part of the same brine system and have been register along the historical production, SRK determined that no capping applied to the lithium data is required.

To limit the impact of moderate to high concentrations of lithium (not outliers) in areas with a limited quantity of data and characterized by lower concentrations of lithium, a Vulcan software tool to exclude distant high yield samples was used during the estimation. Samples with concentrations of lithium higher than 250 mg/l were limited to a radius of 2,000 m x 2,000 m x 100 m. The lithium threshold (250 m/l) was defined from the analysis of the probability plot (Figure 11-6) selecting a concentration approximately where the curve slope changes, and the values are discontinuous (87^{th} percentile). The radius used was defined based on the visual inspection of the distribution of grades in the relevant hydrogeological units. In addition, the experimental semi-variogram shows a steady increase of the variance up to approximately 2,000 m, although it remains above the variance of the data.

Previous to the grade interpolation, samples need to be regularized to equal lengths for constant sample volume (Compositing). The raw sampling data for lithium is characterized by variable lengths and discontinuous sampling along the drillholes. Figure 11-7 presents a histogram of the raw sample lengths. Given the nature of the hydraulic sampling and the differences in lengths, SRK selected a composite length of 25 meters (m), resulting in an increasing number of composites compared with the number of raw sample intervals. The compositing was performed using the compositing tool in Maptek Vulcan software.

Most of the production wells extract brine from both aquifers and aquitards. Therefore, the sample collected in those wells represents the lithium concentration from both sources, however most of the brine contribution is from the aquifers. To breakdown by geology, the composites were flagged using the lithology 3D volumes (Wireframes) differentiating the aquifer and aquitard units (lacustrine sediments – LAC). In these cases, only the composites flagged as aquifers were considered.

Table 11-1 shows the comparative statistics for the raw samples and the resulting composites. In general, SRK aims to limit the impact of the compositing to less than 5% change in the mean value after compositing. A change of 4% in the mean value is observed.



Source: SRK, 2020

Figure 11-7: Histogram of Length of Samples of Lithium (mg/l)

Table 11-1: Comparison of Raw vs Composite Statistics

Data	Element	Count	Minimum (mg/l)	Maximum (mg/l)	Mean (mg/l)	Variance	StDev	CV
Samples	Lithium	107	0	694	137.9	11,278	106.2	0.77
Composites	Lithium	248	0	694	143.5	11,570	107.6	0.75

Source: SRK, 2020

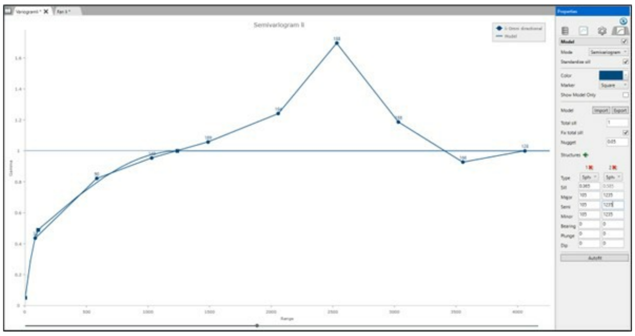
11.2.1 Spatial Continuity Analysis

The spatial continuity of lithium at the Silver Peak property was assessed through the calculation and interpretation of variography. The variogram analysis was performed in Vulcan™ software (version 11.0.4).

The following aspects were considered as part of the variography analysis:

- Analysis of the distribution of data via histograms
- Down-hole semi-variogram was calculated and modeled to characterize the variability
- Experimental semi-variograms were calculated to define directional variograms for the main directions defined from the fan variograms analysis though results were inconclusive
- Omnidirectional variogram was modeled using the nugget and sill previously defined
- The total sill was normalized to 1.0

The lithium drilling data are heterogeneously distributed across the property, therefore, the determination of dominant anisotropy of lithium was not possible. The QP determined an omnidirectional variogram model was preferred for the neighborhood analysis and estimation. The graphical and tabulated semi-variogram for lithium is provided in Figure 11-8 and Table 11-2 respectively.



Source: SRK, 2020

Figure 11-8: Experimental and Modeled Omnidirectional Semi-Variogram for Lithium

Table 11-2: Modeled Omnidirectional Semi-Variogram for Lithium

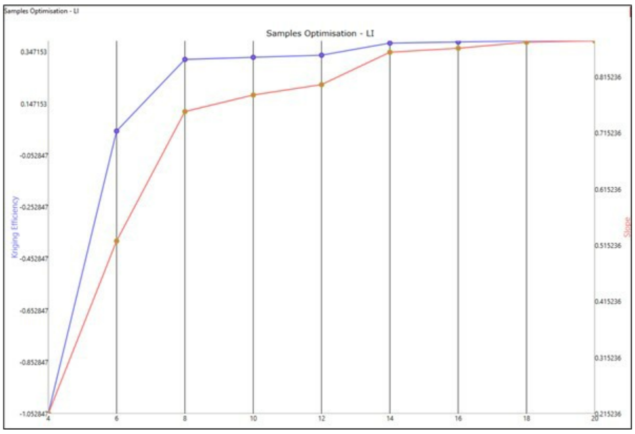
Variable	Rotation	Type	Co	C1	A1 X (m)	A1 Y (m)	A1 Z (m)	C2	A2 X (m)	A2 Y (m)	A2 Z (m)
Lithium	-	SPH	5%	36.5%	105	105	105	58.5%	1,235	1,235	1,235

Source: SRK, 2020

The variogram provided parameters for estimation of a nugget effect is 5% with maximum range at 1,235 m in terms of continuity.

11.4 Neighborhood Analysis

Based on the results of the variography analysis, a neighborhood analysis was completed on the lithium data. This analysis provides a quantitative method of testing different estimation parameters and, by accessing their impact on the quality of the resultant estimate, supporting the selection of the appropriate value of each parameter. The slope or regression value (SOR) and kriging efficiency (KE) were used as the determining factors to optimize the kriging search neighborhood. The number of samples is a parameter evaluated with this analysis as shown in Figure 11-9.



Source: SRK, 2020

Figure 11-9: Neighborhood Analysis on Number of Samples for Lithium

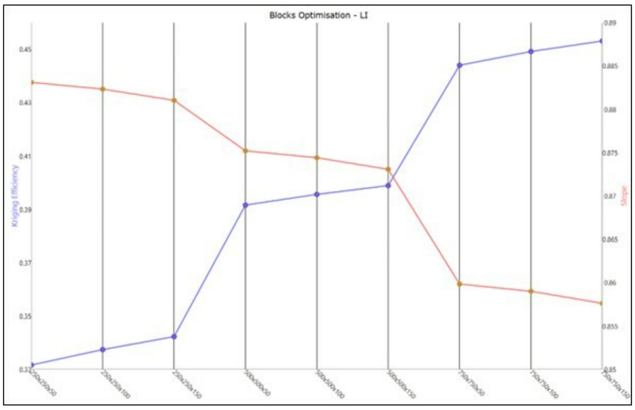
The summary neighborhood parameter used for the estimation of lithium is summarized in Table 11-3.

Table 11-3: Summary Search Neighborhood Parameters for Lithium

Variable	SDIST X (m)	SDIST Y (m)	SDIST Z (m)	Rotation	Min # Composites	Max # Composites	Max # Composites per Drillhole
Lithium	4,000	4,000	200	No Rotation	1	8	2

Source: SRK, 2020

The block size was selected based on the data spacing and the reasonable values of slope of regression and kriging efficiency obtained from the neighborhood analysis (the blue circle on Figure 11-10). The block size selected is 500 m x 500 m x 50 m (X, Y, Z coordinates).



Source: SRK, 2020

Figure 11-10: Outputs from the Block Size Optimization Analysis

11.4.1 Block Model

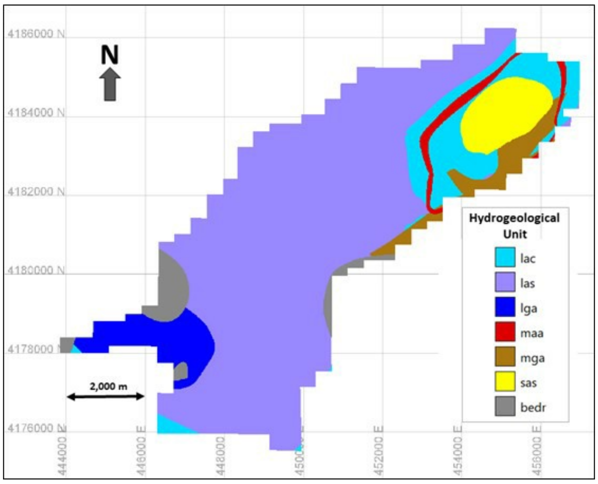
A block model was constructed in Maptek's Vulcan™ software (version 11.0.4) for the purposes of interpolating grade and tonnage. The block model was sub-blocked along geological and mineral claim boundaries. The dimensions of the parent cell size used are 500 m for X, 500 m for Y and 50 m for Z. The minimum sub-blocks sizes used are 10 m x 10 m x 1 m. Grade interpolation was performed on parent cells. The block model limits were defined by the mineral claim polygons with the extents of the block model shown in Table 11-4. Blocks were visually validated against the 3D geological model and the mineral claim boundaries.

Table 11-4: Summary Silver Peak Block Model Parameters

Dimension	Origin (m)	Parent Block Size (m)	Number of Blocks	Min Sub Blocking (m)
X	433,500	500	55	10
Y	4,156,000	500	70	10
Z	-300	50	50	1

Source: SRK, 2020

The blocks were flagged with the hydrogeological units and mineral claims identifiers. Figure 11-11 presents the hydrogeological unit color coded block model (2022 updated geological model).



Source: SRK, 2022

Figure 11-11: Plan View of the Silver Peak Block Model Colored by Hydrogeological Unit (1,125 masl Elevation)

11.4.2 Estimation Methodology

For the 2022 estimate, the lithium input information was not updated and therefore the process, results and validations done for the lithium estimate have not changed. Changes in the geological model volumes has resulted in the changes in the Mineral Resource estimates, but these are related to the geological changes and the specific yield of each unit and not the estimation processes, therefore, in the present document the same information presented in the previous technical summary report is maintained.

SRK used the composited data flagged as aquifer to interpolate the lithium grades into the block model using Ordinary Kriging (OK). A single search pass was performed with the ellipsoid of 4,000 (X) x 4,000 (Y) x 200 m (Z).

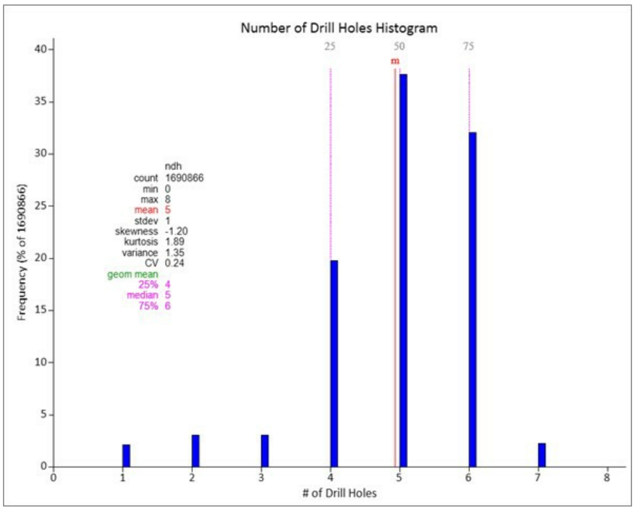
A sensitivity analysis was performed by varying the estimation method and search pass strategy (single and multiple) to compare the resultant data for validation purposes, where the expert hydrogeological criteria was considered, including the historical information of the behavior of the concentration of lithium in production drillholes. The grade estimations were completed in Maptek's

Vulcan[TM] software (version 11.0.4) using OK, Inverse Distance weighting (ID2) and nearest neighbor (NN) estimation. SRK completed the following scenarios:

- Three-pass nested search varying the size of the ellipsoid in the Z dimension (50 and 100 m)
- One-pass search in three scenarios: 3,000 m x 3,000 m x 200 m, 4,000 m x 4,000 m x 200 m and 5,000 m x 5,000 m x 200 m.

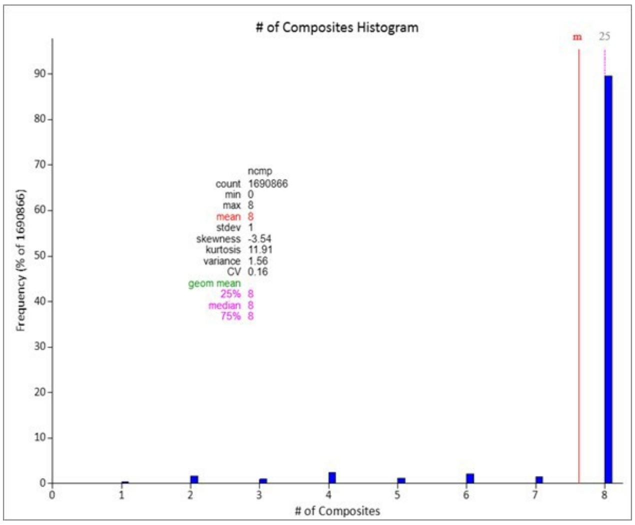
SRK completed visual and basic statistical tests and elected to use the OK estimates using the 4,000 m x 4,000 m x 200 m ellipsoid as being most representative of the underlying data and the type of lithium deposit (Table 11-3).

Figure 11-12 through Figure 11-14 show the results of the estimation in terms of number of drillholes, number of composites, and the distances from the blocks to the composites used during the estimation. It is observed that most of the blocks were estimated with four or more drillholes and with eight composites. The distance between the blocks and the composites used during the estimation has an average of 1,594 m and, in most cases, distances were less than 2,000 m.



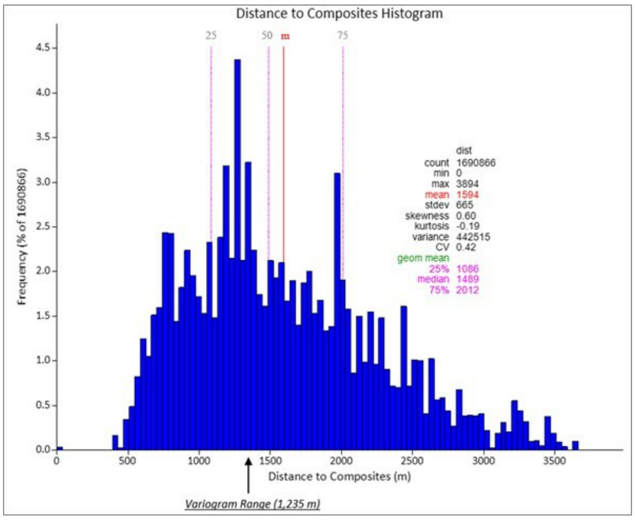
Source: SRK, 2020

Figure 11-12: Histogram of Number of Drillholes Used to Estimate the Block Model



Source: SRK, 2020

Figure 11-13: Histogram of Number of Composites Used to Estimate the Block Model



Source: SRK, 2020

Figure 11-14: Histogram of Average Distance from Blocks to Composites Used in Estimation

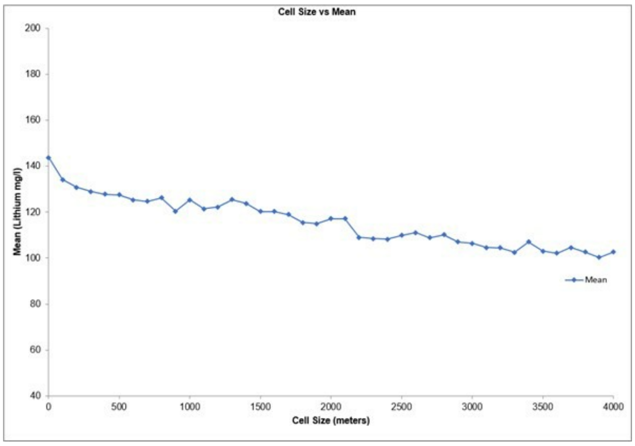
The resource estimate excluded historic lithium concentration data (i.e., it used samples from the 2017 campaign and from the 2020 sampling verification campaign in the production wells) (Section 7.2.2). The limitation of concentration data to only the most recent periods of data was, in SRK's opinion, the best approach to account for depletion of historic production. As the brine resource is extracted, the most significant change to the resource is a reduction in lithium concentration with a more limited reduction to in situ brine volume (the aquifer is constantly being recharged).

It is SRK's opinion that the methodology used in the lithium kriging estimate is adequate and appropriate for resource model calculations.

11.4.3 De-Clustering

A de-clustering cell analysis of the composites was completed to obtain de-clustered statistics for model validation purposes. Additionally, the nearest neighbor (NN) estimation of lithium was used as a spatially de-clustering method for comparative validation.

Figure 11-15 presents the scatter plot (Li average vs Cell Size) obtained for the de-clustering analysis of the lithium composites. Ultimately, a 700 m cell size was selected to calculate de-clustered statistics. Declustering of the data results in an overall reduction in the mean, which reflects the nature of more sampling of higher concentrations of Li in brines compared to less sampling of lower concentrations. This declustered mean is considered more appropriate for validation comparisons for the data against the estimate.



Source: SRK, 2020

Figure 11-15: De-Clustering Analysis Showing Scatter Plot of Cell Size Versus Lithium Mean

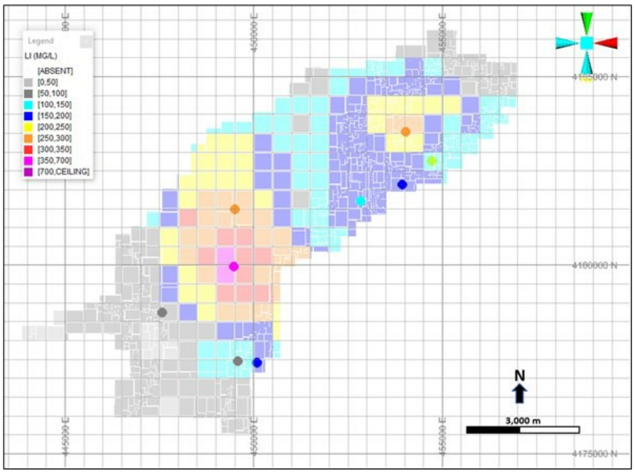
11.4.4 Estimate Validation

SRK performed a thorough validation of the interpolated model to confirm that the model represents the input data and the estimation parameters and that the estimate is not biased. Several different validation techniques were used, including:

- Visual comparison of lithium grades between block volumes and drillhole samples
- Comparative statistics of de-clustered composites and the alternative estimation methods (ID2 and NN)
- Swath plots for mean block and composite sample comparisons

Visual Comparison

Visual validation of drilling data to estimated block grades was completed in 3D. In general, estimated block grades compared well with acceptable correlation from drilling data. Figure 11-16 shows examples of the visual validations in plan view at an elevation of 1,125 m above sea level (masl).



Source: SRK, 2022

Figure 11-16: Example of Visual Validation of Lithium Grades in Composites Versus Block Model in Plan View (1,125 masl Elevation)

Comparative Statistics

SRK performed a statistical comparison of the de-clustered composites to the estimated blocks to assess the potential for bias in the estimated lithium grades. The comparison included the review of the histograms for lithium and the mean analysis between the blocks and composites from aquifers (Table 11-5).

The mean interpolated lithium values by OK shows slightly higher grade than the de-clustered data grade and the lithium grade using other alternative estimation methods. The comparison between data and the blocks is better in the areas with higher quantity of data. The interpolated lithium concentrations using ordinary kriging has a better correlation with the data and provides information about the interpolation error and quality.

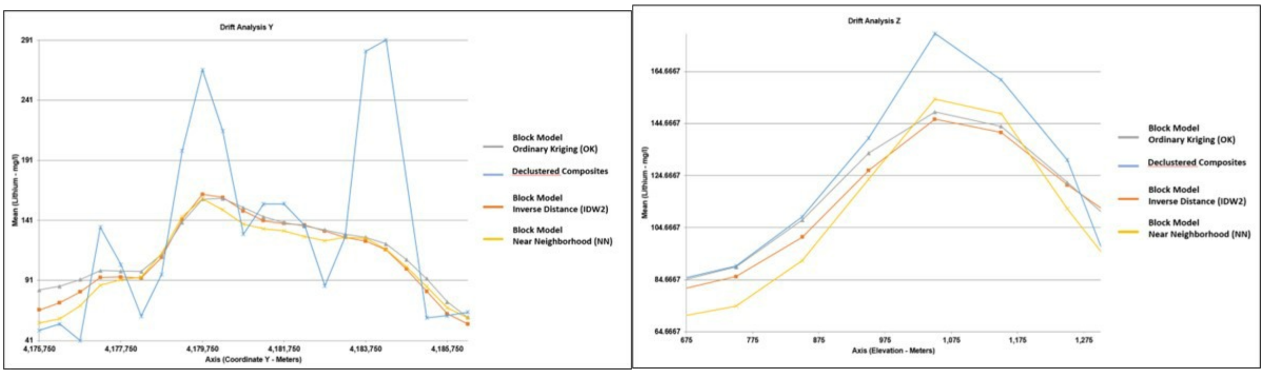
Table 11-5: Summary of Validation Statistics Composites Versus Estimation Methods (Aquifer Data)

Statistic	Mean Sample Data Li (mg/l)	Declustered Sample Data Li (mg/l)	Ordinary Kriging – Block Data (Volume Weighted) Li (mg/l)	Inverse Distance – Block Data (Volume Weighted) Li (mg/l)	Near Neighbor – Block Data (Volume Weighted) Li (mg/l)
Mean	143.7	124	109.8	107.1	104.7
Std Dev	96.8	89.6	54.4	60.7	78.4
Variance	9,379	8,031	2,955	3,690	6,153
CV	0.67	0.72	0.5	0.57	0.75

Source: SRK, 2020

Swath Plots

The swath plots represent a spatial comparison between the mean block grades interpolated using alternative methods and the de-clustered composites. Figure 11-17 presents the swath plots of Lithium in X, Y and Z coordinates. The areas of higher variability between the composites and estimates at Silver Peak occur in the areas of the deposit with lower quantity of data where lower lithium grades are observed.



Source: SRK, 2020

Figure 11-17: Lithium (mg/l) - Swath Analysis for Silver Peak

The QP’s opinion is that the validation using visual comparison, comparative statistics, and swath plots provide a sufficient level of confidence to confirm that the model accurately represents the input data, the estimation parameters are reasonable, and that the estimate is not biased.

11.5 Cut-Off Grades Estimates

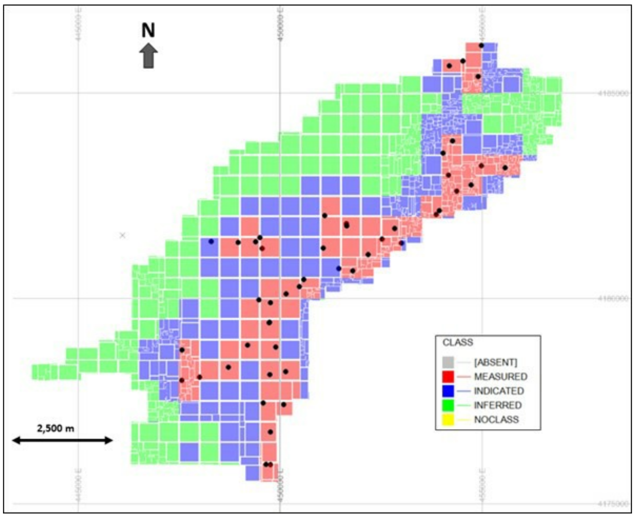
The CoG calculation is based on assumptions and actual performance of the Silver Peak operation. Pricing was selected based on a strategy of utilizing a higher resource price than would be used for a reserve estimate. For the purpose of this estimate, the resource price is 10% higher than the reserve price of US$20,000/t technical grade lithium carbonate, as discussed in 16.1.4. This results in the use of a resource price of US$22,000/t of technical grade lithium carbonate.

SRK utilized the economic model to estimate the break-even cut-off grade, as discussed in Section 12.2.2. Applying the US$22,000/t lithium price to this methodology resulted in a break-even cut-off grade of 50 mg/L, applicable to the resource estimate.

11.6 Resource Classification and Criteria

Resources have been categorized, subject to the opinion of a QP, based on the amount/robustness of informing data for the estimate, consistency of geological/grade distribution, and survey information. The resource calculations have been validated against long-term mine reconciliation for the in situ volumes. The categories of the resource model were based on the normalized variance, sample distribution, and borehole data to support the locations of aquifers and aquitards.

- Measured resources were assigned to areas with high confidence in the aquifer and aquitard geometry, and with high density of lithium samples. From the kriging distribution quality point of view, the blocks with normalized variance under 0.25 were interpreted as measured. However, using the QP's criteria, the distribution of the measured resource was slightly adjusted considering the coverage of boreholes, distribution of lithium samples and the continuity of measured blocks in 3D (Figure 11-18).
- Classification of Indicated resources is done only for those domains with sufficient confidence in the aquifer and aquitard geometry, and sufficient density of lithium samples. These volumes are very well correlated with the blocks with normalized variance between 0.25 and 0.425. Local inherent variability in the geometry of the aquifers has been considered in this classification and has been manually limited in areas of greater concern.
- Brine hosted aquifers with no or low drill density, and no or low lithium samples, have been classified as Inferred. Inferred also corresponds to the blocks with normalized variance over 0.425.



Source: SRK, 2022

Figure 11-18: Block Model Colored by Classification and Drillhole Locations Plan View (1,125 masl Elevation)

11.7 Uncertainty

SRK considered a number of factors of uncertainty in the classification of the mineral resource.

Estimation:

- SRK notes that the data supporting the mineral resources at Silver Peak has not been fully supported by a robust program of QA/QC sample insertion or monitoring. This potentially introduces a risk in the accuracy and precision of the sample data. However, this risk has been mitigated through the use of independent third-party laboratory samples for the estimation, and the inherent confidence derived from a long consistent production history at Silver Peak.
- The lack of availability of site-specific data for Sy values results in uncertainty associated with estimates of brine volume potentially available for extraction. To mitigate this uncertainty, the values were based on literature data of similar lithology units, considering the QP's experience in similar deposits. Additionally, there are areas with limited drill density

which results in uncertainty in the geological model and lithology, which drives the Sy estimate. These areas were classified as inferred resource.

- The use of 25 m composite lengths resulted in an increased number of samples in comparison to the raw data. This is due to some of the sampling points in boreholes being longer than others. SRK has mitigated this uncertainty by limiting the maximum number of composites per drillhole, ensuring that (given the search ranges) that the estimation of lithium into the blocks used samples from more than one drillhole. This eliminates the risk in the Measured and Indicated areas of estimating from only the larger sample intervals during the interpolation.

11.8 Summary Mineral Resources

SRK has reported the mineral resources for Silver Peak as mineral resources exclusive of reserves.

Table 11-6 shows the mineral resources exclusive of reserves. Resource from brine is contained within the resource aquifers with the estimated reserve deducted from the overall resource. This calculation was completed by calculating total lithium (as lithium metal) projected as being pumped from the aquifer in the reserve production forecast. The resources have been calculated from the block model above 740 masl. This quantity of lithium (as metal) was directly subtracted from the overall mineral resource estimate. Notably, the resource grade was not changed as part of this exercise. This is because the resource, exclusive of reserve, and reserve do not represent discrete areas of the resource due to the brine aquifer (i.e., the resource) being a dynamic system that moves, mixes and recharges. Therefore, the resource, after extraction of the reserve would be an entirely new resource, requiring new data and a new estimate.

As this is not practical with current data, in the QP's opinion, it is more appropriate to keep the calculation simple and transparent and utilize this approach. Further, as the dynamic resource largely precludes direct conversion of measured/indicated resources to proven/probable reserves, in the QP's opinion, the most reasonable and defensible approach to allocating depletion of the reserve from the resource is to deplete measured and indicated resource proportionate to their contribution to the combined measured and indicated resource. As measured resources comprise 28% of the combined measured and indicated resource, 28% of the reserve depletion was allocated to measured, with the remainder subtracted from indicated. For comparison, proven reserves comprise approximately 20% of the overall reserve (i.e., a greater proportion and quantity of measured resource is being deducted than the proportion and quantity of proven reserve produced).

Table 11-6: Silver Peak Mineral Resource Estimate, Exclusive of Mineral Reserves (Effective September 30, 2022)

	Measured Resource		Indicated Resource		Measured + Indicated Resource		Inferred Resource	
	Contained Li (Tonnes x 1000)	Brine Concentration (mg/L Li)	Contained Li (Tonnes x 1000)	Brine Concentration (mg/L Li)	Contained Li (Tonnes x 1000)	Brine Concentration (mg/L Li)	Contained Li (Tonnes x 1000)	Brine Concentration (mg/L Li)
Total	**14.0**	**153**	**36.2**	**144**	**50.2**	**146**	**89.5**	**121**

Source: SRK, 2022

- Mineral resources are reported exclusive of mineral reserves. Mineral resources are not mineral reserves and do not have demonstrated economic viability.
- Given the dynamic reserve versus the static resource, a direct measurement of resources post-reserve extraction is not practical. Therefore, as a simplification, to calculate mineral resources, exclusive of reserves, the quantity of lithium pumped in the life of mine plan was subtracted from the overall resource without modification to lithium concentration. Measured and indicated resource were deducted proportionate to their contribution to the overall mineral resource.
- Resources are reported on an in-situ basis.
- Resources are reported as lithium metal
- The resources have been calculated from the block model above 740 masl.
- Resources have been categorized subject to the opinion of a QP based on the amount/robustness of informing data for the estimate, consistency of geological/grade distribution, survey information.
- Resources have been calculated using drainable porosity estimated from bibliographical values based on the lithology and QP's experience in similar deposits
- The estimated economic cut-off grade utilized for resource reporting purposes is 50 mg/l lithium, based on the following assumptions:
  - A technical grade lithium carbonate price of US$22,000/metric tonne CIF North Carolina. This is a 10% premium to the price utilized for reserve reporting purposes. The 10% premium applied to the resource versus the reserve was selected to generate a resource larger than the reserve, ensuring the resource fully encompassed the reserve while still maintaining reasonable prospect for eventual economic extraction.
  - Recovery factors for the wellfield are = $-206.23*(\text{Li wellfield feed})^2 + 7.1903*(\text{wellfield Li feed}) + 0.4609$. An additional recovery factor of 78% lithium recovery is applied to the lithium carbonate plant.
  - A fixed brine pumping rate of 20,000 afpy, ramped up from current levels over a period of five years.
  - Operating cost estimates are based on a combination of fixed brine extraction, G&A and plant costs and variable costs associated with raw brine pumping rate or lithium production rate. Average life of mine operating costs is calculated at approximately US$6,200/metric tonne lithium carbonate CIF North Carolina.
  - Sustaining capital costs are included in the cut-off grade calculation and include a fixed component at US$7.0 million per year and an additional component tied to the estimated number of wells replaced per year and other planned capital programs.
- Mineral Resources tonnage and contained metal have been rounded to reflect the accuracy of the estimate, and numbers may not add due to rounding.
- SRK Consulting (U.S.) Inc. is responsible for the Mineral Resources with an effective date: September 30, 2022.

11.9 Recommendations and QP Opinion on Mineral Resource Estimate

It is the QP's opinion that the aquifers' geometry, brine chemistry composition, and the Sy of the basin sediments have been adequately characterized to support the resource estimate for Silver Peak, as classified.

The mineral resources stated herein are appropriate for public disclosure and meet the definitions of measured, indicated, and inferred resources established by SEC guidelines and industry standards. Based on the analysis described in this report, the QP's understanding of resources that are exclusive of reserves, and the project's status of operating since 1966, in the QP's opinion, there is reasonable potential for economic extraction of the resource.

The current lithium concentration data is mostly located in the southeastern boundary of the claims area. Aquifers in the northern zones have little or no data, generating a zone of inferred along with the previously mentioned zones.

A similar situation occurs in the deep aquifer LGA, located at the bottom of the basin. Given its high estimated Sy (18%), this unit is considered prospective for lithium resources. The current geological model shows LGA below the bottom of the resource model (740 masl). However, there are not enough deep samples for including that LGA volume in the resource estimate.

SRK recommends implementing an infill drilling campaign in the aquifers within the inferred zones and deep areas mentioned above, focused on collecting lithium concentration data in LAS and LGA.

12 Mineral Reserve Estimates

12.1 Key Assumptions, Parameters, and Methods Used

This section describes the key assumptions, parameters, and methods used to simulate the movement of lithium-rich brine in Clayton Valley.

12.1.1 Numerical Model Construction

To simulate the movement of lithium-rich brine in the alluvial sediments of Clayton Valley, a numerical groundwater flow and transport model was developed using the finite-difference code MODFLOW-SURFACT with the transport module (HydroGeoLogic, 2012) via the Groundwater Vistas graphical user interface (Rumbaugh and Rumbaugh, 2011). The model was calibrated to available historical water level and lithium concentration data. The calibrated model was used to evaluate different production wellfield pumping regimes.

12.1.2 Numerical Model Grid and Boundary Conditions

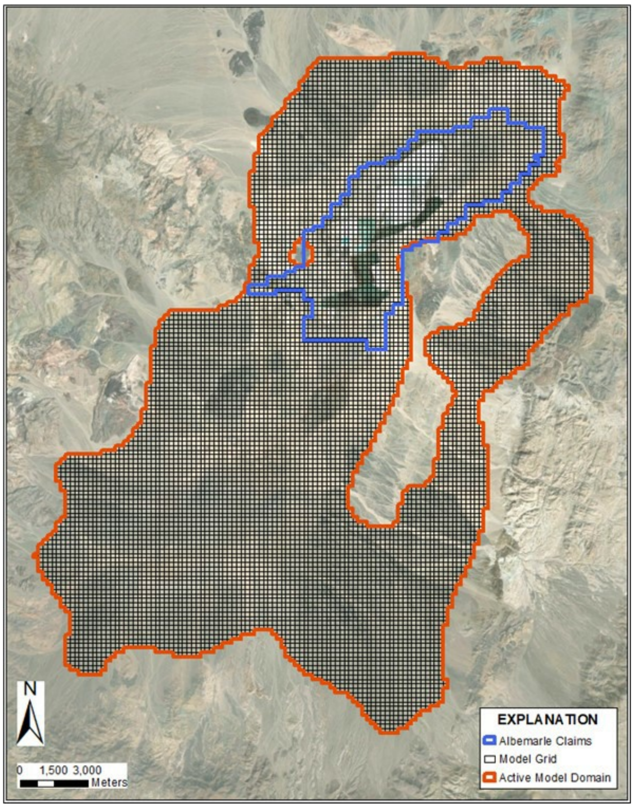
The active model domain includes the alluvial sediments of Clayton Valley and covers an area of 392 square kilometers with 262,653 active cells over 41 layers. Model cells are uniform at 200 m x 200 m. Figure 12-1 shows the model grid and the extent of the active model domain within Clayton Valley. Model layers vary in thickness from 10 m near land surface to 100 m for deeper zones with a total thickness of 1,500 m. Table 12-1 shows the breakdown of model layer thicknesses. Model layering was developed to ensure proper representation of the aquifer units within the numerical model.

Table 12-1: Model Layering

Layers	Thickness (m)
1 to 18	10
19 to 24	20
25 to 36	50
36 to 41	100

Source: SRK, 2022

The alluvial sediments of the basin are surrounded by low-permeability bedrock. In the numerical model, these boundaries are represented as no-flow boundaries.



Source: SRK, 2022

Figure 12-1: Active Model Domain and Model Grid

12.1.3 Hydrogeologic Units and Aquifer Parameters

The hydrogeologic units specified in the model were derived from the geologic model developed using the Leapfrog Geo software and described in Section 11.1. Aquifer parameters of hydraulic conductivity, specific yield, and specific storage in addition to the transport parameter of effective porosity are specified by hydrogeologic unit in the model.

Horizontal hydraulic conductivity values used in the model were derived from the pumping tests described in Section 7.3. The geometric mean of results from the pumping tests conducted in each aquifer unit shown in Table 7-5 provided the initial values for use in calibrating the numerical groundwater flow model. Ratios of horizontal to vertical hydraulic conductivity were initially selected based on understanding of the lithology of each aquifer and aquitard unit. Vertical hydraulic conductivity values were adjusted during calibration to best match the conceptual understanding of brine movement within the system.

Sy or drainable porosity have not been directly tested or analyzed by Albemarle in Clayton Valley. Specific yield and effective porosity values used in the model were derived from a review of literature. Results of the literature review for the different sediment types are shown in Table 7-6. For improved defensibility of the model and of the resource estimate, a value between the mean and the minimum was used for each aquifer unit. These values are consistent with the QP's experience in similar deposits.

Specific storage has also not been directly tested by Albemarle in Clayton Valley. Specific storage values used in the model were derived from the QP's experience in similar deposits. Aquifer parameters used in the model are shown in Table 12-2 for each hydrogeologic unit.

Table 12-2: Hydrogeologic Units and Aquifer Parameters

Hydrogeologic Unit	Hydraulic Conductivity (m/d)		Specific Yield (%)	Specific Storage (1/m)	Effective Porosity (%)
	Horizontal	Vertical			
Surficial Alluvium	4.32	1.44	20	1×10^{-6}	20
Surficial/Near Surface Playa Sediments	0.01	0.0001	1	1×10^{-7}	1
Tufa Aquifer System (TAS)	3.4	0.0068	7	1×10^{-6}	7
Salt Aquifer System (SAS)	0.4	0.0008	1	1×10^{-6}	1
Marginal Gravel Aquifer (MGA)	1.2	0.002	15	1×10^{-7}	15
Main Ash Aquifer (MAA)	5.3	5.3	11	1×10^{-7}	11
Lower Aquifer System (LAS)	0.1	0.0002	5	1×10^{-7}	5
Lower Gravel Aquifer (LGA)	1.8	0.018	5	1×10^{-7}	5
Lacustrine Sediments	0.015	0.00015	1	1×10^{-7}	1

Source: SRK, 2022

12.1.4 Simulated Pre-Development Conditions

The pre-development model simulates equilibrium conditions prior to lithium mining activities. Prior to mining activities, groundwater generally flowed from the basin boundaries toward the center of the basin. Water enters the basin aquifer system via mountain front recharge and groundwater inflows. Rates of these inflows were estimated by Rush (1968) as shown in Table 12-3.

Table 12-3: Basin Inflows

Inflow Description	Inflow Rate (AFA)	Inflow Rate (m^3/d)
Mountain Front Recharge	1,500	5,100
Interbasin Groundwater Inflow from Big Smoky Valley	13,000	43,900
Interbasin Groundwater Inflow from Alkali Spring Valley	5,000	16,900
Total	**19,500**	**65,900**

Source: Modified from Rush, 1968

Prior to pumping, groundwater left the basin via evaporation in the central and lowest portions of the basin. The simulated water balance for pre-development conditions is shown in Table 12-4.

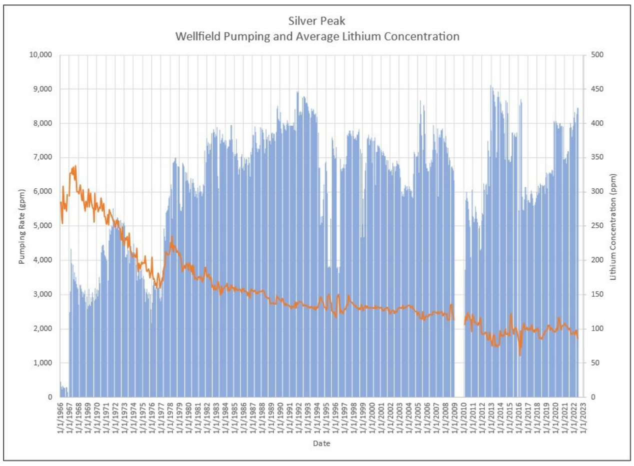
Table 12-4: Simulated Groundwater Budget, Pre-Development

Model In (m^3/d)	
Mountain Front Recharge	5,066
Groundwater Inflow	60,786
Total In	**65,898**
Model Out (m^3/d)	
Evapotranspiration	65,817
Total Out	**65,817**
In - Out (m^3/d)	81
Percent Discrepancy	0.12%

Source: SRK, 2022

12.1.5 Simulated Historical Development

Production wells have been used to extract lithium-rich brine from the alluvial sediments of Clayton Valley since 1966. Annual production rates in relation to wellfield average lithium concentration for 1966 through June 2022 are shown in Figure 12-2.



Source: SRK, 2022

Figure 12-2: Wellfield Pumping and Average Lithium Concentration

In 2009, SPLO staff member Jennings estimated that the amount of brine recharging the aquifer from the evaporation ponds was 6,960 m^3/day (2,060 AFA). The brine in the ponds would have been extracted the prior year, 2008. The average pumping rate for the production wellfield in 2008 was 37,900 m^3/day (11,217 AFA). Jennings estimate of pond recharge represents approximately 18% of the pumping from the prior year. This ratio was applied to the pumping to estimate the amount of pond recharge each year of the historical model simulation. According to current SPLO operations staff, the ponds are divided into three categories: the weak brine system, the strong brine complex, and the final pond. The lithium concentration varies in the evaporation ponds depending on the feed from the wellfield and the rate of evaporation. In the first half of 2020, the average concentration of lithium was 306 parts per million (ppm) in the weak brine system and 2,038 ppm in the strong brine complex (S. Thibodeaux, personal communication, 2020). The final pond is lined so it was not evaluated with regards to recharging the aquifer system.

The simulated groundwater budget at the end of the historical period, June 2022, is shown in Table 12-5.

Table 12-5: Simulated Groundwater Budget, End of 2019

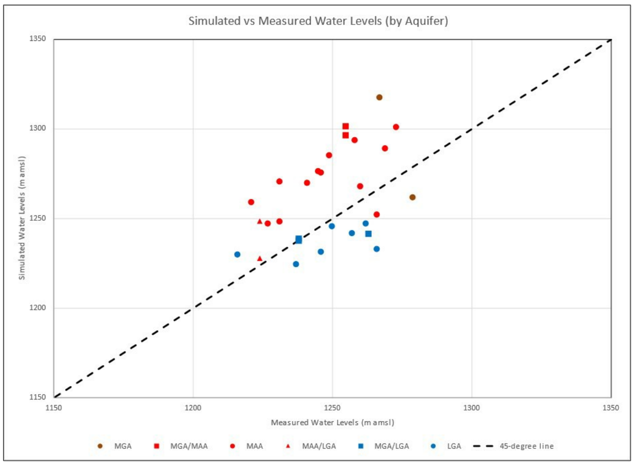
Model In (m^3/d)	
Decrease in Storage	5,216
Mountain Front Recharge	5,066
Groundwater Inflow	60,786
Pond Recharge	6,015
Total In	80,370
Model Out (m^3/d)	
Increase in Storage	22
Evapotranspiration	39,198
Production Wells	45,177
Total Out	80,398
In - Out (m^3/d)	-28
Percent Discrepancy	-0.05%

Source: SRK, 2022

Historical water levels measured on-site by the SPLO are taken in the production wells. In the database, these water levels are labeled as either pumping or static. It is not clear from the records how long the pumps had been off when static water levels were measured. Therefore, in SRK's opinion, these water levels were not suitable for use in calibrating the numerical flow model. Water levels were measured during development of the 26 wells drilled during the last few years. SRK attempted to calibrate the model to these water levels. Simulated water levels versus measured water levels are shown in Figure 12-3. Statistics for the calibration of water levels are as follows:

- Residual mean error: -12.6 m
- Absolute mean error: 22.8 m
- Root mean square error (RMSE): 26.5 m
- RMSE divided by the range of observed data: 42%

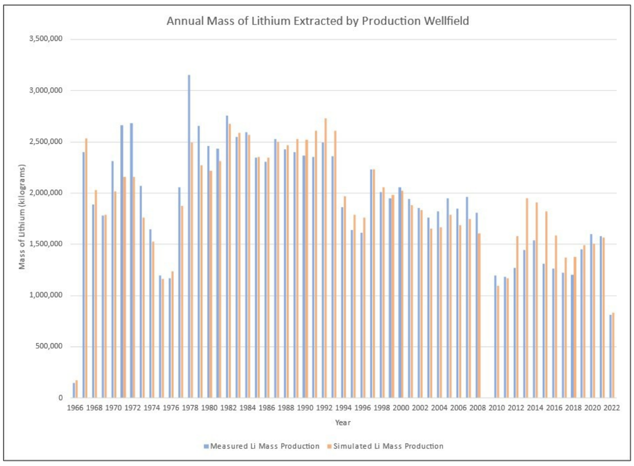
Values of RMSE divided by the observed data range should be less than 10% for an acceptably calibrated model. SRK acknowledges that the statistics for this calibration are not ideal. The model simulates lower than observed water levels in wells screened in the LGA and higher than observed water levels in wells screened in the MAA. SRK used the geometric mean of horizontal hydraulic conductivity values from the pumping test data, as shown in Table 12-2, for the numerical models.



Source: SRK, 2022

Figure 12-3: Simulated Versus Measured Water Levels, 2021-2022 Well Installation

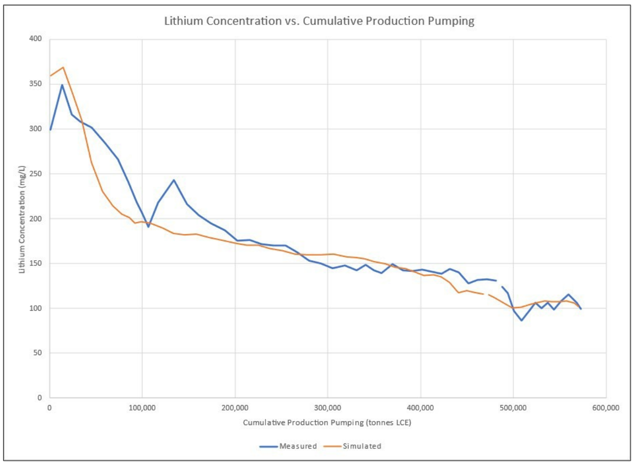
In comparison, lithium concentrations have been measured at the wellhead of each active production well on a regular basis since 1966. A comparison of the simulated mass of lithium extracted annually by the production wellfield versus the measured mass is shown on Figure 12-4. The residual mean error in this comparison is 7,877 kg, the absolute mean error is 162,351 kg, and the RMSE is 224,028 kg. The RMSE divided by the range of observed data is 7%. Values of RMSE divided by the observed data range should be less than 10% for an acceptably calibrated model.



Source: SRK, 2022

Figure 12-4: Annual Mass of Lithium Extracted by Production Wellfield, Simulated Versus Measured

A comparison of simulated to observed average wellfield lithium concentration vs cumulative production pumping is shown on Figure 12-5.

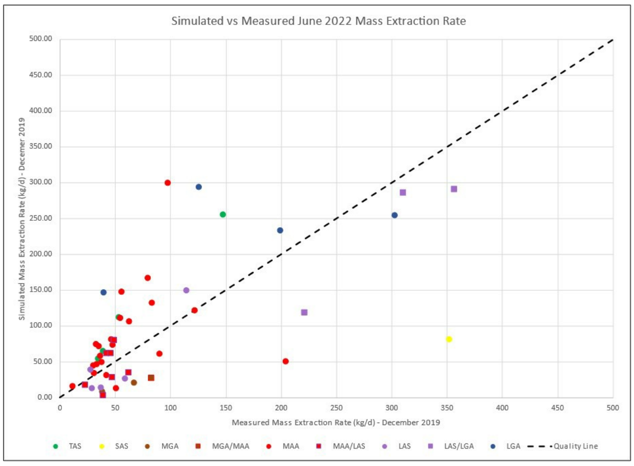


Source: SRK, 2022

Figure 12-5: Lithium Concentration Versus Cumulative Production Pumping, Simulated Versus Measured

A comparison of the simulated vs observed mass extraction rate (lithium concentration times pumping rate) for each production well active at the end of June 2022 is shown in Figure 12-6. The residual mean error in this comparison is -6.1 kg/d, the absolute mean error is 50.0 kg/d, and the RMSE is 19.1 kg/d. The RMSE divided by the range of observed data is 5.5%. Values of RMSE divided by the observed data range should be less than 10% for an acceptably calibrated model.

Calibration of the model to mass extracted by the production wellfield annually and comparison of simulated to observed lithium concentration versus cumulative production pumping are both reasonable. Calibration of the model to the mass extraction rate at the end of June 2022 also looks reasonable. It is SRK's opinion that the numerical model adequately represents the historical and current wellfield production of lithium from the basin and can be used for future production plans to support a reserve estimate.



Source: SRK, 2022

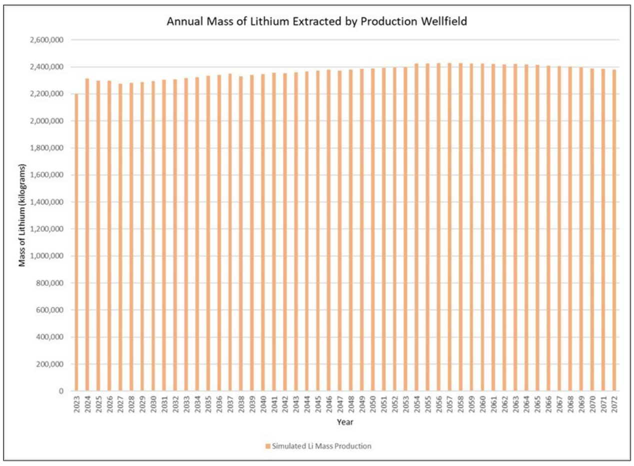
Figure 12-6: Mass Extraction Rate at the End of 2019, Simulated Versus Measured Sensitivity Analysis

The current recalibration of the model and previous evaluations of parameter sensitivity determined that the largest uncertainty related to the reserve modeling is the long-term pumpability of the Clayton Valley aquifer system. Therefore, analysis of sensitivity for this update of the report focused on this uncertainty by evaluating the impact of reduced groundwater inflow on the long-term pumpability of the aquifer system and the number of wells needed to maintain 20,000 AFA over the long-term. This will be addressed in more detail in Section 12.2.4.

12.2 Mineral Reserves Estimates

Using the hydrogeologic properties of the playa combined with the well field design parameters, the rate and volume of lithium projected as extracted from the Project was simulated using the predictive model. The predictive model output generated a brine production profile appropriate for the playa based upon the well field design assumptions with a maximum pumping rate of 20,000 afpy (based on the maximum water rights held by Albemarle) over a period of 50 years. The model was able to simulate extraction of brine from the aquifer system during the 50-year LoM. Total wellfield pumping was maintained by turning off shallow MGA and MAA wells and installing deeper LGA wells.

Additional details on the wellfield design and pumping schedule are discussed in Section 13. Projected lithium mass extracted each year for the next 50 years is shown on Figure 12-7. SRK cautions that this prediction is a forward-looking estimate and is subject to change depending upon operating approach (e.g., pumping rate, well location/depth) and inherent geological uncertainty.



Source: SRK, 2022

Figure 12-7: Projected Annual Mass of Lithium Extracted by Production Wellfield

12.2.1 Model Simulation to Reserve Estimate

When estimating brine resources and reserves, different models are utilized to define those resources and reserves. The resource model presents a static, in situ measurement of potentially extractable brine volume whereas the reserve model (i.e., the predictive model) presents a dynamic simulation of brine that can potentially be pumped through extraction wells. As such, the predictive model does not discriminate between brine derived from inferred, measured, or indicated resources. Further, a brine resource is dynamic and is constantly influenced by water inflows (e.g., precipitation, groundwater inflows, pond leakage, etc.) and pumping activities which cause varying levels of mixing and dilution.

Therefore, direct conversion of measured and indicated classification to proven and probable reserves is not practical. As the direct conversion is not practical, in the QP's opinion, the most defensible approach of generation of a reserve is to truncate the predictive model simulation results early and assume only a portion of the static measured and indicated resource is successfully produced. This is because the confidence level in the pumping plan is highest in the early years and reduces over time.

While this is a qualitative measure and subject to the opinion of the QP, it is an established industry practice. For the purposes of this reserve estimate, in the QP's opinion, a 30-year pumping plan is reasonable and defensible and therefore truncated the pumping plan at the end of 2052 (due to the partial year of pumping in 2022, the actual mine plan is approximately 30.5 years). Truncating the mine plan at the end of 2052 results in a pumping plan that extracts approximately 60% of the lithium contained in the total in situ measured and indicated mineral resource (inclusive of reserves).

Beyond the in situ reserve calculation, described above, given the delay in the time of pumping brine to actual production of lithium being approximately two years due to the extended evaporation period, the first two years of lithium production in the economic model are sourced from brine that is in process (i.e., in the evaporation ponds). Given these first two years of production are included in the economic model, in SRK's opinion, they are also appropriately classified as a component of the reserve. Therefore, SRK has also included this brine in the reserve, quantified separately from the pumping plan.

Silver Peak tracks the volume and concentration of brine pumped for production purposes on an ongoing basis. Therefore, to quantify this in process component of the reserve, SRK summarized the prior 24 months of pumping data as the in-process reserve. This component of the reserve is reported at the concentration of brine pumped as this is the most reliable point of measurement. SRK classified this component of the reserve as proven, given the actual quantity of brine produced was directly measured and therefore has relatively low uncertainty.

12.2.2 Cut-Off Grade Estimate

Due to the dynamic nature of brine resources and inflow of fresh water, the concentration of lithium in brine pumped from the mineral resource decreases over time. While there is some ability to selectively extract areas of the mineral resource with higher grades by targeting the location of new extraction well locations, the impact of dilution cannot be fully avoided. Therefore, as the brine concentration declines, the quantity of lithium production, for the same pumping rate, also declines over time. As lithium brine production operations such as Silver Peak have relatively high fixed costs, eventually the quantity of lithium contained in the extracted brine is not adequate to cover the cost of operating the business.

As discussed in Section 19, the economic model provides positive operating cash flow for the entire life of the reserve, so it is clear that the entirety of the reserve estimated herein is above the economic cut-off grade utilizing the assumptions described in that section. This includes the use of a long-term price assumption for technical grade lithium carbonate of US$20,000/metric tonne (see Section 16 for discussion on the basis of this assumption).

While the pumping plan supporting this reserve, estimate is above the economic cut-off grade for the operation, SRK also calculated an approximate break-even cut-off grade for the purpose of supporting the mineral resource estimate and long-term planning for Silver Peak production. To calculate the break-even cut-off grade, SRK utilized the economic model and manually adjusted the input brine concentration downward until the NPV of the after-tax cash flow reaches a value of zero.

This estimate effectively includes all operating costs in the business as well as sustaining capital with other inputs such as lower process recovery with lower concentration also being accounted for. Based on this modeling exercise, SRK estimates that the breakeven cut-off grade at the assumptions outlined in Section 19, including the reserve price of US$20,000/metric tonne of technical grade lithium carbonate, is approximately 57 mg/l Li (for comparison, the last year of pumping in the 30-year life of mine plan has a lithium concentration of 97 mg/l).

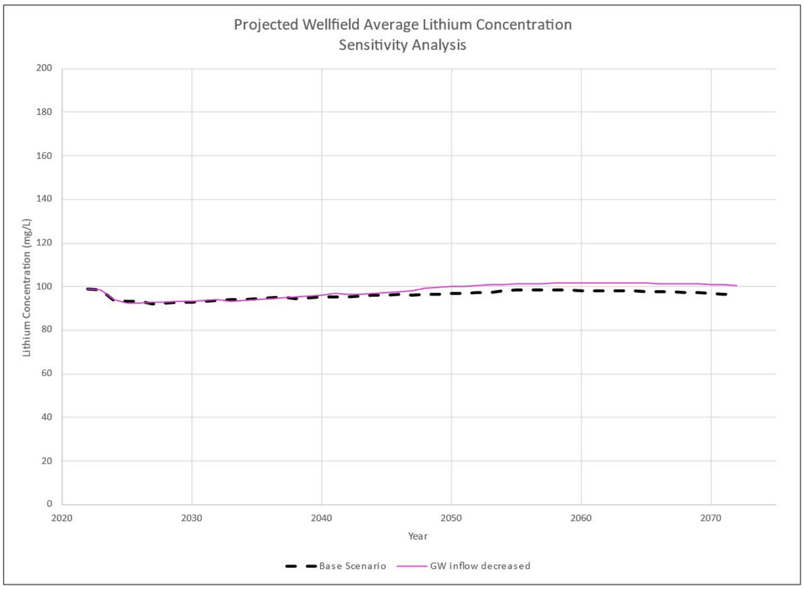
12.2.3 Reserves Classification and Criteria

As noted in Section 11.7, due to the static nature of the mineral resource estimate which includes measured, indicated, and inferred resources versus the dynamic predictive model for the mineral reserve estimate, a direct conversion of measured and indicated resource to proven and probable reserves is not practical. Therefore, as with the estimation of the total magnitude of the reserve, in the QP's opinion, a time-dependent approach to classification of the reserve is the most defensible as the QP has the highest confidence in the early years of the predictive model results, with a steady erosion of that confidence over time. Therefore, in the QP's opinion, the production plan through the end of 2027 (approximately 5.5 years of pumping) is reasonably classified as a proven reserve with the remainder (24.5 years) of production classified as probable. Notably, this results in approximately 20% of the reserve being classified as proven and 80% of the reserve being classified as probable. For comparison, the measured resource comprises approximately 28% of the total measured and indicated resource. Effectively, this assumption represents that some measured resource would be converting to probable reserve (if a direct conversion were practical). In the QP's opinion, this is reasonable as the uncertainty associated with pumping and associated dilution increases overall uncertainty beyond that geologic uncertainty reflected in the resource classification. Finally, as noted in Section 12.2.1, SRK classified the in-process brine as proven, given the relatively low uncertainty associated with this brine that has been fully measured during the pumping process.

12.2.4 Reserve Uncertainty

For this update to the report, analysis of sensitivity focused on long-term pumpability of the aquifer system. Therefore, groundwater inflow was reduced by 25% to evaluate the potential impact to lithium concentrations and number of wells needed to maintain 20,000 AFA over the long-term. Results of reducing groundwater inflow in the predictive model are shown in Figure 12-8.

Reducing groundwater inflow reduces pumpability of the thinner aquifer units like the MAA. Results of this sensitivity simulation, indicate that with reduced groundwater inflow into Clayton Valley, SPLO would need to stop pumping certain MAA and MGA wells sooner than estimated by the base scenario. SPLO would then need to install more deeper LGA wells and earlier than is scheduled in the base scenario pumping plan.



Source: SRK, 2022

Figure 12-8: Sensitivity of Projected Wellfield Lithium Concentration to Varying Select Parameters

12.3 Summary Mineral Reserves

The estimation of mineral reserves herein has been completed in accordance with CFR 17, Part 229 (S-K 1300). Mineral reserves were estimated utilizing a lithium carbonate price of US$20,000/t of technical grade Li_2CO_3. Appropriate modifying factors have been applied as discussed through this report. The positive economic profile of the mineral reserve is supported by the economic modeling discussed in Section 19 of this report.

Table 12-6 shows the Silver Peak mineral reserves as of September 30, 2022.

In the QP's opinion, key points of uncertainty associated with the modifying factors in this reserve estimate that could have a material impact on the reserve include the following:

- Resource dilution: The reserve estimate included in this report assumes the brine aquifer is extracted at a rate of 20,000 afpy, in accordance with Albemarle's maximum water rights at Silver Peak. Historic pumping rates are lower, on average, than this level and pumping at this higher rate could result in more inflow of fresh water increasing dilution more than predicted in the model simulation. Higher dilution levels may result in a shorter mine life (i.e., lower reserve) or require pumping at lower rates. While the same amount of lithium potentially could be extracted over a longer timeframe at the lower pumping rate, the associated reduction in lithium production on an annual basis could increase the cut-off grade for the operation and potentially reduce the mineral reserve.
- Aquifer Pumpability: The pumpability of an aquifer is an assessment of the simulated water level in the model's production wells to estimate when the well will likely no longer be operable due to water levels in the well dropping below the pump intake. Comparison of simulated to measured water levels where possible were used to devise adjustment factors for evaluating aquifer pumpability, allowing for a conservative estimate of when wells would no longer be operable. The current sensitivity analysis focused on the potential impact to aquifer pumpability from reduced groundwater inflow to the basin. Results indicate that certain MAA and MGA wells would no longer be pumpable and deeper LGA wells would need to installed sooner than estimated in the base scenario. Inaccurate estimates of aquifer pumpability may result in wells becoming inoperable earlier or require pumping at lower rates.
- Hydrogeological assumptions: Factors such as specific yield and hydraulic conductivity play a key role in estimating the volume of brine available for extraction in the wellfield and the rate it can be extracted. These factors are variable through the project area and are generally difficult to directly measure. Significant variability, on average, from the assumptions utilized in the predictive model could materially impact the estimate of brine available for extraction and associated concentrations of lithium. Previous model sensitivity analyses on key aquifer parameters resulted in a in lithium concentrations ranging from 93% to 128% of the base scenario, 95 mg/l, at the end of the 30-year reserve life. However, these analyses do not fully quantify all potential uncertainty and wider variability in these parameters or changes in other parameters may result in more significant deviation in the base case than those shown in the sensitivity analyses.
- Lithium carbonate price: Although the pumping plan remains above the economic cut-off grade discussed in Section 12.2.2, commodity prices, including technical grade lithium carbonate, can have significant volatility which could result in a shortened reserve life.

- Extension of the pumping plan beyond 2052: In the QP's opinion, the predictive model presents adequate confidence in the results to support a reserve estimate through 2052, with a two year trailing operation on brine in the pond system. However, the model continued to predict lithium concentrations above the economic cut-off grade discussed in Section 12.2.2 for the full 50-year simulation period. This suggests opportunity remains to extend the mine life and associated reserve beyond the current assumptions.

Table 12-6: Silver Peak Mineral Reserves, Effective September 30, 2022

	Proven Mineral Reserves		Probable Mineral Reserves		Total Mineral Proven and Probable Reserves	
	Contained Li (Metric Tonnes x 1,000)	Li Concentration (mg/L)	Contained Li (Metric Tonnes x 1,000)	Li Concentration (mg/L)	Contained Li (Metric Tonnes Li x 1,000)	Li Concentration (mg/L)
In Situ	12.0	94	56.3	95	68.3	95
In Process	1.3	104	-	-	1.3	104

Source: SRK, 2022

- In process reserves quantify the prior 24 months of pumping data and reflect the raw brine, at the time of pumping. These reserves represent the first 24 months of feed to the lithium process plant in the economic model.
- Proven reserves have been estimated as the lithium mass pumped during the Partial Year 2022 through 2027 of the proposed Life of Mine plan
- Probable reserves have been estimated as the lithium mass pumped from 2028 until the end of the proposed Life of Mine plan (2052)
- Reserves are reported as lithium metal.
- This mineral reserve estimate was derived based on a production pumping plan truncated at the end of year 2052 (i.e., approximately 29.5 years). This plan was truncated to reflect the QP's opinion on uncertainty associated with the production plan as a direct conversion of measured and indicated resource to proven and probable reserve is not possible in the same way as a typical hard-rock mining project.
- The estimated economic cut-off grade for the Silver Peak project is 57 mg/l lithium, based on the assumptions discussed below. The production pumping plan was truncated due to technical uncertainty inherent in long-term production modeling and remained well above the economic cut-off grade (i.e., the economic cut-off grade did not result in a limiting factor to the estimation of the reserve).
  - A technical grade lithium carbonate price of US$20,000/metric tonne CIF North Carolina.
  - Recovery factors for the wellfield are = -206.23*(Li wellfield feed)^2 +7.1903*(wellfield Li feed) + 0.4609. An additional recovery factor of 78% lithium recovery is applied to the lithium carbonate plant.
  - A fixed brine pumping rate of 20,000 afpy, ramped up from current levels over a period of five years.
  - Operating cost estimates are based on a combination of fixed brine extraction, G&A and plant costs and variable costs associated with raw brine pumping rate or lithium production rate. Average life of mine operating costs is calculated at approximately US$6,200/metric tonne lithium carbonate CIF North Carolina.
  - Sustaining capital costs are included in the cut-off grade calculation and include a fixed component at US$7.0 million per year and an additional component tied to the estimated number of wells replaced per year and other planned capital programs.
- Mineral reserve tonnage, grade and mass yield have been rounded to reflect the accuracy of the estimate (thousand tonnes), and numbers may not add due to rounding.
- SRK Consulting (U.S.) Inc. is responsible for the mineral reserves with an effective date: September 30, 2022.

13 Mining Methods

As a sub-surface mineral brine, the most appropriate method for extracting the reserve is by pumping the brine from a network of wells. This method of brine extraction has been in place at Silver Peak for over 50 years. As discussed in Section 14, the extracted brine is concentrated using solar energy in a series of evaporation ponds prior to final processing in the lithium carbonate production plant.

These extraction wells and associated pumping infrastructure are the primary pieces of equipment required for brine extraction (see the following section for more discussion). Primary ancillary equipment required are drills for development of new or replacement wells. Silver Peak utilizes a contractor for wellfield development that provides necessary drilling and well installation equipment.

The extraction rate of raw brine from the aquifer can be limited by the number of wells in the wellfield, the hydraulic parameters of the aquifer, the capacity of the evaporation ponds, the capacity of the lithium carbonate production facility, or the water rights held by Albemarle. The current limits on extraction rate are the evaporation pond capacity and the wellfield pumping capacity. However, the lithium carbonate production plant has excess capacity and Albemarle has water rights exceeding current pumping rates. Therefore, consistent with Albemarle's strategic plan for the Silver Peak operation, SRK has assumed increasing the capacity of the wellfield and the evaporation ponds to sustain brine extraction rates at the maximum level of water rights held by Albemarle (20,000 afpy). At these pumping rates, the predicted brine concentrations and predicted evaporation pond recovery rates, the associated lithium production rate will remain under the capacity of the lithium carbonate plant. Expansion of the wellfield and rehabilitation of existing evaporation ponds to sustain this pumping rate will require significant capital investment, as discussed in Section 18.2.

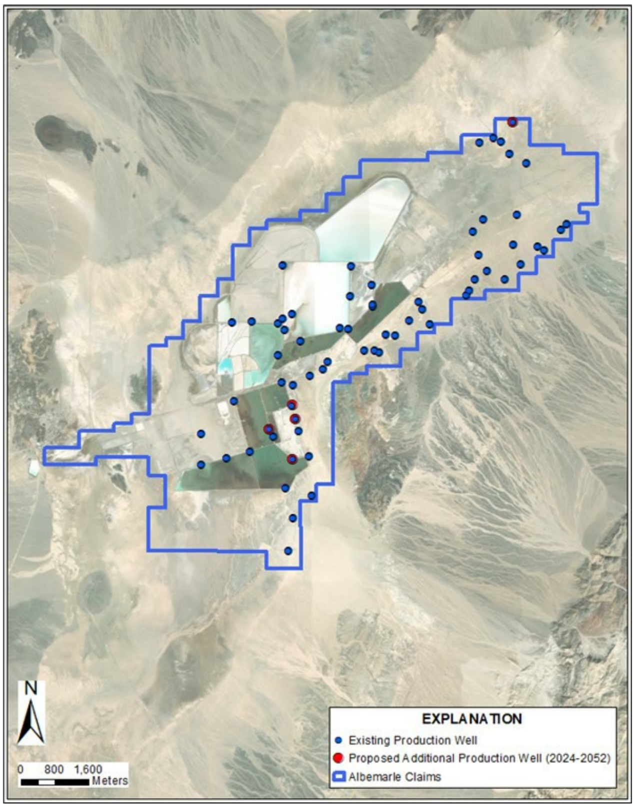
13.1 Wellfield Design

To support increasing the brine pumping rate to 20,000 afpy, the mine plan evaluated for the reserve estimate increased the number of active production wells to 63 that are active at the end of 2022. The net number of wells decreases through the LoM as wells are replaced and new wells drilled. The schedule the number of active production wells is shown in Table 13-1. The well count slowly decreases over time until it, the well count stabilizes at approximately 45 active wells in 2047 through the end of the 30-year reserve period. Existing production wells require periodic replacement as well with around three wells replaced per year, on average, for the current wellfield. For the purposes of this reserve estimate, SRK has assumed roughly the same rate of wells failing per year with the increased well count. A map showing the predicted locations for the life of mine production wells is presented in Figure 13-1.

Table 13-1: Wellfield Expansion Schedule (30-Year Reserve Pumping Plan)

Year	Number Active Wells at Start of Year	Number Replacement Wells	Number Wells Removed	Number New Wells	Total Number Wells Drilled	Number Active Wells at End of Year
2022 (Oct - Dec)	63	0	0	0	0	63
2023	63	3	2	0	3	61
2024	61	3	8	0	3	53
2025	53	3	2	1	4	52
2026	52	3	0	0	3	52
2027	52	3	3	0	3	49
2028	49	3	0	0	3	49
2029	49	3	0	0	3	49
2030	49	3	0	0	3	49
2031	49	3	0	0	3	49
2032	49	3	0	0	3	49
2033	49	3	0	0	3	49
2034	49	3	1	0	3	48
2035	48	3	0	0	3	48
2036	48	3	0	0	3	48
2037	48	3	0	0	3	48
2038	48	3	1	0	3	47
2039	47	3	0	0	3	47
2040	47	3	0	0	3	47
2041	47	3	1	0	3	46
2042	46	3	1	1	4	46
2043	46	3	0	0	3	46
2044	46	3	0	0	3	46
2045	46	3	0	0	3	46
2046	46	3	0	0	3	46
2047	46	3	1	0	3	45
2048	45	3	0	0	3	45
2049	45	3	0	0	3	45
2050	45	3	0	0	3	45
2051	45	3	0	0	3	45

Source: SRK, 2022



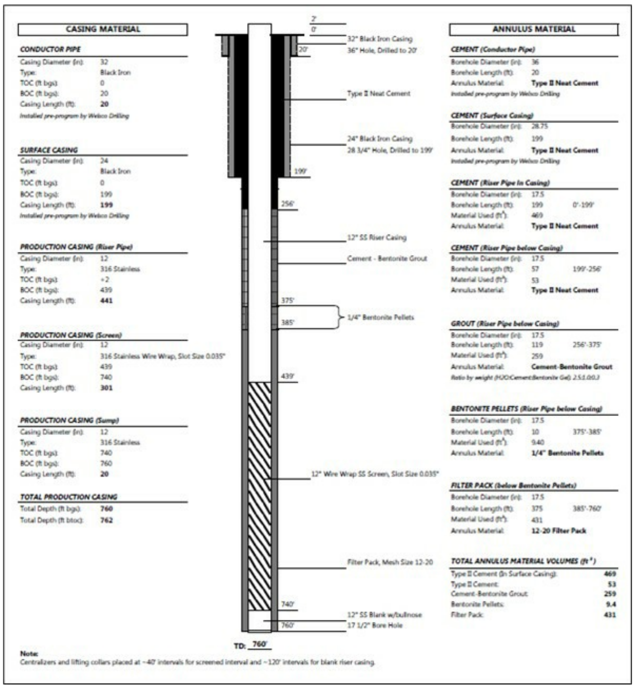
Source: SRK, 2022

Figure 13-1: Well Location Map for Predicted Life of Mine

New extraction wells are designed to produce pumping rates of approximately 2,360 m^3/d (approximately 470 gpm) from the LGA. Current extraction wells are drilled to depths ranging from 0 to 880 m. SRK selected the location for new wells to support the higher predicted pumping rates and target areas of the reserve with higher lithium grades. These new wells are expected to be similar in design to current Silver Peak extraction wells screened in the LGA with depths ranging from 150 to 870 m. A photo of a typical extraction well from Silver Peak is shown in Figure 13-2. The typical well consists of casing and screen between 12 and 16 inches in diameter with a submersible pump. The pumps extract between 125 and 4500 m^3/d. The well has valves, backflow preventer, flow meter, and pump control panel. The well pumps through HDPE piping to the evaporation ponds. A cross section of a typical extraction well is shown in Figure 13-3.

Source: SRK, 2020

Figure 13-2: Brine Extraction Well at Silver Peak



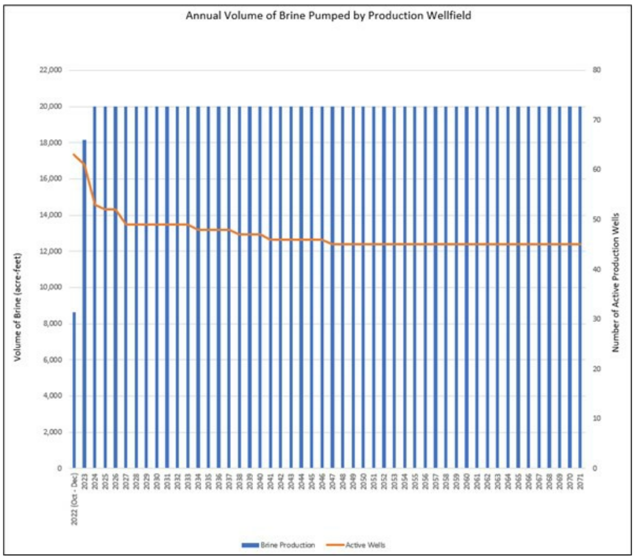
Source: Wood, 2018

Figure 13-3: Typical Production Well Construction

13.2 Production Schedule

Section 12.1 details the hydrogeological modeling that was utilized to develop the life of mine production plan. The associated proposed brine extraction rate from the wellfield is shown on Figure 13-4. Note that as discussed in Section 12.3.1, the reserve portion of this pumping plan was truncated in year 30.

Factors such as mining dilution and recovery are implicitly captured by the predictive hydrogeological model. Reporting of these factors is not practical due to the disconnect between the static resource model and the dynamic predictive model utilized for reserve estimation as well as other factors such as mixing of brine during production. However, at a high level and highly simplified comparison, the reserve grade for the 30-year reserve pumping plan is 95 mg/l in comparison to a measured and indicated resource grade of 147 mg/l, suggesting dilution greater than 50% (if dilution is at zero grade, which it is not which means, in reality, dilution is even higher). Further, as noted in Section 12.2.1, the production plan was truncated at 30 years which results in a conversion of approximately 60% of the measured and indicated resource to reserve. Again, this is a gross simplification, but this conversion rate does have a relationship to mining recovery rates. Figure 13-4 shows the life of mine pumping volume and active wells.



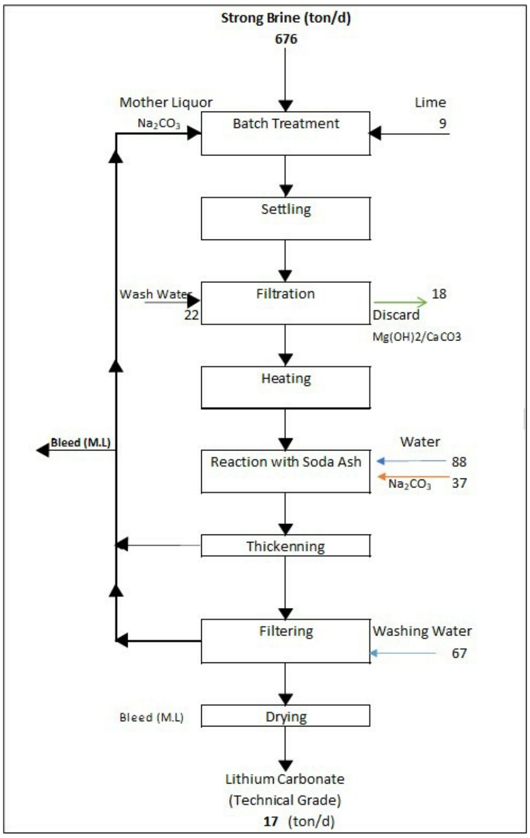
Source: SRK, 2022

Figure 13-4: Planned Pumping for Life of Mine

14 Processing and Recovery Methods

The processing methodology at Silver Peak utilizes traditional solar evaporation to concentrate and remove impurities from the lithium-rich brine extracted from the resource. This concentrated brine is then further purified in the processing facilities and chemically reacted to produce a technical grade lithium carbonate. Figure 14-1 provides a high-level flow sheet and mass balance for a 6,000 tonnes per year (t/y) Li_2CO_3 production target, summarizing the key unit operations.

The nameplate capacity of the Lithium carbonate plant is listed as 6,000 t/y Li_2CO_3. However, in recent years, Silver Peak has demonstrated that the plant is capable of producing higher than that. In 2018, the plant produced approximately 6,500 tonnes Li_2CO_3. The plant has operated at significantly higher rates for short periods of time but not on a sustained basis.



Source: SRK, 2020

Figure 14-1: Silver Peak Simplified Process Flowsheet and Mass Balance

14.1 Evaporation Pond System

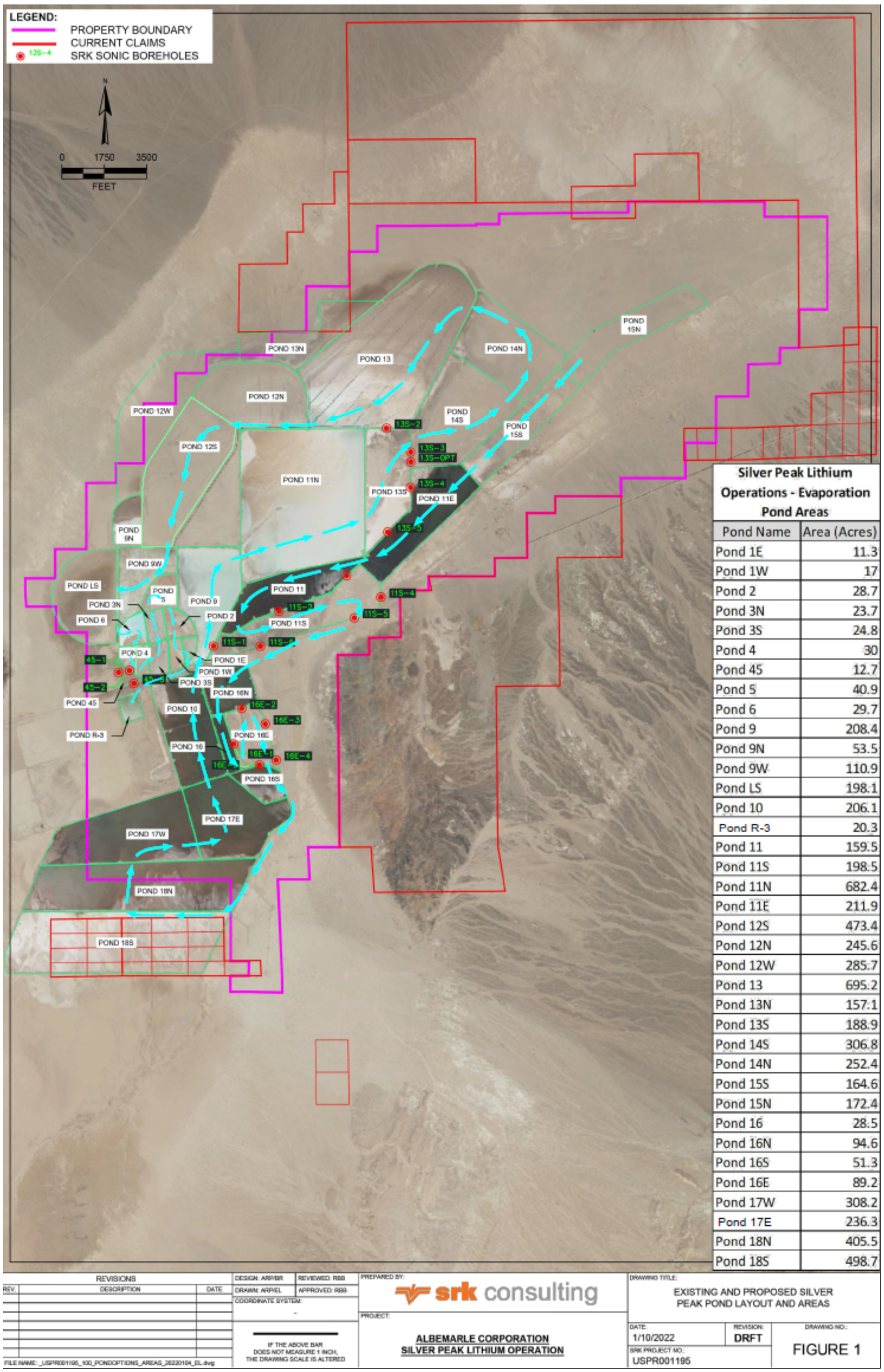
Lithium bearing brines are pumped from beneath the playa surface by a series of wells designed and distributed to recover the resource from the aquifer. The range of designed operation conditions for each well is dependent upon the aquifer and individual environment of the unit, with the wellfield as a whole historically producing a maximum of twelve million gallons of fluid per day. Exploration, well drilling and aquifer development are on-going throughout the life of the operation and are covered in more detail in Section 13. Brine produced from the extraction wells is pumped to the solar evaporating pond system.

In the pond system the brines are concentrated by the solar evaporation of water, which leads to the precipitation of salts (primarily sodium chloride) when the saturation level of the solution is reached.

Brine flows from one pond to another, typically through flow points cut in the dikes separating one pond from another, or pumped where elevation differential requires, as evaporation increases the total dissolved solids (TDS) content. Figure 14-2 shows the flow through the various ponds in the current and future evaporation pond system. Management of the flow through the system consists of regular monitoring of pond levels and laboratory analysis of the contained brine concentration. The pond flow is modified over time to meet operational needs including maintenance, desalting, and production demands.

The rate of brine transfer from one pond to another is governed by the rate of solids increase, which is dependent upon the evaporation rate, which is seasonally variable. Sampling of the pond brines for laboratory analysis is done on a regular schedule, which provides for sampling of each pond a minimum of once per month and a maximum of daily, dependent upon management needs.

Pond levels are surveyed monthly to determine the volume of brine contained and monitored daily by visual inspection by the playa supervisory personnel. In addition, there is always at least one employee on duty (10 hours per day, 365 days per year) who is assigned to monitor the pond system. The storage capacity for meteoric waters is typically in excess of one foot of dike freeboard, or more than four times the 100 yr., 24 hr. storm event. The flow through the system is adjusted and closely monitored by supervisory personnel during and after any severe storm event. The operating personnel are instructed to contact a supervisor in the event of any precipitation over the pond system and action must be taken by the supervisor if the quantity of precipitation exceeds one tenth of an inch, as described in the emergency response plan.



Silver Peak Lithium Operations - Evaporation Pond Areas

Pond Name	Area (Acres)
Pond 1E	11.3
Pond 1W	17
Pond 2	28.7
Pond 3N	23.7
Pond 3S	24.8
Pond 4	30
Pond 4S	12.7
Pond 5	40.9
Pond 6	29.7
Pond 9	208.4
Pond 9N	53.5
Pond 9W	110.9
Pond LS	198.1
Pond 10	206.1
Pond R-3	20.3
Pond 11	159.5
Pond 11S	198.5
Pond 11N	682.4
Pond 11E	211.9
Pond 12S	473.4
Pond 12N	245.6
Pond 12W	285.7
Pond 13	695.2
Pond 13N	157.1
Pond 13S	188.9
Pond 14S	306.8
Pond 14N	252.4
Pond 15S	164.6
Pond 15N	172.4
Pond 16	28.5
Pond 16N	94.6
Pond 16S	51.3
Pond 16E	89.2
Pond 17W	308.2
Pond 17E	236.3
Pond 18N	405.5
Pond 18S	498.7

Source: SRK, 2022

Figure 14-2: Brine Flow Path in Pond System-Current and Future

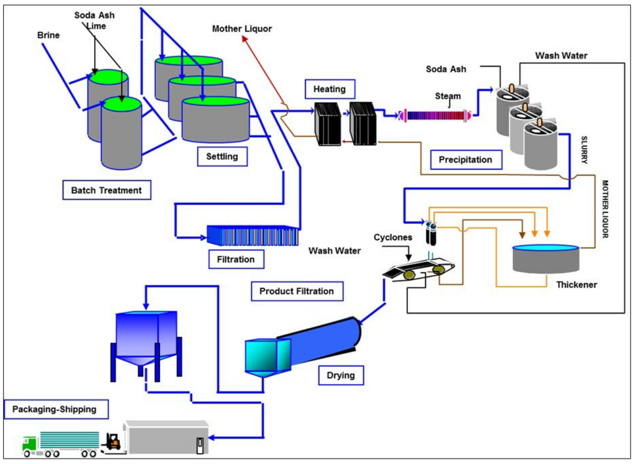
It is necessary to remove magnesium from the brines, and this is accomplished by treatment with slaked lime ($Ca(OH)_2$). A new lime plant with a three-stage reactor is installed and the old lime plant has been removed from site. The slaked lime is added as a slurry to the brine in a two-stage reactor system. The lime slaking operation is controlled by measuring the specific gravity of the slurry to ensure that the proper ratio of water to lime is used for maximum efficiency. The lime addition rate is controlled by measuring the pH of the brine as it is discharged from the reactors. The lime treatment results in the production of a semi-solid mud, consisting mainly of magnesium hydroxide ($Mg[OH]_2$) and calcium sulfate ($CaSO_4$), which is deposited in a lime solids pond. Seasonal liming occurs during summer months, May through September. The discharged brine enters a series of nine small ponds known as the Strong Brine Complex (SBC) for further concentration through solar evaporation. Seasonal dredging is performed during winter months following the liming season. SRK notes that to support the forecast expansion of pumping rates to 20,000 afpy, additional liming capacity will need to be installed at the operation. The lime plant is being constructed and should be in service by Q2 2023

Decant and further evaporation of the treated brine results in the continued deposition of salts in the pond bottoms. The salts are removed from the ponds and stockpiled in one of three piles located adjacent to the pond area. Salt harvesting is performed by a contractor during winter months within the strong brine complex on a three to five-year rotation. The removal of precipitated salt restores capacity for future use. At the production rates forecasted in this reserve estimate, on average, 2 million tons of salt will require harvesting per year.

There are currently 4,171 acres of active ponds at Silver Peak. While evaporation-based process performance can vary significantly due to factors such as climate and salt harvesting strategy, SRK estimates these ponds are adequate to support a maximum of approximately 16,420 AFA of sustained brine extraction. However, Albemarle is currently evaluating options to expand pond capacity to support forecasted pumping rates in excess of this value. While multiple options for pond expansion are under evaluation, as a current base-case, new pond construction will occur in three phases beginning in 2023 with Phase 1. Approximately 300 acres of ponds (three ponds) will be developed. Phase 2 will develop four ponds providing an additional 900 acres of capacity. Additionally, salt will be removed in part of the existing Pond 12 South to complete the Phase 2 expansion. The final expansion in Phase 3 will add approximately 200 acres of pond capacity in a single pond. Options are available and being considered to add approximately 440 acres of ponds that could be substituted for the salt removal options. For purposes of this report, SRK uses the salt removal option as it is most conservative. With this expansion, SRK estimates that the Silver Peak pond system can support sustained pumping of 20,000 AFA although climatic factors and other operational factors (e.g., salt harvesting strategy) could negatively impact this production capacity. Albemarle completed lining of five Strong Brine Ponds and will continue to explore other lining options to further enhance lithium recovery.

14.2 Lithium Carbonate Plant

When the lithium concentration reaches levels suitable for feed to the lithium carbonate plant, approximately 0.54% lithium, the brine is pumped from the SBC to the carbonate plant. Within the plant (Figure 14-3), the brine is discharged into one of two mixing tanks, where slaked lime and soda ash ($Na2CO_3$) are added to remove any remaining magnesium and calcium. This treatment results in the production of a semi-solid sludge composed primarily of magnesium hydroxide and calcium carbonate ($CaCO_3$). This sludge is removed periodically from the treatment tanks and discharged into the plant waste ditch, where it is combined with other plant waste waters and discharged onto the playa surface on Albemarle's permitted property near the western edge of the pond system. A planned plant project to be completed in 2024 will allow the sludge to be captured as cake and hauled to an existing waste pond. The settled brine is decanted through one of two plate and frame filter presses into the clear brine surge tank (CBST).



Source: Albemarle, 2018

Figure 14-3: Silver Peak Lithium Carbonate Plant

The brine feed is pumped from the CBST on a continuous basis through heat exchangers into the reactor system for final precipitation of lithium carbonate (Li_2CO_3). The rate of brine feed to the plant is based on lithium concentration and production requirements. The rate is historically approximately 500 to 600 m^3/d of 0.54% Li concentrate. The heat exchangers heat the brine to increase the efficiency of the precipitation of the lithium carbonate. The hot brine feed is processed through a series of reactors where soda ash is added to precipitate lithium carbonate. The resultant lithium carbonate slurry is pumped into a bank of cyclones for concentration of the lithium carbonate solids prior to further removal of liquids using a vacuum filter belt. Overflow from the cyclones goes to the thickener to be re-circulated, and the underflow goes to filtration and consequently drying. Mother liquor from the reactors, recovered in the cyclones and belt dryer, is pumped to the pond system for recycle so the contained lithium is not lost.

The product cake from the belt filter is washed with hot, softened water to remove any contaminants left by the mother liquor. The water is removed from the cake by another vacuum pan and recycled to the lithium carbonate reactors. The washed cake is fed to a propane fired dryer, then air conveyed to the product bin and packaging warehouse for final packaging prior to shipment to customers. In the packaging facility the product may be packaged in a number of different containers, depending on sales and inventory needs.

There is another facility on site that produces anhydrous lithium hydroxide. However, this facility does not directly source feed product from Silver Peak and has therefore been excluded from this evaluation of reserves for Silver Peak.

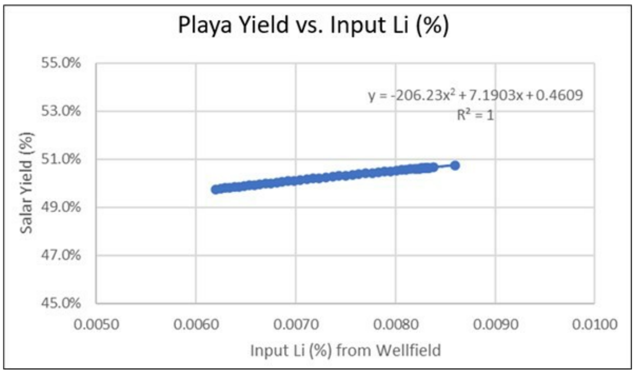
14.3 Pond System and Plant Performance

SRK developed a mass yield model of the evaporation pond system that is used to predict concentrate mass yield and lithium recovery, based on wellfield lithium input grade, into concentrate containing 0.54% Li feeding the lithium carbonate plant. The mass yield model was developed from an analysis of the pond system performance at different feed grades. The recovery model for the pond system is

given as:

Yield % = -206.23(Li wellfield feed)^2 +7.1903*(wellfield Li feed)+0.46099*

Predicted mass yield and lithium recoveries versus Li feed from the wellfield are shown in Figure 14-4.



Source: SRK, 2021

Figure 14-4: Playa Yield versus Wellfield Li Input

As previously mentioned, Albemarle has lined five Strong Brine ponds and is investigating options to line other ponds within the system. Lining of these ponds would potentially increase the lithium recovery in the pond system by 16% taking the total pond system recovery near to 59%. SRK has not included additional recovery for pond lining in the reserves estimate awaiting performance data from the ponds to confirm the actual pond system total recovery.

Recovery at the lithium carbonate plant can be considered constant at 78% recovery with an input concentrate from the ponds at 0.54% Li. However, SRK recognizes that site has programs intended to improve this recovery and note that future increases will be captured if appropriate in future updates to the report.

The pond yield and plant yield are provided as part of the summary cash flow in Table 19-7 of this technical report under the heading "Processing" and is the QP's opinion that the metallurgical recovery information provided is sufficient to declare mineral reserves, which may be inferred through its use of the resulting parameters in the reserve analysis.

14.4 Requirements for Energy, Water, Process Materials, and Personnel

For its nameplate capacity of 6,000 t/y Li_2CO_3, the Silver Peak process (ponds and lithium carbonate plant) uses the following:

- Personnel: Approximate number of people at site, 65.
- Propane: Average of 150 gallons per t of Li_2CO_3 produced
- Electricity: An average of 10.7 million mw/h for the playa operations, and 4.3 million mw/h for the lithium carbonate plant
- Fresh Water: 120 to 140 m^3 fresh water per t of Li_2CO_3 produced
- Soda ash: 2.5 tons per t of Li_2CO_3 produced
- Lime: 1.3 tons per t of Li_2CO_3 produced
- Salt Removal: Average of 2 Mt/y for the entire pond system

14.5 SRK Opinion

It is SRK's opinion that the metallurgical testwork is sufficient to declare reserves, which may be inferred through its use of the resulting parameters in the reserves analysis.

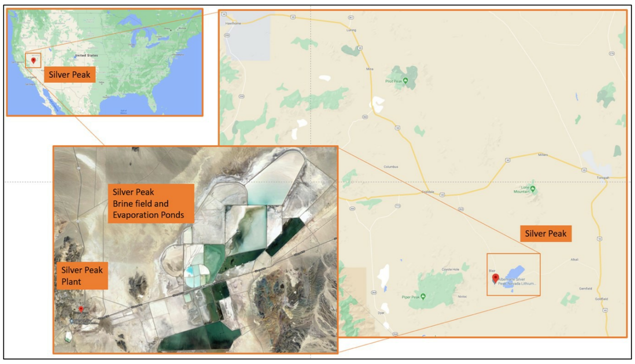
15 Infrastructure

Silver Peak is a mature operating lithium brine mining and concentrating project that produces lithium carbonate and to a lesser degree, lithium hydroxide. Access to the site is by paved highway off of major US highways. Employees travel to the project from various communities in the region. There is some employee housing in the unincorporated town of Silver Peak, where the project is located. The site covers approximately 15,000 acres includes large evaporation ponds, brine wells, salt storage facilities, administrative offices and change house, laboratory, processing facility, propane and diesel storage tanks, water supply and storage, utility supplied power transmission lines feed power substations and distribution system, new liming facility, boiler and heating system, packaging and warehousing facility, miscellaneous shops, and general laydown yard. All infrastructure needed for ongoing operations is in place and functioning. Additional evaporation ponds will reactivate band / or be constructured to increase to the needed capacity.

15.1 Access, Roads, and Local Communities

15.1.1 Access

The project is located in south central Nevada, USA between the large cities of Reno and Las Vegas. The unincorporated town of Silver Peak, where the project is located, is by paved highway from the north and by improved dirt road to the east. Accessing the project from the north starting in Hawthorne, travel is via paved two-lane US-95, 63 mi to Coaldale. At Coaldale, continue east on US-95 approximately six mi to NV-265. Travel south on paved two-lane NV-265 for 21 mi to Silver Peak. The project administration offices and plant are located on the south side of town. The project can also be accessed from the east from Goldfield. Proceed north on US-95 for five mi to Silver Peak road and turn northwest. Travel northwest approximately five mi on the improved gravel road though Alkali and then south for a total of 25 mi to arrive at the project site. Silver Peak Road bisects the evaporation ponds and salt storage areas. There are numerous dirt roads that provide access to the project from Tonopah to the north. Figure 15-1 shows the general location of the project.



Source: SRK, 2020

Figure 15-1: Silver Peak General Location

15.1.2 Airport

The nearest public airport is located approximately 9 mi east of Tonopah, south of US highway 6. The county owned airport has two asphalt paved runways. One is approximately 7,200 ft long. The other is approximately 6,200 ft long. The airport is approximately 45 to 65 mi northeast of the project depending on the route chosen. Substantial international airports are located to the north in Reno and to the south in Las Vegas.

15.1.3 Rail

The nearest railroad is operated by the Department of Defense from Hawthorne, Nevada approximately 90 mi north of Silver Peak. The rail runs north to connect to main east-west portion of the Union Pacific rail near Fernley, Nevada. The rail is not currently used nor planned to be used by the Project.

15.1.4 Port Facilities

Port facilities are approximately 400 mi away from the Project. The Port of San Francisco, CA is to the east and the ports of Los Angeles, CA and Long Beach, CA to the south.

15.1.5 Local Communities

The processing facilities are located in the unincorporated community of Silver Peak (population 115) in Esmeralda County, Nevada. Goldfield (population 270), the county seat of Esmeralda County is located approximately 30 mi to the east. Three quarters of the personnel who work at Silver Peak live locally in the communities of Silver Peak, Tonopah, and Goldfield, with the majority living in Tonopah. Albemarle has company housing and a camp area for recreational vehicles or campers in Silver

Peak. Others travel to work from other regional communities. Table 15-1 shows the population and mileage from the site to regional towns and cities. Tonopah is the closest community with full services to support the Project.

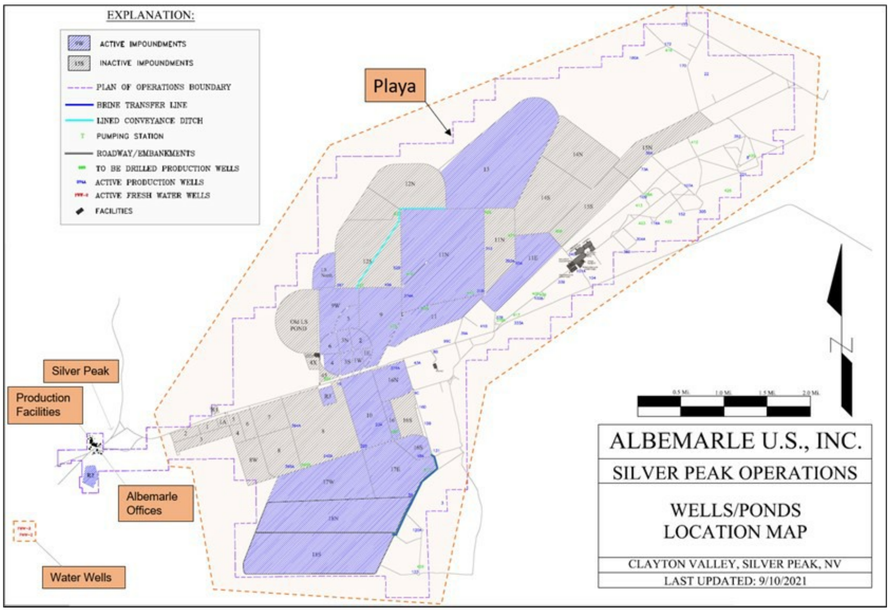
Table 15-1: Local Communities

Community	Population	Distance from Silver Peak (Mi)
Bishop, CA	3,900	102
Fernley, NV	19,400	189
Fallon, NV	8,600	162
Dyer/Fish Lake Valley, NV	1,300	35
Goldfield, NV	268	30
Las Vegas, NV	2,200,000	214
Reno, NV	504,000	214
Tonopah	2,000	58

Source: SRK, 2020

15.2 Facilities

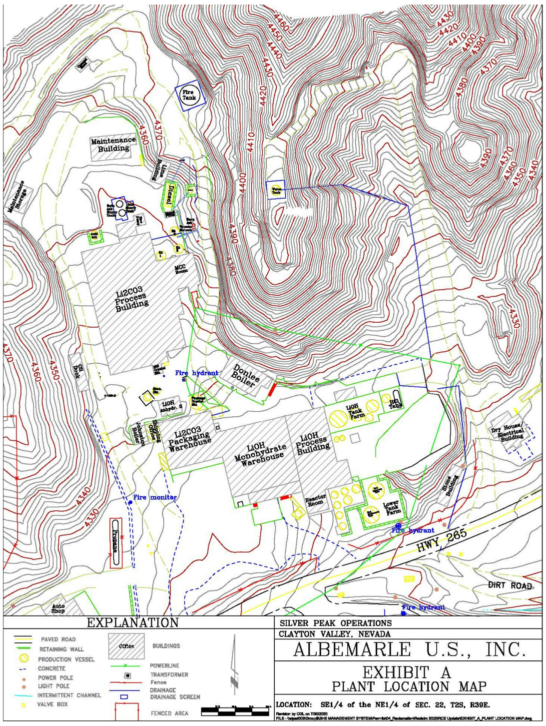
The Project has the three locations where facilities are located. The playa is the area that has the evaporation ponds, salt storage areas, new liming plant to be in service in Q2 2023, fuel tanks, wellfield maintenance facility and Avian Rehabilitation Center. The overall site layout can be seen in Figure 15-2. The evaporation ponds are located in the playa which also contains the brine production wells. The plant is located in town north of the highway. The administrative area is across the street to the southeast. Farther to the south are the process water supply wells.



Source: Albemarle, 2021

Figure 15-2: Infrastructure Layout Map

The plant area has the lithium carbonate plant, the lithium anhydrous plant, shipping and packaging facility, reagent building, propane and diesel tanks, boiler room, warehouse facility, plant maintenance facility, electrical and instrument shop, water storage tank, firewater system and dry and house/change house facility. The administrative area is located just north of the plant (across the street) and includes the main office/administrative building including the laboratory, safety office, and mine office. The Silver Peak substation is located approximately 4 mi northeast of the plant and administrative facilities. Figure 15-3 shows the plant area.



Source: Albemarle, 2021

Figure 15-3: Plant Layout Map

15.3 Evaporation Ponds

Evaporation ponds are used to concentrate lithium. The ponds are discussed in detail in Section 14.1. Figure 15-2 shows the location of the existing evaporation ponds. Figure 14-2 shows future pond locations.

15.4 Harvested Salt Storage Areas

Salt is harvested from the evaporation ponds and stored in designated salt storage areas. The salt storage areas are located near the evaporation ponds and can be seen in Figure 15-2.

15.5 Energy

15.5.1 Power

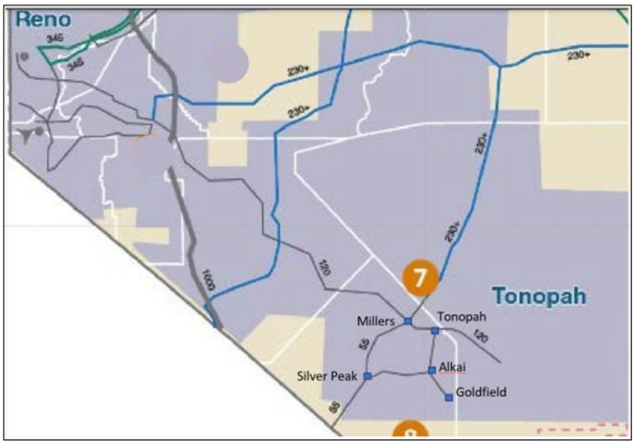
Electricity is provided by NV Energy. Two 55 kV transmission lines feed the Silver Peak substation. One line connects to the Millers substation NE of Silver Peak and the other line connects to Goldfield to the east through the Alkali substation. A 55 kV line continues south from the Silver Peak substation to connect to the California power system. Figure 15-4 shows the regional transmission system and local substations.

Primary loads are the pumps in the brine wellfield (Playa) and the processing plant. Table 15-2 shows the average loads for 2017 to 2021 in megawatts per hour (MWh).

Table 15-2: Silver Peak Power Consumption

Year	Playa (MWh)	Plant (MWh)	Total (MWh)
2017	8.6	4.0	12.7
2018	8.7	5.1	13.9
2019	8.8	4.4	13.1
2020	10.9	3.8	14.7
2021	10.5	4.7	15.2

Source: Albemarle, 2021



Source: NV Energy, 2017 (Modified by SRK)

Figure 15-4: NV Energy Regional Transmission System

15.5.2 Propane

Propane is used for heating and drying in the process facilities. The major propane loads include an 800 horsepower (hp) Donlee boiler, a 150 Johnston boiler, and a carbonate rotary dryer. The propane is supplied by a vendor located in Salt Lake City. The main propane supply tank is located on the plant site with a capacity of 20,000 gallons. There are several smaller tanks with approximately of 2,000 gallons used for forklifts and heating at various locations on the site. Propane is supplied by 12,000-gallon tanker trucks as needed four to six times per month.

15.5.3 Diesel

The project has two diesel storage tanks on site. A 15,000-gallon storage tank, which fueled a now decommissioned boiler, and a new 10,000-gallon storage tank located in the playa area near the liming facility. The playa diesel tank is being permitted and once permitting is completed it will be filled by tanker truck delivery in 10,000-gallon loads from Las Vegas or Tonopah, NV. During the interim period fuel is delivered out of Tonopah in smaller 1,700-gallon quantities every other week. The fuel is delivered by truck typically in larger quantities during the winter month when salt harvesting is occurring during the winter months. The fuel is used for site and contractor vehicles.

15.5.4 Gasoline

Gasoline is delivered in smaller quantities, typically 3,000 gallons per load, and stored in a 5,000-gallon tank and used for site vehicles.

15.6 Water and Pipelines

Potable water is supplied by ESCO. The County water system is used at all company provided houses or lots for general domestic purposes; office restrooms; dry house showers, restrooms, laundering, emergency eyewash/showers throughout the processing plants.

Albemarle owns and operates two freshwater wells located approximately two mi south of Silver Peak, near the ESCO fresh water well. These wells are used to provide process water to the boilers, firewater system and makeup water for process plant equipment. The freshwater wells are located approximately 150 ft apart in the same aquifer and are operated one at a time. The 60 and 75 hp pumps each have approximately 672 gallons per minute (gpm) capacity based on pump tests performed in 2019. Both fresh-water wells are discharged to the same 6-inch pipeline which runs to the plant water tank and on to the playa water tank located at the liming facility.

16 Market Studies

Fastmarkets was engaged Albemarle through SRK to perform a preliminary market study, as required by S-K 1300 to support resource and reserve estimates for Albemarle's mining operations. This report covers the Silver Peak operations. Silver Peak's sole product, sourced from its brine resource, is technical grade lithium carbonate. The site does also produce a specialty anhydrous lithium hydroxide that uses lithium hydroxide brought onto site from other Albemarle facilities. This product has been excluded from the analysis as it is not directly sourced from the Silver Peak brine resource.

The preliminary market study and summary detail contained herein present a forward-looking price forecast for applicable lithium products. This includes forward-looking assumptions around supply and demand. Fastmarkets notes that as with any forward-looking assumptions, the eventual future outcome may deviate significantly from the forward-looking assumptions

16.1 Market Information

This section presents the summary findings for the preliminary market study completed by Fastmarkets on lithium.

16.1.1 Lithium Market Introduction

Historically, (i.e., prior to the 2000s), the dominant use of lithium was in ceramics, glasses, and greases. The current lithium market is driven by the battery electric vehicle industry. Demand from lithium-ion batteries currently contributes 81% of total demand. Split into EV's (70%), ESS (4%) and consumer electronics (7%) The remainder (19%) is from ceramics and other traditional applications.

Lithium is currently recovered from hard rock sources and evaporative brines. The predominant hard rock mineral is spodumene, whilst most production from brine operations occurs as lithium chloride (LiCl). For the rest of this document, unless specifically noted, when referring to brine production Fastmarkets will be referring to chloride brines, and when referring to hard rock, again unless specifically noted, Fastmarkets will be referring to spodumene. This is to minimize the complexity of this explanation and given these are the dominant forms of production from both sources, this simplification covers the majority of current and future production sources.

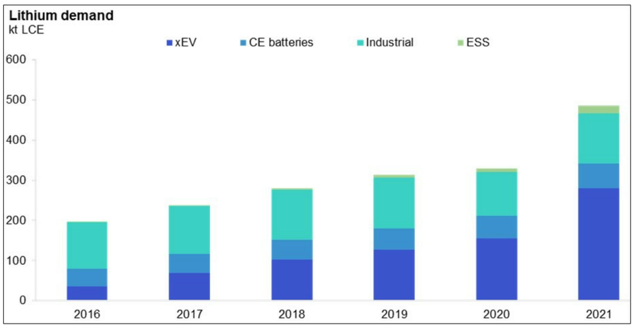
For use in batteries appropriate for electric vehicles, lithium is generally used in either a carbonate or hydroxide form. Current practice allows direct production of lithium carbonate from either brines or hard rock sources, whereas only hard rock sources directly produce lithium hydroxide (brine operations all first produce lithium carbonate which is then converted to hydroxide, if desired). However, there is a reasonable probability that lithium hydroxide will be produced directly from a brine source in the future. For existing producers, the major differences in cost between brine and hard rock include the following:

- Hard rock sources require additional mining, concentrating, and roasting/leaching costs.
- For a final hydroxide product, brine sources first produce a lithium carbonate that requires further conversion costs, whereas hard rock sources can be used to directly produce a lithium hydroxide from a mineral concentrate.
- Brine sources require concentration prior to production, as natural brine solutions are generally too diluted to allow for precipitation of lithium in a salable form.
- Brine sources generally have a higher level of impurities (in solution) that require removal.

Historically, brine producers have had a significant production cost advantage over hard rock producers for lithium carbonate and a smaller cost advantage for lithium hydroxide. New brine producers have relatively high operating costs when compared to traditional hard rock production, especially with respect to the production of lithium hydroxide, so the prior landscape is evolving.

16.1.2 Lithium Demand

In recent years, the lithium industry has gone through an evolution. The ceramic and glass sectors were traditionally the largest source of demand for lithium products globally. However, the development boom in demand for mobile consumer applications reliant upon lithium-ion batteries structurally changed the industry. Much of this change, 2000-2015, was driven by devices such as phones, laptop computers, tablet computers, and other devices (e.g., speakers, lights, drones and wearables, etc.), as well as small mobility devices (e.g., electric bikes). However, the use of lithium in EV's has quickly become the most important aspect of overall lithium demand, not just within the battery sector of demand, but for lithium demand on whole. This is seen in Figure 16-1, with EV market share rapidly growing in importance and driving overall demand growth in the lithium industry.



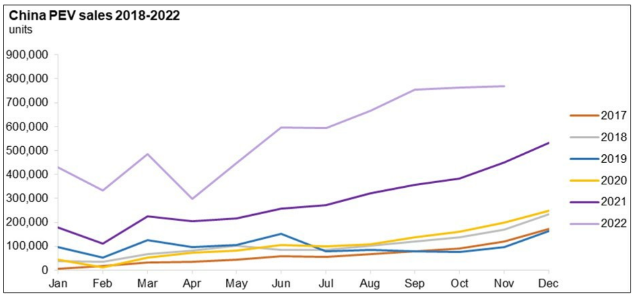
Source: Fastmarkets

Figure 16-1: Lithium Demand

The potential future demand scenarios look extremely strong as the adoption of EV's is happening at a fast pace, governments have accelerated their zero-carbon agendas, towns and cities are introducing emission charges, which is accelerating uptake of EV, especially light commercial EV's and as more power generation comes from renewables, the need for Energy Storage Systems (ESS) will also need to grow at a fast pace. Indeed, lithium demand from ESS application is expected to be bigger than EV's.

But the future landscape could also change, instead of households owning cars, autonomous vehicles may lead to ride hailing and car sharing usage models, battery chemistries are likely to change and different power trains, such as hydrogen, could be adopted.

Nonetheless, acceleration in the growth of the EV industry appears to be unstoppable. Demand growth in 2019 and 2020 were relatively disappointing but were likely driven by external factors (e.g., changes in EV subsidies in jurisdictions such as China, as well as the global COVID-19 pandemic) that have largely moved through the system. Indeed, EV demand in China in the second half of 2020 and throughout 2021 accelerated at a fast pace and have remained strong in 2022 (Figure 16-2). In the first three quarters of 2022, BEV sales were up 89% in China, 69% in the US and 26% in Europe.



Source: CAAM, Fastmarkets

Figure 16-2: China Historic PEV Sales

Ironically, the pandemic and the lockdowns led to significantly less polluted cities and clear skies, which has changed public perceptions about climate change, which combine with government incentives to buy EV's, in an effort to boost economic recovery, have further boosted demand for EV's. Most auto makers and other industry participants have invested heavily to expand into EV production and have accepted that the future is EV's, with many already signaling when they will stop producing internal combustion engine (ICE)- based vehicles. Interestingly, many of Japan's OEMs were reluctant to adopt EV's wholeheartedly, given they had to import energy to produce electricity, but in recent years they have signaled their intent to switch to electric. In Fastmarkets' opinion, many of the barriers to EV's becoming the dominant type of vehicle sales have been lifted, although there are still concerns about availability of raw materials and the cost of EV's.

Several barriers for mass EV adoption persist, with cost being the most significant one. In 2020, Bloomberg New Energy Finance (BNEF) estimated that the battery pack makes up 33% of the total BEV cost. At that time, the cells within the pack made up 75% of the battery pack cost and the cathode active material (CAM) made up around 51% of the cell cost. The CAM is the most expensive component of the entire battery pack. These proportions will now have changed due to high commodity prices and other global economic factors.

Due to a lack of maturity of the lithium battery market, current contract prices are significantly lower than spot market prices. This is expected to change with time. Fastmarkets expects that a move to market-based pricing mechanisms will result in raw material prices settling at a level that is mutually beneficial for both producers and consumers.

For higher end vehicles, this cost is manageable in the context of the overall vehicle cost. However, for entry level vehicles, the cost of the battery pack remains a hurdle to BEV's being competitive with ICE cars. BNEF state that US$68 per kWh is a rough global benchmark for BEV's becoming cheaper than ICE vehicles.

Fastmarkets' modeling, which considers spot prices for lithium, nickel, manganese, cobalt, and iron phosphate, showed battery pack costs peaked at US$180 to US$190 per kWh for nickel-based chemistries in March 2022 following high lithium hydroxide prices and the nickel price spike. The LFP battery pack cost peaked near US$155 per kWh around the same time, driven by high lithium carbonate prices.

We expect a greater penetration of vehicles fitted with LFP/LMFP battery packs outside of China. LFP/LMFP is a lower cost on a kWh basis, helping to reduce the average fleet battery pack cost and improve cost parity in budget vehicle segments. Improvement in technologies will also help reduce battery pack costs by reducing material intensity (less material = reduced cost) and increasing energy density (higher kWh for the same cost).

We have seen EV's become increasingly popular across developed markets in 2021 and 2022. We expect to see this level of growth sustained due to two factors. Firstly, the variety and availability of EV models have expanded since 2021, making EV's attractive to a greater number of consumers. The second is the introduction, or expansion, of EV-related subsidies and electric mobility strategies by governments in order to increase local EV adoption rates.

That said, two headwinds pose a downside risk to EV adoption in the near term, namely EV prices and range anxiety. Data from Fleet Europe shows that, although EV prices have fallen in China by 52% since 2015, they have risen in the US and Europe by 20% and 14% respectively, making EV's 43% and 27% more expensive than ICE cars in these markets. EV's also remain unaffordable for most consumers in emerging markets where average household incomes are lower, making ICE and used vehicles more attractive. We also expect that range anxiety will continue to limit battery-only-EV (BEV) sales in the near term, particularly in markets where vehicle ownership is necessary for travel, until battery range and charging infrastructure improves. But, where range anxiety is an issue, plug-in-hybrid EV (PHEV) sales are expected to do well.

In Fastmarkets' opinion, raw materials and supply chain limitations are the other potential major risk to widespread EV adoption, given how much longer it takes to build new mine supply, compared with downstream manufacturing capacity. Out of all the battery raw materials, Fastmarkets expects graphite and lithium are the materials that are most likely to constraint battery production, but it is not a given. The risks are generally considered to exist in the nearer term period, as the further out you look, a broader base of producers, who will by then have better knowhow, will be better placed to expand production or use their expertise to help, by partnership or acquisition, other junior miners get into production. In addition, longer term, widespread recycling will likely mitigate this risk. Downstream production (e.g., battery-grade lithium carbonate/hydroxide, cathode precursor, cathodes, batteries, etc.) also appears to have a low risk of creating a bottleneck, as extensive investment in this manufacturing capacity has already happened and continues. Technological improvements, including direct lithium extraction, DLE, and mining different ore types, like lepidolite and clays, are also expected to speed up the bringing of new supply to market as well as expanding the availability of lithium units, in the case of lepidolite.

Fastmarkets expects near- to mid-term growth in the EV market to remain robust, the biggest near-term threats are the cost of living crisis, the higher interest rate environment and the prospect of widespread recession. The International Monetary Fund (IMF) expects one third of the world's economy to be in recession in 2023. Normally, such an economic outlook would dampen the outlook for new vehicle sales, but while Fastmarkets expects total vehicle sales to be negatively impacted, it does not expect EV sales to be impacted. Reasons being, first there are long waiting lists to buy EV's, these range 3-24 months. Second, EV production that has been constrained by the parts shortages, especially the semiconductor shortage, is expected to recover as more capacity has been built and supply lines have had time to adjust to the disruption caused by Russia's invasion of Ukraine, the latter being a significant manufacturer of auto parts. In addition, the EV market has moved on from being a niche market to being much more mainstream. In addition, it needs to be remembered that EV growth will run parallel with ESS growth, and both will be driving demand for lithium-ion batteries, While Fastmarkets has little doubt the electrification era will unfold at a fast pace, there is no room for complacency. There are risks - technological changes could see hydrogen power-trains, with hydrogen being used as a fuel to combust, or to power fuel cells, and other battery chemistries could evolve, such as sodium-ion. In addition, advances in charging could mean EV's could operate with significantly smaller batteries, which in turn would mean the global vehicle fleet needs less battery raw materials. Under these scenarios, demand for lithium from EV's would be curtailed. Overall, Fastmarkets expects lithium-ion batteries will remain essential as the electrification era unfolds at a fast pace.

To quantify potential demand growth, Fastmarkets has constructed a bottom-up demand model, forecasting BEV sales by region, by EV type (BEV, PHEV, Mild-hybrid (MHEV)), which is further broken down by battery size and battery chemistry, from which we calculate the volume of demand for each battery material. The demand side remains extremely dynamic, different battery chemistries, including sodium-ion, LFP LMFP, high nickel, high manganese and others are expected to be utilized by different applications going forward. The main risk for lithium would be if a non-lithium-ion battery gained traction. Again, while we expect non-lithium batteries will find some applications, we expect lithium-ion batteries will dominate.

With governments imposing targets and legislation as to when the sale of ICE vehicles will be banned, strong growth in EV uptake is expected over the next 10-15 years. Fastmarkets' forecast is by 2032, EV sales will reach 50 million, which will mean about 55% of global sales will be EV - highlighting there will still be a lot of room for organic growth ahead.

While the is a lot of focus on EV growth, there is a likely cap on how big the EV market can be. But given the potential for grid scale energy storage, the ESS market is likely to surpass the EV market in the future.

16.1.3 Lithium Supply

Lithium supply is currently sourced from two types of lithium deposit: hard rock (spodumene, lepidolite, and petalite minerals) and concentrated saline brines hosted within evaporite basins (largely salt flats in Chile, Argentina, China and Bolivia). Exploration and technical studies are currently ongoing on three additional types of deposits: hectorite clay deposits, a unique hard rock deposit with a lithium-boron mineral named Jadarite, and other deep brines (e.g., geothermal and oil field). Although extensive study has been completed and much is being invested in these alternate lithium sources, they have not yet been commercially developed, although some are expected to be commercially developed in the not too distant future.

Currently (i.e., 2022 production), approximately 45% of lithium produced comes from brines and 55% from hard rock deposits.

Up until 2016, global lithium production was dominated by two deposits: Greenbushes in Australia (hard rock) and the Salar de Atacama in Chile (brine), the latter having two commercial operations on it, Albemarle and SQM. Livent, formerly FMC, was the third main producer in South America with their operation in Argentina. Tianqi Lithium and Ganfeng Lithium were the two main Chinese lithium players, growing domestically and overseas with Tianqi buying a 51% stake in Greenbushes and Ganfeng developing lithium mining and production facilities in China, as well as investing in mines and brine operations in Australia and South America. Since then, many more producers have emerged on the scene, first with the restart of the Mt Cattlin mine in Australia, the brief restart of North American Lithium's La Corne mine in Canada, the expansion at Mt Marion and the start-up of Allkem (formerly Orocobre) brine operation in Argentina. These were then followed by a rush of new production in 2017/18, with AMG's Mibra in Brazil and four new starts in Australia, including Tawana Resources' (later Alita Resources) Bald Hill mine, Altura Mining's Pilgangoora mine, Pilbara Minerals' Pilgangoora mine and Mineral Resources' Wodgina mine. In addition, there were start-up in China, including Qarhan, Taijinaier and Yiliping. In addition, a number of existing producers have expanded production in recent years, including at Albemarle, SQM, Pilbara Minerals, Allkem and Mineral Resources' Mt Marion mine. The result is that production climbed to 528,000 tonnes LCE in 2021, from 186,000 tonnes LCE in 2016.

As of mid-2022 there were 27 miners, operating 30 mines/salars, with the average size of production being 16,500 tonnes per year LCE. In 2021, brine accounted for 46%, spodumene 45% and lepidolite and clays 9%. Geographically, in 2021, 41% of lithium raw material was mined in Australia, 32% in South America, 24% in China, with 3% from other countries.

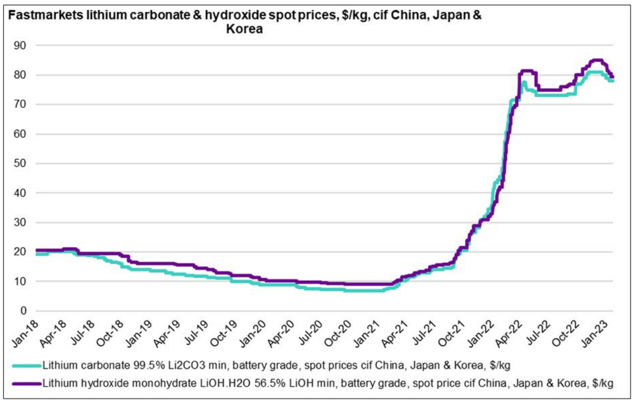
Looking forward, as discussed above, Fastmarkets forecasts that demand will grow significantly. However, supply is also rapidly increasing. Based on Fastmarkets' knowledge of global lithium projects in development, it forecasts that mine supply will grow by 165% between 2021 and 2025, with estimated mine supply reaching 1.4 million tonnes in 2025, from 0.58 million tonnes in 2021. This potential growth in supply is limited to projects that are near production (i.e., projects that are either producing, under construction, or at an advanced stage of development, such as operating demonstration plants and at the point of financing construction). The current price environment and political climate is extremely supportive of bringing on new production, with many governments giving grants, tax breaks and downstream consumers keen to provide support by offering partnerships and offtake agreements. The main headwinds today are social and environmental opposition, while planning and permitting still take time. Given the demand outlook discussed above, Fastmarkets believes it is likely the next-in-line projects come into production and other junior miners will be incentivized to get into production as fast as they can. Our forecast is that there are more than enough potential lithium mines to provide enough supply, the big question is whether the supply can be commercially available in a timely manner.

Beyond 2025, the supply pipeline is well stocked with junior miners and their journey to market may well be accelerated as existing miners invest in them, bringing with them their knowhow, finance and management expertise.

16.1.4 Pricing Forecast

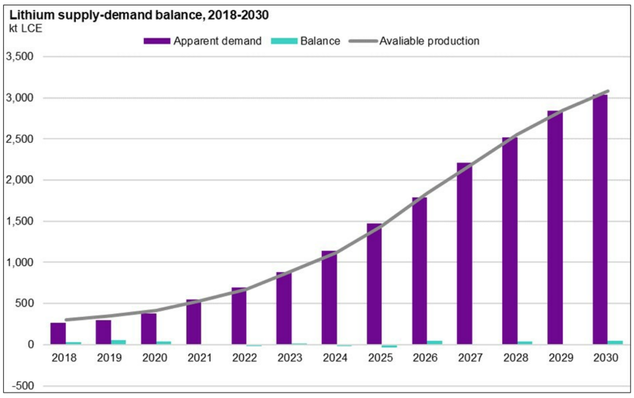
Lithium prices reacted negatively to the supply increases that started in 2017/18, with spot prices for battery grade lithium carbonate, CIF China, Japan, Korea (CJK) falling from a peak of US$20 per kg in early 2018, to a low of US$6.75 per kg in the second half 2020. They have since been catapulted higher, averaging US$16.60 per kg in 2021 and US$70.66 in the first eleven months of 2022, with the high price range so far in 2022 being US$80 to US$82 per kg. This surge in prices has been driven by stronger than expected demand and a far from optimal supply response, which was hampered by the negative fallout from the pandemic and a much slower than expected restart of idle production capacity, while new capacity and restarts have suffered the usual ramp-up issues. Figure 16-3 presents the historical spot prices for lithium carbonate and hydroxide.

But, as 2022 turns into 2023, another supply response is underway, with some idle capacity restarting, expansions and new mines starting up. This new capacity has been ramping up during 2022 and is expected to continue to do so in 2023, bringing with it much needed additional supply that should alleviate the current supply shortage. Fastmarkets does, however, expect the market to end up being in a small supply surplus in 2023, which should take pressure of prices. The supply-demand estimate is provided in Figure 16-4.



Source: Fastmarkets

Figure 16-3: Lithium Carbonate and Hydroxide Historical Spot Prices



Source: Fastmarkets

Figure 16-4: Lithium Supply-Demand Balance

After two years of a deficit market, 2023 is expected to see a significant supply response and the market tightness is expected to ease. Although Fastmarkets expects the market to move into a small surplus of 11,500 tonnes LCE in 2023, the market will still feel tight, and as such the price is expected to remain elevated. Thereafter, the market is expected to be tight and mainly in deficit until 2026, as we move further away from the parts shortages that have been constraining EV production, and therefore lithium demand.

Given the strong demand outlook we envisage a challenge for producers to keep up and bring supply online in a timely manner. Given this challenge, Fastmarkets does not expect prices to drop down below the incentive price anytime soon. In Fastmarkets' opinion, the lithium price will need to exceed the production cost for new projects and provide an adequate rate of return on investment to justify developments.

Near to medium term supply increases will be fueled by traditional sources, including spodumene units from Australia, Africa and the Americas, as well as salar brines in Argentina, Chile and China. Post 2025, an increasing portion of new supply is forecast to come from lower-grade unconventional resources such as lepidolite, geothermal brines and oilfield brines. Based on how Chinese companies have rapidly developed the nickel/cobalt sector in Indonesia, as it strived to secure battery raw materials, Fastmarkets is confident in the ability of the Chinese to do the same in lithium by ramping-up domestic lepidolite production and developing lithium mines in Africa. Both of these are expected to become a significant contribution to global supply.

There is expected to be a period of surplus in the second half of the decade, but as mentioned, a significant amount of new capacity is reliant on the successful implementation of yet mostly unproven

DLE technology at unconventional resources, so the forecast presence of some surpluses is not a bad thing. While an 87,100-tonne surplus in 2031 seems a lot now, it will only represent around 3% of forecast demand. Surpluses will also likely be absorbed by restocking. In addition, experience tells us that even though we have allowed for delays, we are likely to see more issues affecting the delivery of new material into the market - as such, prices are expected to remain elevated. The emergence of more recycled material will provide an extra boost to supply in the later years.

Fastmarkets has provided price forecasts out to 2030 for the most utilized market prices. These are the battery grade carbonate and hydroxide, CIF China, Japan and Korea. Fastmarkets recognizes that Albemarle's current operations are expected to continue for at least another 20 years, but due to a lack of visibility beyond 2030, there is little reward in attempting to forecast a supply-demand balance and therefore a price forecast beyond this period. We have therefore flatlined our forecast from 2030. Table 16-1 shows the forecasts, provided in both nominal and real terms.

Table 16-1: Lithium carbonate and hydroxide Price Forecast

Prices and Forecast (Base case)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Lithium carbonate BG CIF China, Japan And Korea spot US$/kg (nominal)	16.6	71.2	63.5	59.0	61.0	42.0	47.8	28.0	33.0	24.0
Lithium carbonate BG CIF China, Japan and Korea spot US$/kg (real 2022)	17.9	71.2	61.3	55.8	56.4	37.9	42.7	24.7	28.6	20.5
Lithium hydroxide BG CIF China, Japan And Korea spot US$/kg (nominal)	17.4	72.9	65.5	61.0	60.0	40.0	48.0	28.0	33.0	24.0
Lithium hydroxide BG CIF China, Japan And Korea spot US$/kg (real 2022)	18.8	72.9	63.2	57.7	55.5	36.1	42.8	24.7	28.6	20.5
Prices and Forecast (High case)										
Lithium carbonate BG CIF China, Japan and Korea spot US$/kg (nominal)	16.6	70.8	76.0	76.0	70.0	65.0	65.0	55.0	55.0	55.0
Lithium carbonate BG CIF China, Japan and Korea spot US$/kg (real 2022)	17.9	70.8	73.4	71.9	64.7	58.7	58.0	48.4	47.7	47.1
Lithium hydroxide BG CIF China, Japan and Korea spot US$/kg (nominal)	17.4	72.2	76.0	76.0	70.0	65.0	65.0	55.0	55.0	55.0
Lithium hydroxide BG CIF China, Japan and Korea spot US$/kg (real 2022)	18.8	72.2	73.4	71.9	64.7	58.7	58.0	48.4	47.7	47.1
Prices and Forecast (Low case)										
Lithium carbonate BG CIF China, Japan and Korea spot US$/kg (nominal)	16.6	70.8	60.0	43.0	40.0	20.0	16.0	12.0	12.0	12.0
Lithium carbonate BG CIF China, Japan and Korea spot US$/kg (real 2022)	17.9	70.8	57.9	40.7	37.0	18.1	14.3	10.6	10.4	10.3
Lithium hydroxide BG CIF China, Japan and Korea spot US$/kg (nominal)	17.4	72.2	60.0	43.0	40.0	20.0	16.0	12.0	12.0	12.0
Lithium hydroxide BG CIF China, Japan and Korea spot US$/kg (real 2022)	18.8	72.2	57.9	40.7	37.0	18.1	14.3	10.6	10.4	10.3

Source: Fastmarkets

Tightness is expected to keep prices well above incentive prices for the whole forecast period, albeit at lower levels than the peaks seen in 2022. Volatility will remain a key theme, as supply increases in waves, we expect periods when supply will be greater than that year's demand, leading to surpluses, and downward pressure on prices.

Post 2030, the continued growth of demand for lithium from EV's and ESS, will require a lithium price that incentivizes new supply to come online to meet this demand. The lithium price will need to exceed the production cost for new projects and provide an adequate rate of return on investment to justify development. Based on our understanding of the cost of bringing new supply online, especially higher cost units such as lepidolite, whilst also ensuring an adequate rate of return, we believe prices long-term will settle around the US$20/kg mark. Due to typical price volatility, Fastmarkets expects prices may spike well above or fall well below this level, but from an average pricing perspective, Fastmarkets views this forecast as reasonable.

Fastmarkets recommends that the above price of US$20/kg for lithium carbonate cf China, Japan and Korea should be utilized by Albemarle for the purpose of reserve estimation.

Our high-case scenario could pan out either if the growth in supply is slower than we expect, or demand growth is faster than expected. The former could happen if the Chinese struggle to make lepidolite mining economically viable, or if DLE technology takes longer to be commercially available. The latter could be seen if the adoption of EV's continues to accelerate, or if demand for ESS grows at a faster pace. However, we do think prices over US$55 to US$60 per kg would be unsustainable over the long term when most of the market is priced basis market prices.

Our low-case scenario could unfold if the current price regime prompts a much faster reaction from producers. This is most likely to be achievable by Chinese producers both domestically and in Africa, considering the strict permitting process in western economies is already delaying project development timelines. Alternatively, or possibly in tandem, we would expect a fast return towards incentive prices if demand did end up being hit by either a recession, a massive escalation in geopolitical events, or a more incapacitating pandemic.

As noted above, Fastmarkets views it likely that there will be short-term volatility in pricing. However, from a longer term viewpoint, the key points of uncertainty to the average spodumene or lithium carbonate price in this forecast follow:

- EV sales growth – The rate at which EV's are accepted by the general population will be the biggest driver of lithium prices. In the high case scenario, Fastmarkets believes prices of US$30 per kg for battery grade lithium and US$3,000 per tonne for spodumene are realistic for a sustained period to support the almost exponential supply growth required for this scenario beyond 2030.
- Fundamental battery technology – Even with very strong EV demand, if the industry substitutes away from lithium-based technology, it could materially reduce lithium demand resulting in a similar pricing situation to the low-scenario noted above. However, in Fastmarkets opinion, the probability of this occurring within the forecast period is low considering the performance, practicality and versatility of lithium-based battery technologies and chemistries. Given the very long timing to commercialize battery technology, it appears highly unlikely the industry will substitute away from lithium-ion in the forecast period.
- Supply growth beyond 2025 – As shown in Figure 16-4: Lithium Supply Demand Balance After two years of a deficit market, 2023 is expected to see a significant supply response and the market tightness is expected to ease. Although Fastmarkets expects the market to move into a small surplus of 11,500 tonnes LCE in 2023, the market will still feel tight, and as such the price is expected to remain elevated. Thereafter, the market is expected to be tight and mainly in deficit until 2026, as we move further away from the parts shortages that have been constraining EV production, and therefore lithium demand.
- , Fastmarkets expects supply growth to broadly match demand in the period. There is a healthy number of potential projects in the pipeline but there remains uncertainty in the ability for these to come online in a timely manner. We have placed faith in the markets ability to develop alternative deposit types, such as the hectorite clay deposits in Nevada and Mexico, some of the largest occurrences of lithium in the world. At this stage, the only question around development of these deposits is the ultimate timeline on when they can start, especially projects in the US, which are being continually delayed due to NIMBYism and delays in permit issuance. We have allowed for delays, but experience tells us that we are likely to see more issues affecting the delivery of new material into the market. Toward the end of the decade, recycling will become an increasingly important component in filling potential supply gaps, especially in areas which lack inadequate raw material supply (Europe and US).

16.1.5 Product Sales

Silver Peak is an operating lithium mine. The mine pumps a subsurface brine that is rich in lithium to evaporation ponds on the surface of the playa. These evaporation ponds concentrate the brine utilizing solar energy. Lithium chloride is concentrated to approximately 0.54% lithium at which point it is processed into technical grade lithium carbonate at the site's production facilities. Specifications for this product are provided in Table 16-2.

Table 16-2: Technical Grade Lithium Carbonate Specifications

Chemical	Specification	
Li_2CO_3	min.	99%
Cl	max.	0.015%
K	max.	0.001%
Na	max.	0.08%
Mg	max.	0.01%
SO_4	max.	0.05%
Fe_2O_3	max.	0.003%
Ca	max.	0.016%
Loss at 550°C	max.	0.75%

Source: Albemarle 2017

Historic production from the Silver Peak facility is presented in Table 16-3.

Table 16-3: Historic Silver Peak Annual Production Rate (Metric Tonnes)

	2015	2016	2017	2018	2019	2020	2021
Technical Grade Lithium Carbonate	5,410	3,849	4,471	6,565	3,586	3,920	6,198

Source: Albemarle 2021
2015-2020 data reflects actual production, 2021 production is an estimate

Looking forward, Albemarle is targeting increasing production from Silver Peak to fully utilize the facility. As seen in Table 16-2 the facility has produced as much as 6,500 tonnes of Li_2CO_3 in recent years (specifically 2018), although not on a sustainable basis. Current active evaporation ponds do not have the capacity to sustain this production rate and the 2018 production relied upon depleting pond inventory. Going forward, Albemarle plans to rehabilitate existing ponds that are out of use to increase the evaporation capacity to bring sustained pond capacity closer to the capacity of the production facilities and achieve higher production rates on a sustained basis (note, these production rates are dependent upon lithium concentration in brine remaining at or near recent levels, as lithium concentration drops over time, the production rate will also fall unless pumping rates and evaporation pond capacity can be increased).

The technical grade lithium carbonate product from Silver Peak is a marketable lithium chemical that can be sold into the open market. However, Albemarle is an integrated chemical manufacturing company that operates multiple downstream lithium processing facilities and also has the option of utilizing the production from Silver Peak for further processing to develop value-add products (e.g., battery grade lithium carbonate or hydroxide). Therefore, a proportion of the production from Silver Peak is utilized as source product for Albemarle's downstream processing facilities. In recent years, the proportion of production consumed internally has averaged approximately 65% with the remainder sold to third parties.

While a portion of the production may be consumed internally, for the purposes of this reserve estimate, Fastmarkets has assumed that 100% of the production from Silver Peak will be sold to third parties and has therefore utilized a typical third-party market price, without any adjustments, as the basis of the reserve estimate.

16.2 Contracts and Status

As outlined above, the lithium carbonate produced from Silver Peak is either consumed internally for downstream value-add production or sold to third parties. These third-party sales may be completed in spot transactions, or the lithium carbonate may be utilized to satisfy sales contracts for lithium chemicals held at the consolidated corporate Albemarle level or its affiliates. Silver Peak also has direct offtake contracts to third parties totaling 2,000 tonnes per year. Of this, around 1,600 tonnes are sold under long term or annual contracts with the rest being sold at spot prices. The balance of Silver Peak's annual production volumes is used internally as raw material for downstream lithium salts. Fastmarkets is not aware of any other material contracts for Silver Peak.

17 Environmental, Permitting and Social Factors

The following sections discuss reasonably available information on environmental, permitting, and social or community factors related to the SPLO. Where appropriate, recommendations for additional investigation(s), or expansion of existing baseline data collection programs, are provided.

17.1 Environmental Studies

The SPLO is in a rural area approximately 30 mi southwest of Tonopah, in Esmeralda County, Nevada. It is located in Clayton Valley, an arid valley historically covered with dry lake beds (playas). The operation borders the small unincorporated town of Silver Peak, Nevada. Albemarle uses the SPLO for the production of lithium brines, which are used to make lithium carbonate (Li_2CO_3) and, to a lesser degree, lithium hydroxide (LiOH). The site covers approximately 13,753 acres and is dominated by large evaporation ponds on the valley floor; some in use and filled with brine while others are dry and temporarily unused. Actual surface disturbance associated with the operations is 7,390 acres, primarily associated with the evaporation ponds. The manufacturing and administrative activities are confined to an area approximately 20 acres in size, portions of which were previously used for silver mining through the early twentieth century (DOE, 2010)

Albemarle Corporation and its predecessor companies (Rockwood Lithium, Inc., Chemetall Foote Corporation, Cyprus Foote Minerals, and Foote Minerals) have operated at the Silver Peak site since 1966, significantly pre-dating most all environmental statutes and regulations, including National Environmental Policy Act (NEPA) and subsequent water, air, and waste regulations. Baseline data collection as part of environmental impact analyses was never conducted comprehensively, though some hydrogeological investigations were performed as part of project development. The U.S. Department of Energy (DOE) conducted a limited NEPA Environmental Assessment (EA) in 2010 of its proposal to partially fund the following activities:

- The establishment of a new 5,000 metric tonne per year lithium hydroxide plant at an existing Chemetall facility in Kings Mountain, North Carolina
- The refurbishment and expansion of an existing lithium brine production facility and lithium carbonate plant in Silver Peak, Nevada

Both projects were intended to support the anticipated growth in the Battery Electric Vehicle (BEV) industry and hybrid electric vehicle (HEV) industry. The following information was obtained primarily from early studies, publicly available databases, and information provided in the Final Environmental Assessment for Chemetall Foote Corporation Electric Drive Vehicle Battery and Component Manufacturing Initiative Kings Mountain, NC and Silver Peak, NV (DOE, 2010), which analyzed the impact to a limited number of environmental resources. Supplemental information was provided in the updated resource baseline reports prepared as part of the current permitting efforts at SPLO.

The SPLO currently has a permitting action before the U.S. Department of the Interior – Bureau of Land Management (BLM) for the reconciliation of total surface disturbance that has taken place at the Project site as well as potential expansion and future disturbance activities, including the construction of two new weak brine evaporation ponds, as well as a new strong brine complex with lined ponds to replace existing unlined ponds and a small area of existing ponds that overlapped onto BLM-administered public land, but were not properly authorized. Albemarle is planning to increase the authorized disturbance of 6,462 acres to approximately 8,138 acres. The proposed expansion and future disturbance would be located on both private lands controlled by Albemarle and public land administered by the BLM.

Baseline reports for these actions were prepared by SWCA Environmental Consultants for use by the BLM in the NEPA-driven impact analysis, and include studies for the pale kangaroo mouse, soils, ecological sites, vegetation, noxious and invasive weeds, migratory birds, eagles and raptors, and cultural resources. Separately, SPLO conducted a site evaluation for the presence of Tiehm's buckwheat and observed no evidence of any buckwheat species within the SPLO project property boundaries. The precise nature of the NEPA disclosure document to be used by the BLM for the impact analyses has not yet been formally determined and could involve either an Environmental Assessment (EA) or Environmental Impact Statement (EIS), depending on the level of significance of the proposed impacts. While a preliminary determination by the agency suggests that an EIS would likely be required, supplemental communications have indicated that an EA is still an option. The formal determination will be issued by the agency by mid-2023.

In addition, several broad-scope environmental studies have also been conducted within Clayton Valley, but not specifically for the SPLO. While the studies were not officially sanctioned by the BLM as part of an active mining plan, each study does follow approved protocols for data collection with respect to the resource under investigation per BLM Instruction Memorandum NV-2011-004 Guidance for Permitting 3809 Plans of Operation (BLM, 2010). The botanical inventory was initiated early due to the time critical nature of plant identification, which is generally limited to the spring of the year in most locations in Nevada. The wildlife inventory was conducted concurrently as an opportunistic sampling event. The following is a summary of the relevant environmental studies conducted in the valley to date.

17.1.1 Air Quality

The Nevada Division of Environmental Protection (NDEP) – Bureau of Air Quality Planning (BAQP), which is responsible for monitoring air quality for each of the criteria pollutants and assessing compliance, has promulgated rules governing ambient air quality in the State of Nevada. Esmeralda County is in attainment for all criteria air pollutants. Immediately bordering the SPLO to the north and west is the town of Silver Peak, which contains private residences, a small school, a post office, a Fire/Emergency Medical Services (EMS) station, a small church, a park, and a tavern. The closest occupied structures to the SPLO (measured from Albemarle's Administrative Office) are approximately 1,000 ft away. The DOE (2010) EA concluded that exhaust emissions from equipment used in construction, coupled with likely fugitive dust emissions, could cause minor, short-term degradation of local air quality.

The SPLO operates via a Class II Air Quality Operating Permit (AP2819-0050) issued by the NDEP – Bureau of Air Pollution Control (BAPC). This permit applies to most of the equipment used and materials handling activities in the lithium carbonate and lithium hydroxide manufacturing processes. The SPLO has historically been in full compliance with their air quality operating permit. However, on June 28, 2022, Albemarle was issued a Letter of Alleged Findings and Order to Appear for Enforcement Conference with respect to AP2819-0050 for the observance of an unpermitted propane generator and failure to submit required monitoring, recordkeeping, or reporting at the Project site. Albemarle has completed all the requested actions from BAPC including providing all records of monitoring and incorporating the propane generator and are awaiting further feedback in order to resolve these issues.

17.1.2 Site Hydrology/Hydrogeology and Background Groundwater Quality

The SPLO is located within the Clayton Valley Hydrographic Area, which covers 1,437 square kilometers (km^2), and is designated as Hydrographic Area No. 143 of the Central Region, Hydrographic Basin 10. Clayton Valley, a topographically closed basin bounded by low to medium altitude mountain ranges, is a graben structure. Seismic and gravity surveys reveal numerous horst and graben features as the basin deepens to the east-southeast. Extensive faulting has created hydrologic barriers, resulting in the accumulation of lithium brines below the playa surface. Jennings (2010) states that satellite imagery and geological mapping identifies several parallel north-south trending faults that are semi-permeable barriers separating the freshwater aquifer on the west from the brines beneath the playa. Stratigraphic barriers occur around much of the playa, isolating it from significant freshwater inflows originating in the mountains.

Recharge occurs as underflow into the basin from Big Smoky Valley in the north and Alkali Spring Valley in the west. Recharge derived from precipitation in the basin is low due to high evapotranspiration rates.

Extensive exploration drilling has occurred to define the naturally occurring brine resource and hydrogeology of the Clayton Valley playa and surrounding areas. Freshwater does not exist near the pond system of the playa. However, upgradient of the playa margin yields groundwater that is potable. A monitoring well is located between the R-2 process pond and the freshwater wells (located upgradient) to define the groundwater quality between the playa aquifer and the freshwater aquifer. The topographic surface at the freshwater wells is about 390 ft higher in elevation than the playa surface and the direction of the groundwater flow is clearly toward the playa.

The groundwater pumped from the Clayton Valley playa produces a brine solution with very high Total Dissolved Solids (TDS) concentrations, averaging 139,000 parts per million (ppm). Stormwater runoff and accumulation is directed to the closed hydrogeologic system of Clayton Valley.

17.1.3 General Wildlife

A review conducted in 2011, indicated that the dark kangaroo mouse (Microdipodops megacephalus) and the pale kangaroo mouse (Microdipodops pallidus) may occur in the area. The dark kangaroo mouse is listed as a sensitive species by the Nevada BLM, and both species are protected by the State of Nevada. At the same time, the Nevada Department of Wildlife (NDOW) reported that bighorn sheep (Ovis canadensis) and mule deer (Odocoileus hemionus) distributions exist on Mineral Ridge, north and west of the community of Silver Peak. The 2011 review also cited the potential presence of desert kangaroo rat (Dipodomys deserti), Merriam’s kangaroo rat (Dipodomys merriami), Great Basin whiptail (Cnemidophorus tigris tigris) and the zebra-tailed lizard (Callisaurus draconoides). Small mammal tracks were not documented within the Project area boundary during the 2020 investigations. The U.S. Fish and Wildlife Service (FWS) had no listings for threatened or endangered species in the area.

Golden eagle (Aquila chrysaetos) and raptor aerial surveys of the area were conducted in the spring of 2016 and again in 2020. During the first aerial survey conducted in May, four eagle nests were observed. The four nests were again monitored in June. All four nests were inactive in June 2016. No golden eagle or other raptor nests were recorded within the Project area, and no occupied golden eagle nests were recorded in the survey area during the 2020 investigations.

Both desktop analysis and field observations conducted during 2020 indicate that the playa system supports a low diversity of wildlife. Small mammals and reptiles do occur in low densities within the playa setting where occasional vegetative structures occur. Based on a desktop review, it is not anticipated that mule deer or bighorn sheep would occur within the playa, as the playa provides no foraging habitat and adequate water sources are likely closer to or within the known bighorn sheep habitat. It is not anticipated that the Project would have considerable impact to the habitats of the species that are either known to occur or could occur within the playa setting.

17.1.4 Avian Wildlife

A comprehensive assessment of avian wildlife in and around the area of the SPLO was originally completed as part of the Avian Protection Program (APP) (EDM, 2013). Clayton Valley lies in an arid region at the northern edge of the Mojave Desert which represents a transition from the hot Sonoran Desert to the cooler and higher Great Basin. The landscape is dominated by Nevada’s driest habitat, salt desert scrub, with isolated ephemeral wetlands and playas. According to the Great Basin Bird Observatory (GBBO, 2010), salt desert scrub and ephemeral wetlands and playas constitute important habitat for several priority bird species in Nevada. Although the breeding bird population of Esmeralda County is small, several hundred species of birds migrate through the county (Esmeralda County Commissioners, 2010).

The proposed Project area occurs on playa that is devoid of vegetation and currently provides little avian habitat. Based on the results of the field survey conducted in 2020, development of the Project is not anticipated to impact breeding or nesting birds or result in a loss of habitat. The Project itself, once developed, would provide significant habitat through the development of ponds, which vary in their water quality. The SPLO currently provides nesting habitat for two sensitive species: western snowy plover (Charadrius nivosus nivosus) and American avocet (Recurvirostra americana). Development of the Project may increase the available nesting habitat for these species. Additionally, these ponds provide stopover habitat for thousands of migrating waterfowl, shorebirds, and wading birds. Water quality that would pose a risk to birds is managed through the Project’s extensive monitoring and minimization efforts to maintain avian mortality rates at extremely low levels.

17.1.5 Botanical Inventories

Based on a review of data provided by the Southwestern Regional Gap Analysis Program (SWReGAP) and a biological survey conducted on June 16, 2011, the area generally consists of three vegetative communities: inter-mountain basins playa, inter-mountain basins greasewood flat, and inter-mountain basins active and stabilized dunes (U.S. Geologic Survey (USGS), 2005). Additional seasonally sensitive botanical inventories were conducted in the area between June 19 and June 21, 2016. Playa habitat types were generally void of vegetation, while greasewood flats were dominated by black greasewood (Sarcobatus vermiculatus), Bailey’s greasewood (Sarcobatus baileyi), four-wing saltbush (Atriplex canescens), Mojave seablite (Suaeda moquinii), shadscale (Atriplex confertifolia), pickleweed (Salicornia ssp.) and inland saltgrass (Distichlis spicata).

SWCA completed additional botanical surveys for special-status plants and noxious and invasive weeds in the Project's proposed expansion area in May 2020. No special-status species were observed. One noxious weed species, saltcedar (Tamarix sp.), and one invasive weed species, Halogeton (Halogeton glomeratus), were observed within the proposed expansion area.

17.1.6 Cultural Inventories

No cultural inventories appear to have been conducted as part of the original permitting effort within the SPLO areas of disturbance, including the process plant site. In general, the valley playas are devoid of cultural artifacts and easily cleared during baseline data collection. The presence and complexity of cultural resources does, however, tend to increase toward the playa edges and adjacent dune systems. (DOE, 2010) As part of the current permitting process, limited cultural surveys were completed, as per request by the BLM.

17.1.7 Known Environmental Issues

There are currently no known environmental issues that could materially impact Albemarle's ability to extract SPLO resources or reserves. Currently proposed permitting actions should be approved but have the potential to impact the overall Project schedule.

17.2 Environmental Management Planning

Environmental management plans have been prepared as part of the state and federal permitting processes authorizing mineral extraction and beneficiation operations for the SPLO. Requisite state permitting environmental management plans include (NAC 445A.398 and NAC 519A.270):

- Fluid Management Plan
- Monitoring Plan
- Emergency Response Plan
- Petroleum Contaminated Soil (PCS) Management Plan
- Temporary and Seasonal Closure plans
- Tentative Plan for Permanent Closure
- Reclamation Plan

Federal permitting environmental management plans incorporate many of the same plans as are required by the State of Nevada. These are specified in Title 43 of the Code of Federal Regulations Part 3809.401(b) (43 CFR § 3809.401(b)) and include:

- Water Management Plan
- Rock Characterization and Handling Plan (not applicable to SPLO)
- Spill Contingency Plan
- Reclamation Plan
- Monitoring Plan
- Interim Management Plan

The state environmental management plans were submitted to the NDEP – Bureau of Mining Regulation and Reclamation (BMRR) as part of the Water Pollution Control Permit (WPCP) renewal application (Albemarle, 2021), which remains currently under agency review. In the meantime, the SPLO is authorized to continue operations under the existing permit. Several of the federal management plans were updated and re-submitted as part of the SPLO Amended Plan of Operations (Albemarle, 2022) most overlap with state counterparts.

17.2.1 Waste Management

The major materials used at the SPLO include various salts, and acids. There is a diesel fueling station onsite, as well as several water tanks and a hydrochloric acid tank system. The facility has a Hazardous Material Storage Permit issued by the Nevada Fire Marshall. The facility also holds a Class 5 license from the Nevada Board for the Regulation of Liquefied Petroleum Gas for its storage of liquefied petroleum gas (propane).

The site is located in U.S. Environmental Protection Agency (EPA) Region IX and operates as a very small quantity generator (VSQG) under the Resource Conservation and Recovery Act (RCRA) waste regulations, as the SPLO generates less than 220 lb (100 kg) of hazardous waste or less than 2.2 lb (1 kg) of acute hazardous waste per month, or less than 220 pounds of spill residue per month. In fact, the SPLO typically generates little or no hazardous waste.

All non-hazardous solid waste generated at the plant is disposed of in an on-site landfill, permitted by the NDEP. Petroleum contaminated soil at the site, resulting from spills, leaks, and drips of various petroleum hydrocarbon products used at the site, are managed through the PCS Management Plan (June 2009). The facility currently operates two bioremediation cells (CFC Pad and SR Pad) for the treatment of PCS. There are no known off-site properties with areas of contamination or federal Superfund sites within the immediate vicinity of the facility.

17.2.2 Tailings Disposal

While not tailings in the traditional hard rock mining sense, the SPLO does generate a solid residue that requires management during operations and closure. As part of the lithium extraction process, it is necessary to remove magnesium from the Clayton Valley brines. This is accomplished by treating the brines with slaked lime ($Ca(OH)_2$). The lime treatment results in the production of a lime solid, consisting mainly of magnesium hydroxide ($Mg(OH)_2$) and calcium sulfate ($CaSO_4$), which is collected and deposited for final storage in the Lime Solids Pond (LS Pond; a.k.a., R2 Tailings Pond).

Toxicity Characteristic Leaching Procedure (TCLP) analysis of the lime solids conducted in October 1988, indicated concentrations below detection levels for cadmium, chromium, lead, mercury, selenium, and silver, but detectable levels of arsenic (0.02 mg/L) and barium (0.08 mg/L) in the leachate, both of which are regularly observed in brine and freshwater samples. More recent analyses were not available. SRK recommends that more comprehensive characterization of this material be undertaken as part of final closure of the facility.

Final reclamation of the LS Pond will involve decanting all fluids away from the pond to allow the solids to dewater. The containment berm will be breached at the lowest part to ensure the surface drains freely and remains dry. A four-strand barbed wire fence will be erected around the perimeter to prevent access to the surface of the pond. The lime solids should solidify but are not likely to support vehicular traffic. If it is later determined that the dried material in the LS Pond represents dust or other hazards, the permittee/operator will cooperate with appropriate state (and federal) regulatory agencies to correct the situation. If the correction includes capping or covering the pond, the appropriate actions will be included in the final closure plan. Inspection of this surface-crusted facility during heavy winds suggests that such remedial action is not likely to be necessary.

17.2.3 Site Monitoring

Monitoring of the SPLO is accomplished on multiple levels and across various regulatory programs. These include:

- Air quality and emissions monitoring through the Class II Air Quality Operating Permit
- Surface disturbances, reclamation and revegetation monitoring through the Plan of Operations and Reclamation Permit
- Terrestrial and avian wildlife mortalities and mitigative protection measures monitoring through the Industrial Artificial Pond Permit and Avian Protection Program
- Solution impoundment embankments and appurtenant inspections as part of the Dam Safety Permit
- Process fluids, surface, and groundwater resources (including contamination from petroleum contaminated soils) through the Water Pollution Control Permit

The groundwater in Clayton Valley is essentially the “ore” for the SPLO, and thus represents the water quality of the mine area. In the vicinity of the plant and town, monitoring of the freshwater aquifer through a pumping well is performed quarterly. Leak detection is conducted to monitor encroachment from the brine aquifer and surface ponds into the freshwater aquifer via the monitor well (R-2W). To date,no evidence of leakage or brine encroachment has been detected.

17.2.4 Human Health and Safety

The site has prepared a Safety Manual that includes an Emergency Response Plan (ERP) for the SPLO. The ERP provides a risk and vulnerability assessment that rates hazards from low to high for probability and severity. The greatest hazards are associated with a propane tank failure or a boiler explosion, which were both rated high for severity but low for probability. Hazards rated as having both moderate probability and moderate severity include the potential for a propane line failure, a hydrochloric acid spill, and a hydroxide spill (either solution or powder). The area has a low probability for earthquake hazards. The plan outlines safety procedures, communications, and response procedures, including evacuation procedures, to protect workers from hazardous conditions. The facility is located in an unoccupied area separated from residential communities. The evaporation ponds, process facilities, and some of the other ponds are surrounded by security fencing to restrict public access.

17.3 Project Permitting

17.3.1 Active Permits

The SPLO includes both public and private lands within Esmeralda County, Nevada. The Project, therefore, falls under the jurisdiction and permitting requirements of Esmeralda County, the State of Nevada (principally the various bureaus within the NDEP), and federally through the BLM. The list of permits and authorizations under which the SPLO operates is presented in Table 17-1.

Table 17-1: SPLO Project Permits

Permit/Approval	Issuing Authority	Permit Purpose	Status
Federal Permits Approvals and Registrations			
Plan of Operations	BLM	Prevent unnecessary or undue degradation of public lands	BLM Case No. N-072542 Geothermal Lease No. NVN-87008 BLM Bond No. NVB001312 Surety Bond No. 105537179
Rights-of-Way (RoW) Grant	BLM	Authorization to use public land for things such as electric transmission lines, communication sites, roads, trails, fiber optic lines, canals, flumes, pipelines, and reservoirs, etc.	RoW N-44618 for access and pipeline to pumping wells (renewed annually)
Explosives Permit	U.S. Bureau of Alcohol, Tobacco, Firearms, and Explosives (BATFE)/U.S. Department of Homeland Security (DHS)	Storage and use of explosives	License No. 9-NV-009-33-9F-00385 Note: This permit is no longer held as it was deemed not necessary for the materials used/stored onsite.
U.S. Environmental Protection Agency (EPA) Hazardous Waste ID No.	EPA	Registration as a generator of wastes regulated as hazardous	SPLO is currently classified as a Very Small Quantity Generator (VSQG)
Migratory Bird Special Purpose Utility Permit	Department of the Interior – Fish and Wildlife Service (FWS)	Required for utilities to collect, transport, and temporarily possess migratory birds found dead on utility property, structures, and rights-of-way as well as, in emergency circumstances, relocate or destroy active nests	MB38854B-0 (renewal application remains under agency review)
Fish and Wildlife Rehabilitation Permit	FWS		MB38854B-3 Renewed
Waters of the U.S. (WOTUS) Jurisdictional Determination	U.S. Army Corps of Engineers (USACE)	Implementation of Section 404 of the Clean Water Act (CWA) and Sections 9 and 10 of the Rivers and Harbors Act of 1899	1992 NDEP correspondence determined that stormwater runoff from the SPLO discharges to a dry playa in a closed hydrological basin and is not considered a water of the United States
Federal Communications Commission Permit	Federal Communications Commission (FCC)	Frequency registrations for radio/microwave communication facilities	Registration No. 0021049176
State of Nevada Permits Approvals and Registrations			
Annual Status and Production Report	NDM Commission on Mineral Resources	Operator shall submit to the Administrator a report relating to the annual status and production of the mine for the preceding calendar year	Reported by April 15 for each preceding year
Surface Area Disturbance Permit	NDEP/ BAPC	Regulates airborne emissions from surface disturbance activities	Included as Section VII of SPLO Class II Air Quality Operating Permit
Air Quality Operating Permit	NDEP/BAPC	Regulates project air emissions from stationary sources	AP2819-0050.03 Renewed September 8, 2021
Mercury Operating Permit to Construct	NDEP/Bureau of Air Quality Planning	Requires use of Nevada Maximum Achievable Control Technology (MACT) for all thermal units that have the potential to emit mercury	NA
Mining Reclamation Permit	NDEP/ BMRR	Reclamation of surface disturbance due to mining and mineral processing; includes financial assurance requirements	0092
Groundwater Permit / General Permit to Operate and Discharge Large-Capacity Septic System	NDEP/ Bureau of Water Pollution Control (BWPC)	Prevents degradation of waters of the state from discharges wastewater, dewatering water, or water from industrial processes.	NS2013501_DTS08-02-2013

Water Pollution Control Permit (WPCP)	NDEP/BMRR	Prevent degradation of waters of the state from mining, establishes minimum facility design and containment requirements	NEV0070005 Renewed 2021
National Pollutant Discharge Elimination System (NPDES)	NDEP/ BWPC		Waiver; Closed hydrological basin
Approval to Operate a Solid Waste System	NDEP/Bureau of Sustainable Materials Management (BSMM)	Authorization to operate an on-site landfill	SW321
Hazardous Waste Management Permit	NDEP/BSMM	Management of non-Bevill Exclusion mining/hazardous wastes	59084; 5-5062-01
General Industrial Stormwater Discharge Permits	NDEP/BWPC	Management of site stormwater discharges in compliance with federal CWA	Waiver; Closed hydrological basin
Permit to Appropriate Water/Change Point of Diversion	NDWR	Water rights appropriations	52918, 52919, 52920, 52921, 49988, 44251, 44270, 44253, 44268, 44267, 44252, 44255, 44257, 44258, 44269, 44256, 44261, 44260 (20,330.510 AFA)
Permit to Construct a Dam	NDWR	Regulate any impoundment higher than 20 feet or impounding more than 20 acre feet (AF)	J-735
Potable Water System Permit	Nevada Bureau of Safe Drinking Water	Water system for drinking water and other domestic uses (e.g., lavatories)	Potable water is purchased from city water supply.
Sewage Disposal System Permit	NDEP/BWPC	Construction and operation of Onsite Sewage Disposal System (OSDS)	GNEV0SDS09-0403 (cancelled and moved over to NS2013501_DTS08-02-2013)
Industrial Artificial Pond Permit	Nevada Department of Wildlife (NDOW)	Regulate artificial bodies of water containing chemicals that threaten wildlife	S-37036
Wildlife Rehabilitation Permit	NDOW	Authorization to capture, transport, rehabilitate, release, and euthanize sick, injured or orphaned birds and mammals	License No. 427565 Renewed 2021
Hazardous Materials Permit	Nevada Fire Marshal	Store a hazardous material in excess of the amount set forth in the International Fire Code, 2006	97426 (expires February 28, 2023; renewed annually)
Encroachment Permit	Nevada Department of Transportation (NDOT)	Permits for permanent installations within State ROWs and in areas maintained by the State	Documents indicate having a NDOT permit for “Oversized hauling or changes in traffic pattern”. This was a one-time permit to haul a drill rig.
Fire and Life Safety Permit	Nevada Fire Marshal	Review of non-structural features of fire and life safety and flammable reagent storage	NA
Liquefied Petroleum Gas License	Nevada Board of the Regulation of Liquefied Petroleum Gas (LPG)	Tank specification and installation, handling, and safety requirements	No. 5-5533-01 (expires May 31, 2023; renewed annually)
State Business License	Nevada Secretary of State	License to operate in the state of Nevada	State of Nevada Business license for ALBEMARLE U.S., INC.; NV20021460735
Local Permits for Esmeralda County			
Building Permits	Esmeralda County Building Planning Department	Compliance with local building standards/requirements	None
Conditional Use Permit	Esmeralda County Building Planning Department	Compliance with applicable zoning ordinances	None
County Road Use and Maintenance Permit/Agreement	Esmeralda County Building Planning Department	Use and maintenance of county roads	Road through facility is private, but Albemarle allows use and maintains for public through agreement with county

Source: Albemarle, 2020

17.3.2 Current and Anticipated Permitting Activities

Several strong brine ponds are undergoing salt excavation and lining activities using high-density polyethylene (HDPE) in order to increase recovery efficiency and reduce infiltration losses. While this is not a permit compliance-related activity, authorization for embankment modifications is required by the NDWR prior to construction activities.

As noted in Section 17.1, Albemarle has submitted to the BLM a plan of operations amendment for the reconciliation of total surface disturbance and the construction and operation of additional evaporation ponds:

Disturbance Reconciliation

- Two impoundments (18S, 18N), constructed on public land but not properly approved
- Transfer pump station and additional piping infrastructure (16S-18S)
- Conveyance trench (13-9W, an approximately 1.6 mile long, 35 ft wide trench; contained entirely within previously disturbed pond footprint)
- 9N Salt Pile

Proposed Expansion

- New strong brine complex including two transfer pump stations and related pipelines (1, 2W, 3W, 4W, 5W, 6W, 7)
- Two weak brine ponds including transfer pump stations and related pipelines (12W, 13N)
- Future production well drilling

Albemarle is planning to increase the authorized disturbance of 6,462 acres to approximately 8,138 acres. The current Proposed Action includes a nominal expansion of the existing plan boundary onto surface lands not currently claimed or controlled by Albemarle. While the consensus appears to be that the BLM is within its authority to grant the pond and plan boundary expansion, should the agency deny this request, Albemarle is prepared to scale back the expansion plans to only use surface lands within its currently authorized plan boundary. The plan amendment will require appropriate NEPA review and disclosure documentation, as well as a public comment period prior to final agency decision.

Once ponds 12 West and 13 North are permitted, Albemarle intends to pursue the authorization of several new ponds, located principally on private lands owned or controlled by the company. While actions strictly limited to private land should be solely under the jurisdiction of the NDEP-BMRR, the BLM may exercise some review or approval authority on these new constructions under NEPA and Council on Environmental Quality (CEQ) regulations concerning connected actions. The final determination on potential connectively will not be made until the proposal for new ponds is formally presented to both agencies, and therefore remains a risk to the permitting and construction schedule, if additional federal involvement is required.

Albemarle has been working closely with the NDWR on a number of temporary and permanent water rights applications, with the filing for the construction of new wells and the redevelopment of existing wells. Temporary permits are issued for only one year and will need to be converted to permanent rights once expired.

Construction of a new lime system for dosing of the brine ponds will require modification of the current air quality permit and updating of the WPCP to reflect the proposed changes in the process flow and containment systems. Similarly, optimization of the carbonate system will require further modifications to these permits, both activities of which will not likely occur until mid to late 2022.

17.3.3 Performance or Reclamation Bonding

Pursuant to state and federal regulation, any operator who conducts mining operations under an approved plan of operations or reclamation permit must furnish a bond in an amount sufficient for stabilizing and reclaiming all areas disturbed by the operations. The BLM Tonopah Field Office and the NDEP-BMRR received an updated Reclamation Cost Estimate (RCE) for the SPLO on September 3, 2020, in support of a three-year bond review and update. The agencies reviewed this updated RCE and approved the amount of US$8,164,980. The amount is based on the operator complying with all applicable operating and reclamation requirements as outlined in the regulations at 43 CFR § 3809.420 and NAC 519A.350 *et seq*. Additional details are provided in Section 16.5 Mine Closure. This RCE will remain in effect until updated as part of the current state and federal permitting action and next three-year bond review (anticipated early 2023).

17.4 Mine Reclamation and Closure

17.4.1 Closure Planning

Mine closure and reclamation requirements are addressed on several levels and by a several authorities:

- Federal requirements are generally covered in the plan of operations under the BLM's 43 CFR § 3809.401(b)(3) which state that, at the earliest feasible time, the operator shall reclaim the area disturbed, except to the extent necessary to preserve evidence of mineralization, by taking reasonable measures to prevent or control on-site and off-site damage of the federal lands.
- State of Nevada requirements are stipulated in both the Water Pollution Control Permit's Tentative Plans for Permanent Closure (TPPC) and Final Plans for Permanent Closure (FPPC) under NAC 445A.396 and 445A.446/.447, respectively, and the Reclamation Permit requirements under NAC 519A.
- On a local level, the 2013 Esmeralda County Public Lands Policy Plan, Policy 7-7 for Mineral and Geothermal Resources: Reclamation of geothermal, mine, or exploration sites should be coordinated with the Esmeralda County Commission, and should consider the post-mine use of buildings, access roads, water developments, and other infrastructure for further economic development by industry, as well as historic and other uses pursuant to the federal Recreation and Public Purposes (R&PP) Act.

The state closure and stabilization requirements under the WPCP pertain to process and non-process components (sources), such as mill components, heap leach pads, tailings impoundments, pits, pit lakes, waste rock dumps, ore stockpiles, fueling facilities, and any other associated mine components that, if not properly managed during operation and closure, could potentially lead to the degradation of waters of the State. A mining facility operator/permittee must submit a TPPC as part of any application for a new WPCP or modification of an existing permit. A TPPC was submitted as part of the SPLO WPCP NEV0070005 renewal application in 2021. A FPPC must be submitted to the agency at least two years prior to the anticipated closure of the mine site, or any component (source) thereof. This plan must provide closure goals and a detailed methodology of activities necessary to achieve chemical stabilization of all known and potential contaminants at the site or component, as applicable. The FPPC must include a detailed description of proposed monitoring that will be conducted to demonstrate how the closure goals will be met.

Under State of Nevada Reclamation Permit #0092, total permitted disturbance at the SPLO, as of 2021, totaled 7,390 acres, of which, only 18% is on public lands administered by the BLM; the remaining 82% is on private land and subject to state mine reclamation regulations (NAC 519A). In general, the reclamation and closure of the SPLO, upon cessation of brine pumping, will involve the removal of all pumps and abandonment of the wells in accordance with state regulations. While no additional brines will be added to the evaporation pond system, brine management would continue unchanged for at least one year while the ponds evapoconcentrate and are systematically shut down. As each pond is abandoned, all equipment associated with its operation will be removed. It will then require another year to year and a half to process all of the remaining limed brine through the lithium carbonate plant. Once processing has been halted, all surface structures will be removed, including buildings, pipelines, equipment, and power lines. The solar pond embankments will not be removed; neither the ponds, nor the salt spoils are expected to pose a hazard to public safety. The embankments surrounding these ponds will be graded at 3:1 slopes as described in the reclamation plan. Final reclamation of the LS Pond is described in Section 17.2.2. The PCS disposal site will be reclaimed according to the PCS Management Plan.

To the extent practicable, reclamation and closure activities would be conducted concurrently to reduce the overall reclamation and closure costs, minimize environmental liabilities, and limit financial assurance exposure. The revegetation release criteria for reclaimed areas are presented in the Guidelines for Successful Revegetation for the Nevada Division of Environmental Protection, the Bureau of Land Management, and the U.S.D.A. Forest Service (NDEP, 2016). The revegetation goal is to achieve the plant cover similar to adjacent lands as soon as possible, which, on a denuded salt playa, is relatively simple.

17.4.2 Closure Cost Estimate

Albemarle/Silver Peak does not maintain a current internal life-of-mine (LoM) cost estimate to track the closure cost to self-perform a closure. The most recent closure cost estimate available for review was the 2020 reclamation bond cost update prepared by Haley and Aldrich. This three-year reclamation cost update for financial assurance primarily involved importing previous data from an earlier build of the Nevada Standardized Reclamation Cost Estimator (SRCE) into version 17b. The SRCE model has been in use since 2006 in the State of Nevada after validation by both state and federal regulators and mining industry representatives.

SRK reviewed the 2022 Amended Plan of Operations and the August 2020 3-year reclamation cost estimate provided by Albemarle. The documents meet the requirements of Nevada Revised Statutes (NRS) 519A and NAC 519A, as well as meeting requirements in 43 CFR§ 3809. An acceptance letter for the 2020 update to the associated RCE has also been provided and found to meet the requirements for financial assurance. As noted above, the 2020 update to the reclamation bond cost is US$8,164,980.

The 2020 update utilized a Cost Data File (CDF) prepared by the NDEP-BMRR, which was released on August 1st, 2020. The CDF utilizes the unit rates below:

- Labor rates from federally mandated Davis-Bacon rates
- Rental equipment rates quoted from Cashman Caterpillar in Reno, Nevada
- Miscellaneous unit rates from Nevada mining vendor quotes (e.g., seeding, well abandonment, etc.)
- Costs for some activities and supplies are from the 2019 RS Means Heavy Construction database (where activities include labor, they are modified to use the Davis Bacon wages)

A cost basis was selected for Southern Nevada, which includes Clark, Esmeralda, Lincoln, and Nye counties. The SRCE model utilizes first principles to calculate various costs for activities related to mining operations, inputs for these equations range from: equipment efficiencies, labor efficiencies, fuel consumption rates, area calculations, unit rates for labor/equipment/consumables, etc. Some costs estimated in the SRCE model, such as those for demolition are estimated based on the RS Means Heavy Construction database. Other, site-specific costs may be calculated by the operator and included in one of the User Sheets.

The rates for the CDF are supplied by the NDEP-BMRR and vetted for usage in reclamation estimates throughout the State of Nevada, as well as several surrounding jurisdictions. Davis-Bacon labor rates are based on government contracts with select labor unions and may be higher than those that would be incurred by an operator in a self-perform closure scenario where in-house or non-union contract labor can be used. The costs within a reclamation estimate prepared for a regulatory agency often have additional overhead costs related to government oversight of the closure project. The same is true of the values associated with equipment. The rates within the government prepared CDF are leased rates (which include capital and operating costs), as opposed to an owner/operator fleet already having a majority of the equipment on hand and partially or fully amortized, or potentially easier access to equipment. The reclamation bond cost estimate includes 10% for contractor overhead and profit, 6% for engineering and design, 6% for contingency, 10% for government project management and 4% for bonding and insurance. The total indirect markup of the reclamation bond estimate is 35%. While this total markup is likely sufficient to cover the project management and overhead (general and administrative) costs in a self-perform closure, they are not detailed enough to make a judgement whether they are adequate in this case. Normally, a self-perform LoM closure cost will include a project-specific list of general and administrative costs for both management and overhead items like phones, office supplies, electricity, etc.

The 2020 cost estimate prepared by Haley and Aldrich utilizes various sheets within the SRCE. These sheets include: Cost Summary, Other User, Waste Rock Dumps, Roads, Quarries and Borrow Pits, Haul Material, Foundations and Buildings, Landfills, Yards, etc., Waste Disposal, Well Abandonment, Misc. Costs, Monitoring, Construction Management, and various User Sheets (User 1 (calculations for equipment removal), User 2 (2019 mobilization/demobilization calculation spreadsheet), User 3 (quote from SANROC INC to remove powerlines and poles)).

User 1 sheet includes various calculations to remove equipment (transfer pumps, lime slaking plant equipment, and power poles); these calculations utilize equipment, material, and labor rates from within the SRCE model (i.e., they mobilization/demobilization calculation spreadsheet), User 3 (quote from SANROC INC to remove powerlines and poles)). All of the sheets that contain added data appear to be done in a manner that is representative of good industry practice. SRK was provided copies the worksheets in PDF format rather than in native Excel format so we could not review any custom formulas and links created by Albemarle/Silver Peak or their consultants within worksheets in the model.

SRK did not attempt to recreate the closure cost estimate by reproducing the inputs that were derived from computer aided drafting (CAD) or geographic information system (GIS) models. When implemented in an acceptable manner, this information should be accurate and lead to a cost estimate model that is also a relatively accurate facsimile of the financial liability associated with the operation. There are many nuances in how to approach the desired inputs for the SRCE model, as well as the desired outcome, and no two modelers or models are identical. However, given the acceptance by the federal and state regulators of the previous versions of the reclamation cost estimate, and the regulators familiarity with the SRCE model, it appears that the reclamation estimate executed with respect to the Silver Peak operation is within the margins of good industry practice and showcases a reasonable cost to reclaim the operation and its associated features.

Note: The current permitting activities will require modification of the approved 2020 RCE at a time specified by the BLM during the permitting process. At a minimum, additional costs associated with the expanded and new evaporation ponds and future production wells will need to be captured. However, according to Albemarle, some of these costs will be offset by the current and ongoing closure of a number of extraction wells that are currently carried in the SRCE model; thus, a material change in the reclamation cost estimate is not anticipated, though the new estimate will be required to utilize the 2022 or 2023 agency-approved CDF which is likely to see significant increases in fuel, labor, and materials due to inflation.

17.4.3 Limitations on the Closure Cost Estimate

The purpose for which the cost estimate provided for review was created was to provide a basis for financial assurance. This type of estimate reflects the cost that the government agency responsible for closing the site in the event that an operator fails to meet their obligation would incur. If Albemarle, rather than the government, closes the site in accordance with their current mine plan and approved closure plan, the cost of closure is likely to be different from the financial assurance cost estimate approved by the government. There are a number of costs that are included in the financial assurance estimate that would only be incurred by the government, such as government contract administration. Other costs, such as head office costs, a number of human resource costs, taxes, fees, and other operator-specific costs that are not included in the financial assurance cost estimate would likely be incurred by Albemarle during closure of the site. Because Albemarle does not currently have an internal closure cost estimate, SRK was not able to prepare a comparison of the two types of closure cost estimates. The actual cost could be greater or less than the financial assurance estimate.

Furthermore, because closure of the site is not expected until 2053, based on the forecast reserve production plan, the closure cost estimate represents future costs based on current expectations of site conditions at that date. In all probability, site conditions at closure will be different that currently expected and, therefore, the current estimate of closure costs is unlikely to reflect the actual closure cost that will be incurred in the future.

17.5 Plan Adequacy

Given the robust state and federal regulatory requirements in Nevada, and review of the available documentation, it is SRK's opinion that the current plans are sufficiently adequate to address any issues related to environmental compliance, permitting, and local individuals or groups.

17.6 Local Procurement

No formal commitments were identified by the SPLO for local procurement.

18 Capital and Operating Costs

18.1 Capital and Operating Cost Estimates

Silver Peak is an operating lithium mine. Capital and operating costs are forecast as a normal course of operational planning with a primary focus on short term budgets (i.e., subsequent year). Silver Peak currently utilizes mid (e.g., five-year plan) and long-term (i.e., LoM) planning. Given the current mid and long-term planning completed at the operation, SRK developed a long-term forecast for the operation based on historic operating results, adjusted for assumed changes in operating conditions and planned strategic changes to operations.

Estimation of capital and operating costs is inherently a forward-looking exercise. These estimates rely upon a range of assumptions and forecasts that are subject to change depending upon macroeconomic conditions, operating strategy and new data collected through future operations. For this report, capital and operating costs are estimated to a PFS-level, as defined by S-K 1300, with a targeted accuracy of +/-25%. However, this accuracy level is only applicable to the base case operating scenario and forward-looking assumptions outlined in this report. Therefore, changes in these forward-looking assumptions can result in capital and operating costs that deviate more than 25% from the costs forecast herein.

18.2 Capital Cost Estimates

Capital cost forecasts are estimated based on (i) a baseline level of sustaining capital expenditures, in-line with recent historic expenditure levels, and (ii) strategic planning for major capital expenditures.

In reviewing historical costs, elevated lithium prices in 2017 to 2022 supported increased expenditure at the operation. Some of this expenditure (including non-specific 'Other Sustaining") was likely to catch up on historic under-spend from years with more depressed pricing. However, given the significant changes in the economic environment in the last several years, in SRK's opinion, the 2022 non-specific expenditure and forecast is likely reflective of typical long-term forward looking expenditure levels

For the purpose of forecasting capital to support the reserve estimate, SRK did not include expenditure for operational improvement as no improvement is assumed in operating performance relative to historic. Further, for facilities such as the anhydrous hydroxide plant does not utilize feed material from the Silver Peak resource/reserve and economics associated with this plant are not included in the economic evaluation of the reserve, capital associated with this portion of the plant is excluded. Therefore, SRK's capital forecast includes a direct estimate of replacement/rehabilitation of production wells, several major capital programs and a single line item to capture all other miscellaneous sustaining capital.

Table 18-1 presents capital estimates for the next 10 years and the life of the reserve and incorporated into the cashflow model. Total capital costs over this period (October 2022 to December 2054) are estimated at US$1532.7 million (including closure) in 2022 real dollars.

Table 18-1: Capital Cost Forecast ($M Real 2022)

Period	Wellfield	General Sustaining	Pond Rehabilitation and Construction	Liming	Closure	Total Sustaining Capex
2022 (partial)	-	6.7	2	2	-	10.7
2023	2.7	30.8	25.9	7.7	-	67.0
2024	2.7	31	30.5	-	-	64.3
2025	3.9	10.5	20.7	-	-	35.1
2026	2.7	10.5	7.1	-	-	20.3
2027	2.7	7	69.6	-	-	79.3
2028	2.7	7	-	-	-	9.7
2029	2.7	7	-	-	-	9.7
2030	2.7	7	-	-	-	9.7
2031	2.7	7	-	-	-	9.7
Remaining LoM (2032 – 2054)	55.2	154			8.2	209.2
LoM Total	**80.6**	**278.5**	**155.8**	**9.7**	**8.2**	**532.7**

Source: SRK, 2022
Note: 2022 capex is October – December only

18.2.1 Wellfield

For the estimate of replacement/rehabilitation of production wells, SRK assumes three wells per year will require replacement with a typical cost of US$900,000 per well. As replacement wells, these wells do not require supporting piping or electrical infrastructure. Actual well costs vary depending upon depth but based on historic expenditure and the current economic environment, US$900,000 presents a reasonable estimate for a typical well and the rate of three wells per year is consistent with historic averages. Notably, this average three wells per year rate is based on the current wellfield of 63 production wells. SRK's production assumptions include increasing production rates to maximize permit and infrastructure capacity. This results in a production well field of a maximum of 63 wells by the end of 2023 and a general decline in active well counts over time.

For the wellfield, SRK's production modeling requires at least 63 total production wells. The wellfield does require a fairly consistent replacement of wells during operation averaging 3 wells per year. During the modeled period, an additional two low producing wells are replaced with completely new wells in SRK's assumptions. For capital forecasts, SRK assumed the same US$900,000 per well cost plus an additional US$250,000 per well to piping and electrical infrastructure to tie the new wells into the existing infrastructure. This results in a total capital expenditure for the wellfield of US$80.6 million over the life of the reserve base.

18.2.2 General Sustaining

For a typical annual sustaining capital meant as a catch-all for all other items, SRK estimates a long term average value of US$7.0 million per year. This aligns with actual 2022 expenditure. Given the volatile market conditions experienced over the last several years, 2022 presents the best and most up to date information supporting general sustaining capital. In SRK's opinion, at US$7.0 million per year, the assumption is a reasonable assumption given the recency of supporting information.

In the near term, there are several significant sustaining capital programs above the general sustaining level planned. These capital programs are estimated to be completed by 2025 and consist of a 2023 Outage Program, SVP Carbonate Plant Life Extension, Onsite housing and septic system and replacement of a cyclone assembly. The expenditure profiles are outlined in Table 18-2.

Table 18-2: Major Capital Expenditures

Major Near Term Capital Items (US$ million)	2022 (Q4)	2023	2024	2025	2026	2027+
2023 Outage Program	3.2	9.6	7.8	-	-	-
SVP Carbonate Plant Life Extension	0.7	5.9	10.3	-	-	-
SP - New Housing and Septic System	-	3.8	-	-	-	-
Cyclone Assembly Replacement	0.0	2.5	-	-	-	-
Other Capital	-	2.0	5.9	3.5	3.5	-
General Sustaining Capital (Long Term)	2.7	7.0	7.0	7.0	7.0	7.0
Total General Sustaining Capital	**6.7**	**30.8**	**31.0**	**10.5**	**10.5**	**7.0**

Source: SRK, 2022

All the capital expenditure discussed above is most appropriately classified as sustaining existing production levels. However, as noted above, SRK's reserve assumptions include increasing production rates and other significant expenditures in the form of near-term major maintenance items. To allow for these higher production rates, Silver Peak will need to increase space available in the evaporation ponds through removal of salt buildup from evaporation ponds that are not currently in use and expansion of the evaporation ponds.

18.2.3 Pond Works

In order for the operation to sustainably reach the forecast production levels, a program of pond lining, pond construction and pond rehabilitation must continue. For this analysis, these programs are forecast to continue through 2027.

Pond lining consists of the installation of a liner to increase the efficiency of the ponds by limiting solution lost to ground.

The pond construction and rehabilitation program is consists of the rehabilitation of existing pond structures and construction of new ponds to ensure that sufficient pond capacity is available. This program is divided into three phases. The cost estimates per pond are presented in Table 18-3.

Table 18-3: Pond Construction / Rehabilitation

Phase I	Cost	Date
16E	3.9	2023
13S	5.9	2023
45	7.0	2023
Total Ph1	**16.8**	
Phase 2		
15N	6.1	2024
15S	6.5	2024
14N	6.0	2024
14S	6.4	2024
12 S	20.7	2025
Total Ph2	**45.7**	
Phase 3		
11S	7.1	2026
Total Ph3	**7.1**	
Program Total	**69.6**	

Source : SRK, 2022

18.2.4 Liming

The final remaining material capital investment item required to support the forecast production rate is the expansion of liming capacity in the evaporation ponds. Albemarle currently forecasts the capital requirement for this project at US$9.7 million expended over the next year.

18.3 Operating Cost Estimates

As noted above, Albemarle has not developed long term cost forecasts. Therefore, SRK developed a cost model to reflect future production costs. Of note, SRK's forecast production profile includes an increase in wellfield pumping rates and production rates, therefore, the cost forecast necessarily accounts for these changing conditions.

In evaluating the historic costs and discussing the cost profile with Albemarle, the majority of the Silver Peak costs are fixed and will not change with increasing pumping and production rates. However, there are a few material cost items that are variable and therefore need to be adjusted. For the purposes of this reserve estimate, SRK developed a variable cost model for the following items:

- Packaging
- Propane
- Soda Ash
- Lime
- Electricity
- Salt Removal

For packaging, propane, soda ash and lime, the costs are treated as fully variable to the current year's lithium carbonate production. For Salt Removal, the cost is calculated based on a factor against the contained salt in the brine pumped two years prior (reflects timing to evaporate brine before salt is harvested). For electricity, based on a comparison of historic electricity usage versus production and pumping rates, it appears likely that the majority of electrical consumption is related to the wellfield. SRK also found better correlation between electricity usage and brine pumping rates than lithium carbonate production. Therefore, the consumption of electricity is treated as variable to brine pumping rates.

Some of the cost inputs can have volatile pricing which can have a material impact on operating costs. SRK utilized Albemarle's 2022 budgetary actuals and forecasts for these items to represent LoM inputs. SRK checked the 2022 budgetary forecasts against historic actuals, and they are reasonable in SRK's opinion in the context of industry price increases observed in 2022. These key inputs are listed below. Note, that in the economic model, SRK ran a sensitivity analysis on soda ash pricing as it is the most important of these inputs. See Section 19.3 for more detail.

- Soda Ash: US$232/metric tonne, delivered
- Lime: US$271/metric tonne, delivered
- Electricity: 0.089/kW-hr
- Propane: US$1.63/gallon, delivered

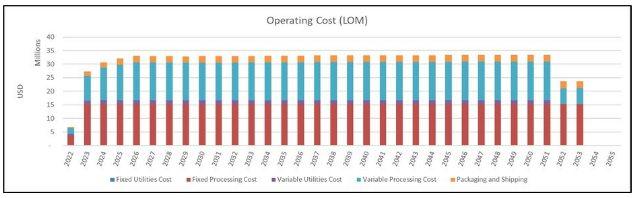
While the 2022 actuals are higher than experienced previously, this is likely the result of volatile market conditions within the United States. As such, 2022 actuals were selected as most representative of the go forward operating costs.

For salt harvesting, Albemarle has recently begun limited harvesting and has generally not performed salt harvesting historically. This has resulted in some ponds no longer being usable for evaporation purposes as they are full of salt. As noted in the capital section above, salt must be removed to allow usage of these ponds again. To sustain the forecast production rates, excess salt cannot be allowed to accumulate over time. Therefore, instead of utilizing historic salt harvesting rates, SRK has calculated salt harvesting requirements as a factor of salt contained in the brine pumped (with harvesting delayed two years from the time brine is pumped). This results in annual average salt harvesting costs of approximately US$8.2 million, in comparison to historic costs that have averaged around US$800,000 per year pre 2020-2022 era. This is a significant jump and is due to SRK's opinion that salt harvesting must be performed to maintain performance.

As Albemarle has begun salt harvesting operations, the cost to remove salt on a per tonne basis is readily available. For the purposes of modeling, SRK is utilizing US$4.10/t of salt harvested as this is the number currently being incurred by the operation.

Approximately 53% of the operations costs are variable. The remaining fixed costs are primarily the result of the operation of the carbonate plant on site. Based on 2022 actuals, the fixed cost of running this facility is US$15.0 million/ year with an additional US$0.2 million in fixed utilities costs. These values have been used for modeling of the economics of the project.

Total annual forecast operating costs for Silver Peak are shown in Figure 18-1.



Source: SRK
Note 2022 costs reflect a partial year (October – December)

Figure 18-1: Total Forecast Operating Expenditure (Tabular Data shown in Table 19-7)

19 Economic Analysis

As with the capital and operating cost forecasts, the economic analysis is inherently a forward-looking exercise. These estimates rely upon a range of assumptions and forecasts that are subject to change depending upon macroeconomic conditions, operating strategy and new data collected through future operations.

19.1 General Description

SRK prepared a cash flow model to evaluate Silver Peak's reserves on a real, 2022-dollar basis. This model was prepared on an annual basis from the reserve effective date to the exhaustion of the reserves. This section presents the main assumptions used in the cash flow model and the resulting indicative economics. The model results are presented in US$, unless otherwise stated.

All results are presented in this section on a 100% basis, reflective of Albemarle's ownership.

As with the capital and operating cost forecasts, the economic analysis is inherently a forward-looking exercise. These estimates rely upon a range of assumptions and forecasts that are subject to change depending upon macroeconomic conditions, operating strategy and new data collected through future operations.

19.1.1 Basic Model Parameters

Key criteria used in the analysis are presented throughout this section. Basic model parameters are summarized in Table 19-1.

Table 19-1: Basic Model Parameters

Description	Value
TEM Time Zero Start Date	October 1, 2022
Pumping Life (first year is a partial year)	30
Operational Life (first year is a partial year)	32
Model Life (first year is a partial year)	33
Discount Rate	8%

Source: SRK, Albemarle, 2022

All cost incurred prior to the model start date are considered sunk costs. The potential impact of these costs on the economics of the operation are not evaluated. This includes contributions to depreciation and working capital as these items are assumed to have a zero balance at model start.

The operational life extends two years beyond the pumping life to allow for recovery of the lithium pumped to the ponds from the wellfield.

The model continues one year beyond the operational life to incorporate closure costs in the cashflow analysis.

The selected discount rate is 8% as provided by Albemarle.

19.1.2 External Factors

Pricing

Modeled prices are based on the prices developed in the Market Study section of this report. The prices are modeled as US$20,000/t technical grade Li_2CO_3 over the life of the operation. This price is a CIF price and shipping costs are applied separately within the model.

Taxes and Royalties

As modeled, the operation is subject to a 21% federal income tax rate. All expended capital is subject to depreciation over an eight-year period. Depreciation occurs via straight line method. Taxable income is adjusted by depletion on a US$644 per tonne lithium carbonate basis provided by Albemarle.

As the operation is located in Nevada, it is not subject to a state level income tax but is subject to the Nevada Net Profits Interest tax.

This tax is on a sliding scale and is levied over the operation's gross revenue fewer operating costs and depreciation expenses. As the operation is modeled to have a ratio of net proceeds to gross proceeds greater than 50% at the forecast price, the tax rate is modeled as 5%.

Working Capital

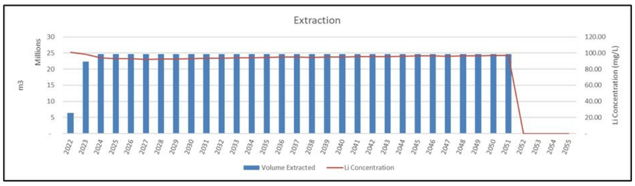
The assumptions used for working capital in this analysis are as follows:

- Accounts Receivable (A/R): 30-day delay
- Accounts Payable (A/P): 30-day delay
- Zero opening balance for A/R and A/P

19.1.3 Technical Factors

Pumping/Extraction Profile

The modeled pumping profile was developed by SRK. The details of this profile are presented previously in this report. No modifications were made to the profile for use in the economic model other than adjustments where necessary to account for already pumped solution in the first year. The modeled profile is presented in Figure 19-1.



Source: SRK, 2022

Figure 19-1: Silver Peak Pumping Profile (Tabular Data shown in Table 19-7)

A summary of the modeled life of operation pumping profile is presented in Table 19-2.

Table 19-2: Modeled Life of Operation Pumping Profile

Extraction Summary	**Units**	**Value**
Total Brine Pumped	**m3(millions)**	**719.6**
Total Contained Lithium	**tonnes (x 1000)**	**68.3**
Average Lithium Grade	mg/l	94.91
Annual Average Brine Production	m3 (millions)	24.0
Annual Average Brine Production	Acre Feet	19,445

Source: SRK, 2022

Processing Profile

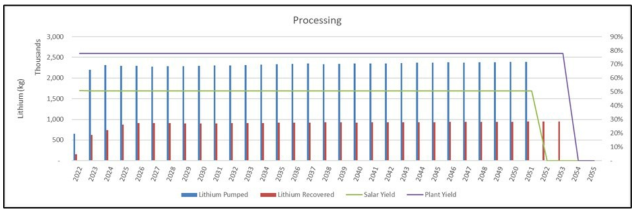
The processing profile is identical to the pumping profile. The material pumped is immediately fed to the processing circuit consisting of evaporation ponds and processing plant.

The production profile is the result of the application of processing logic to the processing profile within the economic model. The following recovery curve was applied to raw brine pumping profile to account for losses in the evaporation ponds:

Lithium Pond Recovery = -206.23 * $(Li\%)^2$ + 7.1093 * Li %+0.4609

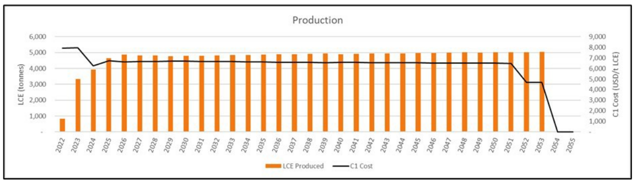
An additional 78% fixed lithium recovery is applied to account for losses in the lithium carbonate plant as presented in Section 14 of this report.

Final lithium production in the model is delayed by two years from the date of pumping to allow for the brine to concentrate in the evaporation ponds. As a result, the production in the years immediately following the start of the model is based on historical pumping. The modeled processing and production profiles are presented in Figure 19-2 and Figure 19-3. Note that the first year is a partial year.



Source: SRK, 2022

Figure 19-2: Modeled Processing Profile (Tabular Data shown in Table 19-7)



Source: SRK, 2022

Figure 19-3: Modeled Production Profile (Tabular Data shown in Table 19-7)

A summary of the modeled life of operation processing profile is presented in Table 19-3.

Table 19-3: Life of Operation Processing Summary

LoM Processing	Units	Value
Lithium Processed	tonnes (x1000)	68.3
Combined Lithium Recovery	%	41.37%
Li_2CO_3 Produced (Partial year 2021)	tonnes (x 1000)	150.4
Annual Average Li_2CO_3 Produced (Partial year 2021)	tonnes (x 1000)	4.7

Source: SRK, 2022

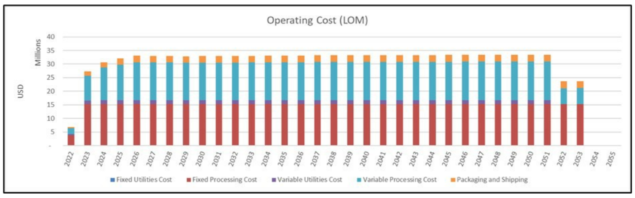
Operating Costs

Operating costs are modeled in US$ and are categorized as utilities, processing, and shipping costs. No contingency amounts have been added to the operating costs within the model. A summary of the operating costs over the life of the operation is presented in Table 19-4 and Figure 19-4.

Table 19-4: Operating Cost Summary

LoM Operating Costs	Units	Value
Utilities	US$M	48.8
Processing Costs	US$M	877.8
Shipping Costs	US$M	75.7
Total Operating Costs	**US$M**	**1,002.3**
Utilities	US$/t Li_2CO_3	325
Processing Costs	US$/t Li_2CO_3	5,838
Shipping Costs	US$/t Li_2CO_3	503
LoM C1 Cost	US$/t Li_2CO_3	6,666

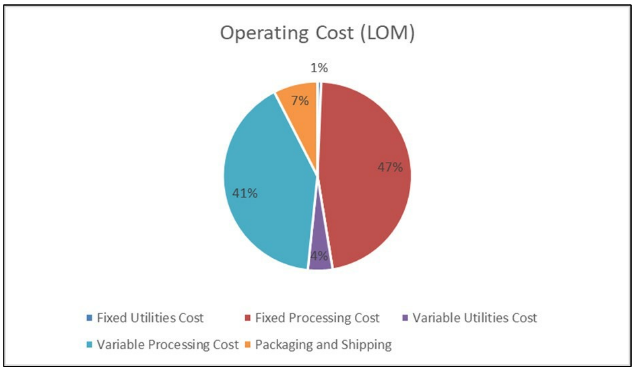
Source: SRK, 2022



Source: SRK, 2022

Figure 19-4: Life of Operation Operating Cost Summary (Tabular Data shown in Table 19-7)

The contributions of the different operating cost segments over the life of the operation are presented in Figure 19-5.



Source: SRK, 2022

Figure 19-5: Life of Operation Operating Cost Contributions

Utilities

The utilities costs in the model consist of fixed and variable electricity and other costs. The non-electricity cost is captured at US$90,000/y and the fixed electrical cost is captured at US$120,000/y. The variable electric costs are assessed at a rate of US$0.089/kWh with an estimated consumption of 0.66 kWh/m^3 of brine.

Processing

Processing costs are composed of fixed and variable components. The fixed component is modeled a US$15.0 million/y. The variable components are modeled as outlined in Table 19-5.

Table 19-5: Variable Processing Costs

Processing Costs	Units	Value
Soda Ash Consumption	t/t Li_2CO_3	2.50
Soda Ash Pricing	US$/tonne	232.32
Lime Consumption	t/t Li_2CO_3	1.30
Lime Pricing	US$/tonne	270.85
Propane Consumption	gal/t Li_2CO_3	150.00
Propane Pricing	US$/gal	1.63
Salt Removal	US$/tonne	4.10

Source: SRK, 2022

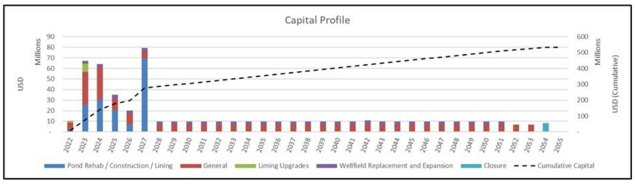
Shipping

Shipping costs are captured as variable costs and composed of two cost areas, packaging, and shipping.

Packaging costs are assessed at a rate of US$55.22/t Li_2CO_3, and shipping costs are assessed at a rate of US$448.03/t Li_2CO_3.

Capital Costs

As Silver Peak is an existing operation, no initial capital has been modeled. Sustaining capital is modeled on an annual basis and is used in the model as developed in previous sections. No contingency amounts have been added to the sustaining capital within the model. Closure costs are modeled as sustaining capital and are captured as a onetime payment the year following cessation of operations. The modeled sustaining capital profile is presented in Figure 11-6.



Source: SRK, 2022

Figure 19-6: Silver Peak Sustaining Capital Profile (Tabular Data shown in Table 19-7)

19.2 Results

The economic analysis metrics are prepared on annual after-tax basis in US$. The results of the analysis are presented in Table 19-6. As modeled, at a Lithium Carbonate price of US$20,000/t, the NPV8% of the forecast after-tax free cash flow is US$270 million. Note that because Silver Peak is in operation and is modeled on a go-forward basis from the date of the reserve, historic capital expenditures are treated as sunk costs (i.e., not modeled) and therefore, IRR and payback period analysis are not relevant metrics.

Table 19-6: Indicative Economic Results

LoM Cash Flow (Unfinanced)	Units	Value
Total Revenue	**US$ million**	**3,007.1**
Total Opex	**US$ million**	**(1,007.5)**
Operating Margin	US$ million	1,999.6
Operating Margin Ratio	%	66%
Taxes Paid	US$ million	(372.7
Free Cashflow	US$ million	1,094.2
Before Tax		
Free Cash Flow	US$ million	1,466.9
NPV at 8%	US$ million	392.8
NPV at 10%	US$ million	298.9
NPV at 15%	US$ million	161.4
After Tax		
Free Cash Flow	US$ million	1,094.2
NPV at 8%	US$ million	270.1
NPV at 10%	US$ million	198.4
NPV at 15%	US$ million	94.2

Source: SRK, 2022

The economic results are presented on an annual basis in Table 19-7.

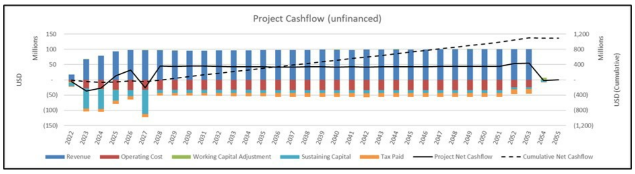
Table 19-7: Silver Peak Annual Cashflow and Key Project Data

US$ in millions	Total	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Counters																	
Calendar Year		**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**
Days in Period		**92**	**365**	**366**	**365**	**365**	**365**	**366**	**365**	**365**	**365**	**366**	**365**	**365**	**365**	**366**	**365**
Escalation																	
Escalation Index		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Project Cashflow (unfinanced)																	
	Total																
Revenue	3,007.1	16.8	66.5	78.5	92.7	97.3	96.5	96.6	95.5	95.8	96.1	96.4	96.8	97.0	97.4	97.7	98.1
Operating Cost	(1,007.5)	(6.9)	(27.3)	(30.7)	(32.1)	(33.1)	(33.0)	(33.0)	(32.9)	(32.9)	(33.0)	(33.0)	(33.0)	(33.1)	(33.1)	(33.2)	(33.2)
Working Capital Adjustment	-	(3.2)	0.0	(0.7)	(1.1)	(0.3)	0.1	0.0	0.1	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Sustaining Capital	(532.7)	(10.7)	(67.0)	(64.3)	(35.1)	(20.3)	(79.3)	(9.7)	(9.7)	(9.7)	(9.7)	(9.7)	(9.7)	(9.7)	(9.7)	(9.7)	(9.7)
Other Government Levies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tax Paid	(372.7)	(2.3)	(8.9)	(9.5)	(10.9)	(10.9)	(10.4)	(8.8)	(8.4)	(8.3)	(8.4)	(9.6)	(10.7)	(11.3)	(11.5)	(13.0)	(13.1)
Project Net Cashflow	1,094.2	(6.4)	(36.7)	(26.6)	13.6	32.7	(26.1)	45.1	44.5	44.8	45.0	44.1	43.3	42.9	43.0	41.8	42.1
Cumulative Net Cashflow		(6.4)	(43.1)	(69.7)	(56.1)	(23.4)	(49.5)	(4.5)	40.1	84.9	130.0	174.1	217.4	260.3	303.3	345.1	387.2
Operating Cost (LoM)																	
Fixed Utilities Cost	6.6	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Fixed Processing Cost	468.8	3.8	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Variable Utilities Cost	42.3	0.4	1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Variable Processing Cost	414.3	2.3	9.1	12.1	13.1	14.0	13.9	13.9	13.8	13.9	13.9	13.9	13.9	14.0	14.0	14.0	14.1
Packaging and Shipping	75.7	0.4	1.7	2.0	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.5	2.5
Extraction																	
Volume Extracted (m3 in millions)	719.6	6.4	22.4	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7
Li Concentration (mg/L)	94.9	101	98	94	93	93	92	92	93	93	93	94	94	94	95	95	95
Processing																	
Lithium Pumped (tonnes x1000)	68,296.6	647.9	2,199.8	2,315.1	2,297.6	2,298.6	2,274.1	2,280.5	2,287.6	2,294.7	2,302.5	2,307.9	2,316.2	2,324.0	2,332.9	2,341.1	2,349.4
Lithium Recovered (tonnes x1000)	28,252.0	157.4	625.0	737.8	871.1	914.2	906.9	907.3	897.1	899.8	902.7	905.7	909.0	911.2	914.7	918.0	921.7
Playa Yield	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%
Plant Yield	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%
Production																	
Lithium Carbonate Produced (tonnes x1000)	150,356	838	3,326	3,927	4,636	4,866	4,827	4,829	4,774	4,789	4,804	4,820	4,838	4,850	4,868	4,885	4,905
C1 Cost\ (US$/MT)	6,701	8,185	8,222	7,821	6,923	6,804	6,840	6,838	6,889	6,876	6,861	6,846	6,830	6,819	6,802	6,786	6,768

US$ in millions	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054
Counters																	
Calendar Year	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**	**2051**	**2052**	**2053**	**2054**
Days in Period	**365**	**365**	**366**	**365**	**365**	**365**	**366**	**365**	**365**	**365**	**366**	**365**	**365**	**365**	**366**	**365**	**365**
Escalation																	
Escalation Index	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Project Cashflow (unfinanced)																	
Revenue	98.5	98.8	98.0	98.4	98.7	99.1	99.0	99.3	99.6	99.9	100.2	99.9	100.2	100.4	100.6	100.8	-
Operating Cost	(33.2)	(33.3)	(33.2)	(33.2)	(33.3)	(33.3)	(33.3)	(33.3)	(33.4)	(33.4)	(33.4)	(33.4)	(33.4)	(33.5)	(23.7)	(23.7)	-
Working Capital Adjustment	(0.0)	(0.0)	0.1	(0.0)	(0.0)	(0.0)	0.0	(0.0)	(0.0)	(0.0)	(0.0)	0.0	(0.0)	(0.0)	(0.8)	(0.0)	6.3
Sustaining Capital	(9.7)	(9.7)	(9.7)	(9.7)	(10.9)	(9.7)	(9.7)	(9.7)	(9.7)	(9.7)	(9.7)	(9.7)	(9.7)	(9.7)	(7.0)	(7.0)	(8.2)
Other Government Levies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tax Paid	(13.1)	(13.2)	(13.1)	(13.1)	(13.2)	(13.2)	(13.2)	(13.3)	(13.3)	(13.4)	(13.4)	(13.4)	(13.4)	(13.5)	(15.1)	(15.2)	(0.5)
Project Net Cashflow	42.4	42.6	42.1	42.3	41.4	42.8	42.8	43.0	43.2	43.4	43.6	43.4	43.6	43.7	54.0	54.9	(2.3)
Cumulative Net Cashflow	429.6	472.2	514.3	556.6	598.0	640.9	683.7	726.6	769.8	813.2	856.9	900.3	943.9	987.6	1,041.6	1,096.5	1,094.2
Operating Cost (LoM)																	
Fixed Utilities Cost	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-
Fixed Processing Cost	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	-
Variable Utilities Cost	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	-	-	-
Variable Processing Cost	14.1	14.1	14.1	14.1	14.1	14.2	14.1	14.2	14.2	14.2	14.3	14.2	14.3	14.3	5.9	5.9	-
Packaging and Shipping	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	-
Extraction																	
Volume Extracted (m3 in millions)	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	-	-	-
Li Concentration (mg/L)	94	95	95	95	95	96	96	96	96	96	96	97	97	97	-	-	-
Processing																	
Lithium Pumped (tonnes x1000)	2,331.0	2,339.5	2,347.4	2,355.4	2,352.5	2,360.1	2,367.3	2,374.0	2,380.3	2,373.4	2,379.1	2,384.4	2,389.1	2,393.1	-	-	-
Lithium Recovered (tonnes x1000)	925.1	928.6	920.9	924.4	927.8	931.1	929.9	933.1	936.1	938.9	941.5	938.6	941.0	943.2	945.2	946.9	-
Playa Yield	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	0%	0%	0%
Plant Yield	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	0%
Production																	
Lithium Carbonate Produced (tonnes x1000)	4,923	4,942	4,901	4,920	4,937	4,955	4,949	4,966	4,982	4,997	5,011	4,995	5,008	5,020	5,030	5,039	-
C1 Cost\ (US$/MT)	6,751	6,735	6,771	6,755	6,739	6,723	6,729	6,714	6,700	6,686	6,674	6,688	6,677	6,666	4,704	4,698	-

Capital Profile																																		
Pond Rehab / Construction / Lining	155.8	2.0	25.9	30.5	20.7	7.1	69.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
General	278.5	6.7	30.8	31.0	10.5	10.5	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	-
Liming Upgrades	9.7	2.0	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wellfield Replacement and Expansion and Other	80.6	-	2.7	2.7	3.9	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	3.9	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	-	-	-
Closure	8.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.2

Source: SRK, 2022



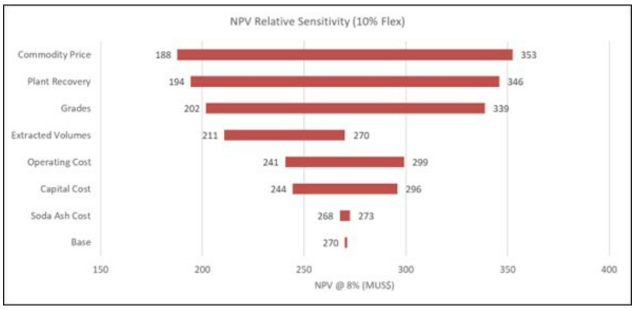
Source: SRK, 2022

Figure 19-7: Annual Cashflow Summary (Tabular Data shown in Table 19-7)

19.3 Sensitivity Analysis

SRK performed a sensitivity analysis to evaluate the relative sensitivity of the operation's NPV to a number of key parameters (Figure 19-8). This is accomplished by flexing each parameter upwards and downwards by 10%. Within the constraints of this analysis, the operation appears to be most sensitive to commodity price, lithium recovery and brine grade.

SRK cautions that this sensitivity analysis is for comparative purposes only to show the relative importance of key model input assumptions. The 10% flex is not intended to reflect actual uncertainty for these inputs but instead is maintained as a constant value to maintain comparability. These parameters were flexed in isolation within the model and are assumed to be uncorrelated with one another which may not be reflective of reality. Additionally, the amount of flex in the selected parameters may violate physical or environmental constraints present at the operation.



Source: SRK, 2022

Figure 19-8: Silver Peak NPV Sensitivity Analysis

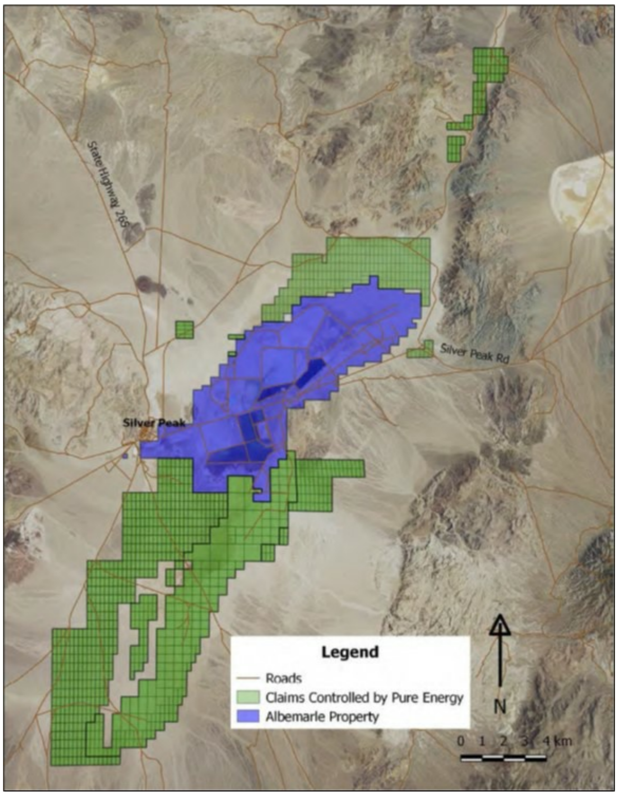
20 Adjacent Properties

20.1 Pure Energy Minerals

The Pure Energy Minerals (PEM) Project is located in central Esmeralda County, Nevada – neighboring the SPLO.

Extracted from PEM March 2018 NI 43-101 Preliminary Economic Assessment Report:

The property consists of 1,085 lithium placer claims located in Clayton Valley. The placer claims are comprised of blocks to the south and north of Albemarle Corporation's existing lithium-brine operation. In their entirety, the claims controlled by PEM occupy approximately 106 km^2 (10,600 ha or 26,300 ac). All 1,085 claims are located on unencumbered public land managed by the federal Bureau of Land Management (BLM) and shown in Figure 20-1.



Source: Pure Energy Minerals, 2018

Figure 20-1: Map of Claims Controlled by Pure Energy Minerals

In addition, SRK notes that there are other exploration companies also hold claims in Clayton Valley.

21 Other Relevant Data and Information

No additional data is included in Section 21 as the relevant information is provided in the body of the report.

22 Interpretation and Conclusions

22.1 Geology and Mineral Resources

Geology and lithium on brine distribution are well understood through decades of active mining, and SRK has used relevant available data sources to integrate into the modeling effort at the scale of a long-term resource for public reporting, as of the effective date of the sampling. The mineral resource estimation could be improved with additional infill program (drilling and brine sampling).

Lithium concentration sample lengths from the brine sampling exploration data set was regularized to approximately equal lengths for consistent sample support (Compositing). Lithium grades were interpolated into a block model using ordinary kriging and inverse distance methods. Results were validated visually, and via various statistical comparisons. The estimate was depleted for current production, categorized in a manner consistent with industry standards. The resources have been calculated from the block model above 740 masl. Mineral resources have been reported using a revisited pumping plan, based on economic and mining assumptions to support the reasonable potential for eventual economic extraction of the resource. A cut-off grade has been derived from these economic parameters, and the resource has been reported above this cut-off. The mineral resource exclusive of reserves will continue to evolve as the reserves are depleted, and over time the effective date of the remaining resource will make its comparison to the reserve less reasonable. It is expected that the resource will need to be updated as these deviations become material.

In SRK's is of the opinion, that the mineral resources stated herein are appropriate for public disclosure and meet the definitions of Indicated and Inferred resources established by SEC guidelines and industry standards

22.2 Reserves and Mine Plan

Mining operations have been established at Silver Peak over its more than 50-year history of operation. Reserve estimates have been developed based on a predictive hydrogeological model that estimates brine production rates and associated lithium concentrations over time. In the QP's opinion, the mining methods and predictive approach for reserve development are appropriate for Silver Peak.

However, in the QP's opinion, there remains opportunity to further refine the production schedule. This includes the potential to optimize the ramp-up schedule to the full 20,000 afpy (timing will be dependent upon Albemarle's strategic goals and desired annual capital spending). Furthermore, it is likely that there remains opportunity to increase lithium concentration in the brine by optimizing well locations (both in the existing wellfield and with new well development). This may include the use of deeper extraction wells. Therefore, SRK recommends Silver Peak evaluate these optimization opportunities to test the potential for improvement.

22.3 Metallurgy and Mineral Processing

Silver Peak is an operating mine. At this stage of operations, the facility relies upon historic operating performance to support its production projections. Therefore, no metallurgical testwork has been relied upon to support the estimation of reserves documented herein.

The nameplate capacity of the Lithium carbonate plant is listed as 6,000 t/y Li_2CO_3. However, in recent years Silver Peak has demonstrated that the plant is capable of producing higher than that. In 2018 the plant produced ~6,500 tonnes Li_2CO_3.

SRK's reserve estimate includes the assumption that Albemarle will increase the pumping rate from the Silver Peak wellfield to 20,000 afpy. To support this increased pumping rate, the facility will require expansion of evaporation pond capacity and liming operations. Albemarle is currently performing work to select the optimal approach to this expansion.

SRK recommends assessing the feasibility of lining additional evaporation ponds in order to evaluate an increase in recovery within the pond system which could help improve overall production levels.

22.4 Infrastructure

Silver Peak is a mature operating lithium brine mining and concentrating project that produces lithium carbonate and to a lesser degree, lithium hydroxide. Access to the site is well established and functional. Local communities are available to provide supplies, services, and housing for employees at the project. Albemarle provides some employee housing in Silver Peak. The site covers approximately 15,000 acres includes large evaporation ponds, brine wells, salt storage facilities, administrative offices and change house, laboratory, processing facility, propane and diesel storage tanks, water supply and storage, utility supplied power transmission lines feed power substations and distribution system, liming facility, boiler and heating system, packaging and warehousing facility, miscellaneous shops and general laydown yard. All infrastructure needed for ongoing operations is in place and functioning.

22.5 Environmental, Permitting, Social and Closure

While the SPLO predates all state and federal environmental statutes and regulations, the operation follows all currently required permits and authorizations. Environmental management and monitoring are an integral part of the operations and is completed on several levels across a number of permits. There are currently no known environmental issues that could materially impact Albemarle's ability to extract SPLO resources or reserves.

Closure

Although Silver Peak has a closure plan prepared in accordance with applicable regulations, this plan should be reviewed and modified, as necessary, to ensure inclusion of all closure activities and costs SPLO to properly close all of the project facilities. This update should be prepared in accordance with applicable regulatory requirements and commitments included in the approved closure plan, but also include any activities that would be specific to an owner-implemented closure project. It should also be prepared in sufficient detail that a proper PFS-level closure cost estimate can be prepared.

Because Albemarle/Silver does not have an internal closure cost estimate, SRK was only able to review the financial assurance cost estimate prepared in accordance with applicable regulations. If Albemarle, rather than the government, closes the site in accordance with their current mine plan and approved closure plan, the cost of closure is likely to be different from the financial assurance cost estimate approved by the government. There are a number of costs that are included in the financial assurance estimate that would only be incurred by operator such as government contract administration. Other costs, such as head office costs, a number of human resource costs, taxes, fees, and other operator-specific costs that are not included in the financial assurance cost estimate would likely be incurred by Albemarle during closure of the site. Without an internal closure cost estimate with sufficient detail to compare with the financial assurance cost estimate, SRK cannot provide a comparison between the two types of cost estimates.

Furthermore, because the site will continue to operate for approximately 30 more years, the closure cost estimate represents future costs based on current expectations of site conditions at that date. In all probability, site conditions at closure will be different that currently expected and, therefore, the current estimate of closure costs is unlikely to reflect the actual closure cost that will be incurred in the future.

22.6 Economics

The Silver Peak operation as modeled for the purposes of this report is forecast to have a 32-year life with the first modeled year of operation being a partial year to align with the effective date of the reserves.

As modeled for this analysis, the operation is forecast to produce 4,699 tonnes of technical grade lithium carbonate, on average, per year over its life. At a price of US$20,000/t technical grade lithium carbonate, the NPV at 8% of the modeled after-tax cash flow is US$270 million.

The operation is expected to generate positive cashflow during every full year in which it is pumping or processing brine on the schedule and at the costs and process outlined in this report except for 2023, 2024 and 2027 when there are significant capital expenditures scheduled. This supports the economic viability of the reserve under the assumptions evaluated.

An economic sensitivity analysis indicates that the operation’s NPV is most sensitive to variations in lithium carbonate price, lithium recovery and raw brine grade.

23 Recommendations

23.1 Recommended Work Programs

SRK suggests the following for recommendations to further develop the project or understanding of the mineral resources and reserves. The qualified person is of the opinion that, with consideration of the SRK recommendations and opportunities outlined below that any issues relating to all applicable technical and economic factors likely to influence the prospect of economic extraction can be resolved with further work.

- SRK recommends further optimizing the projected wellfield pumping plan. Through further optimization of well locations and depths as well as timing of stopping pumping from existing wells, SRK believes it is likely that the predicted brine concentration over the life of the operation can be increased.
- SRK recommends developing a program for measuring water levels in current and historical production wells. This program would outline a protocol for when a static, non-pumping water level would be measured following turning off the pump in active production wells. Historical production wells that are no longer actively pumping but have not been fully abandoned could also be used for monitoring groundwater levels. An improved understanding of the groundwater levels within the basin would allow for optimized well placement and improved production modeling for estimating aquifer pumpability into the future.
- SRK recommends implementing an infill drilling campaign in the aquifers within the inferred zones and deep areas mentioned above, focused on collecting lithium concentration data in LGA. The drilling campaign should include a sampling program for drainable porosity lab tests.
- SRK also recommends collecting drainable porosity samples when drilling any new wells. This would require drilling for core ahead of drilling the well.
- In order to evaluate an increase in recovery within the pond system, SRK recommends continuing to assess the feasibility of lining some evaporation ponds.
- Leapfrog Model needs to be updated based on new geological information derived from the proposed drilling program.
- Numerical Groundwater Model needs to be updated and improved based on the new information derived from the proposed drilling program and monitoring data.
- Prepare detailed closure plan suitable to estimate internal closure costs at a PFS level. Prepare PFS level internal closure cost estimate.

23.2 Recommended Work Program Costs

Table 23-1 summarizes the costs for recommended work programs.

Table 23-1: Summary of Costs for Recommended Work

Discipline	Program Description	Cost (1000's US$)
Mineral Resource Estimates	Infilling Drilling Program to obtain brine and porosity samples over a 2-year period	3,000
Mineral Reserve Estimates	Update numerical groundwater model if additional drilling and sampling is completed	200
Water Level Monitoring	Establish water sampling program and evaluate additional monitoring wells	50
Mining Methods	Update Mine Plan with new information if drilling program implemented	50
Processing and Recovery Methods	Pond Lining Assessment	100
Infrastructure	No Work Programs are recommended as this is a stable operating project.	---
Environmental, Permitting, Social and Closure	Updated LS Pond solids residue (tailings) characterization (incl. TCLP testing)	15
Closure	Prepare detailed closure plan suitable to estimate internal closure costs at a PFS level. Prepare PFS level internal closure cost estimate	150
Total US$		**$3,415**

Source: SRK, 2022

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25 Reliance on Information Provided by the Registrant

The Consultant's opinion contained herein is based on information provided to the Consultants by Albemarle throughout the course of the investigations. Table 25-1 of this section of the TRS will:

Table 25-1: Reliance on Information Provided by the Registrant

Category	Report Item/Portion	Portion of TRS	Disclose Why the Qualified Person Considers It Reasonable to Rely Upon the Registrant
Legal Opinion	Sub-sections 3.3, 3.4, and 3.6	Section 3	Albemarle has provided a document summarizing the legal access and rights associated with its unpatented mining claims and mineral rights. This documentation was reviewed by Albemarle's legal representatives. The Qualified Person is not qualified to offer a legal perspective on Albemarle's surface and title rights but has summarized this document and had Albemarle personnel review and confirm statements contained therein.
Discount Rates	19.1.1	19 Economic Analysis	Albemarle provided discount rates based on a benchmarking of publicly available information for 54 lithium mining project studies. The median value of the benchmarking dataset is 8%. SRK typically applies discount rates to mining projects ranging from 5% to 12% dependent upon commodity. SRK views the selected 8% discount rate as appropriate for this analysis
Tax rates and government royalties	19.1.2	19 Economic Analysis	SRK was provided with tax rates and government royalties for application within the model. These rates are in line with SRK's understanding of the tax regime at the project location.

Signature Page

This report titled "SEC Technical Report Summary Pre-Feasibility Study Silver Peak Lithium Operation Nevada, USA" with an effective date of September 30, 2022, was prepared and signed by:

SRK Consulting (U.S.) Inc. ***Signed*** **SRK Consulting (U.S.) Inc.**

Dated at Denver, Colorado
February 14, 2023

Exhibit 96.4

JORDAN BROMINE OPERATION

Technical Report Summary
as of December 31, 2022

214554
Final

15 February 2023

JORDAN BROMINE OPERATION

Technical Report Summary

Peer Review		
Michael Gallup, P. Eng.	[email]: michael.gallup@rpsgroup.com	10 February 2023
Approval for issue		
Michael Gallup, P. Eng.	[email]: michael.gallup@rpsgroup.com	10 February 2023

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February 15, 2023

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Jordan Bromine Operation

Technical Report Summary as of December 31, 2022

As requested in the engagement letter dated July 26, 2021, RPS and RESPEC have evaluated certain Bromine reserves and resource in the Kingdom of Jordan, as of December 31, 2022 ("Effective Date"), and submit the attached report of our findings. The evaluation was conducted in compliance with subpart 1300 of Regulation SK.

This report contains forward looking statements including expectations of future production and capital expenditures. Potential changes to current regulations may cause volumes actually recovered and amounts future net revenue actually received to differ significantly from the estimated quantities. Information concerning reserves and resources may also be deemed to be forward looking as estimates imply that the reserves or resources described can be profitably produced in the future. These statements are based on current expectations that involve a number of risks and uncertainties, which could cause the actual results to differ from those anticipated. These risks include, but are not limited to, the underlying risks of the mining industry (i.e., operational risks in development, exploration and production; potential delays or changes in plans with respect to exploration or development projects or capital expenditures; the uncertainty of resources estimates; the uncertainty of estimates and projections relating to production, costs and expenses, political and environmental factors), and commodity price and exchange rate fluctuation. Present values for various discount rates documented in this report may not necessarily represent fair market value of the reserves or resources.

Yours sincerely,

for RPS Energy Canada Ltd
"Original Signed by Michael Gallup, P. Eng.
on behalf of RPS Energy Canada Ltd."

Michael Gallup
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CERTIFICATE OF QUALIFICATION - RESPEC

RESPEC, a global leader in integrated technology solutions and consulting for mining, minerals, and energy based in Rapid City, South Dakota, has participated in the preparation of a Technical Report Summary for Albemarle Corporation (the "Company"), on certain bromine reserves and resources located in the Kingdom of Jordan, which are controlled by the company.

RESPEC certifies that its professional employees who worked on the preparation of this Technical Report Summary meet the requirements to act as Qualified persons as defined by subpart 1300 of Regulation SK, particularly § 229.1300.

RESPEC certifies that in compliance with subpart 1300 of Regulation SK, as a third-party firm comprising mining experts, it has dated and signed the technical report summary it has prepared for the Company.

RESPEC is not an affiliate of the Company or another entity that has an ownership, royalty or other interest in the property that is the subject of the technical report summary.

RESPEC

On behalf of RESPEC:________________________
Name: Edmundo J. Laporte
Title: Director of International Business/Principal Consultant
Dated: February 15, 2023

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INDEPENDENT CONSULTANT'S CONSENT AND WAIVER OF LIABILITY

The undersigned firm of Independent Consultants of Calgary, Alberta, Canada knows that it is named as having prepared an independent report of the bromine reserves of the Jordan property owned by Albemarle Corporation and it hereby gives consent to the use of its name and to the said report. The effective date of the report is December 31, 2022.

In the course of the evaluation, Albemarle provided RPS Energy Canada Ltd. (RPS) personnel with basic information which included the field's licensing agreements, geologic and production information, cost estimates, contractual terms, studies made by other parties and discussions of future plans. Any other engineering or economic data required to conduct the evaluation upon which the original and addendum reports are based, was obtained from public literature, and from RPS non-confidential client files. The extent and character of ownership and accuracy of all factual data supplied for this evaluation, from all sources, has been accepted as represented. RPS reserves the right to review all calculations referred to or included in the said reports and, if considered necessary, to revise the estimates in light of erroneous data supplied or information existing but not made available at the effective date, which becomes known subsequent to the effective date of the reports.

"Original Signed by Michael Gallup, P. Eng. on behalf of:"

RPS Energy Canada Ltd.

1 EXECUTIVE SUMMARY

This Technical Report Summary ("TRS") was prepared by RESPEC at the request of Albemarle Corporation (Albemarle, or the company) for the company's Jordan Bromine Company ("JBC"). The TRS complies with disclosure standards of the SEC S-K Regulation 1300 following the TRS outline described in CFR 17 and reports the estimated reserves for the Jordan bromine operation as well as all summary information required as outlined in the SEC S-K Regulation 1300.

1.1 Property Description

The JBC operation is located in Safi, Jordan, and is located on a 26-ha area on the southeastern edge of the Dead Sea, about 6 kilometers north of the of the Arab Potash Company (APC) plant. JBC also has a 2-hectare storage facility within the free-zone industrial area at the Port of Aqaba.

1.2 Mineral Rights

JBC was established in 1999 and is a joint venture between Albemarle Holdings Company Limited, a wholly owned subsidiary of Albemarle and the Arab Potash Company (APC). JBC's operations primarily consist of the manufacturing of bromine, from bromide-enriched brine which is a by-product of potash operations from the Dead Sea waters, conducted by APC. The Government of the Hashemite Kingdom of Jordan granted APC a concession for exclusive rights to exploit the minerals and salts from the Dead Sea brine until 2058. Rights granted to APC are applicable to JBC by virtue of APC's participation in the Joint Venture. APC maintains all the necessary permits to guarantee the continuous operation of its facilities under Jordanian legislation.

1.3 Geological Setting, Mineralization and Deposit

Movement of the plates that created the basin containing the Dead Sea began 15 Ma and the plates continue to diverge today at a rate of 5 to 10 mm per year[i]. The Dead Sea is an isolated hypersaline lake within the lowest part of the catchment basin and is a unique, current-day example of evaporitic sedimentation and accumulation within a brine body[1].

The climate, geology and location provide a setting that makes the Dead Sea a valuable large-scale natural resource for potash and bromine. Today, the Dead Sea has a surface area of 583 km^2 and a brine volume of 110 km^3. The Dead Sea is the world's saltiest natural lake[2], containing high concentrations of ions compared to that of regular sea water and an unusually high amount of magnesium and bromine. There is an estimated 900 million tonnes of bromine in the Dead Sea.

Evaporation greatly exceeds the inflow of water to the Dead Sea, causing a negative water balance and a receding shoreline of approximately 1.1 m to 1.25 m per year[1]. Variable evaporation rates and uncertain subsurface inflow of fresh water make it difficult to predict its water deficit. The Dead Sea contains a large and deep northern basin and a shallow southern basin. The southern Basin is a saline mudflat, and the water level is maintained by artificial flooding, with North Basin brine.

1.4 Exploration

There is no exploration as typically conducted for the characterization of a mineral deposit. A limited site investigation program was carried out in 1966 when most of the southern basin of the Dead Sea was covered in up to 3 m of brine. A more detailed program, with a cost of £3 million, took place in 1977 when the brine level had receded from the southern basin, leaving only land-locked ponds in the central depression.

1.5 Mineral Processing and Metallurgical Testing

The JBC bromine plants and connection to the APC C-7 carnallite ponds was designed to move substantial quantities of concentrated brine to the central bromine production facilities, where brine is processed to produce bromine. Knowing the consistency of the bromide salts (“bromides”) within the feedbrine is critical for operations and business planning of the various bromine derivative sales. Feedbrine and tailbrine samples are taken frequently, upstream and downstream of the bromine tower, to capture any concentration changes.

The sampling process is systematic and documented. Bromides within the brine is measured by a widely used halogen titration process; methods appear to be reasonable and well established. The sampling and analytical processes are adequate to support the plant operation.

1.6 Mineral Resource Estimates

JBC’s bromine production plant is atypical of many mineral mining and processing operations in that the feedstock for the plant is concentrated brine available from another mineral processing plant owned by APC. The feedstock for the APC plant is drawn from the Dead Sea, a nonconventional reservoir, a reservoir owned by the nations of Israel and Jordan.

As such, there are no specific resources owned by APC or JBC, but rather APC has exclusive rights granted by the Hashemite Kingdom of Jordan to withdraw brine from the Dead Sea and process it to extract minerals.

The measured resources of bromide ion attributable to Albemarle’s 50% interest in its JBC joint venture is estimated to be approximately 178.34 MMt. From these large resources, JBC is extracting approximately 1 percent of the bromine available.

1.7 Mineral Reserves Estimates

Proven and probable reserves have been estimated based on the operational parameters, economics and concession agreements for JBC.

The reserve estimate is constrained by the time available under the concession agreement with the Hashemite Kingdom of Jordan, and the processing capability of the plant. The forecast volumes of brine processed are supported by demonstrated plant performance. The reserve estimate is not constrained by available resources, with approximately 1 percent of the measured resources being consumed. Costs are based on forward projections supported by historical operating and capital costs, with no major capital projects or plant expansions required to support the operating forecast. Revenues are based on a range of bromine sales prices between the spot price for the effective date of December 31, 2022, and the spot price less 15 percent, 30 percent and 45 percent.

The plants are forecast to process approximately 16.47 MMt of brine per year on average over the remaining concession life. On an annual basis, the feed contains approximately 146,400 tonnes of bromide ion. At the plant process recovery of 80-85 percent (bromine from bromide), product bromine is estimated at approximately 120,000 tonnes per year.

The APC concession and JBC’s ownership of the facility expires at the end of 2058. Over the 36 years of production from the reserves effective date of December 31, 2022, an estimated 4.75 MMt of bromine will be produced, which establishes the reserve estimate.

The proven reserves attributable to Albemarle’s 50% interest in its JBC joint venture are estimated to be approximately 2.38 MMt of elemental bromine.

1.8 Mining Methods

Mining methods consist of all activities necessary to extract brine from the Dead Sea and extract Bromine. The low rainfall, low humidity and high temperatures in the Dead Sea area provide ideal conditions for recovering potash from the brine by solar evaporation. JBC obtains its feedbrine from APC’s evaporation C-7 carnallite pond and this supply is intimately linked to the APC operation.

As evaporation takes place the specific gravity of the brine increases until its constituent salts progressively crystallize and precipitate out of solution, starting with sodium chloride (common salt) precipitating out to the bottom of the ponds (pre-carnallite ponds). Brine is transferred to other pans in succession where its specific gravity increases further, ultimately precipitating out of the sodium chloride. Carnallite precipitation takes place at C-7 carnallite pond. Where it is harvested from the brine and pumped as slurry to a process plant (where the potassium chloride is separated from the magnesium chloride). JBC extracts the bromide-rich, “carnallite-free” brine from pond C-7 through a pumping station with a capacity of approximately 84.1 MCM per year. This brine feeds the bromine and magnesium plants.

1.9 Processing and Recovery Methods

Bromide-enriched brine (feedbrine) is conveyed to the two bromine plants via two parallel bromine production trains within the JBC facility via an open channel. Elemental bromine is produced at the JBC plants through a series of chemical processes.

The brine is then mixed with chlorine to extract the remaining bromine from solution. Chlorinated brine enters the bromine distillation tower (at approximately 120°C) where additional chlorine is added to continue the reaction with any residual bromide salts and where the brine stream is heated by adding steam, maintaining a temperature above the boiling point. Bromine exiting the recovery section of the tower is purified.

Heated bromide-depleted brine (tailbrine) exits the bromine distillation tower and is mixed with a strong base to neutralize any remaining acid, bromine, or chlorine. Then it is pumped to a storage pond for cooling and eventual discharge, recycled back to the Dead Sea via the APC process plant. Vaporized bromine is condensed, and the wet bromine is fed to a glass lined crude bromine storage drum that acts as an intermediate storage before downstream purification (and removal of any dissolved chlorine).

1.10 Infrastructure

The Jordan Valley Highway/Route 65 is the primary method of access for supplies and personnel to JBC. The Port of Aqaba is the main entry point for supplies and equipment for JBC, where imported shipping containers are offloaded from ships and are transported by truck to JBC via the Jordan Valley Highway. Aqaba is approximately 205 km south of JBC via Highway 65. Major international airports can be readily accessed either at Amman or Aqaba. Jordan’s railway transport runs north-south through Jordan and is not used to transport JBC employees and product.

JBC ships product in bulk through a storage terminal in Aqaba. There are above ground storage tanks as well as pumps and piping for loading these products onto ships. JBC main activities at Aqaba are raw material/product storing, importing, and exporting. An evaporation pond collects the waste streams from pipe flushing, housekeeping, and other activities.

Infrastructure and facilities to support the operation of the bromine production plant at the Safi site is compact and contained in an approximately 33 ha area. Fresh water is sources from the Mujib Reservoir, a man-made reservoir. Approximately 1.0 to 1.2 MCM of water is used annually.

Electricity is generated through the National Electric Power Company of Jordan (NEPCO) and distributed directly to JBC via the Electricity Distribution Company (EDCO), owned and operated by Kingdom Electricity Company. There are 6 substations and onsite.

Overall, the project is well supported by quality infrastructure.

1.11 Market Studies

The global bromine market is expected to grow steadily at a Compound Annual Growth Rate (CAGR) of approximately 4.02 percent between 2022 and 2027. The growth trend is attributed in part by an increased demand for plastics and flame-retardant chemicals using bromine to develop fire resistance. Also driving the trend is the use of bromine and its derivatives as mercury reducing agents, for example, used for the reduction of mercury emissions from combustion of coal in coal-fired power plants. The need for specialty chemicals in various end-use industries such as oil and gas, automobile, pharmaceuticals, and construction will also drive the demand for bromine. The major producers of elemental bromine in the world are Israel, Jordan, China, and the United States. The global bromine market is dominated by manufacturers who have an extensive geographical presence with massive production facilities, all around the world.

A forecast of the global bromine market till 2024 suggests that Asia would be the fastest growing region for bromine consumption due to a growing population and the increasing purchasing power in the developing nations. The growth of agriculture and automobile industries in countries such as China and India will also drive the increasing demand for bromine.

In 2021, the price of bromine significantly increased, reaching a peak of $10,700 per tonne in November. The bromine spot price on the effective date of this report, December 31, 2022, was US$ 6,480 per tonne and the overall trend is towards a progressive decrease.

The above-described behavior of the market is the product of a combination of factors, including China's decrease in bromine production from brine due to the country's electricity curtailment policy.

Because the market for bromine is expected to grow and oversupply is not foreseen, the price of bromine is expected to stay strong in the near future.

1.12 Environmental Studies, Permitting and Plans, Negotiations, or Agreements With Local Individuals or Groups

JBC has carried out environmental impact studies in compliance with Jordanian regulations. The environmental impact studies are part of the public domain and accessible through the MIGA web site (www.miga.org).

JBC complies with national environmental and labor regulations. It also meets or exceeds the international regulations of OSHA and NFPA. JBC is the first company of its kind in Jordan to become an authorized exporter into Europe and has been certified for ISO 9001, 14001 and VECAP (Voluntary Emissions Control Action Program). The company's environmental program has been ISO 14001 certified by Lloyd's Register since 2007 and further enhanced through the adoption of the integrated management system for quality (IS0 9001: 2015, OHSASL800L, 2007, ISO/4001:2015) certificate received in 2018.

JBC works closely with the local communities, governmental and non-governmental organizations (NGOs) to make a positive difference and help communities prosper, both socially and environmentally. The company has established the Caring for Jordan Foundation, which contributes to the well-being of Jordanians by helping them to improve their quality of life through support of sustainable community projects.

1.13 Capital and Operating Costs

The JBC facility is an active operation with a track record of industrial production of elemental bromine and most of the major capital expenditures have already taken place in the past. Review of the business plan provided by JBC confirmed no further facilities or plant capital is required because JBC intends to keep all of the major components of its industrial facility through the expiration of the concession contract. An annual sustaining capital allocation of approximately $13.00-$14.40 million has been included.

Plant operating costs and forecast budget were reviewed. Plant operating costs are expected to remain relatively constant and are forecast at $250/tonne of product bromine.

1.14 Economic Analysis

An economic model has been used to forecast cash flow from elemental bromine production and sales to derive a net present value for the bromine reserves. Cash flows have been generated using annual forecasts of production, sales revenues, operating costs and capital costs.

At the assumed bromine sales price range of $3,560 to $6,480/tonne, the operations generate an NPV of $2.05 billion to $4.11 billion at a discount rate of 15 percent as of December 31, 2022, demonstrating economic viability.

1.15 Interpretation and Conclusions

JBC primary raw material is bromide enriched brine from the adjacent APC potash processing business. APC has mineral rights to brine extracted from the Dead Sea through 2058. The measured resources for bromide ion in the Dead Sea is far in excess of the stated proven reserves of 4.75 million tonnes of bromine. The operation has been in production since 2002 and has a demonstrated production capacity to support the reserve estimate.

1.16 Recommendations

No additional work relevant to the existing reserves is applicable at this time. The JBC plants have demonstrated capacity to operate at the production levels forecasted through the life of the reserve. No significant capital projects are anticipated to extend the life or expand the capacity of the existing plants.

2 INTRODUCTION

2.1 Issuer of Report

This Technical Report Summary (TRS) was prepared at the request of Albemarle Corporation (Albemarle), and this report is being filed for the first time under SEC S-K Regulation 1300 (SEC S-K 1300) reporting requirements for Albemarle's Jordan Bromine Company (JBC) operation located in Safi, Jordan. The JBC is a joint venture with Arab Potash Company (APC). Headquartered in Charlotte, North Carolina, Albemarle is a global leader in specialty chemicals such as lithium, bromine, and refining catalysts.

2.2 Terms of Reference and Purpose

The following general information applies to this TRS:

- This document reports the estimated reserves for the JBC operation as well as all summary information required by the SEC S-K 1300. The focus of this TRS and the scientific and technical information in this report only apply to the JBC operation. RESPEC Consulting Inc. (RESPEC) is entirely independent of Albemarle and has no interest in the mineral property discussed in this report.
- This TRS was prepared by RESPEC, complies with disclosure standards of the SEC S-K Regulation 1300, and follows the TRS outline described in CFR 17, Part 229.600.
- The point of reference (i.e., effective date) of this report is December 31, 2021, which is also the deadline for the data included within this report.
- Reserve estimates are presented on a 100 percent basis (i.e., the reserve is the total reserve for JBC) with Albemarle's share of the reserve per the joint venture with APC is 50 percent.
- Units presented are metric units, unless otherwise noted and currency is expressed in United States dollars (USD or $) unless otherwise noted.
- Copyright of all text and other matters in this document, including the manner of presentation, is the exclusive property of RESPEC and Albemarle as per the Agreement signed between RESPEC, RPS Group (RPS), and Albemarle.
- RESPEC will receive a fee for preparing this TRS according to normal professional consulting practices. The fee is not contingent on the conclusions of this report and RESPEC will not receive any other benefit for preparing this report. RESPEC does not have any monetary or other interests that could be reasonably considered as capable of affecting its ability to provide an unbiased opinion in relation to the project. RESPEC is a 100 percent employee-owned global leader in integrated technology solutions for mining, energy, water, natural resources, infrastructure, and services.

2.3 Sources of Information

The interpretations and conclusions presented in this report are primarily based on the information obtained from the public sources and information provided by Albemarle. All source materials have been properly cited and are referenced in Chapter 24.0 of this report.

2.4 Glossary

Description of terms that are used throughout this report are provided in Table 2-1.

Table 2-1 Glossary of Terms

Term	Abbreviation	Description
Assay		A test performed to determine a sample's chemical content.
Brine		A high-concentration solution of salt (NaCl) in water (H_2O).
Bromide	Br	A compound of bromine with another element or group, especially a salt containing the anion Br− or an organic compound with bromine bonded to an alkyl radical.
Bromine		A halogen element with atomic number 35 and element symbol Br that is the 10^{th} most abundant element in sea water and 64^{th} in the earth's crust.
Carnallite	$KCl.MgCl_2 6(H_2O)$	A mineral containing hydrated potassium and magnesium chloride.
Halite	NaCl	Sodium chloride, which is a naturally occurring sodium salt mineral.
Jordanian dinar	JD	Official currency of the Hashemite Kingdom of Jordan
Million cubic meters	MCM	Million cubic meters, a measurement of volume
Million metric tonnes	MMt	Million metric tonnes
Sylvite	KCl	Potassium chloride, which is a metal halide salt consisting of potassium and chlorine, also known as potash.
Sylvinite		A rock consisting of a mineralogical mixture of halite and sylvite crystals ± minor clay and carnallite.
Potassium Oxide	K_2O	A standard generally used to indicate/report a potash deposit ore grade.
Insoluble		Water-insoluble impurities (e.g., generally clay, anhydrite, dolomite, or quartz).
Seismic Anomaly		A structural change in the natural, uniformly bedded geology.
Tetrabromobisphenol-A	TBBPA	A derivative of bromine and is one of the most prevalent flame retardants used in plastic paints, synthetic textiles, and electrical devices.
United States dollar	USD or $	Official currency of the United States of America

2.5 Personal Inspection

Due to travel restrictions related to the COVID-19 pandemic, no site visit has taken place. A site visit will take place when travel restrictions are lifted.

3 PROPERTY DESCRIPTION

JBC is in the Hashemite Kingdom of Jordan (Jordan), in the Governorate of Karak, and is located on the southeastern edge of the Dead Sea. The JBC production plant facility occupies a 26-hectare (ha) area with geographic coordinates of 31° 8' 34.85"N and 35° 31' 34.68"E. The JBC site, as shown in Figure 3.1, is located approximately 6 kilometers (km) north of the APC plant.

JBC also has a 2-ha storage facility within the free-zone industrial area at the Port of Aqaba. The facility is used to store bulk-liquid products before export and is located near the Jordan Oil Terminals Company, which is just west of the Aqaba Thermal Power Station and east of Solvochem-Holland. The site contains storage tanks and pumps and is connected to the nearest oil port by a 1.5-km pipeline. An extensive expansion of this facility was completed in 2013[3].

The administrative division of Jordan is shown in Figure 3.2. The country consists of 12 Governorates (i.e., Muhafazah). Control of the Dead Sea waters and minerals is shared by Jordan on the east and Israel (including the West Bank) on the west.

3.1 Jordan Land Management and Regulatory Framework

Established in 1927, the Department of Lands and Surveys (DLS) is responsible for all legal property registration in Jordan. The DLS "has been established on a solid basis" according to *The Land Tenure Journal*, which is a peer-reviewed, open-access journal of the Climate, Energy and Tenure Division of the Food and Agriculture Organization of the United Nations[4].

The Jordan Valley Authority (JVA) manages various aspects of economic activity and agriculture water management on the Jordan side of the Jordan Valley. The Aqaba Special Economic Zone Authority (ASEZA) is responsible for most government-related issues in the Aqaba Region[4]. The ASEZA was established in 2001 by the government of Jordan to independently (financially and administratively neutral) manage and regulate the economic development of the Aqaba Special Economic Zone. A description of the ASEZA and the laws and regulations are available at its website (http://www.aqabazone.com/).

The Ministry of Energy and Mineral Resources is the primary regulator of most mining activities in Jordan that provides information (e.g., studies and maps) to interested companies and investors to help facilitate exploration and extraction. These efforts promote a strong regulatory environment with international industry standard environmental and safety best practice regulations[v].

3.2 Mineral Rights

3.2.1 Jordan Bromine Company and Albemarle Joint Venture

JBC was established in 1999 as a joint venture between Albemarle Holdings Company Limited (a wholly owned subsidiary of Albemarle) and APC. Albemarle holds a 50 percent interest in JBC Limited. The bromide-enriched brine is a by-product of potash operations conducted by APC. JBC's operations primarily consist of the manufacturing of bromine, from which derivative products are made including TBBPA, calcium bromide, sodium bromide, hydrobromic acid, and potassium hydroxide.

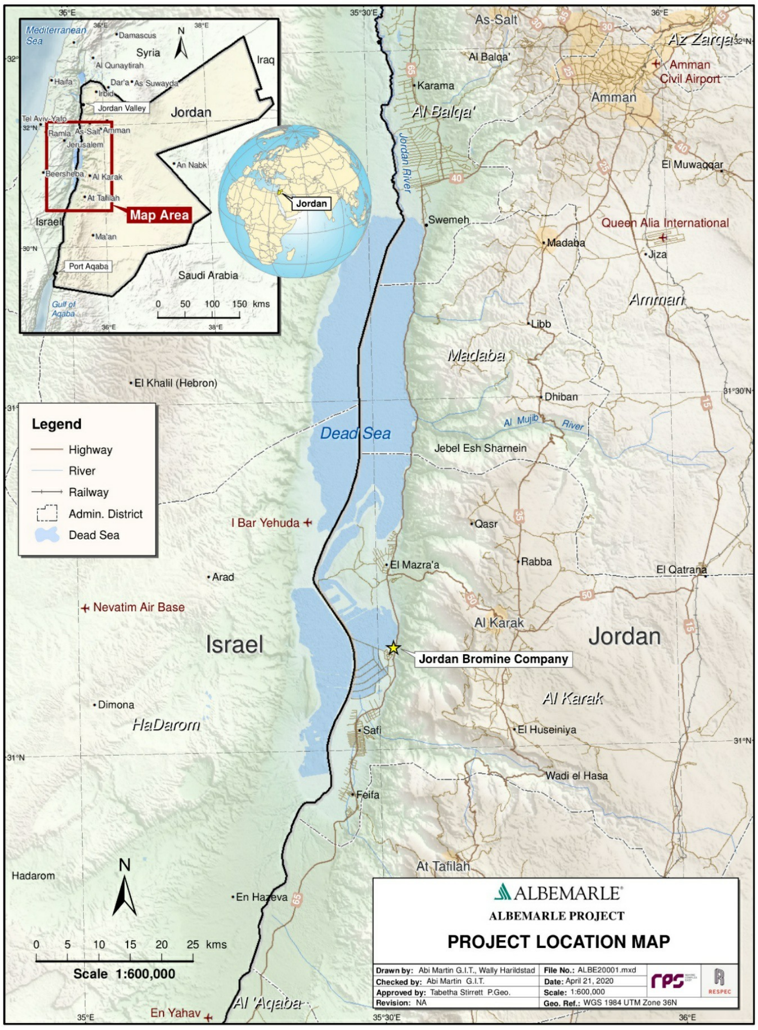

Figure 3.1: Jordan Bromine Company Project Location Map.

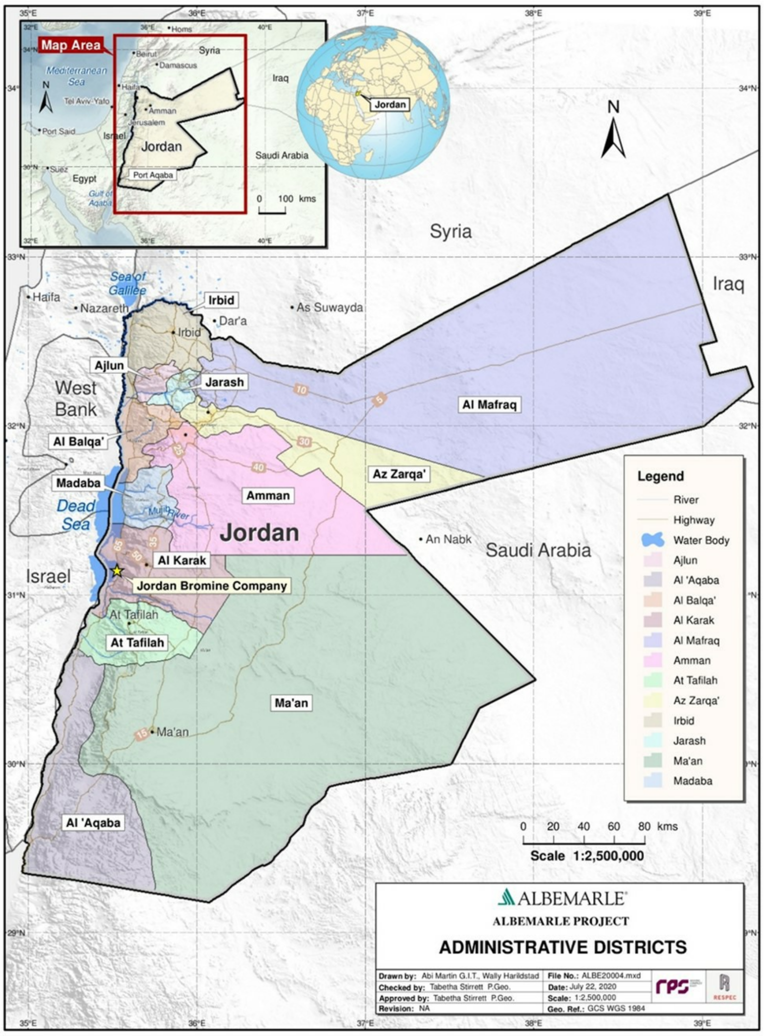

Figure 3.2: Administrative Divisions of Jordan.

The share agreement signed between APC and Albemarle Holdings Company Limited established that Albemarle's share on the losses, liabilities, and interest expense of the joint venture is 50 percent; however, its share in the joint venture's profit was 70 percent until 2012 and has been 60 percent since 2013. This percentage varies and depends on product split.

In 1958, the Government of the Hashemite Kingdom of Jordan granted APC a concession for exclusive rights to exploit the minerals and salts from the Dead Sea brine until 2058; at that time, APC factories and installations would become the property of the Government[vi]. APC was granted its exclusive mineral rights under the Concession Ratification Law No. 16 of 1958.

APC produces potash from the brine extracted from the Dead Sea. A concentrated bromide-enriched brine extracted from APC's evaporation ponds is the feed material for the JBC plant, as well as for the Manaseer Magnesia Company (MMC) (formally Jordan Magnesia) plant. The most relevant clauses of APC's concession Agreement with the Government of Jordan are summarized in the following text:

- The agreement grants to APC licenses to import all devices, tools, transport means, machinery, and construction material necessary for the entire duration of the concession, its expansion or completion, work continuation, and relocation.
- APC is exempted from import fees, customs fees, and all other fees imposed on imported goods, provided they are used for the purposes of the company. If APC sells the fee-exempted goods, those goods are subject to taxation as per the Jordanian customs law.
- APC's products are exempt from exportation licenses and all fees imposed on exported goods.
- APC retains exclusivity over the mining rights throughout the term of the concession.
- The concession grants ample rights to APC to acquire fresh water from the Jordan River, the Al Mujeb or the Maeen and Sweimeh, to be used at its facilities for mineral extraction and processing as well as to drill wells in the concession area to obtain fresh water. APC also has the right to use spring water from sources located out of the concession area, with the exception of sources that are registered as private property, and the right to request expropriation at the company's expense.
- APC also has the right to establish stone quarries on fee- and license-exempted, state-owned land.

All these rights are applicable to JBC by virtue of APC's participation in the joint venture.

3.2.2 Arab Potash Company

According to APC's website (http://arabpotash.com), they are the eighth largest potash producer in the world by volume of production and the sole producer of potash in the Arab world. APC also has one of the best track records among Jordanian corporations in the areas of work safety, good governance, sustainable community development, and environmental conservation. Established in 1956 in the Hashemite Kingdom of Jordan as a pan-Arab venture, APC operates under a concession from the Government of Jordan that grants it exclusive rights to extract, manufacture, and market minerals from the Dead Sea brine until 2058. Upon termination of the concession, 100 years from the date it was granted, ownership of all plants and installations will be transferred to the Government of the Hashemite Kingdom of Jordan at no cost to the latter.

In addition to its potash operations, APC also invests in several downstream and complementary industries related to the Dead Sea salts and minerals, including potassium nitrate, bromine, and other derivatives. As a major national institution and economic contributor, APC employs more than 2,200 workers across its locations in Amman, Aqaba, and Ghor Al-Safi. Potash production began in1983 and has since progressed with various projects aimed at optimizing and expanding this production. The initial plant was built to a capacity of 1.2 million tonnes (MMt) of product and was expanded in the late 1980s to handle 1.4 MMt with key modifications undertaken with the Solar System to enhance the production of the ore accordingly. A second plant based on different technology with a capacity of 0.4 MMt was built in

1994 and brought the total production capacity to 1.8 MMt. Another cold crystallization plant of 0.45 MMt was built in 2010, which brought the total production capacity to 2.45 MMt. Further expansion is currently under evaluation to bring the total potash capacity to 3.2 MMt.

3.3 Significant Encumbrances or Risks To Performing Work On Permits

The brine supply to the JBC facility fully depends on raw material extracted and pre-processed, through an evaporation sequence, by APC. The pumping facilities, which will be described later in this report, are owned and operated by APC and covered by APC's permits. Because APC is a national enterprise and the sole producer of a key commodity, all the necessary permits are maintained by APC to guarantee the continuous operation of its facilities under Jordanian legislation. Therefore, the encumbrances and/or risks to perform work on the operational permits are considered minimal. The fact that APC is both the entity controlling the subject mineral rights and a partner in the joint venture, JBC contributes to a seamless coordination regarding the key permitting aspects of the operation.

4 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE, AND PHYSIOGRAPHY

4.1 Topography and Vegetation

The surface of the Dead Sea is at an elevation of approximately 430 meters (m) below sea level[vii] within the Dead Sea Rift Valley, which is the lowest surface on earth. The Dead Sea Rift Valley contains a series of pull-apart basins, including the Jordan Valley and Wadi Araba/Arava Valley, that connect to the Dead Sea[8].

The Jordan River is within the Jordan Valley that extends south from the Sea of Galilee to the north and connects to the northern shoreline of the Dead Sea. The Jordan River is the only major source of water to the Dead Sea[9]. The Jordan Valley is named the "food basket of Jordan." With a continual supply of water (dams and irrigation) and its year-round warm temperatures, the Jordan Valley and the Southern Ghor are among the most important agricultural areas in Jordan[9].

The Wadi Araba/Arava Valley extends from the southern shore of the Dead Sea and continues south to the Port of Aqaba. This valley is geologically related to the Jordan Rift Valley[x]. This stretch of valley land is predominantly sand-dune-covered desert with scattered settlements, but the northern and the southern shore areas support some irrigated agriculture[10].

Most of the Dead Sea shoreline is surrounded by steeply dipping, incised valleys and mountainous terrain. From the Port of Aqaba, the elevation rises from sea level to about 200 m above sea level along the Wadi Araba Ghor and drops drastically below sea level at the Dead Sea. The elevation gently rises but stays below sea level along the Jordan River/Valley depression, north to the Sea of Galilee (Figure 4.1).

The Wadi Araba - Dead Sea depression steeply rises to the east and forms the mountain ridge (known as the Northern Highlands), which is home to Jordan's natural forests and are intersected by many deep wadis (canyons)[9]. Mountain elevations reach 1,850 m above sea level and are steeper and less vegetated in the south along the mountain ridge[9].

An east-west ridge separates the deep northern Dead Sea basin from a shallow southern Dead Sea basin (or lagoons). The Dead Sea is approximately 80 km long, 13 km wide and around 330 m deep in the north basin[xi]. The southern shallow basin is made up of shallow lagoons that average 2 m in depth. The southern basin would be exposed and dried up because of the continued drop in sea level if not for their current use as solar evaporation ponds that were constructed for the chemical extraction industry[10].

Saline-tolerant vegetation begins to grow 50 to 100 m from the Dead Sea shoreline and diversifies to less salt-tolerant vegetation moving away from the Dead Sea, with vegetation variety and density increasing within the wadis[3]. Figure 4.2 displays the vegetation types in Jordan.

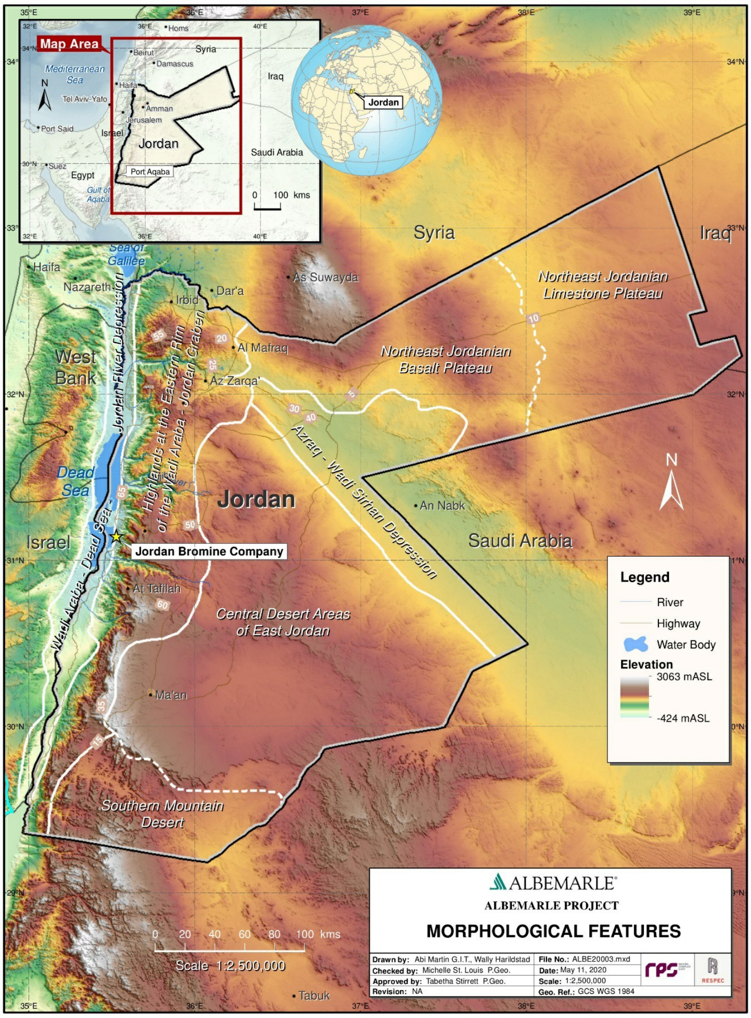

Figure 4.1: Morphological Features and General Elevation.

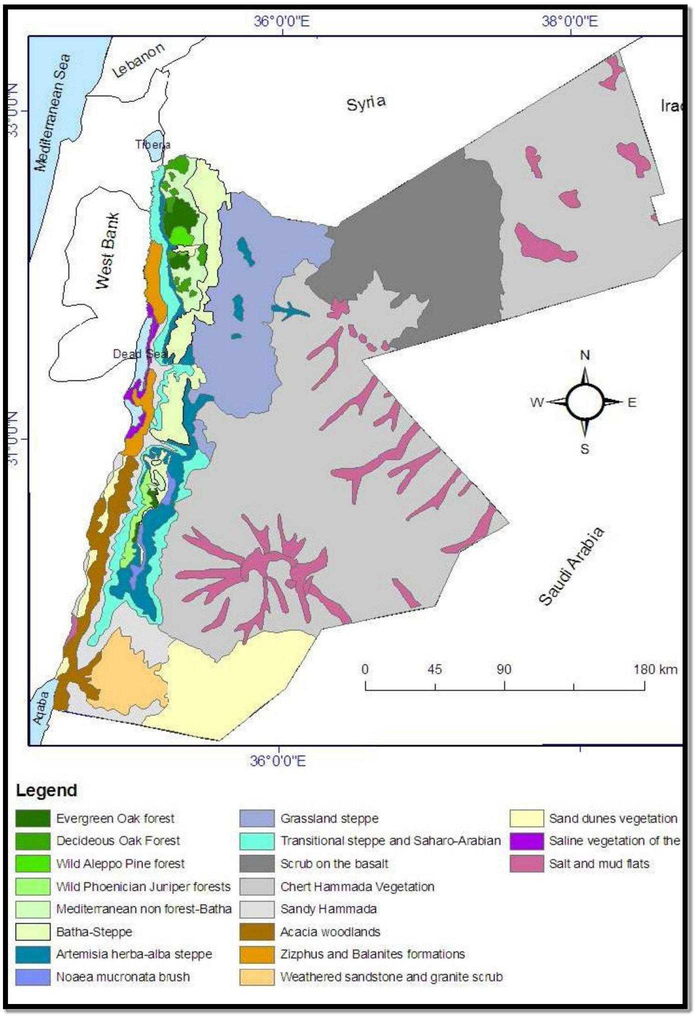

Figure 4.2: Vegetation Types of Jordan[3].

The Gulf of Aqaba (or Gulf of Eilat, Israel) is a large gulf at the northeastern tip of the Red Sea. The gulf is 177 km long with an average width of about 12 to 17 km [https://www.britannica.com/place/Gulf-of-Aqaba]. The gulf coastline is primarily mountainous with the east side bordered by Jordan (approximately 27 km of Jordan coastline is on the northeastern portion) and Saudi Arabia. The west side of the gulf is bordered by Egypt and a small portion of Israel coastline (in the very northwestern portion of the gulf).

4.2 Accessibility and Local Resources

The geographical location of Jordan has made it a crossroads of the Middle East for thousands of years. Jordan continues to play a major role by participating in and providing a fairway for trades because of its location at the junction of Africa, Asia, and Europe[4].

JBC is approximately 137 km south-southwest from Amman (the capital city of Jordan) and 40 km from the city of Al-Karak. The Jordan Valley Highway/Route 65 runs north-south and locally along the east side of the Dead Sea and is the primary access method for supplies and personnel to JBC. The Port of Aqaba is the main entry point for supplies and equipment for JBC, where shipping containers imported on ships are offloaded to trucks and transported to JBC via the Jordan Valley Highway/Route 65.

The Jordan Valley Highway/Route 65 is a major highway that runs from the northwestern region of Jordan (from North Shuna) along the western edge of Jordan and south to Aqaba and the Port of Aqaba. JBC is situated midway along this highway, which is interconnected to several primary and secondary highways available to the western region of Jordan.

From the outskirts of Amman, JBC can be accessed via vehicle by traveling southwest on Dead Sea Road/Route 40 for approximately 35 km and then south on the Jordan Valley Highway/Route 65 for 77 km. Various networks of primary and secondary highways and roads surround Amman.

JBC is 40 km from Al-Karak (one of Jordan's major cities) and can be reached via vehicle by travelling west on Al-Karak Highway/Route 50 for 26 km to Jordan Valley Highway/Route 65 and then south for 12.2 km. The community of Gawr al-Mazraah is in close proximity to JBC and is located 14.5 km north of JBC along Jordan Valley Highway/Route 65. The primary and secondary highways are provided in Figure 3.1.

The Port of Aqaba is located 205 km south of JBC along the Jordan Valley Highway/Route 65 and is the only port in Jordan and the main entry point for supplies and equipment for JBC. The Jordanian port is on the Red Sea's Gulf of Aqaba and is owned by the Aqaba Development Corporation. The port has undergone major redevelopment and expansion since 2002 and consists of 12 terminals with more than 32 specialized berths, which are operated by world-class operators (https://www.adc.jo/).

Jordan has three commercial airports that are all located within proximity to the JBC plant, as shown in Figure 3.1. The Queen Alia International Airport and Amman/Marka Civil Airport are 35 km south of Amman and located approximately 121 km north and northeast of JBC via Jordan Valley Highway/Route 65 and secondary roads and highway. The King Hussein International Airport is in Aqaba, which is 205 km south of JBC.

Jordan's railway transport line is operated by Hijazi Jordan Railway and the Aqaba Railway Corporation (Al Rawabi Environment & Energy Consultancies). The line runs north-south through Jordan and is not used to transport JBC employees and/or product.

4.3 Climate

Located within a desert, the Dead Sea and its shoreline is extremely arid. Summer temperatures average 34 degrees Celsius (°C) in August with maximum temperatures reaching 51°C. Mild winter temperatures in January average 17°C on the south shore and 14°C on the north shore[7]. Hot, dry southerly winds can be very strong and can potentially cause sandstorms. Rainfall averages are only 2 inches (65 millimeter) per year[7] and occurs primarily during the winter months of November to March; January is the coldest and rainiest month in the Ghor Safi area[3]. Figure 4.3 is taken from the Red Sea Dead Sea Water Conveyance Study[10] and depicts the average annual rainfall over an area that included Jordan and Israel.

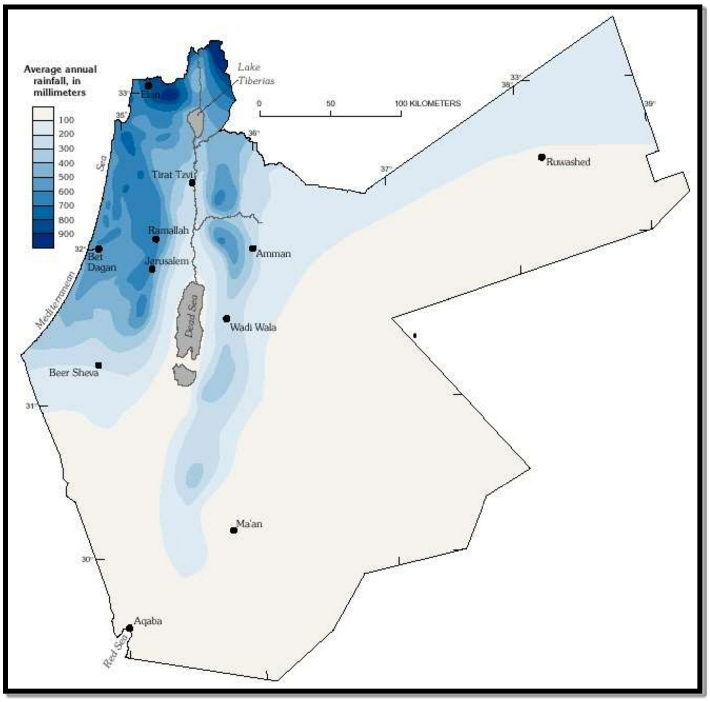

Figure 4.3: Average Annual Rainfall [10].

4.4 Infrastructure

The JBC facility is located in the Karak Governorate of Jordan and is connected to the nearby city of Al-Karak by the Jordan Valley Highway/Route 65 and the Al-Karak Highway/Route 50. The site is connected to the city of Amman by the Dead Sea Road/Route 40 and the Jordan Valley Highway/Route 65. The Jordan Valley Highway/Route 65 connects the facility with the Port of Aqaba in the Red Sea.

Electricity is generated through the National Electric Power Company of Jordan (NEPCO) and is distributed directly to JBC through the Electricity Distribution Company (EDCO). EDCO is owned and operated by Kingdom Electricity Company, which is one of the preeminent holding companies in Jordan that invests in energy generation and distribution companies/utilities.

In February 2014, Noble Energy Inc. (Noble Energy), a partner in Israel's Tamar natural-gas field, announced that they had signed an agreement to supply APC and JBC with fuel beginning in 2016[12]. In January 2017, APC and JBC were connected to Israel's national pipeline network and gas exports had started that month. The agreement with Noble Energy appears to have a duration of 15 years (until 2032) and is based on a price of $5.50 per million British thermal unit (USD/btu) and be linked to the price of Brent crude oil[13].

In November 2018, APC and JBC announced that the quantity of natural gas that Noble Energy would supply to both Jordanian companies would increase in 2019. This additional agreement would extend until the end of the original agreement in 2032[14]

JBC employs more than 350 people. Most personnel who work shifts (i.e., lower-technical staff and labor) typically stay in a company residence located near the JBC plant, and higher-level technical staff and management usually commute from Amman[3]. The company residence is equipped with internet, televisions, a sports hall, and a cafeteria that is catered by a contractor[3]. Small towns and villages are located between Amman and JBC; however, few personnel reside in these communities.

The Port of Aqaba is the main entry point for supplies and equipment for JBC, where shipping containers imported on ships are offloaded to trucks and transported to JBC via the Jordan Valley Highway/Route 65.

4.5 Water Resources

Fresh water is supplied by the Mujib River that originates from the Mujib Reservoir (or dam), which is a man-made reservoir created in 1987 by the Royal Society for the Conservation of Nature. The Mujib River flows west through the Wadi Mujib Canyon and into the Dead Sea. According to JBC, approximately 1.0 to 1.2 million cubic meters (MCM) of water is used annually. Per the JV agreement, APC guarantees that JBC will receive all the brine and fresh water it requires for its operations.

JBC's water supply is provided by APC. APC is enhancing its water security through several projects, primarily by constructing dams in the southern regions. APC has financed the construction of the 4 million m3 Wadi Ibn Hammad Dam in the Al-Karak Governorate and is studying the feasibility of financing the construction of Al-Wadat Dam in the Tafilah Governorate. These projects will achieve water cost savings and provide water to the local communities and the agriculture sector[6].

5 HISTORY

JBC is Jordan's first and only producer and manufacturer of bromine and bromine derivatives and was established in January 1999. JBC is registered as a private Free Zone Establishment in Safi, located in the southeastern area of the Dead Sea, Jordan, and is the first Jordanian company to become certified in the International Maritime Dangerous Goods (IMDG) Code, the Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), and the International Air Transport Association (IATA). JBC has successfully established sales in more than 30 countries worldwide since its inception and is the first company of its kind in Jordan to become an authorized exporter to Europe.

The following timeline is the history of the development of JBC joint venture and is summarized from the Albemarle Website.

- **1999**: Albemarle forms a joint venture with Jordan Dead Sea Industries Company (JODICO) and APC to manufacture bromine and bromine derivatives in a world-scale complex to be built in Jordan.
- **2000**: JBC is registered as a private Free Zone Establishment in Safi in southeast Jordan in June.
- **2002**: The JBC bromine plant begins operation.
- **2003**: Hydrogen bromide (HBr) and calcium bromide (CaBr)/sodium bromide (NaBr) plants begin operating. JBC also becomes an authorized exporter to Europe of bromine and bromine derivatives.
- **2005**: JBC receives IMDG, ADR, and IATA certifications. The chlorine plant begins operations.
- **2011**: JBC announces that it will double the capacity of its bromine production to meet expanding global customer requirements.
- **2013**: JBC completes the first phase of its expansion to double its bromine production capacity.
- **2017**: The expansion of JBC's TBBPA facilities goes into operation.

6 GEOLOGICAL SETTING, MINERALIZATION, AND DEPOSIT

6.1 Regional Geology

The Dead Sea Basin, as shown in Figure 6.1, is a tectonically subsiding, strike-slip depression that belongs to the Aqaba-Dead Sea-Jordan Valley rift that formed between the African and Arabian diverging tectonic plates (an active plate boundary) and connected the Red Sea to Turkey[15]. The Dead Sea depression is a result of the transform faulting between the plates; the Western Boundary fault and the Arava fault are drawn on Figure 6.2[1]. The Dead Sea is a hypersaline lake within the lowest part of the catchment basin and is a unique, current-day example of evaporitic sedimentation and accumulation within a brine body[1].

Movement of the plates that created the basin began 15 million years ago (Ma) and the plates continue to diverge at a current rate of 5 to 10 mm per year[1]. Holocene and Miocene sediments comprise approximately 8 to 10 km of the basin fill that underlies the Dead Sea[1]. The Mediterranean Sea water is believed to have invaded the trough depression around 4 to 6 Ma and deposited 2 to 3 km of halite-rich evaporites of the Sedom Formation[1]. These evaporites form diapirs and subcrops along the Western Margin faults[1] within the basin. Mount Sedom is an exposed salt diapir at the southwest corner of the Dead Sea. Fluviatile and lacustrine sediments of the Amora and Lisan Formations comprise 3 to 4 km of sediments that overlie the Sedom Formation and underlie the Dead Sea deposits, as shown in Figure 6.2[1]. Figure 6.3 provides a simple schematic of the structural features for the Dead Sea area. The JBC Environmental Impact Assessment Report, 2012 includes a figure drawn by Powell [1988][16] that illustrates the generalized geological map of the JBC area and is provided in Figure 6.4.

6.2 Local Geology

The Dead Sea is not only the lowest surface on earth but is also the saltiest natural lake on earth with an average salinity of 342 grams per kilogram (g/kg) as of 2011, which is 9.6 times as salty as the ocean[17]. The climate, geology, and location provide a setting that makes the Dead Sea a valuable large-scale natural resource for potash and bromine. When the Dead Sea was first formed, the volume was likely 4 to 5 times larger than the current volume[2]. Today, the Dead Sea waterbody has a surface area of 583 square kilometers (km^2) and a brine volume of 110 cubic kilometers (km^3)[1].

Warren [2006][1] explains that the northern basin is the only permanent body of water (See Figure 6.1, Physiological Features Map). The southern basin is a saline pan and saline mudflat that would have been subaerially exposed, but the water level is maintained by artificial flooding with north basin brine and controlled evaporation for industrial salt extraction on the Israeli and Jordanian sides of the Dead Sea. Warren [2006][1] draws the various depositional settings and general geology surrounding the Dead Sea, including the saline mudflats and pans at the southern end of the sea, as depicted in Figure 6.5.

Evaporation greatly exceeds the inflow of water to the Dead Sea, especially since the mid-twentieth century, because of increased diversion and damming of the Jordan River for agricultural and domestic use. The Dead Sea has been receding approximately 1.1 to 1.25 m per year[1]. Warren [2006][1] described that in 400 years (from 2006), the Dead Sea will drop 80 m below its current sea level and the remaining brine will have approximately 380 grams per liter (g/L) of dissolved solids and a density of 1.27 kilograms per liter (kg/L). Simply, these rates suggest that the surface of the Dead Sea will drop approximately 1 m and, depending on the slope, the shoreline could travel 5 to 6.25m seaward over a span of 5 years. While action on falling sea level may be considered a risk to the rights of access to the resources and ultimately reserves, this is not considered likely to be a problem prior to expiry of the lease agreement in 2058.

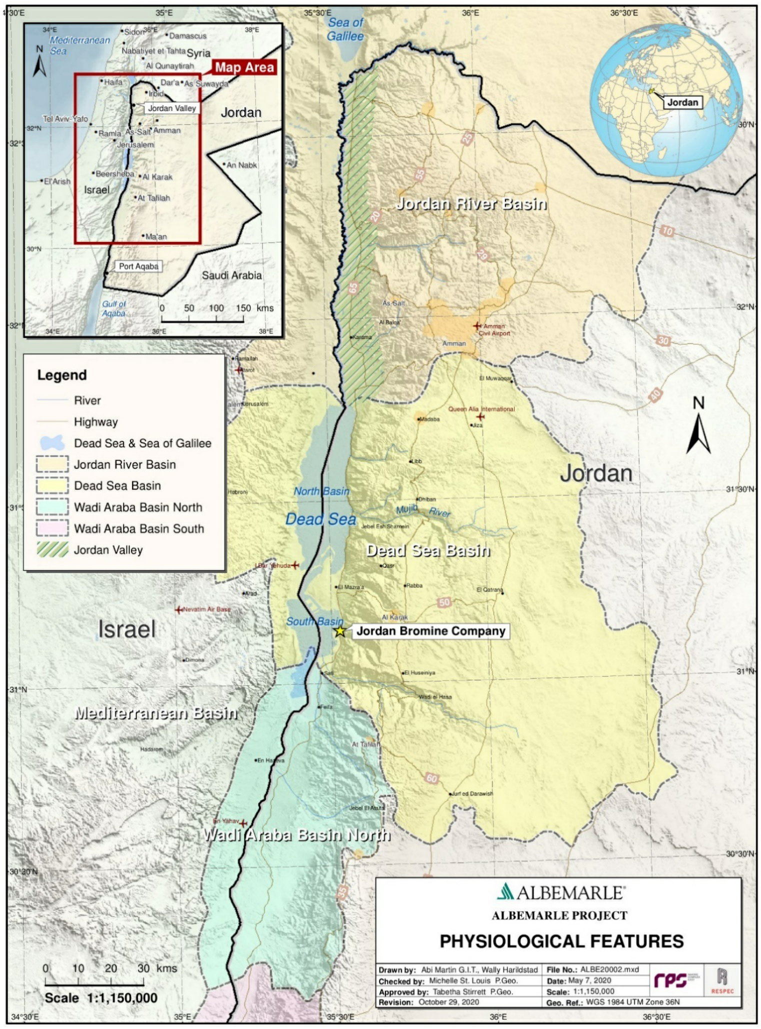

Figure 6.1: Physiological Features.

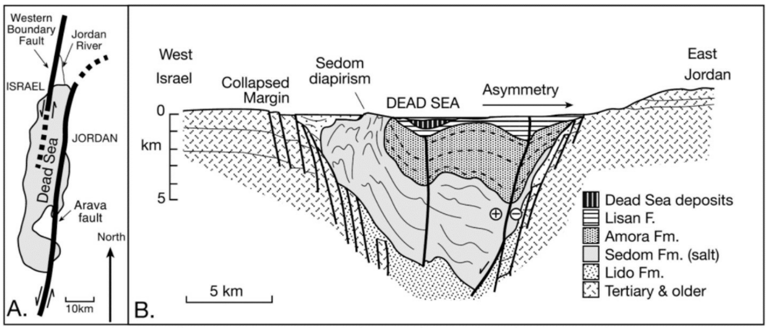

Figure 6.2: (A) Plan View of the Dead Sea in Relation to the Western Boundary Fault and the Arava Fault and (B) Generalized Cross Section of the Dead Sea Lake Geology[1].

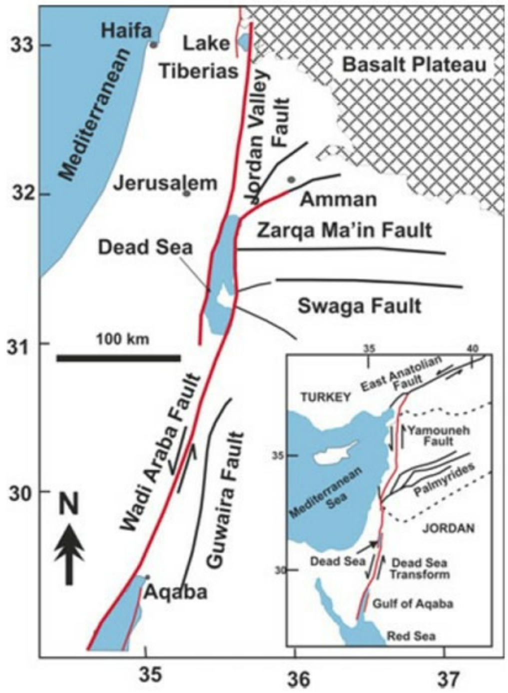

Figure 6.3: Main Regional Faults in the Area [18].

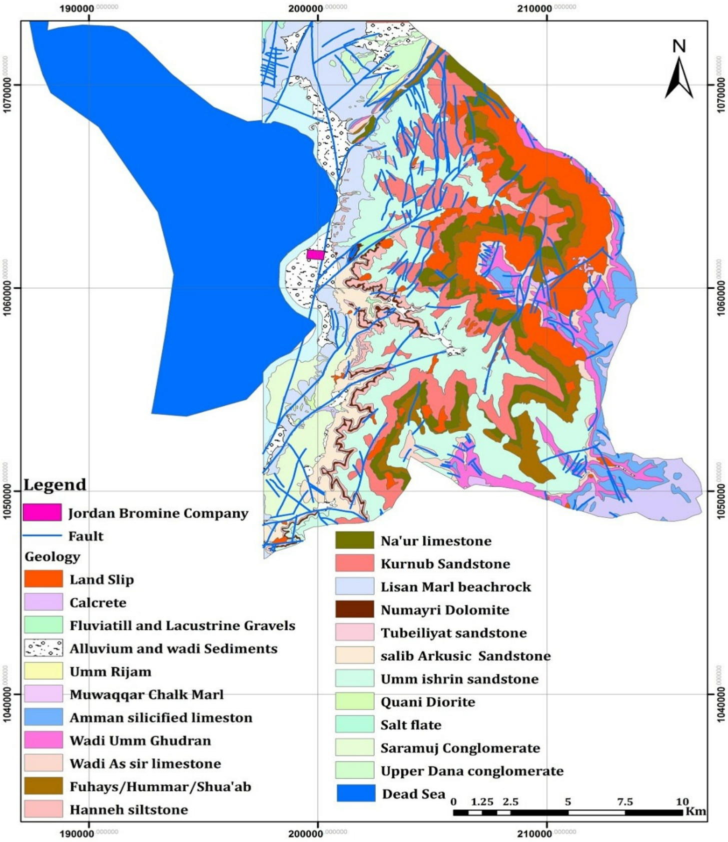

Figure 6.4: Map of the Jordan Bromine Company Area and Its Generalized Geology, Including Faults [10,17].

The sea level generally rises slightly in winter by unpredictable, brief runoff and sudden flood events[1]. As the sea level continues to decrease, the brine/freshwater interface within the surrounding groundwater moves toward the sea[19]. The infiltration of less saline groundwater is causing the dissolution of localized rock salt in the ground, thus causing an increased occurrence of sinkholes. The Dead Sea level is expected to continue decreasing with the ongoing demand for fresh water within the area[19]. Chemical extraction by solar evaporation ponds in the southern basin also contributes to the drop in the sea level by artificially increasing the rate of evaporation[19].

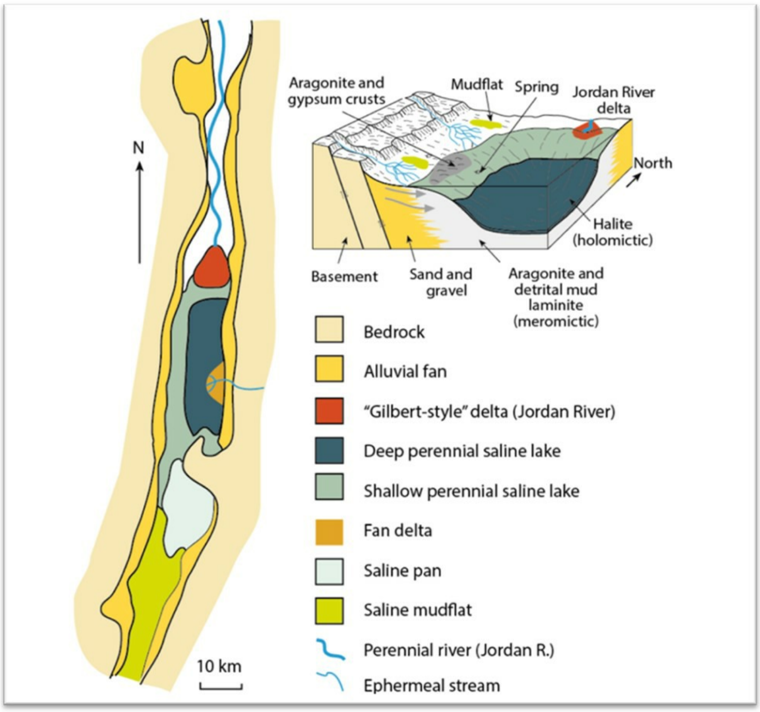

Figure 6.5: Depositional Settings of the Dead Sea[1].

The Red Sea-Dead Sea Water Conveyance Study Program - Final Report[19] states that water balance estimates for the Dead Sea vary wildly because of unknown amounts of water influx from underground streams, variable evaporation rates and an uncertain accumulation of salt collecting on the sea floor. The study also mentions that an evolution of the sea water occurs as the climate becomes warmer and the water becomes more saline and denser with time. Evaporation of the Dead Sea water slows as the water salinity increases[1].

Until 1979, the Dead Sea waters were stratified, and water density increased with depth[1]. The decreased influx of fresh water from the Jordan River, evaporation, and increased influx of end brine from the southern evaporation ponds caused an increase in surface-water salinity and density, which led the deep waters to overturn, mix with the surface waters, and homogenize and oxidize the entire water column in 1979[20]. After 1979, the Dead Sea became less stratified with periodic intermixing of layers (holomictic) and only periodically alters from holomictic to more rigidly stratified (meromictic) with episodes of higher-than-normal influx of fresh water into the basin[1]. During the Holocene era, overturn occurred periodically and is marked by a well-developed, coarse crystalline, deep-water halite.

The Dead Sea is supersaturated with halite (NaCl), and coarse crystalline halite has been rapidly accumulating at the bottom of the Dead Sea since the overturn in 1979[1]. Fine-grained halite interbedded with gypsum layers is more common around the sea edge and shallow waters (less than 50 m depth)[1]. During the summer, sea waters become thermally stratified with the sun's extra heat; the surface waters become warmer and the sea divides into two distinct layers [21]. The warmer, surface layer also becomes saltier than the lower, cooler layer because of increased evaporation[22]. Winter is generally associated with supersaturated levels of NaCl [2].

6.3 Property Geology and Mineralization

Supersaturated with halite, the Dead Sea has an annual negative water balance (i.e., the sea level drops), which is a result of the diversion of fresh water that would normally drain into the Dead Sea[20]. The water deficit by volume is greater than appears as the water level falls because of the coinciding salt precipitation on the sea floor. The water balance is complicated and not well understood because of the variations in freshwater influx, variable evaporation rates, and uncertain subsurface inflow. The evaporation rate of a brine surface decreases with the increase in the amount of dissolved salts and is not comparable to the same evaporation rate of a body of fresh water under the same conditions.

The Dead Sea is the world's saltiest natural lake with a definite chemical stratification[2]. The Dead Sea brine solution contains high concentrations of ions compared to that of regular sea water and has an unusually high amount of magnesium and bromine and low amounts of carbonate and sulfate. Table 6-1 compares the average ion concentration of the Dead Sea with regular sea water.

The relative ionic composition of the brine changes through the years because of continual evaporation, ongoing massive salt deposition, and the reinjection of the dense end brines in the south. End-brine reinjection has a local effect on halite saturation and ion/cation chemistry near the southern end of the north basin. The change in brine chemistry generally changes the solubility of evaporitic salt and brine physical properties (i.e., saturation, heat capacity, and viscosity)[23].

Wisniak [2002][2] reports that an estimated 900 MMt of bromine exists in the Dead Sea. The reason for the high levels of bromine found in the water is not well understood, but the salt brines are believed to have formed during the Tertiary period[2]. The evaporation ponds demonstrate the bromide-enrichment process that is theorized to have occurred many years ago and on a much larger scale. Residual brines are extremely rich in bromide. The feedbrine has a specific gravity of 1.24 and contains 5,000 parts per million (ppm) of bromine. After controlled evaporation occurs in the southern basin ponds following the precipitation of halite and carnallite, the residual brine has a specific gravity of 1.341[2] and 8,760 ppm of bromine [JBC production reports].

Table 6-1: Typical Concentration of Ions in the Dead Sea and Regular Sea Water Grams per Liter

Ions	In Dead Sea (g/L)	In Regular Seawater (g/L)
	Cations	
Sodium (Na^+)	39	10.7
Magnesium (Mg^{2+})	39.2	1.27
Calcium (Ca^{2+})	17	0.42
Potassium (K^+)	7	0.4
	Anions	
Chloride (Cl^-)	208	19.4
Bromide (Br^-)	5	0.07
Sulfate ($(SO^{2-})_4$)	0.5	3.6
Total	**315**	**33.68**

7 EXPLORATION

Although typically conducted, no exploration was required to characterize the mineral deposit as the minerals are extracted from the Dead Sea, which has been extensively characterized. Typical chemistry of the Dead Sea brine is provided in Table 6-1.

Woods Ballard and Brice [1984][24] describe the geotechnical exploration work done for the design of the dike system necessary for the construction of APC's evaporation ponds. This information assists in understanding the shallow geological conditions underlying the evaporation ponds and ancillary structures.

A limited site investigation program[24] was carried out in 1966 when most of the southern basin of the Dead Sea was covered in up to 3 m of brine. A more detailed program, with a cost of £3 million, took place in 1977 when the brine level had receded from the southern basin, leaving only land-locked ponds in the central depression.

The very soft clays which overlay the area to form the flat foundation for the basins were deposited by wadis (streams) which discharge into the area from the wadi Araba and the eastern hills. The foundation clay is interspersed with layers of uncemented salts. These salts are formed during the modern depositional process, when the sea level has receded sufficiently to allow brine at the southern end to become concentrated to the point of precipitation. The wadis have also formed fans of boulders, gravels and sands where they exit from the escarpment and indent the eastern shoreline.

To undertake the site investigation program in 1977, major access problems had to be resolved. The very soft mud in the carnallite pond area would not support normal investigation equipment. Elsewhere brine pools of varying depth covered part of the surface of the central depression and were 10 m deep at the main intake location off the Lisan Peninsula in the Dead Sea.

A drilling rig was mounted on a 15 × 15 m Mackley Ace hover pontoon to allow drilling on the soft mud and over the sea. The unit was maneuvered into position by a Gemco amphibious transporter on land and by a motor launch in deep brine. The unit was serviced with small Nimbus hovercrafts which were also used for reconnaissance of the area. There was some difficulty in controlling the unit when it was being moved to new locations in windy conditions. In the areas of very soft mud, which precluded the use of the Gemco, anchors had to be laid by hand in the mud to enable the pontoon to be winched into position. It was possible to walk on these areas only with the aid of specially made 'mud shoes' produced on site from plywood boards.

Shallow pools of evaporating brines were formed in the central basin 7 km from the shoreline in which jagged reefs of hard salt crystals had formed, protruding up to 700 mm above the brine level. Neither the hover pontoon nor the hovercraft could be used in this particular area as the reefs ripped the hover skirts. Investigations of conditions in this area were carried out using a lightweight drilling rig mounted on the Gemco, with workforce and materials being ferried out by helicopter.

The investigations concentrated on solving two main problems: establishing the most economical design of dike on very soft mud and finding the best method of constructing a cut-off under part of the western perimeter dike for control of seepage through the uncemented salt layers.

The team carried out in situ vane tests and triaxial tests on undisturbed samples to give a preliminary indication of the strength of the mud. The inherent inaccuracy in using small vanes to determine large-scale strength criteria and the difficulty to obtain truly undisturbed samples led to the requirement for full-scale trial dikes. Three trial dikes were then constructed in various materials, with various cross sections, instrumented and loaded to failure.

In situ permeability tests were carried out in the salt and clay strata to establish design criteria for seepage control. To confirm the proposed diaphragm wall, trial cut-off trenches were formed 150 mm wide and 3 m deep in the rock salt using a chain-saw type cutter. A 2.5-mm-thick, medium-stiff high-density polyethylene impermeable membrane was inserted into the trench which was then filled with a self-setting mud.

8 SAMPLE PREPARATION, ANALYSES, AND SECURITY

The deposit (i.e., the Dead Sea) has been characterized based on ample information collected from multiple sources, including companies dedicated to extracting and processing brine as well as scientific institutions. Therefore, the various sampling and testing protocols and sample chain-of-custody documentation that are generally used to characterize the reserves/deposit are not included in this report.

JBC has its own internal lab facilities for testing with advanced technology and well trained staff. The lab complies with ISO 19000, 14001 and OHSAS 18001 certification requirements and follows industry best practices in terms of laboratory procedures. JBC has decided to further improve its lab by pursuing compliance with ISO 17025 requirements and this process is ongoing.

JBC's analytical laboratory is managed by a team of experts, including a chemist, supervisors and technicians, all working around the clock in shifts, to maintain the integrity of the lab at all times.

JBC is an ongoing operation that has processed concentrated brine extracted from the Dead Sea for many years. Therefore, JBC has an extensive database of quality data that were obtained by APC and JBC. This data confirms the characteristics of the brine obtained from the Dead Sea (APC) and the Carnallite Pond C-7 (APC and JBC).

Chapter 10.0 discusses the sample preparation, analyses, and security of the brine samples used to test the quality of the brine.

It is the QP's opinion that Albemarle's laboratory facilities meet or exceed the industry standard requirements for such facilities and that the implemented practices for the collection and preparation of samples, as well as the methodology followed to carry out the analytical work (including the sample security protocols) are based on industry best practices and, therefore, are adequate for their intended purposes.

9 DATA VERIFICATION

Sampling and testing records from 2017 through 2021 were provided by JBC and were used as source material for the TRS. The JBC plant has been operating for approximately 20 years and the quality of the brine extracted from the Dead Sea by APC and the feedbrine coming from APC's Carnallite Pond C-7 is continuously monitored and well understood. The typical density values, as well as the chemical composition of the brine, are well documented, and in the Qualified Person's (QP's) opinion, the quality data provided by JBC are adequate to understand the process and estimate mineral resources and reserves.

The data reviewed by the QP show a sampling and testing system in place that is comparable to the best management practices of the industry. The records contain detailed information on dates, times and the name of the operators who performed the sample-collection process. Documentation provided by JBC also shows appropriate chain-of-custody documentation of the samples and the standard analytical methods that were implemented for quality testing.

10 MINERAL PROCESSING AND METALLURGICAL TESTING

The methods used to test the quality of the brine before it reached the JBC plant is discussed in this chapter. Understanding the quality of the brine before it enters the plant is critical to ensure that the plant feed is consistent. The analytical procedures discussed herein are not typically used in the mining and exploration industry (e.g., geochemical assaying); however, the methods employed are sufficient for JBC to run their plant properly and efficiently. Site inspection was not possible because of COVID-19 travel restrictions; therefore, the sampling process has been described by JBC.

10.1 Brine Sample Collection

The JBC bromine plants and the connection to APC's Carnallite Pond C-7 were designed for the explicit purpose of gathering substantial quantities of brine for transport to the central bromine production facilities. Once at the facility, the bulk brine is processed to produce bromine. Concentration measurements of the bromide salts (hereafter referred to as bromides) are critical to the successful operation of the bromine plant. The brine consistency is critical for forecasting various bromine derivative sales and the overall health of the Albemarle/JBC bromine business.

Bromine samples from the JBC brine plant are taken in two strategic locations: (1) upstream of the bromine tower and (2) downstream of the bromine tower. Because of the nature of brine collection, the feedbrine (i.e., upstream brine) concentration of bromides remain relatively consistent; however, the concentration does vary and depends on weather/climate and APC's process consistency. Feedbrine samples are therefore frequently taken to capture concentration changes and more effectively adjust downstream operating parameters.

Tailbrine (i.e., downstream brine) samples are also taken frequently to primarily ensure that existing parameters at the bromine tower are set correctly. JBC operators collect brine samples multiple times per day and as requested by plant management. The sampling method includes the following steps:

1. Travel to each feedbrine and/or tailbrine sampling area within the plant
2. Slowly open the sample valves to purge out collected debris or stagnant brine to ensure that the samples collected are representative of the actual flow
3. Collect approximately 1 liter of brine within the sample bottle (roughly filling to the bottle's capacity)
4. Label the sample bottle with the date, time, and name of the operator who collected the sample. The label also indicates if the sample corresponds to feedbrine or tailbrine. Cap the bottle and transport to the on-site analytical laboratory for testing.

Because of the long-established operation of the JBC bromine plant, the samples collected at both feedbrine and tailbrine collection sites are only regularly tested for bromide salts. The composition of the feedbrine and tailbrine, in terms of additional salt content outside of the bromide salts, has been very consistent over the last 20 years of production and consists of magnesium, sodium, calcium, and potassium chlorides. Density measurements are not frequently taken based on the lack of density change in the brine over time. Samples are taken within the plant approximately every 2 to 4 hours to monitor process efficiency and allow operators to make adjustments to the bromine plant operations.

10.2 Security

Samples are taken directly from the sampling point to the internal JBC quality control (QC) laboratory. Samples are verified by the QC laboratory technician and operator during delivery and tracked through an electronic sample monitoring system where samples are given a designated number and the results of analytical tests are posted. Samples are not sent to external laboratories for testing; however, some samples are sent to internal analytical laboratories at different Albemarle sites (primarily the Process Development Center in Baton Rouge, Louisiana) for various other tests that are immaterial to plant operations.

A check standard is run for each titration and if the test passes the actual sample is analyzed. If the sample fails, the instrumentation is recalibrated. The laboratory does not hold any internationally recognized certifications.

10.3 Analytical Method

Halogen titration is the current process to measure bromine in brine. This method is widely used across the company for measuring bromine because of its simplicity and no complex machinery/analytical tools are required. The method involves use of different concentrations of chemicals for feedbrine and tailbrine. Firstly, a buffer solution is prepared by adding sodium fluoride and sodium dihydrogen phosphate in deionized water. Clorox bleach is then added, and the solution is heated on a hot plate for 15 minutes. Sodium formate is then added, after which the solution is heated for an additional 5 minutes and then cooled to room temperature. Potassium iodide and sulphuric acid is then added to the solution and then the solution is titrated with sodium thiosulfate until starch endpoint.

The QP has reviewed the analytical method as provided by JBC and the method appears to be reasonable and well-established.

11 MINERAL RESOURCE ESTIMATES

Estimating bromine resources from a nonconventional reservoir such as the Dead Sea presents many challenges. The elevation and the area and volume of this body of water are rapidly decreasing for the reasons explained in this report.

The decreasing water level in the Dead Sea has been of concern for many years and the concept of diverting seawater from the Mediterranean Sea or the Red Sea has been discussed in many publications. The principal objective of diverting seawater is to provide desalinated drinking water for the inhabitants of the surrounding areas of Palestinian Authority, Israel, and Jordan and to stop the decreasing water level of the Dead Sea. The desalination plant is proposed to produce fresh water using the Reverse Osmosis (RO) method.

Water mixing in the Dead Sea is slower because of low waves and wind compared to other waterbodies (e.g., seas and oceans). The Dead Sea is considered a stratified waterbody and is based on 44 available datasets on potential temperature and quasi-salinity. Traditionally, the density anomaly of the Dead Sea water from 1,000 kilograms per cubic meter (kg/m^3) at 25°C was used as an indicator of water salinity[25] and was called “quasi-salinity” and denoted as σ25 or SIGMA-25.

A study by Bashitialshaaer et al. [2011][26] was developed by the Department of Water Resources Engineering, Lund University in Sweden, to investigate methods for understanding the variations of water level and volume of the Dead Sea under various scenarios. The Lund University study[26] developed two models for estimating changes in the Dead Sea level, surface area, and volume: (1) a single-layer (well-mixed) system and (2) a two-layer (stratified) system. The mathematical models used in the study were based on the Land-Ocean Interactions in the Coastal Zone (LOICZ) *Biogeochemical Modeling Guidelines* and have been validated by comparing the model performances with other modeling studies of the Dead Sea[27]. The models were first employed to describe the dynamic behavior of the Dead Sea using the data available in 1997 as the initial conditions and simulating the evolution over a 100-year period. Historical data from 1976 to 2006 were then used to compare with simulations obtained from the model. Although the Dead Sea is not in a steady-state condition, it was assumed to be close to steady state during the first year. Water and salt balances may have internal inputs and outputs but are only a concern in the two-layer approach.

The first model employed encompassed a single layer for which the water and salt mass balances were derived. Salinity variations and water discharged from the desalination plant were considered with and without the proposed project. The Dead Sea shows relatively strong vertical stratification that can be assumed to resemble a two-layer system (also called a stratified system)[28].

Considering the significant differences in the salinities and densities of the input and output brine, as well as the Dead Sea itself, with respect to depth, a two-layer system was determined to provide a better description of the conditions than the single-layer system. The upper layer constitutes an average of approximately 10 percent of the total depth, and the rest of the lake constitutes a rather homogeneous lower layer. Values of volume, surface area, elevation, and cumulative levels of the Dead Sea for a 100-year period were predicted by the single-layer and two-layer models.

Compared to previous studies, the single-layer and two-layer models proved to be robust alternatives to the traditional water and salt balance techniques. These models allowed the water exchange to be successfully calculated through a relatively simple representation of a complex and dynamic system such as the Dead Sea.

Both analytical models were balanced using two approaches: water-mass balance and salt-mass balance. The single-layer model predicted 1.4 and 2.0 percent higher water levels than the two-layer model using the water-mass balance with and without RO discharge, respectively. The two-layer model yielded 3.7 and 4.0 percent higher values than the single-layer system using the salt-mass balance with and without RO discharge, respectively.

RESPEC opines that the two-layer model under the water-mass balance approach is a better representation of the Dead Sea environment and, therefore decided to use this model to predict present and future levels, areas, and volumes that are the bases for estimating resources. For this analysis, the current situation was assumed to be maintained, and the influence of a potential Red Sea to Dead Sea project was not considered. This model will be used to estimate the average water elevation, area, and volume at two critical points in time: 2022 (the effective date of this report) and 2058 (the end of APC's concession), and correspond to the Years 26 and 62, respectively, of the 100-year model (with 1997 as the base year [Year 1]).

The JBC facility has a proven track record of commercial production and, therefore, the reliability of the economic forecast operation is high. From the technical point of view, the quality of the feed, the expected recoveries and other key factors are well understood, by virtue of many years of operation.

The capital and operational costs correspond to a Class 1 estimate and therefore are also significantly accurate (between -10% and +10%), which minimizes the potential impact of those elements on the prospect of economic recovery. Economic factors have also been discussed at length in various sections of this technical report and it is the QP's opinion that they do not present any significant risk that could jeopardize the expected economic recovery of the operations. Moreover, it is the QP's opinion that no additional studies are required."

11.1 Dead Sea Elevation

Among the several institutions in Jordan and Israel that constantly monitor the level of the Dead Sea, the Israel Oceanographic and Limnological Research, which publishes a level chart on its web page, is provided in Figure 11.1. As of late-2022, the reported average water level of the Dead Sea is 431 m below mean sea level (bmsl), which is consistent with the model's forecast.

At the beginning of the last century, the water level was approximately 390 m bmsl with a surface area of 950 km^2. In 1966, the Dead Sea covered an area of 940 km^2 with 76 percent of the lake in the northern basin, and a total length of 76 km, and an average width of 14 km. The total volume of the water in the Dead Sea was estimated at 142 km^3 with only 0.5 percent in the southern basin. At the end of 1997, the water level was 411 m bmsl and the surface area 640 km^2,[29]. The surface area continues to decrease due to the high rate of evaporation and decreasing water inflow. The current volume of the Dead Sea is estimated at approximately 110.0 km3. Work undertaken by Ghatasheh et al. [2013] [18] presented in Table 11-1 shows historical water levels and surface areas for the time period of 1984 through 2012.

Figure 11.1 also shows the variations in the Dead Sea level[30]. Recorded level variations were compared with sea-level forecasts obtained from the selected simulation model and it was found that the selected two-layer model was highly accurate.

11.2 Dead Sea Volume

The drop in the sea level in the late twentieth and early twenty-first centuries changed the physical appearance of the Dead Sea. Most noticeably, the peninsula of Al-Lisān gradually extended eastward until the sea's northern and southern basins became separated by a strip of dry land. The southern basin was eventually subdivided into dozens of large evaporation pools (for extracting salt) and by the 21st century the basin had essentially ceased to be a natural body of water. The northern basin, which is effectively now the actual Dead Sea, largely retained its overall dimensions despite a great loss of water mainly because the shoreline plunged steeply downward from the surrounding landscape.

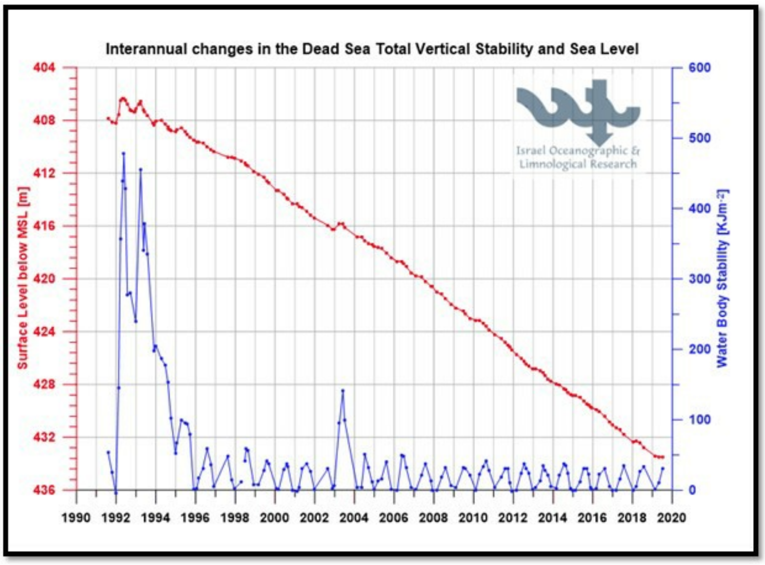

Figure 11.1: Interannual Changes in the Dead Sea Total Vertical Stability and Sea Level [30].

The inflow from the Jordan River, with high waters occurring in winter and spring, once averaged approximately 1.3 billion cubic meters per year (bcm/yr). However, the subsequent diversions of the Jordan River's waters reduced the river's flow to a small fraction of the previous amount and became the primary cause for the drop in the Dead Sea's water level. Four modest intermittent streams descend to the lake from Jordan to the east, through deep gorges: Al-ʿUẓaymī, Zarqāʾ Māʿīn, Al-Mawjib, and Al-Ḥasā. Several other wadis streams flow down spasmodically and briefly from the neighboring heights as well as from the depression of Wadi Al-ʿArabah. Thermal sulfur springs also feed the rivers. Evaporation in the summer and water inflow, especially in the winter and spring, once caused noticeable seasonal variations of 30 to 60 centimeters (cm) in the sea level, but those fluctuations have been overshadowed by the more-dramatic annual drops in the Dead Sea's surface level.

Concern over the continued drop in the Dead Sea's water level increased and prompted studies and a focus on conserving the Jordan River's water resources. In addition to proposals for reducing the amount of river water diverted by Israel and Jordan, the two countries discussed proposals for canals that would bring additional water to the Dead Sea. One of the projects that received approval from both countries in 2015 involved constructing a canal northward from the Red Sea. The plan, which included desalinization and hydroelectric plants along the canal, would deliver large quantities of brine (a by-product of the desalinization process) to the lake. The project was met, however, with skepticism and opposition from environmentalists and other parties who questioned the potentially harmful effects of mixing water from the two sources.

Table 11-1: Dead Sea Water Level and Surface Area [18]

Year	Surface Area (km^2)	Below Mean Sea Level (m)
1984	678.91	403.24
1985	675.46	404.13
1986	674.50	404.39
1987	670.87	405.36
1988	670.76	405.39
1989	663.21	407.50
1990	659.29	408.65
1991	658.32	408.94
1992	664.25	407.20
1993	552.64	407.56
1994	656.41	409.51
1995	653.26	410.48
1996	652.48	410.72
1997	661.55	410.98
1998	650.63	411.30
1999	646.88	412.50
2000	645.07	413.08
2001	643.92	413.46
2002	641.04	414.42
2003	641.85	414.15
2004	640.44	414.62
2005	635.85	415.85
2006	635.13	416.10
2007	633.00	417.19
2008	631.28	417.80
2009	628.02	418.98
2010	626.44	419.56
2011	623.26	420.74
2012	619.90	422.01

The area of the Dead Sea surface at the end of the 1950s was approximately 1,000 km^2, of which approximately 757 km^2 were located in the northern portion and 240 km^2 in the southern portion. Several studies state that the water level of the Dead Sea is dropping by an average of 0.9 m per year, which represents an annual water loss of approximately 600 MCM. The current volume of the Dead Sea is estimated to be approximately 110 km^3.

11.3 Dead Sea Salinity

The data collected by RESPEC as well as relevant forecasts indicate that the Dead Sea quasi-salinity (Sigma 25) is increasing, as illustrated in Figure 11.2.

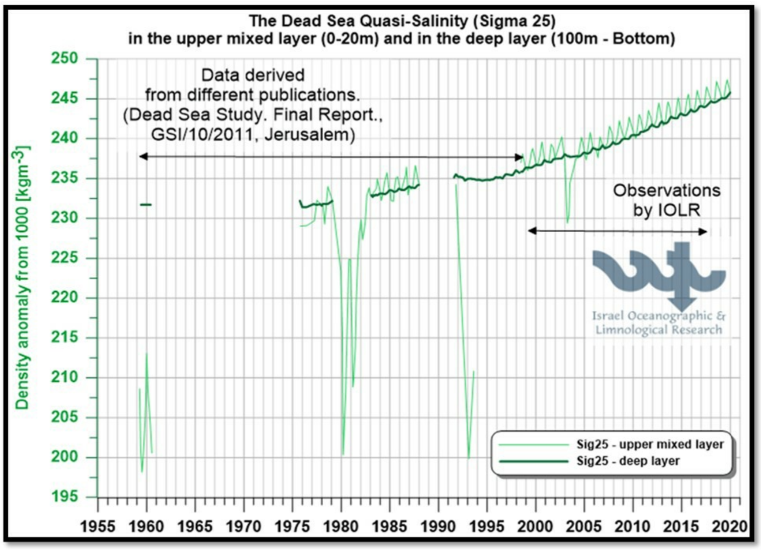

Figure 11.2: Quasi-Salinity (Sigma 25) of the Dead Sea. [30].

11.4 Simulation Model

The selected two-layer model takes into account the significant differences in the salinities and densities of the input and output with respect to depth and, therefore, provides a better description of the conditions of the Dead Sea. A comparison of historical water levels and areas with the model forecasts shows that the selected model is reliable and can be used to predict future water levels. The main components considered in the two-layer model and their interaction are illustrated in Figure 11.3. Table 11-2 summarizes the predicted level, area, and volume of the Dead Sea based on the selected two-layer model.

As mentioned, the two-layer model was developed to forecast the variations under both the baseline conditions (current situation) and the Red Sea-to-Dead Sea project implementation.

RESPEC deemed that the best fit between the model forecast and the historical data (between 1997 and 2021) was obtained from the water-mass balance approach. The Year 1997 represents the baseline case (Year 1) and 2021 corresponds to Year 25 of the model. The end of APC’s concession will take place in 2058, which corresponds to Year 62.

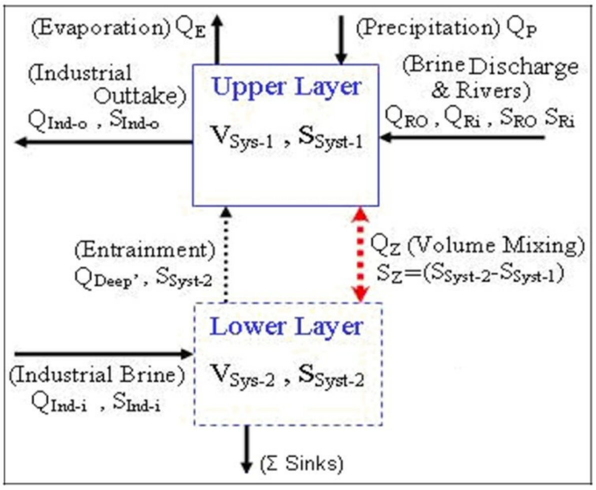

Figure 11.3: Schematic of the Mass Balance for the Dead Sea Using a Two-Layer System.

Table 11-2: Dead Sea Level, Area, and Volume as Predicted by a Two-Layer Model Based on the Water-Mass Balance Approach, Baseline year, 1997

Water-Mass Balance — 2-Layer Model (No RO)				
Year (cycle)	Year (date)	Level (m bmsl)	Area (km^2)	Volume (km^3)
1	1997	–411.00	640.00	131.00
25	2021	–430.30	580.22	109.54
30	2026	–433.41	570.95	105.06
60	2056	–458.56	492.30	78.23
62	2058	–462.44	480.09	76.44
90	2086	–488.58	398.43	51.39

11.5 Bromide Concentration

Bromide ion concentration is well-documented in the reviewed references and records provided by APC. The bromide concentration in the Dead Sea brine averages approximately 5,000 ppm, as reported by APC. The bromide concentration considered as the cut-off grade for resources estimation is 1,000 ppm.

11.6 Resource Estimation

Using on the values obtained from the two-layer model and the reported bromide concentration, a summary of the Dead Sea bromide ion resources is provided in Table 11-3. Because the waters of the

Dead Sea and the resources contained within are shared by the Hashemite Kingdom of Jordan and the State of Israel, the waters can be allocated proportionally to the surface area controlled by each country. The Dead Sea areas corresponding to Jordan, Israel, and the West Bank (under Israeli control) are depicted in Figure 11.4.

Table 11-3: Dead Sea Bromide Ion Resources

Year	Elevation (m)	Area (km^2)	Volume (km^3)	Brine Density (g/cm^3)	Brine Mass (MMt)	Bromide Concentration (ppm)	Bromide Ion Mass (MMt)
2022	-431.17	577.51	108.64	1.2482	135,608	5,033.00	682.52
2058	–462.44	480.09	76.44	1.2662	96.790	5,106.00	494.21

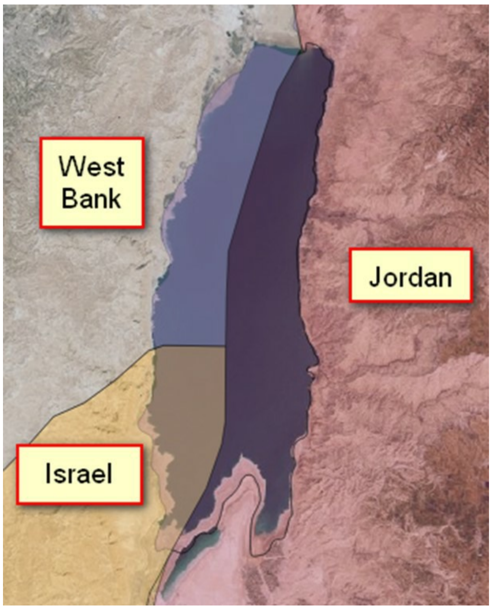

Figure 11.4: Schematization of the Water Mass Balance for the Dead Sea Using a Two-Layer System.

According to current GIS imagery and the official location of the international border between Israel and Jordan, the approximate 580.22 km^2 of surface area of the Dead Sea can be allocated as indicated in Table 11-4.

Table 11-4: Dead Sea Surface Area Allocation (as of 2022)

Jurisdictions	Area (km^2)	Allocation (%)
Israel and West Bank	325.85	47.47
Jordan	356.67	52.26
Total	580.22	100.00

The cut-off grade is an industry-accepted standard expression used to determine what part of a mineral deposit can be considered a mineral resource. It is the grade at which the cost of mining and processing the ore is equal to the desired selling price of the commodity extracted from the ore.

The considered sales price ranges between USD 3,560 and USD 6,480 per tonne and the operating cost ranges between USD 341 and USD 529 per tonne, as detailed in Section 18 of this report.

The cut-off grade of the Albemarle bromine operations has been estimated to be at 1,000 ppm. The bromide ion concentration in the brine extracted from the Dead Sea significantly exceeds the selected cut-off grade.

Based on the above allocation, an estimated 52.26 percent of the brine resources identified in the Dead Sea are controlled by Jordan (as of the effective date of this report) and, therefore, correspond to APC under the terms of its concession. *Consequently, as of December 2022, an estimated 135,608 MMt of brine measured resources with an average bromine ion concentration of 5,000 ppm, and a cut-off grade of 1,000 ppm (135,608 MMt × 52.26 percent = 70,869 MMt) is controlled by JBC. The measured resources of bromide ion attributable to Albemarle's 50% interest in its JBC joint venture is estimated to be approximately 178.34 MMt.* From these large resources, JBC is extracting approximately 1 percent of the bromine available. These estimates include Reserves. For perspective purposes, these estimates are a very large resource of which APC is accessing only a small portion. (as of the effective date of this report) and, therefore, correspond to APC under the terms of its concession. *Consequently, as of 2021, an estimated 354.90 MMt of bromide ion resources (679.10 MMt ×52.26 percent) is controlled by JBC.* This estimate includes Reserves. For perspective purposes, this estimate is a very large resource of which APC is accessing only a small portion—APC is extracting approximately 1 percent of the bromine available in the Dead Sea.

The reported resources slightly differ from the values presented in the 2021 TRS because the end date of the forecast of this project (2058) has remained unchanged. One year of production and the evaporation in the Dead Sea during that year are also factors that impacted in the figures.

12 MINERAL RESERVES ESTIMATES

Reserve estimates presented in this report are consistent with the definition in SEC S-K 1300:

Mineral reserve is an estimate of tonnage and grade or quality of indicated and measured mineral resources that, in the opinion of the qualified person, can be the basis of an economically viable project. More specifically, it is the economically mineable part of a measured or indicated mineral resource, which includes diluting materials and allowances for losses that may occur when the material is mined or extracted.

Even though 354.90 MMt of bromide ion with a cutoff grade of 1,000 ppm have been identified as the measured resources currently available to JBC, only the portion of those resources that can be economically extracted and processed with JBC's current capacity and within the term of the concession agreement constitute proven reserves.

Based on the information supplied by JBC/APC and independently verified by RESPEC, APC has a present and forecast brine extraction capacity of 336.4 MCM of sea water from APC's PS3 pumping station. The facility will eventually be replaced by the new PS4 pumping station and will have a similar capacity. As described in Chapter 13.0 of this report, the brine is transferred through a series of evaporation ponds until reaching pond C-7, where another pumping station with a capacity equivalent to 24 percent of the PS3 pumping station (as indicated in APC and JBC production reports), pumps brine to supply the JBC Area 1 and Petra Bromine plants and also to the Manaseer Magnesia Company facility. Therefore, the maximum pumping capacity from pond C-7 is approximately 84.10 MCM per year.

APC/JBC have reported that the density of the brine pumped from pond C-7 is 1.3478 grams per cubic centimeter (g/cm^3) and the weighted average of the bromide ion concentration of the feedbrine from pond C-7 is 8,890 ppm, based on actual operational records provided by JBC; thus, approximately 0.97 MMt per year of bromine ion are pumped into the channel that feeds to JBC and MMC. The JBC plant's processing capacity at 16.7 MMt per year represents only a fraction of the feed tonnage available and, therefore, both operations have sufficient capacity for brine processing.

Table 12-1 provides JBC (Area 1 and Petra Bromine Plants) Brine Processing and Bromine Production Records (2020-2022).

Table 12-1: Jordan Bromine Company (Area 1 and Petra) Brine Processing and Bromine Production Records (2019-2021)

Data (Unit)	Area 1	Petra	Total
	Feedbrine Flow (tonnes)		
Total (2020-2022)	24,861,839.66	19,904,118.36	44,765,958.02
Annual Average	**8,287,279.89**	**6,634,706.12**	**14,921,986.01**
	Br2 Product (tonnes)		
Total (2020-2022)	189,743	157,856	347,599
Annual Average	**63,247.67**	**52,618.67**	**115,866.33**

In 2020, the plants jointly received approximately 14.70 MMt of brine, producing a total of 112,758 tonnes of bromine. In 2021, the plants received a total of 14.55 MMt of brine and produced 115,164 tonnes of bromine and in 2022 the total feed was approximately 15.21 MMt of feedbrine and the reported bromine production was 119,677 tonnes. The annual bromine production during the period 2020-2022 was 115,866 tonnes per year.

The original production forecast prepared by JBC assumes a slight improvement in the combined production capacity of the bromine plants, to reach a target of annual production of 123,000 tonnes per year in 2025. The QP has assumed and believes it is reasonable that the 2025 production capacity can be maintained through 2058. The overall average production for the time period of 2022 through 2058 is 132,000 tonnes per year of elemental bromine.

The considered sales price ranges between USD 3,560 and USD 6,480 per tonne and the operating cost ranges between USD 341 and USD 529 per tonne, as detailed in Section 18 of this report.

The cut-off grade of the Albemarle bromine operations has been estimated to be at 1,000 ppm. The bromide ion concentration in the brine extracted from pond C-7, which feeds the bromine plants, significantly exceeds the selected cut-off grade.

The reserves are constrained by plant capacity and the duration of the concession. *Consequently, as of December 2022, an estimated 17.18 MMt of brine proven reserves with an average grade of 7,765 ppm, and a cut-off grade of 1,000 ppm are controlled and will be processed by JBC. This is equivalent to 4.75 MMt of contained elemental bromine. The proven reserves attributable to Albemarle's 50% interest in its JBC joint venture are estimated to be approximately 2.38 MMt of elemental bromine*. This reserve estimate represents only a fraction of the total resource contained in the Dead Sea and accessible by APC/JBC and therefore, the estimate provides reasonable assurance that the project will not be affected by shortages of raw material over its life.

Being a mature project with significant historical production information, the reliability of the modifying factors for JBC are considerably high and therefore the risks associated with those modifying factors are relatively low.

The reported reserves slightly differ from the values presented in the 2021 TRS because the end date of the forecast of this project (2058) has remained unchanged. One year of production and the evaporation in the Dead Sea during that year are also factors that impacted in the figures.

It is the QP's opinion that the material factors that could cause actual results to differ materially from the conclusions, estimates, designs, forecasts or projections, including recovery factors, processing assumptions, cut off grades, etc., are well understood and, due to the nature of the deposit and the established extraction and processing operations, they are unlikely to significantly impact the mineral reserve estimates.

13 MINING METHOD

The mining method described summarizes the necessary activities to extract water from the Dead Sea and extract Bromine.

13.1 Brine Extraction Method

The chemical contents of the Dead Sea's brine (average density of 1.24 grams per cubic centimeter [g/cc]) hold a unique collection of salt minerals such as sodium chloride, potassium chloride, magnesium chloride, calcium chloride, and magnesium bromide. The low rainfall (70 mm per year), low humidity (average 45 percent) and high temperatures in the Dead Sea area provide ideal conditions for recovering potash from the brine by solar evaporation. The average concentrations of the ions (grams per liter [g/l]) in the Dead Sea are provided in Table 13-1.

Table 13-1: Ion Concentration in Dead Sea Water [31]

Ions	Concentration (g/l)
Cations	
Sodium (Na^+)	39
Magnesium (Mg^{2+})	39.2
Calcium (Ca^{2+})	17
Potassium (K^+)	7
Anions	
Chloride (Cl^-)	208
Bromide (Br^-)	5
Sulfate (SO_4^{2-})	0.5
Total	**315.7**

JBC obtains feedbrine from APC's pond C-7 (i.e., carnallite pond) and this supply is intimately linked to APC's operations.

The principle of APC's process is that as evaporation takes place, the specific gravity of the brine increases until the constituent salts crystallize and progressively begin to precipitate. The brine concentrates in the initial evaporation pond (also known as a salt pan) until reaching a specific gravity of 1.26, when the sodium chloride (common salt) crystallizes and precipitates to the bottom of the pond at the rate of approximately 250 mm per year thickness in a pond with a brine depth of 1 to 2 m.

The brine is then transferred to other ponds (pre-carnallite ponds) where specific gravity is increased gradually to 1.31, and most of the sodium chloride has been removed through precipitation. At the specific gravity of 1.31, carnallite begins to crystallize and precipitate at the rate of approximately 400 mm/year, which takes place in pond C 7. The carnallite is then harvested by wet dredging from the pond bottom, and the dredged salts are pumped in a slurry to a processing plant where the potassium chloride is separated from the magnesium chloride.

The process through the evaporation ponds is continuous and a part of the final effluent from the carnallite ponds is sent to the JBC and MMC plants. The other part of the effluent is returned to the Dead Sea. A schematic illustration of the process sequence is provided in Figure 13.1.

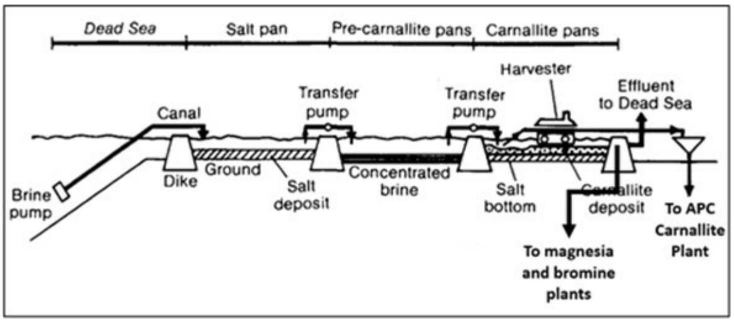

Figure 13.1: Process Sequence Schematic.

The capacity of potash production is largely determined by the extent of the flat areas available for forming evaporation ponds. The Dead Sea, which provides the sources of the chemicals, is in two areas: northern and southern basins.

The total area of the evaporation ponds was determined from the shape and gradient of the flat southern basin. The layout of the schematic within this area was determined by the process design, location of the brine source, harvesting limitations, and the need to route the effluent and flood water safely from the surrounding hills to the Dead Sea.

A 500-m-wide flood channel has been built between the western perimeter dike of the project and the adjacent Dead Sea Works dike in Israel to permit 1,000-year probability floods, calculated to be 2,900 cubic meters per second (m3/s) to be routed to the Dead Sea without damaging the potash works. The solar evaporation system is shown in Figure 13.2.

The Dead Sea brine pumping station has an installed capacity of 16,000 m^3 per hour per pump. The station is equipped with four pumps. Maximum annual capacity is 140.16 MCM per pump which based on operation at 80 percent availability and 75 percent utilization provides a brine volume of 336.4 MCM per year supply capacity to the APC facilities. This capacity is supported by the actual pumping records supplied by JBC and reviewed by the QP.

The brine that feeds the bromine and magnesium plants is extracted from pond C-7 through a pumping station with a capacity of approximately 84.1 MCM per year. The location of the Pond C-7 pumping station is shown in Figure 13.5.

13.2 New Pumping Station

APC intends to build a New Main Brine Intake Pumping Station at the southern end of the Dead Sea approximately 35 km north of the APC plant located at Ghor Al-Safi, 130 km South of Amman. This new Pumping Station (PS4) will replace the existing Pumping Station 3 (PS3). Figure 13.3 shows the location of brine pumping stations including former Pump Stations 1 and 2. Figure 13.4 depicts the existing PS3 and proposed location of PS4 pumping stations.

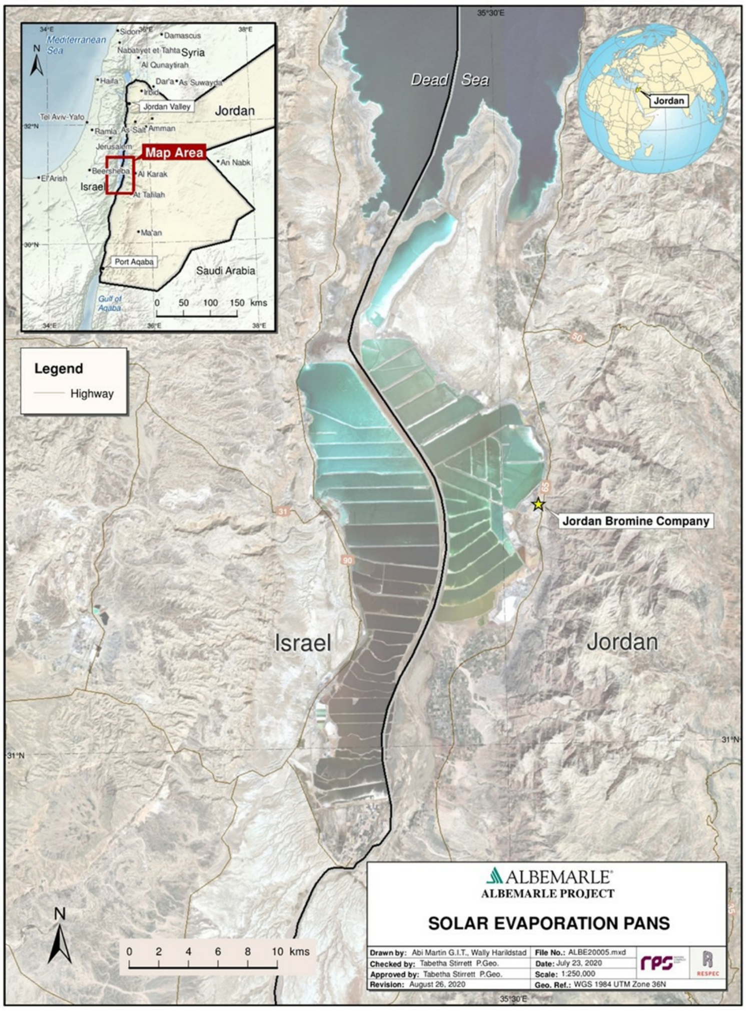

Figure 13.2: Solar Evaporation and Production Plant Map.

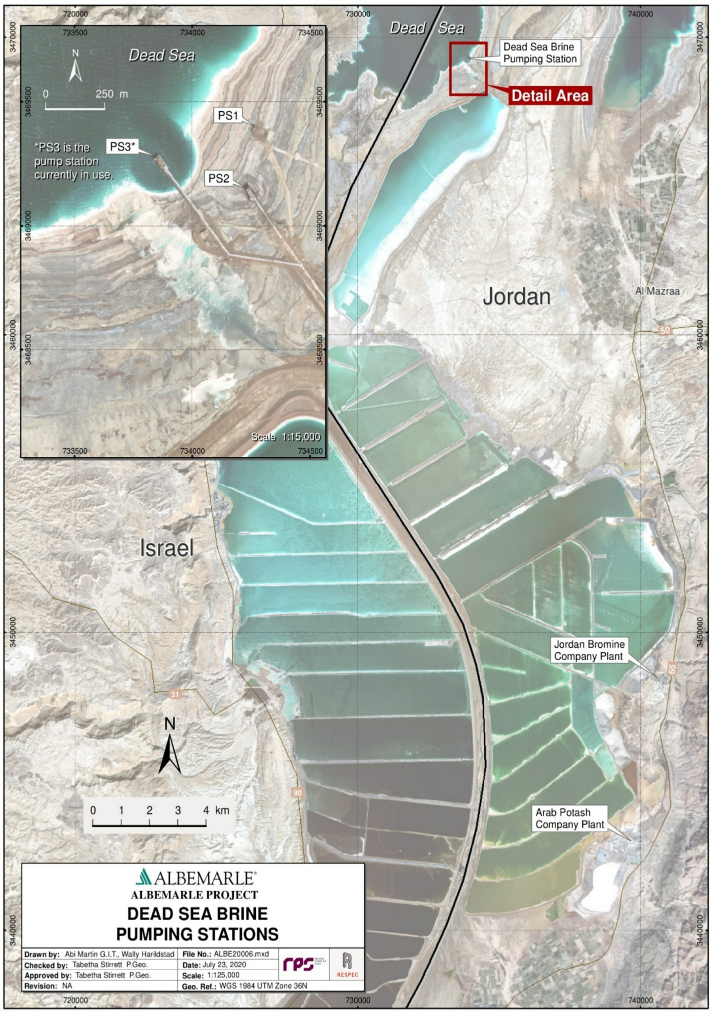

Figure 13.3: Location of the Dead Sea Brine Pumping Station Relative to the APC and JBC Plants.

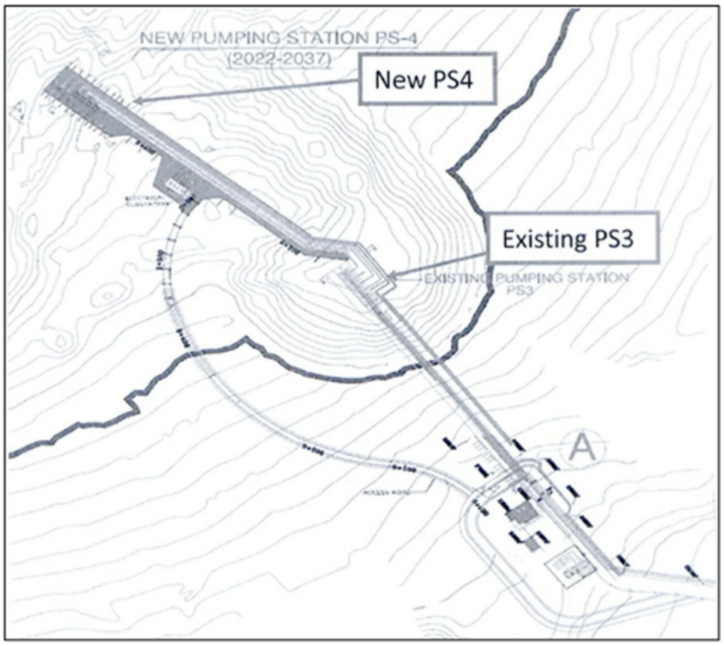

Figure 13.4: Proposed Location for the New Pumping Station Relative to the Existing Pumping Station PS3.

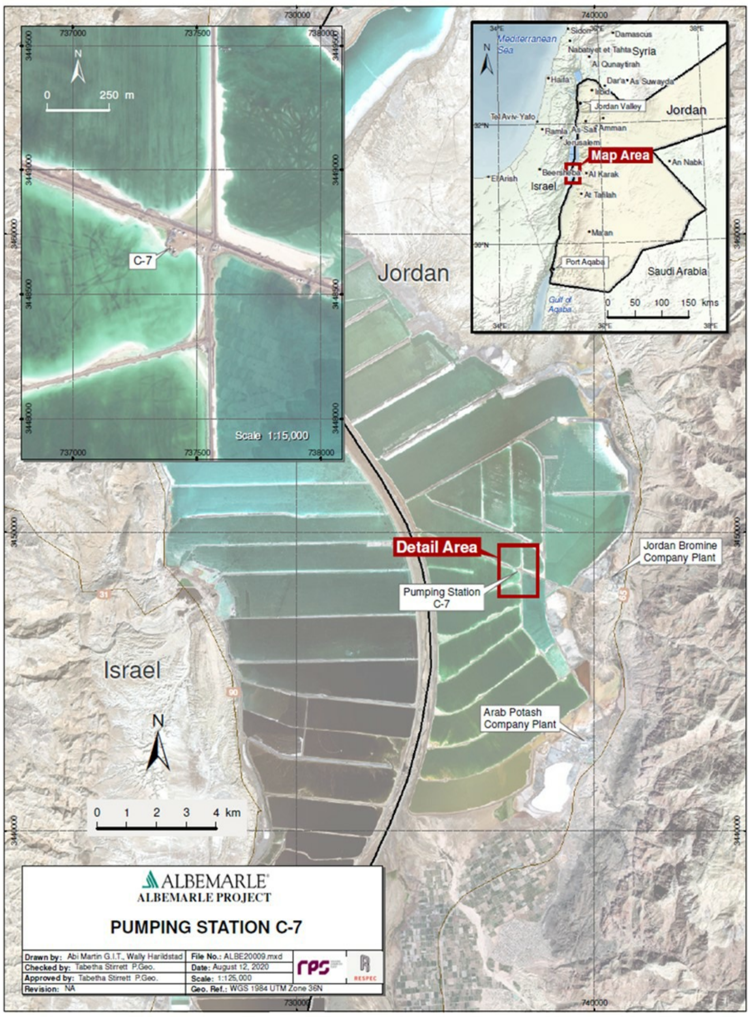

Figure 13.5: Pond C-7 Feedbrine Pumping Station (for Bromine and Magnesium Plants).

13.3 Life of Mine Production Schedule

The following table summarizes the life of mine production schedule of the project.

Table 13-2: Life of Mine Production schedule

LIFE OF MINE PRODUCTION SCHEDULE

COMPANY: Albemarle Corporation
OPERATOR: Albemarle Corporation
FIELD: JBC (Jordan)
WORKING INTEREST: 100.0%

EFFECTIVE DATE OF ANALYSIS: 12/31/2022

RESERVES		Total Field		Company Share	
		Gross	Net	Gross	Net
Bromine	(k Tonnes)	4,772	4,772	4,772	4,772

FULL FIELD GROSS PRODUCTION													
Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Bromine Production	(k Tonne)	121	129	133	133	133	133	133	133	133	133	3,458	4,772

14 PROCESSING AND RECOVERY METHODS

JBC receives feedbrine from APC's pond C-7. The feedbrine is conveyed to the Area 1 and Petra bromine plants within the JBC facility through an open channel. Elemental bromine is produced at the JBC plants through a series of chemical processes described in this chapter.

14.1 Mineral Recovery Process Walkthrough

Brine from pond C-7 at APC is pumped to two, parallel bromine production trains for Area 1 and Petra with no major differences in the equipment or brine throughput of either; therefore, the Area 1 train will be described. The Petra train is essentially a duplicate of the Area 1 mineral recovery train, which is displayed in Figure 14.1

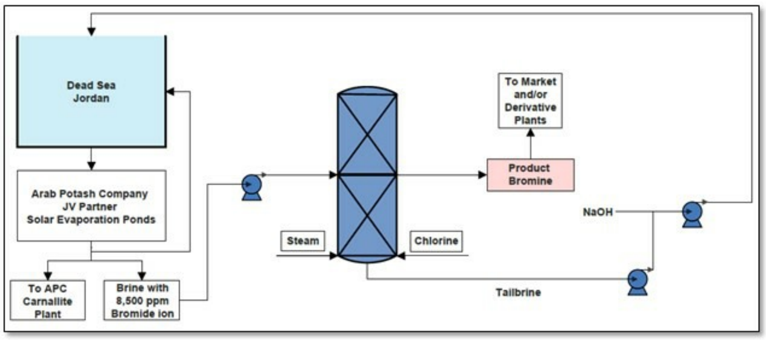

Figure 14.1: Area 1 and Petra Mineral Recovery Trains.

The brine is fed to a bank that consists of a static mixer and a heat exchanger. Different chlorine sources are used to feed both bromine plants, one which derives in a vaporized state from isotanks to the Petra plant and the other provided from an on-site Chlor-Alkali plant to the Area 1 bromine plant. Chlorine is fed before the heat exchanger and uses steam to continue to heat the brine/chlorine mixture. The mixture is then fed to the static mixer. The chlorine feed in this part of the process is designed to react a significant portion of the bromine in the feed as well as continue to heat the brine/chlorine/bromine stream before it reaches the bromine distillation tower. The combined brine stream, after the chlorine addition and mixing, enters the bromine distillation tower at approximately 120°C.

The brine enters the tower through the top and is fed to a distributor tray and then fed downwards. The brine mixes with the bromine vapor exiting the recovery section and the bromine saturates the incoming scrubber brine. Bromine that is not absorbed through the scrubber brine exits the tower toward the downstream separation and purification. The bromine-saturated scrubber brine re-enters the recovery section where the bromine vapor is revaporized for continued removal.

The bromide-depleted brine (i.e., tailbrine) exits out of the bromine distillation tower through the bottom and is fed to two pumps.

The tailbrine is mixed with a strong base to neutralize any remaining acid, bromine, or chlorine. The neutralized tailbrine is then pumped to a storage pond for cooling and eventual “discharge” into the Truce Canal that is recycled back to the APC processing plant.

The vaporized bromine exits the bromine distillation tower with a significant amount of water. This vapor stream is sent to a titanium heat exchanger that condenses the bromine and water vapor to liquid vapor using cooling water on the shell side. Any non-condensed acid or bromine vapors from the heat exchanger are sent to a scrubbing unit. A small stream of feedbrine is fed to the top of the scrubber to absorb any gaseous acid or bromine from the condenser and then recycled back to the tower.

The wet bromine is fed to a glass-lined crude bromine storage drum that acts as an intermediate hold-up before downstream purification.

The tailbrine stream, after stripped of bromine, is cooled and the pH is neutralized with caustic soda before discharging the brine to the Truce Canal. The tailbrine flow rate from the combined plants, Area 1 and Petra, is estimated to be approximately 1,700 m^3 per hour, as reported by JBC.

15 INFRASTRUCTURE

15.1 Roads and Rail

JBC is approximately 130 km south-southwest from Amman, and 40 km from the city of Al-Karak. The Jordan Valley Highway/Route 65 is a major highway that runs from the northwest region of Jordan, from North Shuna, along the western edge of Jordan and south to Aqaba and the Port of Aqaba. This highway is the primary access method for supplies and personnel to JBC. The Port of Aqaba is the main entry point for supplies and equipment for JBC, where shipping containers imported on ships are offloaded to trucks and transported to JBC by the Jordan Valley Highway/Route 65. Aqaba is approximately 205 km south of JBC. Major international airports can be readily accessed either at Amman or Aqaba.

Jordan's railway transport line is operated by the Hijazi Jordan Railway and the Aqaba Railway Corporation (Al Rawabi Environment & Energy Consultancies). The line runs north-south through Jordan and is not used to transport JBC employees and/or product.

15.2 Port Facilities

Jordan Bromine Company ships caustic potash (KOH), NaBr, and CaBr in bulk through a storage terminal in Aqaba. The terminal has storage tanks as well as pumps and piping for loading these products onto ships. JBC is using two sites at Aqaba:

- Aqaba Port
- JBC Terminal: A storage site in the free zone industrial area, to the west of Aqaba Power Station, approximately 1.5 km east of the Oil Terminal. Liquid products are stored at this site before they are exported through the Oil Terminal.

JBC's main activities at Aqaba are raw material/product storing, importing, and exporting. Materials that JBC handles at Aqaba Port and JBC's Terminal sites are shown in Table 15-1 and Table 15-2, respectively.

Table 15-1: Materials Handled by JBC at Aqaba Port and JBC Terminal

Material	Status
Hydrogen peroxide solution (50%)	Importing
Ethyl Alcohol (96%)	Importing
BPA (Bisphenol A) – powder	Importing
Bromine	Exporting
Hydrobromic Acid solution (48%)	Exporting
Ethyl Bromide	Exporting
TBBPA (Tetrabromo Bisphenol A) – powder	Exporting

JBC Terminal contains storage tanks and pumps for receiving and unloading products (calcium bromine [$CaBr_2$], NaBr, KOH 50 percent, and NaOH 50 percent) from the Ghor Al-Safi site. The products are sent and received to/from the JBC Terminal and Ghor Al-Safi sites using road tankers (i.e., trucks) and iso-tanks. The operation is controlled by the JBC Terminal supervisor in addition to four operators. The JBC Terminal site consists of aboveground tanks sitting on reinforced concrete bases. A water storage tank is also used for flushing the pipes that are used for loading ocean going vessels and for all water needs on the site.

Table 15-2: Materials Stored at Jordan Bromine Company Terminal

Material	Status
Calcium Bromide solution (55%)	Storage and Exporting
Sodium Bromide solution (45%)	Storage and Exporting
Potassium Hydroxide solution (50%)	Storage and Exporting
Sodium Hydroxide solution (50%)	Storage and Exporting

Nitrogen storage and vaporizer provides for the blanketing of each of the product storage tanks to maintain the products specifications and prevent absorbing carbon dioxide (CO_2) from the atmosphere that will lead to formation of carbonates and affect the pH of the product. The nitrogen is also used for purging the shipping lines after loading.

The products stored at the JBC Terminal are sold to external customers directly and transported by ocean-going vessels. When a vessel is loaded, two transfer lines (950 m long each) that extend from the JBC Terminal toward the Oil Terminal are used to deliver the product through hoses that are extended from the end of the lines at the terminal to the vessel.

After loading the vessel, the lines and hoses are flushed with water and then nitrogen is used to purge the hoses and loading pipelines. A nitrogen blanket is sometimes needed for vessels that are made of stainless steel when the loaded materials are $CaBr_2$ or NaBr.

All safety standards followed in the Aqaba site are the same as those followed at the Ghor Al-Safi site as per safety procedures. These safety standards follow the same company policy and targets. Personal protective equipment (PPE) is worn by all employees at the sites.

An evaporation pond collects the waste streams from pipe flushing, housekeeping, and other activities and is operated on the basis of natural evaporation with zero discharge coming from the pond. The estimated waste streams resulting from the plant’s housekeeping and flushing of loading lines are approximately 120 (m^3 per month). The evaporation pond capacity is approximately 1,800 m^3 and is lined to protect the groundwater against infiltration and fenced to prevent trespassers.

The collected deposits (salts) from the pond are periodically removed and disposed of in a proper landfilI in full compliance with ASEZA environmental directorate.

15.3 Plant Facilities

Infrastructure and facilities to support the operation of the bromine production plant at the Ghor Al-Safi site is contained in an approximately 33-ha area.

15.3.1 Water Supply

Fresh water is supplied from the Mujib River, a river that originates from the Mujib Reservoir, which is a man-made reservoir created in 1987 by the Royal Society for the Conservation of Nature. The Mujib River flows west through the Wadi Mujib Canyon and into the Dead Sea. Approximately 1.0 to 1.2 million cubic meters of water is used annually.

JBC has a contract for the water rights to the Mujib Reservoir, which is for the right to access 1.8 million m^3 of water per year. The water from the Mujib Reservoir is processed through a series of filtration units before being stored in a 250 m^3, carbon-steel tank. From this tank, the water is distributed to the various downstream users including cooling water, potable water, and reverse osmosis water.

15.3.2 Power Supply

Electricity is generated through the NEPCO and distributed directly to JBC by EDCO, a company owned and operated by Kingdom Electricity Company. Kingdom Electricity Company is one of the preeminent holding companies in Jordan that invests in energy generation and distribution companies/utilities.

The site load is below principal tariff level (< 22 MW). There are six substations on-site that are equipped with ABB switchgear and MCCs. The main transformer is a 33 kilovolt (KV)/11KV with 10.0/12.5 megavolt amperes (MVA) ONAN/ONAF rating. Nine additional stepdown transformers of different ratings provide site power at 420 volts (V). Concerning stability and outages by NEPCO/EDCO, most outages noted just voltage dips or spikes that trip the plant breaker and happen for a few seconds during winter.

Electrical blackout occurred on May 21, 2021. This blackout was the first one since 2003. Electrical infrastructure has improved significantly, but there are still some risks prevalent.

15.3.3 Brine Supply

Brine is supplied to the JBC plant area by pipeline from APC's pond C-7. Vertical pumps extract brine from pond C-7 with additional centrifugal pumps feeding the brine to the JBC plant site. Centrifugal pumps return the tailbrine from the bromine recovery tower to the Truce Canal through pipeline.

15.3.4 Waste-Steam Management

Downstream from the heat exchanger bank, the tailbrine is mixed with caustic soda to neutralize any remaining acid, bromine, or chlorine. The tail brine stream is neutralized by caustic soda before being discharged to the Truce Canal and then finally to the Dead Sea.

16 MARKET STUDIES

16.1 Bromine Market Overview

As reported by Technavio [2021][32], a market research company, the global bromine market is expected to grow steadily at a Compound Annual Growth Rate (CAGR) of around 4.02 percent during 2022-2027 the bromine market has the potential to grow by USD 964.37 million. One major reason for this trend is the increased demand for plastics. Flame-retardant chemicals use bromine to develop fire resistance. Plastics are widely used in packaging, construction, electrical and electronics items, automotive, and many other industries. The increasing demand for plastics across various end-user industries is driving the demand for flame-retardant chemicals that in turn, will propel the bromine market.

Another trend that is responsible for a growing bromine market forecast is the growth in bromine and bromine derivatives used as mercury-reducing agents. Bromine derivatives are used in reducing mercury emissions from coal combustion in coal-fired power plants. Mercury emissions in the environment is a major concern for public health. The rising health concern along with stringent government regulations may increase global bromine market demand. Technavio [2021][32] also reports that the markets for specialty chemicals such as fluorochemicals and pyridine are expected to grow at a CAGR of around 5 to 7 percent during 2021-2025. The increased use of specialty chemicals in various end-use industries such as oil and gas, automobile, pharmaceuticals, and construction will also drive the demand for bromine.

16.2 Major Producers

The major producers of elemental bromine in the world are Israel, Jordan, China, and the United States, as shown in Table 16-1. The bromine production from the United States is withheld to avoid disclosing company proprietary data. The world total values exclude the bromine produced in the United States.

Table 16-1: Bromine Production in Metric Tons by Leading Countries (2016-2021) [33]

Country	2016 (MMt)	2017 (MMt)	2018 (MMt)	2019 (MMt)	2020 (MMt)	2021[(e)]
Israel	162,000	180,000	175,000	180,000	170,000	180,000
Jordan	100,000	100,000	100,000	150,000	84,000	110,000
China	57,600	81,700	60,000	64,000	70,000	75,000
Japan	20,000	20,000	20,000	20,000	20,000	20,000
Ukraine	3,500	4,900	4,500	4,500	4,500	4,500
India	1,700	1,700	2,300	10,000	3,300	3,000
Turkmenistan	500	—	—	—	—	—
United States	W	W	W	W	W	W
World Total (Rounded)	**345,000**	**388,000**	**362,000**	**429,000**	**352,000**	**390,000**

(e) estimated
W = withheld.

The prominent players in the global bromine market are Israel Chemicals Limited (Israel), Albemarle Corporation (United States), Chemtura Corporation (United States), Tosoh Corporation (Japan),

Tata Chemicals Limited (India), Gulf Resources Inc. (China), TETRA Technologies, Inc. (United States), Hindustan Salts Limited (India), Honeywell International Inc. (United States), and Perekop Bromine (Republic of Crimea). The production from the major global bromine producers is also provided in Table 16-1.

16.3 Major Markets

The global bromine market is dominated by manufacturers who have an extensive geographical presence with massive production facilities, all around the world. Competition among the major players is mostly based on technological innovation, price, and product quality.

According to a report by Market Research Future [2020][34], which forecasts the global bromine market until 2023, the market is divided into five regions: Latin America, the Middle East and Africa, Asia Pacific, North America, and Europe. Among these, Market Research Future [2020][34] predicts that Asia would be the fastest-growing region for bromine consumption because of a growing population and increasing purchasing power in the developing nations. The growth of agriculture and automobile industries in countries such as China and India will also drive the increasing demand for bromine. North America will remain a dominant market, and developed industries such as cosmetics, automobile, and pharmaceuticals will affect the demand for bromine. The European region is expected to experience a moderate growth that will be driven by the cosmetic and automobile industries. The growing oil-and-gas drilling activities in Russia will also contribute to the growth of the bromine market.

16.4 Bromine Price Trend

The price of bromine gradually increased during the period 2014-2021. The price in January 2014 was approximately $2,800 per tonne and in January 2021 it had increased to approximately $5,200 per tonne.

In 2021, the price of bromine significantly increased, reaching a peak of $10,700 per tonne in November. The bromine spot price on the effective date of this report, December 31, 2022, was US$ 6,480 per tonne and the overall trend is towards a progressive decrease.

The above-described behavior of the market is the product of a combination of factors, including China's decrease in bromine production from brine due to the country's electricity curtailment policy.

Because the market for bromine is expected to grow and oversupply is not foreseen, the price of bromine is expected to stay strong in the near future.

Figure 16.1 illustrates the behavior of bromine prices in the period January 2014-December 2022.

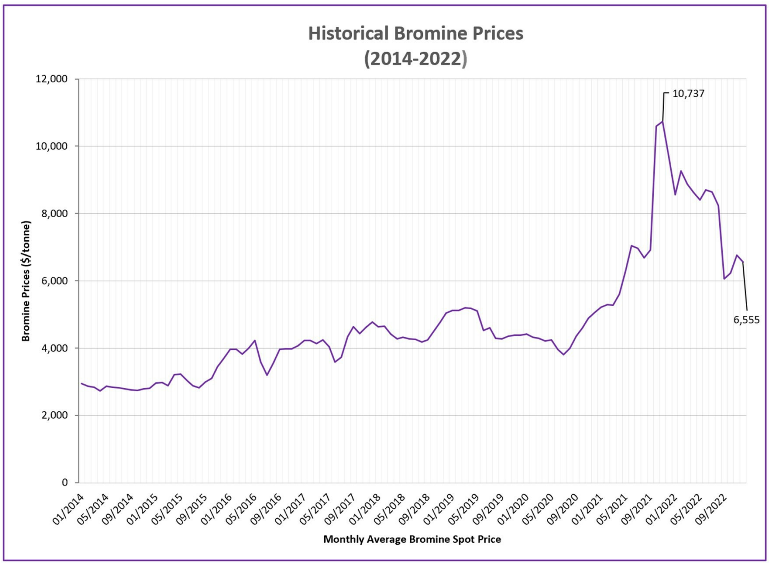

Figure 16.1: Bromine Price Trend as per China Petroleum and Chemical Industry Federation (Price is in US$)[35]

16.5 Bromine Applications

JBC produces a variety of substances from bromine (www.jordanbromine.com). The specific derivatives produced are not discussed in detail in this technical report for proprietary reasons. The following list illustrate the ways that elemental bromine or bromine derivatives are used in a variety of products:

- **Flame Retardants:** Bromine is very efficient as a constituent element when used in producing flame retardants; therefore, only a small amount is needed to achieve fire resistance.
- **Biocides:** Bromine reacts with other substances in water to form bromine-containing substances that are disinfectants and odorless.
- **Pharmaceuticals:** Bromide ions have the ability to decrease the sensitivity of the central nervous system, which makes them effective for use as sedatives, anti-epileptics, and tranquillizers.
- **Mercury Emission Reduction:** Bromine-based products are used to reduce mercury emissions from coal-fired power plants.
- **Energy Storage:** Bromine-based storage technologies are a highly efficient and cost-effective electro-chemical energy storage solution that provides a range of options to successfully

manage energy from renewable sources, minimize energy loss, reduce overall energy use and cost, and safeguard supply.

- **Water Treatment:** Bromine-based products are ideal solutions for water-treatment applications because of bromine's ability to kill harmful contaminants.
- **Oil-Drilling Fluids:** Bromine is used in clear brines to increase the efficiency and productivity of oil-and-gas wells.

17 ENVIRONMENTAL STUDIES, PERMITTING AND PLANS, NEGOTIATIONS, OR AGREEMENTS WITH LOCAL INDIVIDUALS OR GROUPS

17.1 Environmental Studies

JBC has conducted environmental impact studies in compliance with Jordanian regulations. The environmental impact studies are accessible through the Multilateral Investment Guarantee Agency (MIGA) website (www.miga.org) and are part of the public domain.

For the recent JBC capacity expansion, including the construction of the Petra Bromine plant and the Aqaba storage zone, JBC prepared environmental studies under international standards as part of the process to obtain financing from multilateral entities such as MIGA, which is a member of the World Bank Group.

These studies evaluated all key environmental aspects such as air quality, noise levels, water resources, biodiversity, socioeconomic conditions, archaeology, and traffic studies.

17.2 Environmental Compliance

17.2.1 Compliance With National Standards

JBC complies with national regulations including the Environment Protection Law (No. 52/2006), Public Health Law (No. 47/2008), Civil Defense Law (No. 18/1999) and Labor Law (No. 8/1996). JBC also meets or exceeds the Occupational Safety and Health Administration (OSHA) and National Fire Protection (NFPA) international regulations.

17.2.2 Compliance With International Standards

JBC is the first company of its kind in Jordan to become an authorized exporter to Europe and has been certified for International Organization of Standards (ISO) 9001, ISO14001 and the Voluntary Emissions Control Action Program (VECAP). The VECAP is a global chemical management program based on a Code of Best Practice for handling and using brominated flame retardants.

JBC's environmental program has been ISO 14001 certified by Lloyd's Register since 2007 and further enhanced through the adoption of the integrated management system for quality (IS0 9001: 2015, OHSASL800L, 2007, ISO/4001:2015) certifications received in 2018. Audits of the environmental program area are conducted on a monthly basis by JBC management, and regular corporate audits are conducted by Albemarle Health, Safety and Environmental staff.

All JBC employees receive awareness training on the primary environmental procedures (e.g., waste management), ISO 14001 procedures, and the VECAP program. JBC's operators are trained and certified to operate equipment that is critical to the environment, such as scrubbers and boilers. All employees handling waste materials are trained and certified on the specific handling procedures.

JBC has implemented multifaceted programs to reduce water consumption. JBC utilizes water recycling, and in 2011 it implemented a program which achieved a 15 percent reduction in freshwater consumption (~ 30 m^3 / hr). JBC's bromine production site in Safi has extensive water management and reduction programs in place and by applying a process heat integration and by operating at higher concentrations in certain process streams, it has managed to reduce the use of freshwater at its cooling towers by 2.6m^3/hr of fresh water.

In 2020, the water reused as part of the wastewater treatment was 77,000m^3, and in 2021 it is estimated to have reached 90,000m^3.

17.2.3 Environmental Monitoring

JBC has programs in place for monitoring noise and emissions to air and water. JBC also has a waste-management program that includes procedures for storage, handling, and disposing municipal, organic-containing, non-hazardous, and hazardous waste. A water-reduction program is also part of JBC's monitoring program.

An industrial hygiene program that is designed to ensure that employees are not harmed by exposure to chemicals or noise also exists, and work area and personal monitoring are conducted annually. JBC has an incident reporting system for reporting and tracking environmental and safety incidents. All incidents, including minor spills and releases, are reported and investigated with corrective actions are tracked in a database and reviewed monthly.

JBC has a HAZMAT team that is trained to respond to chemical spills and releases on company property or elsewhere in Jordan. Emergency response vehicles are equipped with materials used to stop and contain spills, as well as protective equipment for the employees. The company performs annual spill-response training with the Civil Defense Department offices in Safi and Aqaba.

17.3 Requirements and Plans for Waste and Tailings Disposal

Regarding the bromine production activities by JBC, the main waste product is the tailbrines (i.e., concentrated Dead Sea brines that are chemically neutralized before being sent back to the Dead Sea through the Truce Canal). Furthermore, JBC recently started two projects for the reclamation of water from waste streams that will lead to further reduction of the water footprint.

The waste product of the bromine-production process does not represent a hazardous waste and does not require any other treatment or procedure for final disposal.

JBC's waste management program includes procedures for storage, handling and disposal of municipal waste, organic-containing waste, non-hazardous waste, and hazardous waste.

As part of its waste management approach, JBC focuses its efforts to reduce environmental impact by tracking the waste generated at the plants, checking local and global markets for facilities that reuse or recycle the waste produced by JBC and by Implementing measures to reduce the waste generated, especially hazardous waste that is sent to landfill.

17.4 Project Permitting Requirements, The Status of Any Permit Applications

The QP understands that JBC operates in compliance with Jordan's national regulations, such as the Environment Protection Law (No. 52/2006), the Public Health Law (No. 47/2008), the Civil Defense Law (No. 18/1999) and the Labor Law (No. 8/1996).

JBC works closely with the local communities, governmental, and nongovernmental organizations (NGOs) to positively impact and to help communities prosper socially and environmentally. JBC has also established the Caring for Jordan Foundation, which contributes to the well-being of Jordanians by helping them to improve their quality of life through support of sustainable community projects. The activities include providing computer laboratories in schools and supporting several local community organizations.

The project is aligned with the World Bank Group's Country Partnership Strategy for Jordan, which commits to strengthening the country's foundation for sustainable growth with a focus on competitiveness. MIGA's support is also aligned with the agency's efforts to mobilize $1 billion in insurance capacity to support foreign, direct investment into the Middle East and North Africa.

JBC has indicated that it seeks to help raise the quality of life for the communities where it operates for a balance of social development, environmental improvement, and economic development. JBC also provides small grants to various local projects and initiatives.

In 2011, JBC created the Community Advisory Panel (CAP) to enhance communication and cooperation with the local community. The CAP periodically connects community leaders with JBC management and staff to discuss concerns and strategize on local community development, environmental protection measures, educational and health-related development initiatives, and other key areas of JBC's involvement.

17.5 Qualified Person's Opinion

The QP opines that the JBC facility is operating in conformance with high industrial standards and is comparable with other similar facilities worldwide. The high level of compliance of the project is further confirmed by JBC's ISO 9001, 14001 and VECAP certifications.

JBC's robust Corporate Social Responsibility strategy is targeted at supporting sustainable community development projects and creating and funding sustainable social, cultural, and economic initiatives that service to local and national needs. JBC has a 3-year strategy that covers the Karak area, and in particular, particularly the communities of Qasaba, Ghor Al-Safi, and Ghor Mazra'a.

The QP found that the studies carried out by JBC met or exceeded the requirements of local and international industry standards and have been approved by Jordanian regulators. The QP also opines that JBC has effectively implemented its environmental and socioeconomic policies and has fulfilled its responsibilities efficiently.

18 CAPITAL AND OPERATING COSTS

The JBC facility is an active operation in the industrial production of elemental bromine and most of its major capital expenditures have already taken place. The facility has demonstrated its technical and financial feasibility and, therefore, the capital expenditures (CAPEX) and operating expenditures (OPEX) elements that are discussed in this section are directly related to sustaining the current production level through the term of APC's mineral concession (Year 2058).

JBC provided a model with the actual production, sales, and other financial elements that covers the time period from 2017 to 2022 (actuals) and forecasts for 2023 through 2026. After the QP had reviewed the model and assessed its soundness, the 2025 values (e.g., production and sales price) for the time period from 2026 to 2058 were used for the purpose of evaluating this project.

The Albemarle operation is a mature project which has been in commercial production for years. The accuracy of the capital and operating cost estimates used in the technical report are based on best industry practices and detailed historical information from the operation; therefore, they correspond to an AACE International Class 1 Estimate (AACE International Recommended Practice No. 18R-97).

As indicated by AACE, "Class 1 estimates are typically prepared to form a current control estimate to be used as the final control baseline against which all actual costs and resources will now be monitored for variations to the budget, and form a part of the change/variation control program. They may be used to evaluate bid checking, to support vendor/contractor negotiations, or for claim evaluations and dispute resolution."

Typical accuracy ranges for Class 1 estimates are -3% to -10% on the low side, and +3% to +15% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Albemarle's capital and operating cost estimates have an accuracy of -10% to +10%.

18.1 Capital Costs

The capital costs required for producing the bromine proven reserves have been forecasted based on an analysis of the historical plant capital costs, JBC's production plans, JBC's associated capital budget forecast, and QP's projections.

18.1.1 Development Facilities Costs

No further facilities or plant capital have been used in the business plan because JBC intends to keep all of the major components of its industrial facility through the expiration of the concession contract. JBC has, however, included a Brine Extraction CAPEX Allocation of approximately $13.00-$14.40 million in its model.

18.1.2 Plant Maintenance Capital (Working Capital)

Working capital has been forecasted as 23 percent of the implied revenue generated by the sales of elemental bromine. In the model prepared by JBC, the average annual working capital is approximately $213.90-$236.10 million.

18.2 Operating Costs

The operating costs required for producing and processing brine to obtain elemental bromine have been forecast based on JBC's production and operating budget. The total unit-production cost is forecast to be within the range of USD 341 to USD 442 per tonne of elemental bromine.

The following table contains details on Albemarle's annual capital by major components and operating costs by major cost centers. Columns beyond year 2032 have been combined and the values under 2033+ correspond to the sum of the individual figures through year 2058.

Table 18-1: Summary of Operating and Capital Expenses

SUMMARY OF OPERATING AND CAPITAL EXPENSES													
COMPANY: Albemarle Corporation **OPERATOR:** Albemarle Corporation		**CASHFLOW FORECAST CASE:** Real 2023$ **EFFECTIVE DATE OF ANALYSIS:** 12/31/2022								**FIELD:** JBC (Jordan)			
OPERATING AND CAPITAL COSTS **Year**		**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033+**	**Total**
Operating Costs													
Field and Plant Opex	($MM/yr)	53.7	57.2	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	1,558.3	2,122
Abandonment and Reclamation	($MM/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.0	35.0
Total Opex, G&A, Abex	($MM/yr)	53.7	57.2	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	1,593.0	2,176
Capital Costs													
Facilities (40%)	($MM/yr)	5.7	5.2	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	141.8	195
Plant (35%)	($MM/yr)	5.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	124.1	170
Miscellaneous (25%)	($MM/yr)	3.6	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	88.6	122
Total Capital Costs	($MM/yr)	14.3	13.0	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	354.5	487

19 ECONOMIC ANALYSIS

An economic model has been used to forecast cash flow from elemental bromine production and sales to derive a net present value for the bromine reserves. Cash flows have been generated using annual forecasts of production, sales revenues, and operating and capital costs. The salient features of the cash flow model include the following:

- **Elemental Bromine Production:** In the model prepared by JBC, elemental bromine production varies between 112 thousand and 123 thousand tonnes per year between years 2021 and 2025. After 2025, the production remains constant at 123 thousand tonnes per year through the term of the concession contract ending in Year 2058.
- **Average Selling Price:** The economic analysis has been developed for a range of sales prices comprising the spot price as of the effective date of this report, the spot price less 15 percent, 30 percent and 45 percent (between USD 6,480 and USD 3,560 per tonne).
- **Operating Cost:** Estimated between USD 355 and USD 532 per tonne.
- **Minority Interest:** Calculated as 18.20 percent starting in Year 2023 through Year 2058 and is the amount of profit shared with APC; the remaining 82 percent is allocated to Albemarle.
- **Working Capital:** Estimated as 23% of the implied revenue.
- **Brine Extraction CAPEX Allocation:** It fluctuates between USD 13.00 million and USD 14.40 million per year during the period 2022-2058).
- **Initial Date:** January 1, 2023.
- **Final Date:** December 31, 2058.
- **Discount Rate:** 15 percent.
- **Exchange Rate:** 1 JD = 1.41 USD.
- **Cost Basis:** All costs are expressed in constant Q4 2022 US dollars.

For the purposes of the cash flow model and net present value estimates, the QP has selected discrete values for each of the input parameters noted above that are near the mid-point of the ranges.

19.1 Royalties

The concession agreement between the Hashemite Kingdom of Jordan and JBC does not require payment of any royalty.

19.2 Bromine Market and Sales

Bromine produced from the JBC project is marketed and sold as elemental bromine to external clients, as well as to the JBC plants that produce derivative products. The market value of the elemental bromine produced has been determined by the historical record of elemental bromine sales revenues. The Company has supplied the elemental bromine sales revenue data for analysis, and based on analysis of this data, the QP determined that a sales price between USD 5,400 and USD 7,776 per tonne in the period 2023 to 2058 is consistent with historical sales and current market forecasts.

19.3 Income Tax

JBC has advised the QP that JBC is exempted from income tax based on Jordanian legislation.

19.4 Cash Flow Results

The QP has generated cash flow forecasts in real 2023$ terms. The results are summarized in the following tables. Columns beyond year 2032 have been combined and the values under 2033+ correspond to the sum of the individual figures through year 2058.

Table 19-1: Annual Cash Flow Summary – Proved Reserves – Spot Prices

SUMMARY OF BROMINE FIELD RESERVES, PRODUCTION AND CASHFLOW

COMPANY: Albemarle Corporation	**CASHFLOW FORECAST CASE:** Real 2023$	**FIELD:** JBC (Jordan)
OPERATOR: Albemarle Corporation	**PRICE FORECAST:** Spot	**WORKING INTEREST:** 100.0%
	ANNUAL COST INFLATION: 0.0%	**RESERVES CLASS:** Proved
	EFFECTIVE DATE OF ANALYSIS: 12/31/2022	

RESERVES		Total Field Gross	Total Field Net	Company Share Gross	Company Share Net
Bromine	(k Tonnes)	4,891	4,891	4,891	4,891

PRESENT VALUE - COMPANY SHARE (Million US$) Discount Rate:	0%	5%	10%	15%	20%
Gross Revenue	22,668	10,372	6,033	4,107	3,081

PRODUCT PRICES Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+
Bromine	(US$/kg)	$6.48	$6.48	$6.48	$6.48	$6.48	$6.48	$6.48	$6.48	$6.48	$6.48	$6.48

GROSS PRODUCTION Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Brine Feed Flow	(MMt)	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	418.5	574
Feed Grade	(ppm)	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840
Contained Br	(k Tonne)	137	137	137	137	137	137	137	137	137	137	3,700	5,070
Bromine Recovery	(%)	88	94	97	97	97	97	97	97	97	97	97	97
Bromine Production	(k Tonne)	121	129	133	133	133	133	133	133	133	133	3,458	4,772

COMPANY CASHFLOW Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Bromine Gross Sales Revenue	($MM)	784.1	835.9	861.8	861.8	861.8	861.8	861.8	861.8	861.8	861.8	22,407.8	30,923
Production Royalty	($MM)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Operating Costs													
Field and Plant Opex	($MM/yr)	53.7	57.2	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	1,558.3	2,122
Abandonment and Reclamation	($MM/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35	35
Other Government Levies	($MM/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Opex, G&A, Abex	($MM/yr)	53.7	57.2	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	1,593.0	2,176
Operating Cash Income Before Tax	($MM/yr)	730.4	778.7	802.8	802.8	802.8	802.8	802.8	802.8	802.8	802.8	20,814.8	28,747
Capital Costs													
Facilities (40%)	($MM/yr)	5.7	5.2	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	141.8	195
Plant (35%)	($MM/yr)	5.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	124.1	170
Miscellaneous (25%)	($MM/yr)	3.6	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	88.6	122
Total Capital Costs	($MM/yr)	14.3	13.0	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	354.5	487
Minority Interest (18.2%)	($MM/yr)	142.7	152.1	156.9	156.9	156.9	156.9	156.9	156.9	156.9	156.9	4,078.2	5,628
Working Capital	($MM/yr)	3.0	11.9	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21
Cash Flow After Tax	($MM)	570.4	601.6	626.9	632.9	632.9	632.9	632.9	632.9	632.9	632.9	16,382.1	22,611

Table 19-2: Annual Cash Flow Summary – Proved Reserves – Spot Prices less 15%

SUMMARY OF BROMINE FIELD RESERVES, PRODUCTION AND CASHFLOW

COMPANY:	Albemarle Corporation	**CASHFLOW FORECAST CASE:**	Real 2023$	**FIELD:**	JBC (Jordan)
OPERATOR:	Albemarle Corporation	**PRICE FORECAST:**	Spot -15%	**WORKING INTEREST:**	100.0%
		ANNUAL COST INFLATION:	0.0%	**RESERVES CLASS:**	Proved
		EFFECTIVE DATE OF ANALYSIS:	12/31/2022		

RESERVES		Total Field		Company Share	
		Gross	**Net**	**Gross**	**Net**
Bromine	(k Tonnes)	4,772	4,772	4,772	4,772

PRESENT VALUE - COMPANY SHARE (Million US$)					
Discount Rate:	**0%**	**5%**	**10%**	**15%**	**20%**
Gross Revenue	18,879	8,638	5,024	3,420	2,565

PRODUCT PRICES												
Year		**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033+**
Bromine	(US$/kg)	$5.51	$5.51	$5.51	$5.51	$5.51	$5.51	$5.51	$5.51	$5.51	$5.51	$5.51

GROSS PRODUCTION													
Year		**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033+**	**Total**
Brine Feed Flow	(MMt)	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	418.5	574
Feed Grade	(ppm)	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840
Contained Br	(k Tonne)	137	137	137	137	137	137	137	137	137	137	3,700	5,070
Bromine Recovery	(%)	88	94	97	97	97	97	97	97	97	97	97	97
Bromine Production	(k Tonne)	121	129	133	133	133	133	133	133	133	133	3,458	4,772

COMPANY CASHFLOW													
Year		**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033+**	**Total**
Bromine Gross Sales Revenue	($MM)	666.7	710.8	732.8	732.8	732.8	732.8	732.8	732.8	732.8	732.8	19,053.6	26,294
Production Royalty	($MM)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Operating Costs													
Field and Plant Opex	($MM/yr)	53.7	57.2	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	1,558.3	2,141
Abandonment and Reclamation	($MM/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35	35
Total Opex, G&A, Abex	($MM/yr)	53.7	57.2	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	1,593.0	2,176
Operating Cash Income Before Tax	($MM/yr)	613.0	653.6	673.8	673.8	673.8	673.8	673.8	673.8	673.8	673.8	17,460.6	24,118
Capital Costs													
Facilities (40%)	($MM/yr)	5.7	5.2	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	141.8	195
Plant (35%)	($MM/yr)	5.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	124.1	170
Miscellaneous (25%)	($MM/yr)	3.6	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	88.6	122
Total Capital Costs	($MM/yr)	14.3	13.0	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	354.5	487
Minority Interest (18.2%)	($MM/yr)	121.3	129.4	133.4	133.4	133.4	133.4	133.4	133.4	133.4	133.4	3,467.8	4,785
Working Capital	($MM/yr)	2.5	10.1	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18
Cash Flow After Tax	($MM)	474.9	501.0	522.3	527.3	527.3	527.3	527.3	527.3	527.3	527.3	13,638.3	18,828

Table 19-3: Annual Cash Flow Summary – Proved Reserves – Spot Prices less 30%

SUMMARY OF BROMINE FIELD RESERVES, PRODUCTION AND CASHFLOW

COMPANY: Albemarle Corporation	**CASHFLOW FORECAST CASE:** Real 2023$	**FIELD:** JBC (Jordan)
OPERATOR: Albemarle Corporation	**PRICE FORECAST:** Spot -30%	**WORKING INTEREST:** 100.0%
	ANNUAL COST INFLATION: 0.0%	**RESERVES CLASS:** Proved
	EFFECTIVE DATE OF ANALYSIS: 12/31/2022	

RESERVES

		Total Field Gross	Total Field Net	Company Share Gross	Company Share Net
Bromine	(k Tonnes)	4,772	4,772	4,772	4,772

PRESENT VALUE - COMPANY SHARE (Million US$)

Discount Rate:	0%	5%	10%	15%	20%
Gross Revenue	15,090	6,904	4,015	2,733	2,050

PRODUCT PRICES

Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+
Bromine	(US$/kg)	$4.55	$4.55	$4.55	$4.55	$4.55	$4.55	$4.55	$4.55	$4.55	$4.55	$4.55

GROSS PRODUCTION

Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Brine Feed Flow	(MMt)	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	418.5	574
Feed Grade	(ppm)	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840
Contained Br	(k Tonne)	137	137	137	137	137	137	137	137	137	137	3,700	5,070
Bromine Recovery	(%)	88	94	97	97	97	97	97	97	97	97	97	97
Bromine Production	(k Tonne)	121	129	133	133	133	133	133	133	133	133	3,458	4,772

COMPANY CASHFLOW

Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Bromine Gross Sales Revenue	($MM)	550.6	587.0	605.2	605.2	605.2	605.2	605.2	605.2	605.2	605.2	15,733.9	21,713
Production Royalty	($MM)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Operating Costs													
Field and Plant Opex	($MM/yr)	53.7	57.2	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	1,558.3	2,141
Abandonment and Reclamation	($MM/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35	35
Total Opex, G&A, Abex	($MM/yr)	53.7	57.2	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	1,593.0	2,176
Operating Cash Income Before T	($MM/yr)	496.9	529.7	546.2	546.2	546.2	546.2	546.2	546.2	546.2	546.2	14,140.9	19,537
Capital Costs													
Facilities (40%)	($MM/yr)	5.7	5.2	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	141.8	195
Plant (35%)	($MM/yr)	5.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	124.1	170
Miscellaneous (25%)	($MM/yr)	3.6	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	88.6	122
Total Capital Costs	($MM/yr)	14.3	13.0	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	354.5	487
Minority Interest (18.2%)	($MM/yr)	100.2	106.8	110.1	110.1	110.1	110.1	110.1	110.1	110.1	110.1	2,863.6	3,952
Working Capital	($MM/yr)	2.1	8.3	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15
Cash Flow After Tax	($MM)	380.3	401.5	418.7	422.9	422.9	422.9	422.9	422.9	422.9	422.9	10,922.8	15,084

Table 19-4: Annual Cash Flow Summary – Proved Reserves – Spot Prices less 45%

SUMMARY OF BROMINE FIELD RESERVES, PRODUCTION AND CASHFLOW

COMPANY: Albemarle Corporation	**CASHFLOW FORECAST CASE:** Real 2023$	**FIELD:** JBC (Jordan)	
OPERATOR: Albemarle Corporation	**PRICE FORECAST:** Spot -45%	**WORKING INTEREST:** 100.0%	
	ANNUAL COST INFLATION: 0.0%	**RESERVES CLASS:** Proved	
	EFFECTIVE DATE OF ANALYSIS: 12/31/2022		

RESERVES		Total Field		Company Share	
		Gross	Net	Gross	Net
Bromine	(k Tonnes)	4,772	4,772	4,772	4,772

PRESENT VALUE - COMPANY SHARE (Million US$)					
Discount Rate:	0%	5%	10%	15%	20%
Gross Revenue	11,301	5,170	3,006	2,046	1,534

PRODUCT PRICES												
Year		**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033+**
Bromine	(US$/kg)	$3.56	$3.56	$3.56	$3.56	$3.56	$3.56	$3.56	$3.56	$3.56	$3.56	$3.56

GROSS PRODUCTION													
Year		**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033+**	**Total**
Brine Feed Flow	(MMt)	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	418.5	574
Feed Grade	(ppm)	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840	8,840
Contained Br	(k Tonne)	137.0	137.0	137.0	137.0	137.0	137.0	137.0	137.0	137.0	137.0	3,699.5	5,070
Bromine Recovery	(%)	88	94	97	97	97	97	97	97	97	97	97	97
Bromine Production	(k Tonne)	121	129	133	133	133	133	133	133	133	133	3,591	4,905

COMPANY CASHFLOW													
Year		**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033+**	**Total**
Bromine Gross Sales Revenue	($MM)	431.2	459.8	474.0	474.0	474.0	474.0	474.0	474.0	474.0	474.0	12,798.3	17,481
Production Royalty	($MM)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Operating Costs													
Field and Plant Opex	($MM/yr)	53.7	57.2	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	1,558.3	2,141
Abandonment and Reclamation	($MM/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35	35
Total Opex, G&A, Abex	($MM/yr)	53.7	57.2	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	1,593.0	2,176
Operating Cash Income Before T	($MM/yr)	377.6	402.5	415.0	415.0	415.0	415.0	415.0	415.0	415.0	415.0	11,205.3	15,305
Capital Costs													
Facilities (40%)	($MM/yr)	5.7	5.2	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	141.8	195
Plant (35%)	($MM/yr)	5.0	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	124.1	170
Miscellaneous (25%)	($MM/yr)	3.6	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	88.6	122
Total Capital Costs	($MM/yr)	14.3	13.0	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	354.5	487
Minority Interest (18.2%)	($MM/yr)	78.5	83.7	86.3	86.3	86.3	86.3	86.3	86.3	86.3	86.3	2,329.3	3,182
Working Capital	($MM/yr)	1.6	6.6	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11
Cash Flow After Tax	($MM)	283.1	299.3	312.3	315.6	315.6	315.6	315.6	315.6	315.6	315.6	8,521.5	11,626

19.5 Net Present Value Estimate

Based on the above-mentioned cash flow model, the QP has estimated the net present value (NPV) of the project by using a range of discount rates discount rate between 0 and 15 percent, and the results are shown in the following tables.

Table 19-5: Jordan Bromine Company –NPV of Reserves as of December 31, 2022 – Spot Prices

Jordan Bromine Corporation - Bromine Reserves as of December 31, 2022 Spot Price Forecast						
	Mineral Reserves ('000 tonnes)	Net Present Value Before Tax				
		0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)
Proved	4,772	22,668	10,372	6,033	4,107	3,081

Table 19-6: Jordan Bromine Company – NPV of Reserves as of December 31, 2022 – Spot Prices less 15%

Jordan Bromine Corporation - Bromine Reserves as of December 31, 2022 Spot Price Forecast less 15%						
	Mineral Reserves ('000 tonnes)	Net Present Value Before Tax				
		0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)
Proved	4,772	18,879	8,638	5,024	3,420	2,565

Table 19-7: Jordan Bromine Company – NPV of Reserves as of December 31, 2022 – Spot Prices less 30%

Jordan Bromine Corporation - Bromine Reserves as of December 31, 2022 Spot Price Forecast less 30%						
	Mineral Reserves ('000 tonnes)	Net Present Value Before Tax				
		0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)
Proved	4,772	15,090	6,904	4,015	2,733	2,050

Table 19-8: Jordan Bromine Company – NPV of Reserves as of December 31, 2022 – Spot Prices less 45%

Jordan Bromine Corporation - Bromine Reserves as of December 31, 2022 Spot Price Forecast less 45%						
	Mineral Reserves ('000 tonnes)	Net Present Value Before Tax				
		0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)
Proved	4,772	11,301	5,170	3,006	2,046	1,534

Per the NPV estimate analysis, the 15% discounted NPV of the JBC project is estimated to be $2.05 and $4.11. billion as of December 31, 2022, demonstrating that the operations are economic and supporting the estimation of reserves. The following figure shows the full distribution of the NPV range for each price forecast for Proved reserves.

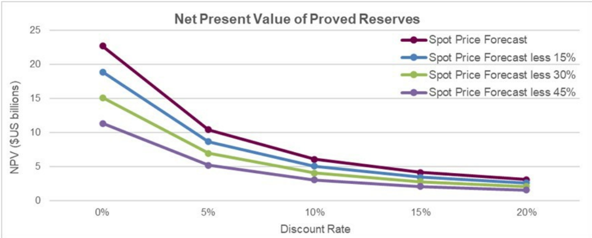

Figure 19.1: Net Present Value Distribution of Proved Reserves by Price Forecast.

20 ADJACENT PROPERTIES

Three properties are adjacent to the JBC plant in the Jordanian territory. The Manaseer Magnesia Company and APC are shown in Figure 20.1. The Israel Chemicals (ICL) Dead Sea Works Limited plant is adjacent and on the west side of the Jordan-Israel border. This plant is similar to the APC and JBC plants in that it produces potash, bromine, and bromine-derivative products.

20.1 Manaseer Magnesia Company

This report has extensively described the APC facilities and this section is a brief description of the Manaseer Magnesia Company property.

Manaseer Group acquired Manaseer Magnesia Company after purchasing the total shares of Jordan Magnesia Company in 2016 for a total of $12.5 million on a cash-free, debt-free basis. With this acquisition, Manaseer Group rehabilitated the plant and officially began operations.

The first phase of the Manaseer Magnesia Company plant operations, located in Ghor Al-Safi, comprised the production of caustic and hydrated lime. Manaseer Magnesia Company announced the commencement of the second phase of its plant operations to produce caustic calcined magnesia (CCM) at a capacity of up to 60,000 tonnes, with ambitious plans to further bolster production capacity in the future.

20.2 Dead Sea Works Limited

ICL is a public company with dual-listed shares on the New York Stock Exchange (NYSE) and Tel Aviv Stock Exchange (TASE) (listed as NYSE:ICL and TASE:ICL). Shareholders include the Israel Corp. (45.93 percent) and the public (54.07 percent).

In 2018, ICL launched its “Business Culture of Leadership” strategy, which focused on enhancing market leadership across ICL’s three core mineral value chains of bromine, potash, and phosphate, as well as realizing the growth potential of innovative agriculture solutions. To better align the organization with this strategy, ICL realigned the company into four business divisions: Industrial Products (Bromine), Potash, Phosphate Solutions, and Innovative Ag Solutions.

ICL’s history began in the early twentieth century with the first efforts to extract minerals from the Dead Sea in Israel’s south. After Israel’s independence in 1948, the activities continued with the establishment of Dead Sea Works Limited, a state-owned company. During the early 1950s, several other government-owned companies were created to extract minerals from the Negev Desert and transform the minerals into chemical products. In 1975, ICL expanded through a consolidation with these companies, including Rotem Amfert Negev, Bromine Compounds, and TAMI (IMI) (ICL’s research arm). ICL also grew through organic growth and acquisitions.

In 1992, the Israeli government began privatization of ICL, first by listing 19 percent of ICL shares on the TASE. In 1995, the State of Israel sold its controlling interest (24.9 percent of ICL’s equity) to Israel Corp., which was then controlled by the Eisenberg family. In 1997, Israel Corp. acquired an additional 17 percent of ICL’s shares with another 10 percent acquired a year later. Also, in 1998, the State of Israel sold 12 percent of ICL’s shares to the general public, as well as 9 percent to Potash Corp.

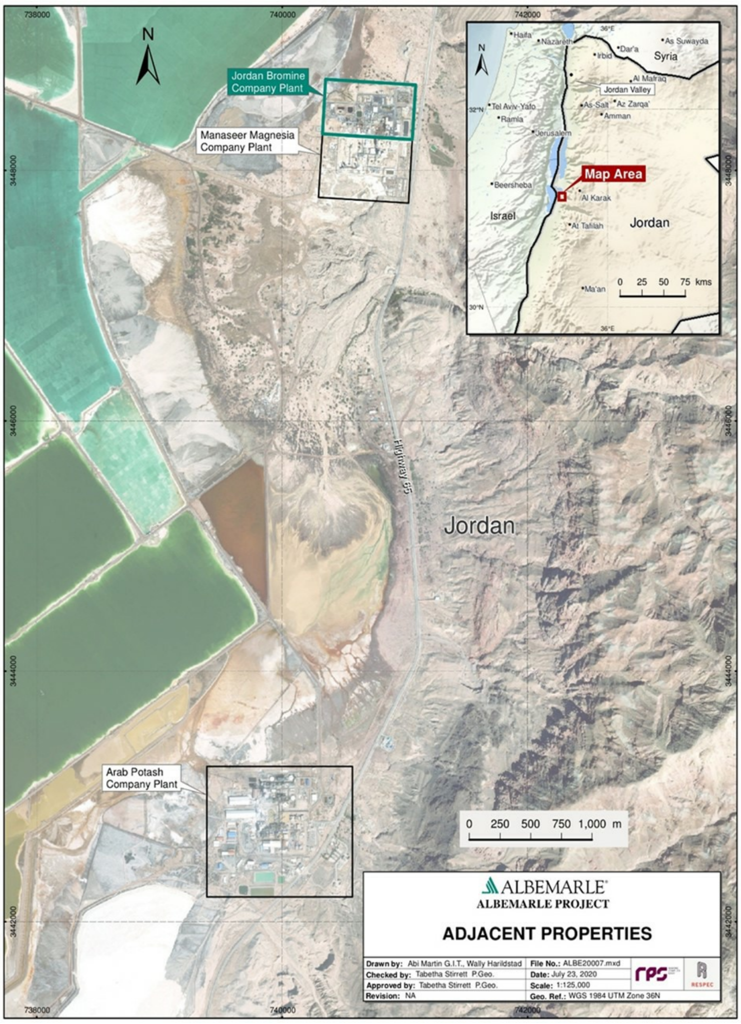

Figure 20.1: The Adjacent Properties of Manaseer Magnesia Company and Arab Potash Company.

In the late 1990s, the Ofer Group acquired control of Israel Corp., including ICL. During the last 15 years, ICL has expanded significantly, primarily by increasing its production capacity and global distribution, establishing regional offices and joint ventures, and through synergistic acquisitions.

In 2018, Potash Corp sold its holdings in ICL. Today, ICL is a global powerhouse in fertilizers and specialty chemicals and fulfills essential needs in three core end markets: agriculture, food, and engineered materials by using an integrated value chain based on specialty minerals.

21 OTHER RELEVANT DATA AND INFORMATION

This section is not applicable at this time.

22 INTERPRETATION AND CONCLUSIONS

22.1 General

- Jordan Bromine Company (JBC) is in the Hashemite Kingdom of Jordan (Jordan), in the Governorate of Karak, and is located on the southeastern edge of the Dead Sea. The JBC production plant facility occupies a 26-hectare (ha) area. It also has a 2-ha storage facility within the free-zone industrial area at the Port of Aqaba.
- In 1958, the Government of the Hashemite Kingdom of Jordan granted Arab Potash Company (APC) a concession for exclusive rights to exploit the minerals and salts from the Dead Sea brine until 2058; at that time, APC factories and installations would become the property of the Government[6]. APC was granted its exclusive mineral rights under the Concession Ratification Law No. 16 of 1958.
- JBC was established in 1999 as a joint venture between Albemarle Holdings Company Limited (a wholly owned subsidiary of Albemarle) and APC. Albemarle holds a 50 percent interest in JBC Limited. JBC's operations primarily consist of the manufacturing of bromine, from which derivative products are made including TBBPA, calcium bromide, sodium bromide, hydrobromic acid, and potassium hydroxide.
- The Joint Venture Agreement guarantees the supply of brine and fresh water for the JBC operations through the life of APC's concession (2058).
- The bromide-enriched brine, used by JBC as its main raw material, is a byproduct of potash operations conducted by APC. JBC's operations primarily consist of the manufacturing of bromine, from which derivative products are made including TBBPA, calcium bromide, sodium bromide, hydrobromic acid, and potassium hydroxide.
- Brine extracted from the Dead Sea by APC is stored in ponds where it evaporates and concentrates until the constituent salts crystallize and progressively begin to precipitate. At the specific gravity of 1.31, carnallite begins to crystallize and precipitate. The carnallite is then harvested by wet dredging from the pond bottom, and the dredged salts are pumped in a slurry to a processing plant where the potassium chloride is separated from the magnesium chloride.
- The process through the evaporation ponds is continuous and a part of the final effluent from the carnallite ponds is sent to the JBC and MMC plants. The other part of the effluent is returned to the Dead Sea.
- The bromide-enriched feedbrine received by JBC is put through an industrial process that includes a chlorination and distillation phases, which accomplishes the separation and recovery of elemental bromine.
- The JBC complex consist of two plants: Area 1 and Petra, which have a combined processing capacity of over 15 million tons of feedbrine per year, and an estimated production capacity in excess of 130 thousand tons of elemental bromine per year.
- An estimated 52.26 percent of the bromide ion resources identified in the Dead Sea are controlled by Jordan (as of the effective date of this report) and, therefore, correspond to APC under the terms of its concession. Consequently, as of December 31, 2022, an estimated 356.68 MMt of bromide ion resources (682.52 MMt ×52.26 percent) controlled by JBC. The measured resources of bromide ion attributable to Albemarle's 50% interest in its JBC joint venture is estimated to be approximately 178.34 MMt. From these large resources, JBC is extracting approximately 1 percent of the bromine available. This estimate includes Reserves.
- The total Bromine reserves controlled by JBC as of 2020 are estimated at approximately 4.75 MMt of bromine (average of 132,500 tonnes/year over 36.0 years). The proven reserves attributable to Albemarle's 50% interest in its JBC joint venture are estimated to be

approximately 2.38 MMt of elemental bromine. This reserve estimate represents only a fraction of the total resource contained in the Dead Sea and accessible by APC/JBC and therefore, the estimate provides reasonable assurance that the project will not be affected by shortages of raw material over its life.

- JBC's location near the APC facilities provides access to power and transportation infrastructure. JBC also operates a terminal at the port of Aqaba through which it imports supplies for its processes and exports elemental bromine and other derivatives.
- The global bromine market is expected to grow steadily at a Compound Annual Growth Rate (CAGR) of around 4.02 percent between 2022 and 2027. The oil-and-gas industry is an important market for bromine derivatives; in particular, the so-called clear brine fluids (e.g., calcium bromide, sodium bromide, and zinc bromide) are used as completion fluids to minimize formation damage and control reservoir formation pressures. Other important markets are cosmetics, automobile, and pharmaceuticals.
- Bromine produced from the JBC project is marketed and sold as elemental bromine to external clients, as well as to the JBC plants that produce derivative products.
- JBC complies with national regulations as well as with the Occupational Safety and Health Administration (OSHA) and National Fire Protection (NFPA) international regulations. JBC is the first company of its kind in Jordan to become an authorized exporter to Europe and has been certified for International Organization of Standards (ISO) 9001, 14001, and the Voluntary Emissions Control Action Program (VECAP).
- JBC's robust Corporate Social Responsibility strategy is targeted at supporting sustainable community development projects and creating and funding sustainable social, cultural, and economic initiatives that service to local and national needs. JBC has effectively implemented its environmental and socioeconomic policies and has fulfilled its responsibilities efficiently.
- The JBC facility is an active operation in the industrial production of elemental bromine and most of its major capital expenditures have already taken place. The facility has demonstrated its technical and financial feasibility and, therefore, the capital expenditures (CAPEX) and operating expenditures (OPEX) elements that are presented in this report are directly related to sustaining the current production level through the term of APC's mineral concession (Year 2058).
- The market value of the elemental bromine produced by JBC has been determined by the historical record of elemental bromine sales revenues.
- Based on the cash flow model presented in Chapter 19, the net present value (NPV) of the project has been estimated by using a discount rate of 15 percent. The NPV of the JBC project is estimated to be between $2.05 billion to $4.11 billion as of December 31, 2022, demonstrating the operations are economic and supporting the estimation of reserves.

22.2 Discussion of Risk

In general, the risks for a large industrial project like JBC in Jordan could be considered moderate, in the opinion of the QP. This opinion is supported by analyses prepared by reputable institutions like the World Bank (www.doingbusiness.org), (Coface (www.coface.com), Societé Generale (https://import-export.societegenerale.fr), the International Labour Organization (www.ilo.org) and others.

The following is a detailed explanation of the major risks related to JBC project:

22.2.1 Geopolitical Risk

The local Jordanian politics should have minimal to no impact on JBC. The plant is at a sufficient distance from Amman; hence, any civil unrest would not impact operations. However, if the Jordanian government so desired, they could gain access to the Dead Sea for a separate bromine production facility. But JBC believes that it has the right of first refusal on this.

Jordan is politically stable, unlike most of its neighbors and it has the political and financial support from the Gulf monarchies and the Western countries. The World Bank projects Jordan's economy to grow by 2.7 percent in 2022.

By the end of 2022 Jordan's economy showed signs of gradual recovery following a moderate contraction of 2.2 percent in 2021. Recovery in economic growth during 2022 has been led by services and industry, yet many subsectors have not yet reached pre-pandemic performance.

The country's current account imbalances continued to widen for another year, particularly through the widening of the trade gap, though strong donor inflows helped Jordan build up its reserves. Jordan's development has historically benefited from international aid as the country has been able to become a central element of stability in the Near and Middle East, ensuring peace on the borders it shares with its neighboring countries. However, it is still vulnerable to international economic conditions and political instability in the Near and Middle East. The continued stability of Jordan hinges on three interrelated factors- its ability to maintain fiscal stability amid economic challenges, preserving relationships with its most important patrons, the US and the Gulf monarchies and mitigating the domestic effects of American or Israeli decisions taken regarding the Palestinians. The regional geopolitical stability is paramount to maintain uninterrupted supply chain and availability of raw materials for the property.

Jordan is one of the most committed countries to financial reforms within the region (privatization, tax reforms, opening of the banking sector, etc.). Jordan has implemented reforms under the terms of the extended fund facility that it negotiated with the International Monetary Fund (IMF) in 2016. The subsequent fiscal consolidation policies brought down the government budget balance to a deficit of 3.2% of GDP in 2019 from 3.6% in 2018. This trend is expected to continue with government balance anticipated to fall to a deficit of 2.9% of GDP by 2020 and 2.4% by 2021. IMF estimates the government debt to be 94.6% of GDP in 2019 and to decrease to 94.1% in 2020 and 92.4% in 2021.

The economic activity of Jordan will continue to be driven by mining and tourism. The latter is a particular focus for the government, which aims to double the 2016 tourist numbers by 2020. As in the past, banking and insurance activities (21% of GDP in 2018) will be growth drivers. Growth will also be fueled by exports (about 19% of GDP in 2018), particularly in the mining sector, following the demonstration of official support at the London Initiative, a conference held to bolster investment in Jordan. The reopening of the Iraqi border (despite security risks) and related trade and investment agreements, lower import costs (oil and food) and quicker-than-expected engagement by domestic companies with the Association Agreement with the EU, should increase economic activity.

Jordan's pro-Western and pro-Gulf stance will remain the cornerstone of foreign policy for security and, increasingly, economic reasons. Jordan's central strategic position should ensure continued logistical, financial, and military assistance from the United States, its main ally, despite differences with US policy in this region. In recent decades, Jordan has managed to navigate a period of regional chaos, maintaining stability through largely cosmetic domestic reforms, with significant financial aid from the US and Saudi Arabia. These patrons have acted as a safety net for Jordan, which lacks the natural resources of many of its neighbours.

In addition to the humanitarian and financial crisis caused by the influx of Syrian refugees, which caused an increase in public spending, Jordan also must deal with a high unemployment rate, that rose further to 16.8% by the end of 2019 (ILOSTAT), a high poverty rate and high levels of inequality. There were numerous popular protests in 2019, including strikes by teachers calling for a 50% increase in salaries, which the government responded to by proposing wage hikes.

A further potential fracture exists between Jordan's citizens of Palestinian descent and its East Bank population. As the Israeli-Palestinian peace process is increasingly seen as dead, Jordan will face mounting pressure from its citizens of Palestinian descent to withdraw from the 1994 Wadi Araba treaty, which made peace between Israel and Jordan. While such a move would surely be popular with a broad section of the Jordanian public, Amman also faces strong incentives to maintain its cooperation. Among these are significant energy and water infrastructure projects on which the two countries have cooperated. Jordan could perhaps find other water and energy sources, but such alternatives may costly and unreliable. The monarchy is further caught between its popular demands and its American allies. The United States remains Amman's most important international partner, and a country as dependent as Jordan is on foreign transfers can ill-afford to jeopardize such relationships.

Jordan's economy showed a healthy recovery following a moderate contraction of 2.2 percent in 2021. The economy then managed to grow to 2.7 percent in Fall 2022.

22.2.2 Environmental Risk

Lower rainfall, increased drought, higher temperatures, and rising sea levels on the Gulf of Aqaba, are just some of the possible results of climate change affecting Jordan. Environmental problems there are further complicated by factors such as garbage disposal and road traffic. Also, the decreasing levels of the Dead Sea may be the single most critical environmental risk for the JBC project.

The scarcity and uneven distribution of precipitation over Jordan results in limited surface and groundwater resources available for domestic consumption and agricultural and industrial uses. Rapid population growth coupled with increased urbanization and industrialization are leading to the over-exploitation of aquifers and the contamination of diminishing supplies through: Inadequate industrial and municipal wastewater treatment capacities; Siting of industrial plants near or immediately upstream from potable supplies; and Overuse and misuse of pesticides, insecticides, fungicides and fertilizers leading to pollution of ground and surface water resources by irrigation drainage.

The Jordanian water shortages are a threat both to development and to the health of the population. Jordan has a multi-faceted difficulty with its lack of available water resources. Over the past decades, there have been extreme changes in climate that have drastically affected Jordan's water supply.

The water balance of the Dead Sea has been disturbed since the late 1950s. The lake has no outlet, and the heavy inflow of fresh water is carried off solely by evaporation, which is rapid in the hot desert climate. Due to large-scale projects by Israel and Jordan to divert water from the Jordan River for irrigation and other water needs, the surface of the Dead Sea has been dropping for at least the past 50 years.

The drop of the sea level increases the pumping and conveyance costs for the potash and bromine operations, due to the required relocation of the pumping facilities. However, these increases in cost are considered in the economic analyses of the operations. It is estimated that the predictable reduction in the level of the Dead Sea will not cause any significant impact on the potash and bromine projects within the APC/JBC mining concession, which will expire in 2058.

22.2.3 Additional Raw Materials Risk

Supply of raw materials have been impacted due to COVID. Certain raw materials such as BPA (Bisphenol A) and chlorine have seen shortages all over the world. JBC is evaluating the prospect of installing a second chlorine plant and talks are ongoing regarding financing, ownership, etc.

Flooding and other natural impediments may also interrupt the supply of raw materials. JBC is working to address some of these concerns.

22.2.4 Other Risk Considerations

Albemarle, the US Joint-Venture partner of JBC mentions in its 2020 Annual Report that it perceives the fact that it is subject to government regulation in the non-U.S. jurisdictions in which it conducts its business as a risk. In the specific case of Jordan, as discussed in this report, the regulatory framework of the country and its favorable business environment, make this potential risk not very likely.

Albemarle indicates that its substantial international operations, like in the case of the JBC Joint Venture, are subject to the typical risks of doing business in a foreign country. As indicated stated by the QP, Jordan is a stable destination for business (both politically and financially). Furthermore, the fact that APC, a state-controlled entity is the JV's local partner, provides further assurance that the operation is shielded from several of the most significant risks listed by Albemarle.

The possibility of terrorist activities that could impact the normal operations of JBC is real and is perhaps one of the greatest risks for any business in the Middle East.

Albemarle also highlighted the fact that the COVID-19 pandemic is having an impact on overall global economic conditions and mentioned that the ultimate impact on its business will depend on the length and severity of the outbreak throughout the world.

Albemarle indicated that it believes that it has sufficient inventory to continue producing at current levels, however, government mandated shutdowns could impact its ability to acquire additional materials and disrupt its customers' purchases. Specifically on the bromine business, Albemarle explained that it expected both net sales and profitability to be modestly higher in 2021 than they were in 2020.

The summary presented in Table 22-1 are the QP's opinion on the risks as highlighted by Albemarle:

Table 22-1: Project Risks

Risk	Level of Risk to the JBC Project
Material adverse effect of the COVID-19 pandemic on the company's results of operations, financial position, and cash flows.	This is a risk that affects industries worldwide. JBC has not reported any material impact on its liquidity. The length and severity of the pandemic may become a risk in the long run; however, Albemarle/JBC have kept their financial flexibility during the pandemic by adopting adequate managerial and financial measures, including the implementation of a cross-functional Global Response Team, to assess the situation and take necessary actions to address employee health and safety and operational challenges.
Fluctuations in foreign currency exchange rates may affect product demand and may adversely affect the profitability in U.S. dollars of products and services we provide in international markets where payment for our products and services is made in the local currency.	This is a risk on the buyers' side of the business and not inherent to the JBC operation. Further, from a local operations standpoint, the Jordanian Dinar is pegged to the U.S. Dollar.
Transportation and other shipping costs may increase, or transportation may be inhibited.	Not likely in Jordan.
Increased cost or decreased availability of raw materials.	Not applicable. Resources beyond foreseeable life of project.
Changes in foreign laws and tax rates or U.S. laws and tax rates with respect to foreign income may unexpectedly increase the rate at which income is taxed, impose new and additional taxes on remittances, repatriation, or other payments by subsidiaries, or cause the loss of previously recorded tax benefits.	Not likely. Very stable exchange rate over the past several years as the Jordanian Dinar is pegged to the U.S. Dollar.
Foreign countries in which Albermarle do business may adopt other restrictions on foreign trade or investment, including currency exchange controls.	Not likely in Jordan.
Trade sanctions by or against these countries could result in losing access to customers and suppliers in those countries.	Possible but not likely.
Unexpected adverse changes in foreign laws or regulatory requirements may occur.	Possible but not likely.

Agreements with counterparties in foreign countries may be difficult for to enforce and related receivables may be difficult to collect.	Not applicable.
Compliance with the variety of foreign laws and regulations may be unduly burdensome.	Not applicable to the JBC operation.
Compliance with anti-bribery and anti-corruption laws (such as the Foreign Corrupt Practices Act) as well as anti-money-laundering laws may be costly.	Possible but not likely.
Unexpected adverse changes in export duties, quotas and tariffs and difficulties in obtaining export licenses may occur.	Not likely in Jordan.
General economic conditions in the countries in which Albemarle operate could have an adverse effect on our earnings from operations in those countries.	Possible but not likely.
Foreign operations may experience staffing difficulties and labor disputes.	Possible but not likely.
Termination or substantial modification of international trade agreements may adversely affect access to raw materials and to markets for products outside the U.S.	Not applicable to the JBC operation.
Foreign governments may nationalize or expropriate private enterprises.	Possible but not likely in Jordan.
Increased sovereign risk (such as default by or deterioration in the economies and credit worthiness of local governments) may occur.	Not likely.
Political or economic repercussions from terrorist activities, including the possibility of hyperinflationary conditions and political instability, may occur in certain countries in which Albemarle does business.	This is a risk in the Middle East, including Jordan.

22.2.5 Risk Conclusion

The QP concludes that the JBC operation in Jordan can be characterized as of moderate risk and that the political or economic repercussions from terrorist activities could be considered the greatest risk, due to its location in the Middle East. Other economic and political factors, as well as the environmental considerations of this type of operation need to be watched, but do not represent a risk to the business in the foreseeable future.

23 RECOMMENDATIONS

No additional work relevant to the existing reserves is applicable at this time. The JBC plants have demonstrated capacity to operate at the production levels forecasted through the life of the reserve. No significant capital projects are anticipated to extend the life or expand the capacity of the existing plants.

24 RELIANCE ON INFORMATION PROVIDED BY THE REGISTRANT

Data provided by Albemarle and relied on is included in the following report sections.

JBC production reports. JBC (Area 1 and Petra Bromine) Brine Processing and Bromine Production Records (2019) [Source: JBC's Operating Costs]

Table 25-1: Reliance on Information Provided by the Registrant

Category	Report Item/ Portion	Disclose why the Qualified Person considers it reasonable to rely upon the registrant
Macroeconomic trends	Section 19	The discount rate used was provided by Albemarle corporate finance group. The QP's experience evaluating international projects leads them to opine that the selected discount rate is representative of the expected risks associated with an ongoing chemical manufacturing operation in the Middle East/North Africa (MENA) region, particularly in a politically stable country like Jordan
Marketing information	Section 16.1	Market overview information obtained from Technavio, a market research company with expertise in the field.
	Section 16.2	Major producer information was sourced from USGS Mineral Commodity Summary for Bromine. The USGS is considered by the QP as a reliable source of such data. The USGS canvasses very thoroughly the world mineral markets and its commodity specialists gather first-hand information from both producers and consumers of minerals.
	Section 16.3	Information on major markets was sourced from Market Research Future, a source considered as reliable by the QP, as well as of gather publicly available market indicators.
	Section 16.5	Albemarle provided information on bromine applications which was reviewed by the QP and considered reasonable. The QP also reviewed the public domain in order to obtain general information on bromine applications.
Legal matters	Section 3.2	This section includes information obtained from the public domain, particularly the general aspects of the Jordanian mining and environmental frameworks. These sources included translations of Jordanian laws available from publicly available sources, as well as comments from Jordanian lawyers specialized in natural resources in specialized forums.
Environmental matters	Sections 17.3, 17.4	Albemarle provided certain information regarding plant operations, particularly in regards waste streams. The QP also obtained information from the public domain, including general aspects of the Jordanian environmental framework, and Environmental Impact Assessment reports prepared by JBC under international environmental standards, in order to obtain multi-lateral financing for expansion work at both the plant and port.
Local area commitments	Section 17.5	The QP obtained information for this section from various sources, including Albemarle and JBC. The QP also obtained information regarding social programs and commitments with the local communities from the public domain.
Governmental factors	Section 3.2	The QP reviewed information from the public domain on the interaction of JBC with Jordanian government agencies and with regulators responsible to manage the various aspects of APC's mineral concession on Dead Sea resources.

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Exhibit 96.5

MAGNOLIA FIELD BROMINE RESERVES AS OF DECEMBER 31, 2022

Magnolia, Arkansas, USA, property of Albemarle Corporation

214554
Final
15 February 2023

rpsgroup.com

MAGNOLIA FIELD BROMINE RESERVES AS OF DECEMBER 31, 2022

Magnolia, Arkansas, USA, property of Albemarle Corporation

Approval for issue		
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MAGNOLIA FIELD BROMINE RESERVES AS OF DECEMBER 31, 2022

Technical Report Summary as of December 31, 2022

As requested in the engagement letter dated July 26, 2021, RPS and RESPEC have evaluated certain Bromine reserves and resources in the Magnolia field, Arkansas, USA, as of December 31, 2022 ("Effective Date") and submit the attached report of our findings. The evaluation was conducted in compliance with subpart 1300 of Regulation SK.

This report contains forward looking statements including expectations of future production and capital expenditures. Potential changes to current regulations may cause volumes actually recovered and amounts future net revenue actually received to differ significantly from the estimated quantities. Information concerning reserves and resources may also be deemed to be forward looking as estimates imply that the reserves or resources described can be profitably produced in the future. These statements are based on current expectations that involve a number of risks and uncertainties, which could cause the actual results to differ from those anticipated. These risks include, but are not limited to, the underlying risks of the mining industry (i.e., operational risks in development, exploration and production; potential delays or changes in plans with respect to exploration or development projects or capital expenditures; the uncertainty of resources estimates; the uncertainty of estimates and projections relating to production, costs and expenses, political and environmental factors), and commodity price and exchange rate fluctuation. Present values for various discount rates documented in this report may not necessarily represent fair market value of the reserves or resources.

Yours sincerely,
for RPS Energy Canada Ltd

"Original Signed by Michael Gallup, P. Eng.
on behalf of RPS Energy Canada Ltd."

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Date: February 15, 2023

CERTIFICATE OF QUALIFICATION - RPS

RPS Energy Canada Ltd. ("RPS"), a global leader in exploration and development initiatives, has participated in the preparation of a Technical Report Summary for Albemarle Corporation (the "Company"), on certain bromine reserves and resources located in the Magnolia Field, Arkansas, USA, which are controlled by the company.

RPS certifies that its professional employees who worked on the preparation of this Technical Report Summary meet the requirements to act as Qualified persons as defined by subpart 1300 of Regulation SK, particularly § 229.1300.

RPS certifies that in compliance with subpart 1300 of Regulation SK, as a third-party firm comprising reserves experts, it has dated and signed the technical report summary it has prepared for the Company.

The sections of the Technical Report Summary exclusively prepared by RESPEC were the following: Sections 4, 10, and 13-17.

The sections of the Technical Report Summary jointly prepared by RESPEC and RPS Energy Canada Ltd were the following: Section 3.

RPS is not an affiliate of the Company or another entity that has an ownership, royalty or other interest in the property that is the subject of the technical report summary.

RPS Energy Canada Ltd.

Yours sincerely,
for **RPS Energy Canada Ltd.**

Michael Gallup
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15 February 2023

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RESERVE AND RESOURCES DEFINITIONS

The following definitions have been used by RPS Energy Canada Ltd. (RPS) in evaluating reserves. These definitions are based on the SEC RIN3232-AL81 “Modernization of Property Disclosures for Mining Registrants” Final rule, October 31, 2018, and are consistent with the definitions of the Committee for Mineral Reserves International Reporting Standards (“CRIRSCO”) “International Reporting Template for the public reporting of Exploration Targets, Exploration Results, Mineral Resources and Mineral Reserves”, November 2019, as published by the International Council of Mining & Metals (“ICMM”).

Mineral Resources

A Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the Earth’s crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction.

The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling.

Mineral Resources are subdivided, in order of increasing geological confidence into Inferred, Indicated and Measured categories:

Inferred Mineral Resources

An Inferred Mineral Resource is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity.

An Inferred Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.

Indicated Mineral Resources

An Indicated Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit.

Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation.

An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve.

Measured Mineral Resources

A Measured Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit.

Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation.

A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proved Mineral Reserve or to a Probable Mineral Reserve.

Mineral Reserves

A Mineral Reserve is the economically mineable part of a Measured and/or Indicated Mineral Resource.

It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Pre- Feasibility or Feasibility level as appropriate that include application of Modifying Factors.

Probable Mineral Reserves

A Probable Mineral Reserve is the economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource.

The confidence in the Modifying Factors applying to a Probable Mineral Reserve is lower than that applying to a Proved Mineral Reserve

Proved Mineral Reserves

A Proved Mineral Reserve is the economically mineable part of a Measured Mineral Resource. A Proved Mineral Reserve implies a high degree of confidence in the Modifying Factors.

INDEPENDENT CONSULTANT'S
CONSENT AND WAIVER OF LIABILITY

The undersigned firm of Independent Consultants of Calgary, Alberta, Canada knows that it is named as having prepared an independent report and its addendum report of the bromine reserves and cash flows of the Magnolia bromine field operated by Albemarle Corporation, and it hereby gives consent to the use of its name and to the said report. The effective date of the report is December 31, 2022.

In the course of the evaluation, Albemarle provided RPS Energy Canada Ltd. (RPS) personnel with basic information which included the field's licensing agreements, geologic and production information, cost estimates, contractual terms, studies made by other parties and discussions of future plans. Any other engineering or economic data required to conduct the evaluation upon which the original and addendum reports are based, was obtained from public literature, and from RPS non-confidential client files. The extent and character of ownership and accuracy of all factual data supplied for this evaluation, from all sources, has been accepted as represented. RPS reserves the right to review all calculations referred to or included in the said reports and, if considered necessary, to revise the estimates in light of erroneous data supplied or information existing but not made available at the effective date, which becomes known subsequent to the effective date of the reports.

"Original Signed by Michael Gallup, P. Eng."

On behalf of RPS Energy Canada Ltd.

1 EXECUTIVE SUMMARY

RPS Energy Canada Limited (“RPS”) has completed an evaluation of Albemarle’s bromine reserves as of December 31, 2022, and assessed the following summary of results:

- The forecast production of sales bromine is 2,419 thousand tonnes for the Proved reserves case, plus an additional 565 thousand tonnes of Probable reserves, for a total Proved plus Probable reserves of 2,984 thousand tonnes. The ultimate recovery over 100% of the leased area at the end of this forecast represents a bromine recovery factor of 75% and 82% for the 1P and 2P cases respectively
- The Smackover formation can be vertically subdivided into the upper Smackover, EOD 0 to 5, historically known as the Reynolds Oolite, and the lower Smackover, EOD 7-9, sometimes split into middle and lower in the literature. The reserves estimated in this report have been confined to the upper Smackover due to technology limitations.
- The bromine reserves represent an estimated net present value range to the Company as shown in the following economics summary tables:

Table 1-1: Albemarle Working Interest Reserves as of December 31, 2022 – Spot Prices

Albemarle Working Interest Bromine Reserves as of December 31, 2022 Spot Price Forecast											
	Mineral Reserves ('000 tonnes)	Net Present Value Before Tax					Net Present Value After Tax				
		0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)	0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)
Proved	**2,419**	**10,102**	**5,093**	**3,261**	**2,386**	**1,889**	**7,607**	**3,839**	**2,460**	**1,801**	**1,426**
Probable	565	3,372	1,400	776	513	377	2,611	1,084	601	397	292
Proved + Probable	**2,984**	**13,474**	**6,494**	**4,038**	**2,899**	**2,265**	**10,218**	**4,923**	**3,061**	**2,198**	**1,718**

Table 1-2: Albemarle Working Interest Reserves as of December 31, 2022 – Spot Prices less 15%

Albemarle Working Interest Bromine Reserves as of December 31, 2022 Spot Price Forecast less 15%											
	Mineral Reserves ('000 tonnes)	Net Present Value Before Tax					Net Present Value After Tax				
		0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)	0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)
Proved	**2,419**	**7,751**	**3,980**	**2,567**	**1,884**	**1,494**	**5,801**	**2,983**	**1,927**	**1,416**	**1,123**
Probable	565	2,822	1,172	650	429	315	2,189	909	504	333	245
Proved + Probable	**2,984**	**10,574**	**5,152**	**3,217**	**2,313**	**1,809**	**7,990**	**3,892**	**2,431**	**1,748**	**1,368**

Table 1-3: Albemarle Working Interest Reserves as of December 31, 2022 – Spot Prices less 30%

Albemarle Working Interest Bromine Reserves as of December 31, 2022 Spot Price Forecast less 30%

	Mineral Reserves ('000 tonnes)	Net Present Value Before Tax					Net Present Value After Tax				
		0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)	0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)
Proved	**2,419**	**5,400**	**2,866**	**1,873**	**1,382**	**1,099**	**3,996**	**2,128**	**1,393**	**1,030**	**820**
Probable	565	2,273	944	523	346	254	1,767	734	407	269	197
Proved + Probable	**2,984**	**7,673**	**3,809**	**2,396**	**1,728**	**1,353**	**5,763**	**2,861**	**1,800**	**1,299**	**1,017**

Table 1-4: Albemarle Working Interest Reserves as of December 31, 2022 – Spot Prices less 45%

Albemarle Working Interest Bromine Reserves as of December 31, 2022 Spot Price Forecast less 45%

	Mineral Reserves ('000 tonnes)	Net Present Value Before Tax					Net Present Value After Tax				
		0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)	0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)
Proved	**2,419**	**3,049**	**1,752**	**1,178**	**880**	**704**	**2,190**	**1,272**	**860**	**644**	**517**
Probable	565	1,723	716	397	262	193	1,345	558	310	204	150
Proved + Probable	**2,984**	**4,773**	**2,467**	**1,575**	**1,142**	**897**	**3,535**	**1,831**	**1,170**	**849**	**667**

RPS estimates that Albemarle will require a working interest share capital investment of US$1.0 to US$1.4 billion to develop the Proved reserves, and no additional capital to develop the Probable reserves. These estimates are in Constant 2023 dollars and are exclusive of abandonment and reclamation costs.

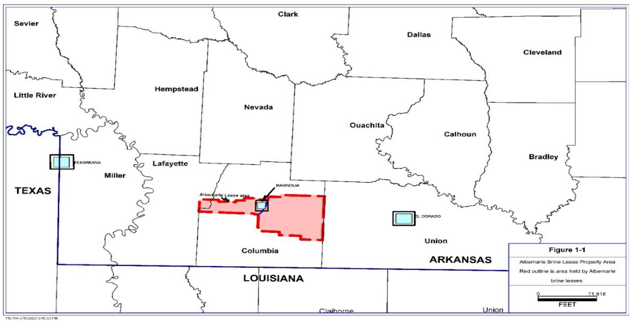

Figure 1-1: Albemarle Magnolia Field Location Map

The body of this report contains an evaluation of the bromine reserves tonnages together with net present value and cash flow forecasts for the Magnolia, Arkansas bromine field. Included in the analysis reported here is a discussion of recent activities, key reservoir and economic issues and RPS' rationale for the reserves evaluations.

This assessment has been conducted within the context of RPS's understanding of the effects of mineral resource extraction legislation, taxation and other regulations that currently apply to this property.

Albemarle has made a representation to RPS as to the validity and accuracy of the data supplied for this evaluation. RPS does not attest to property title or financial interest relationship for any of the appraised properties.

It should be clearly understood that any work program may be subject to significant amendment as a consequence of future results in both the subject and adjacent areas. Mineral exploration and development is a risky and speculative venture, and the actual outcome of work programs cannot be predicted with certainty or reliability.

The net present values reported herein do not necessarily reflect fair market values of the property evaluated.

2 INTRODUCTION

In June 2016, the US Securities Exchange Commission ("SEC" or "Commission") proposed revisions to its disclosure requirements for properties owned or operated by mining companies, to provide a more comprehensive understanding of a registrants' mining properties. Then in June 2018, after a consultation process, including receiving and considering over 60 comment letters on the proposed revisions from various parties, the SEC put in place the amended statutory disclosure and reporting requirements of mineral resources and reserves for public companies engaged in mineral extraction activities. These requirements were spelled out in SEC RIN3232-AL81 "Modernization of Property Disclosures for Mining Registrants" Final rule, dated October 31, 2018. As described in the revised rule, the amendments "are intended to provide investors with a more comprehensive understanding of a registrant's mining properties, which should help them make more informed investment decisions. The amendments also will more closely align the Commissions' disclosure requirements and pollicises for mining properties with current industry and global regulatory practices and standards." The rule requires that all publicly traded companies engaged in mineral exploration and production begin reporting for the first fiscal year beginning on or after January 2, 2021.

On July 26, 2021, RPS Canada Limited, ("RPS") was contracted, by purchase order from Albemarle Corporation ("Albemarle") to conduct an evaluation of Albemarle's interests in bromine reserves in the Magnolia producing brine field in central Arkansas, U.S.A., and the Jordan Bromine Company, Jordan, Dead Sea brine extraction operations in Jordan.

To conduct this evaluation, RPS utilized in-house engineering and associated staff, and engaged the services of RESPEC, an associated environmental and mineral engineering consulting firm to play a major role in many of the portions of the assessment and evaluation.

This report constitutes the final evaluation of the Magnolia, Arkansas brine field bromine reserves. The effective date of this evaluation is December 31, 2022.

3 PROPERTY DESCRIPTION

The Albemarle Corporation Magnolia bromine brine field operations property is located in Columbia County in southwestern Arkansas (Figure 3-1). From the subsurface Smackover formation in this field, Albemarle produces a brine rich in sodium bromide (referred to, throughout this report, as “bromide”) from which bromine is extracted. The area shown is the under lease from the landowners for brine production as of the effective date of this evaluation.

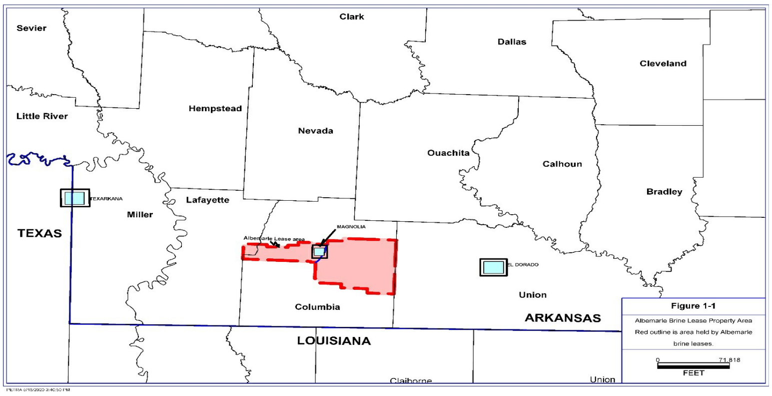

Figure 3-1: Magnolia Field Location Map

The brine field property is centered on the City of Magnolia, Arkansas, which is the county seat of Columbia County and has a population of approximately 12,000 residents. The property is divided into two parts, the South Field and the West Field with the City of Magnolia as the dividing line between the two areas. The area east of the City of Magnolia is referred to by Albemarle as the South Field and the area to the west is referred to as the West Field (Figure 3-2).

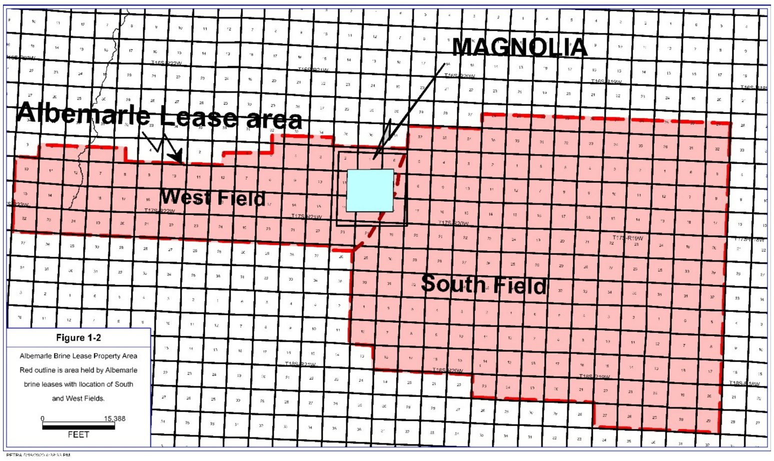

Figure 3-2: Magnolia Field Mapping and Naming

The West Field has a total area of approximately 36,863 acres extending 14.5 miles to the west of the City of Magnolia and is 4 to 5 miles wide (north to south) encompassing parts of Township 17 South, Ranges 21 through 23 West. The South Field has a total area of approximately 104,585 acres that extends 14.5 miles east of Magnolia and is 10 to 12.5 miles wide (north to south) covering all or parts of Townships 16 through 18 South, Ranges 18 through 20 West. The southern edge of the property is approximately 10 miles north of the Arkansas-Louisiana State Line. The property consisting of these two field areas under lease from the landowners by Albemarle Corporation covers approximately 141,448 acres (221 square miles).

The area outlined on the map identified as MSLU is the Magnolia Smackover Lime Unit oilfield in the Magnolia Field operated by White Rock Oil and Gas, LLC where oil was first discovered from the Smackover formation in 1938 (Figure 3-3).

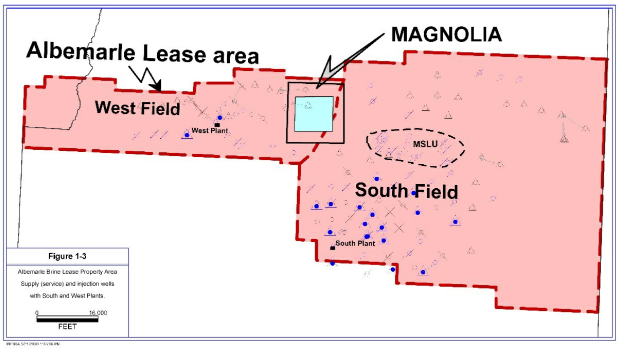

Figure 3-3: Magnolia Field Map showing MSLU Oilfield and Brine Processing Plant locations

The Magnolia oilfield was unitized (a joint operation of several owner/operators of different portions of the reservoir) with the name "MSLU" for secondary recovery and a water flood of the Smackover Formation began in 1945. The produced water (bromine rich) from the oilfield operations is separated, then sent via pipeline to Albemarle's South Plant and processed. Processed brine (depleted in bromine) is sent back to Magnolia Field to be re-injected into the Smackover Formation to continue the secondary recovery operations by White Rock Oil and Gas.

3.1 Property Leases

The area of bromine production operations is comprised of 9,570 individual leases with local landowners, comprising a total area of 99,763 acres. The leases have been acquired over the course of time as field development extended across the field. The production leases are generally of the form of the "Arkansas Form 881/8 Oil, Gas and Mineral Lease (1/8 Gas)" or some derivative thereof. Each of the leases was executed between the parties, with the following terms:

A map showing full sections of the field where Albemarle has lease holdings are shown on map in the following Figure 3-4. Also shown on the map are production, injection and appraisal wells in the area, where the dense clusters of wells show oilfield development contiguous with the brine field operations.

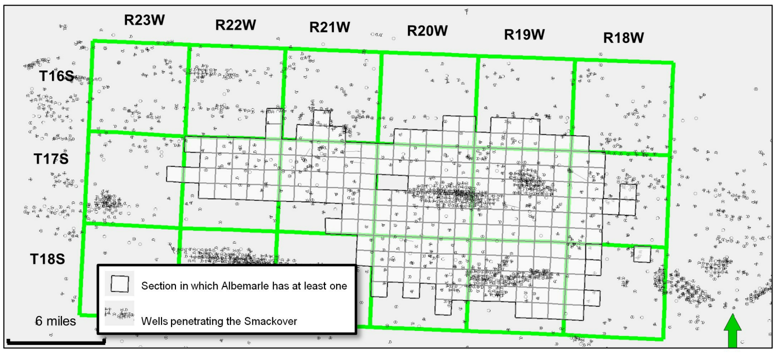

Figure 3-4: Albemarle Magnolia Field Lease Holdings as of December 31, 2021

3.1.1 Burdens on Production:

The production leases include the following burdens:

a) Production Royalties:
- Oil: 12.5% of production
- Gas: 12.5% of gas sales revenues
- Solution gas: 12.5% of gas sales revenues
- Other minerals (except brine and minerals contained in brine): 10% of mineral sales revenue
- Brine: No production royalty

b) Production Lease Licences Fees:
- Lease Years 1, 2, 3,& 4: $1.00 per acre
- Lease Years 4 through 14: $10.00 per acre
- Lease Years 15 onward: $25.00 per acre
- For the purposes of lease licencing fees, the above lease fees have been superseded by the Arkansas Code, Title 15, Subtitle 6, Chapter 76 (15-76-315) which specifies that in lieu of royalty, an annual lease compensation payment of $32.00 per acre payable to the lease owner. This payment amount is indexed to the March 1995 US Producer Price Index for Intermediate Materials, Supplies and Components, then later the Producer Price Index for Processed Goods for Intermediate demand, which specifies that prices and costs are based on a datum cost base as of March 1995 and are escalated annually based on the USA Producer Price Index. In 2022 the average lease cost was $67.84 per acre per year.

For economic evaluation purposes, production lease licence fees have been included in the fixed field operating costs.

3.1.2 Term of Leases

The term of each lease begins on the effective date of the lease, and, as long as lease rentals are continuing to be paid, continues for a period of 25 years or longer until after a two year period where brine is not injected or produced from/to a well within 2 miles of lease lands area. The Lessee may hold leases after production has been shut in for twelve months by continuing the shut-in lease rental payments and hold the leases for a maximum of three years.

4 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

4.1 Topography

The topography of the area is characterized by rolling hills with five stream valleys that cut north-south across the Albemarle Lease Property (Figure 4-1).

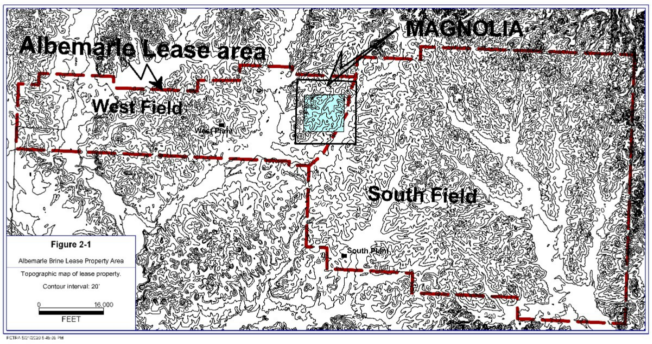

Figure 4-1: Magnolia Field Topography

There is approximately 100 to 200 feet of relief from the stream valleys to the hill tops. The elevations range from 180 feet to 360 feet with some hilltops over 400 feet above sea level. The City of Magnolia with an area of 13.27 square miles is located on one of the hilltops and is centered between the West Field and the South Field. The land area outside of the city is very rural, with vegetation being mostly pine trees on sandy hills with hard wood trees predominantly in the stream valleys. The bromine mineral deposit being extracted by Albemarle Corporation is found in the subsurface waters and is pumped through well bores to the surface and then sent to the main plants for processing by pipeline, therefore the surface pumps, pipelines and tanks would be affected by any changes in the topography. The topographic features and conditions on the surface are taken into consideration for the building of pipelines, roads and well site locations when planning the drilling of a development well to extract the bromine. The stream valleys and the cultural features of the City of Magnolia create challenges topographically for the necessary surface work required of any future development projects in those areas.

4.2 Accessibility

Magnolia is located in southwest Arkansas, north of the center of Columbia County. The average altitude of the area is 336 ft above mean sea level. The surrounding region is a mix of dense forest, farm prairies, and low rolling hills.

The area includes extensive areas of loblolly-shortleaf pine forests. Despite its gently sloping terrain and areas of relatively rich soil, it is a region dominated by forests and forestry-related activities rather than by agriculture. Both pine and hardwood products are harvested in this region where the forest industry is particularly significant.

Magnolia is located about 50 miles east of Texarkana, about 135 miles south of Little Rock, and about 75 miles northeast of Shreveport, Louisiana.

Adjacent counties to Columbia County are Nevada County (north), Ouachita County (northeast), Union County (east), Claiborne Parish, Louisiana (southeast), Webster Parish, Louisiana (south) and Lafayette County (west).

4.2.1 Road Access

A road network consisting of U.S. Routes and local highways provides access to Magnolia.

Primary U.S. Highways in the Magnolia area include the following:

- U.S. Route 82 (US 82)
- U.S. Route 79 (US 79)
- U.S. Route 371
- Arkansas Highway 19 (AR 19 and Hwy. 19)
- Highway 355

Interstates 20, 30 and 49 (I-20, I-30 and I-49), are accessible from Magnolia by way of U.S. Route 371.

4.2.2 Airport Access

The Magnolia Municipal Airport is a public-use airport in Columbia County. It is owned by the city of Magnolia and located three nautical miles southeast of its central business district.

The closest international airports is located in Little Rock, AR, which is approximately 2.5-hours north of Magnolia (approximately 140 miles).

There are regional airports at El Dorado, Arkansas (South Arkansas Regional at Goodwin Field), Texarkana (Texarkana Regional Webb Field) and Shreveport, Louisiana (Shreveport Regional Airport), all within a 70-mile radius of Magnolia.
Rail Access

Union Pacific (UP) and the Louisiana & Northwest Railroad (LNW) provide rail service in Columbia County, Arkansas.

4.3 Climate

The average temperature is 64 °F (18 °C), and the average annual rainfall is 50.3 inches. The winters are mild but can dip into the teens at night and have highs in the 30s and even some 20s but average out around 50. The springs are warm and can be stormy with strong to severe storms and average highs in the mid-70s. Summers are often hot, humid and dry but with occasional isolated afternoon storms, highs in the mid to upper 90s and even 100s. In the fall the temps cool from the 90s and 100s to 80s and 70s. Early fall temperatures are usually in the 80s but can reach 90s and at times have reached 100. Late fall temps fall to 70s and 60s. It is not uncommon to see snow and ice during the winter. It has been known to snow a few times as late as April and as early as November in Magnolia.

Figure 4-2 shows the average temperatures and precipitation at Magnolia, Arkansas.

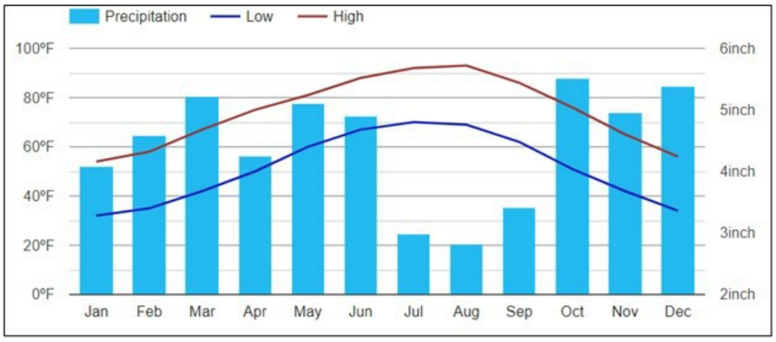

Figure 4-2: Average Temperature and Precipitation at Magnolia, AR

Source: https://www.usclimatedata.com/climate/magnolia/arkansas/united-states/usar0351

4.4 Physiography

Arkansas is divided into two major regions separated by a geologic fall line. The fall line is an imaginary line separating mostly consolidated rock of the Interior Highlands from mainly unconsolidated sediment of the Gulf Coastal Plain. Magnolia is located in the Gulf Coastal Plain Region.

The two major regions are sub-divided into five provinces based on their unique geological characteristics. Magnolia is located in the West Gulf Coastal Plain province, which is characterized by fairly at-lying rock formations and sediment deposited in terraces.

West Gulf Coastal Plain province extends across southern Arkansas. It is located south of the Ouachita Mountains and extends southward to the Gulf of Mexico and eastward to the Mississippi Alluvial Plain. The boundary between the Ouachita Mountains and the Coastal Plain is marked by rapids and waterfalls at points where streams leave the steeply sloping mountains. The eastern boundary of the West Gulf Coastal Plain is the Arkansas River as it extends from Little Rock (Pulaski County) to Pine Bluff (Jefferson County), and then Bayou Bartholomew from Pine Bluff to the Louisiana border. These two waterways separate the West Gulf Coastal Plain from the relatively recent stream deposits of the Mississippi Alluvial Plain.

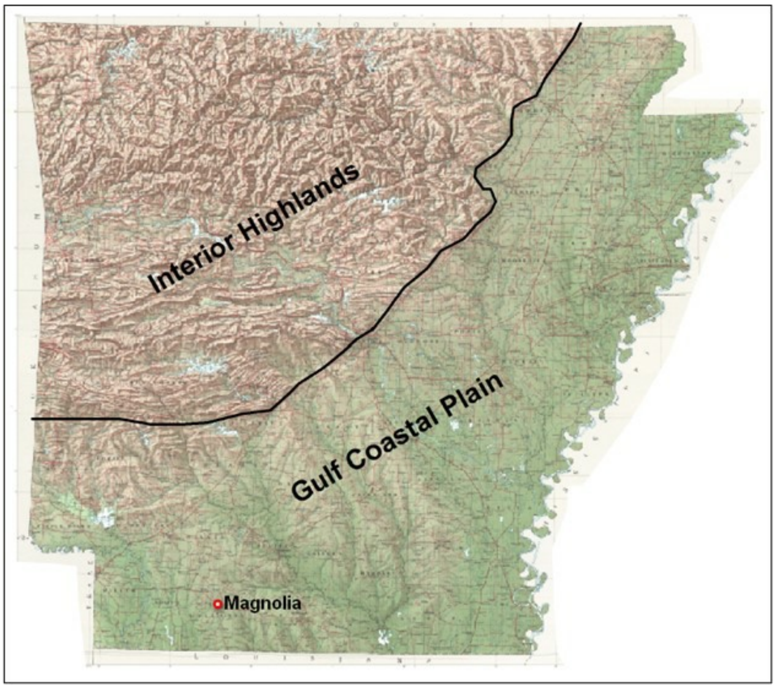

Figure 4-3: Arkansas physiographical regions and location of Magnolia.

Source: Arkansas Geological Survey https://www.geology.arkansas.gov/

5 HISTORY

Oil was first discovered in Arkansas in January of 1921 in the Nacatoch Formation in El Dorado Field, Union County near the site of the current Arkansas Oil and Gas Commission in El Dorado, AR (Figure 5-1). Oil was in demand and prices were good as a result of the First World War. Many discoveries were made in a number of formations in the Upper and Lower Cretaceous afterward with the largest oil field in Arkansas, the Smackover Field being discovered in 1922. By 1925 oil production reached a peak of 275,000 barrels per day and declined to 29,000 barrels per day by 1936[i]. Through the end of 2019, approximately 724 million barrels of oil have produced from many different formations in south Arkansas oil fields.

The Smackover is a geologic formation of limestone and dolomite that is 5000'-10,000' in the subsurface of South Arkansas where it plays an important role in the oil, gas, and brine industries of that area. It is the oldest and deepest oil producing formation in Arkansas and is also thought to be the main source of the oil found in most of the overlying formations in South Arkansas[2]. Subsequent to seismograph operations in the area in 1935[1], oil was first discovered in 1936 from the Smackover Formation in the Phillips Petroleum Co. Reynolds #1 well at Snow Hill in the Smackover Field in southeastern Ouachita County (Figure 5-1).

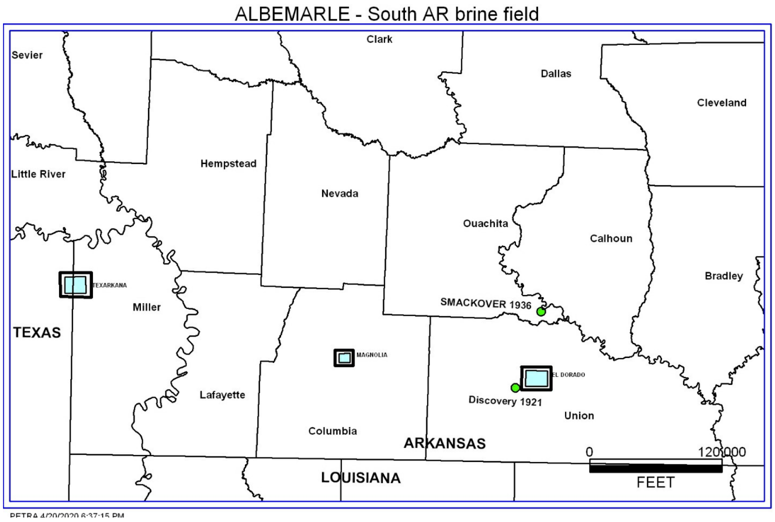

Figure 5-1: Magnolia Field Location Map

A string of Smackover oil field discoveries followed in the next 6 years which include many of the larger fields such as Magnolia, Village, Midway, Buckner, Dorcheat-Macedonia, and Atlanta. These structures were found after the advent of exploration with the use of seismic reflection methods. Exploration, drilling, and production of oil and gas from the Smackover Formation in South Arkansas have continued to the present day.

Brine is formation water that has higher than the usual concentration of dissolved salts, comprised of Ca, Na, K, and Cl and minor amounts of other elements [Bates, 1980]. The brine is produced as a by-product of the oil production in many subsurface reservoirs and generally the brine rate increases as the oil rate decreases throughout the life of a producing well. The Smackover Formation water (brine) is hypersaline containing higher concentrations of the previously mentioned elements as well as many other elements including Bromine (Br). The concentrations of Bromine in the Smackover Formation brine in South Arkansas are unusually high with a range of 1,300-6,800 parts per million[3].

Bromine is one of four halogen elements along with chlorine, fluorine, and iodine and is a highly corrosive, reddish-brown, volatile liquid that naturally occurs as sodium bromide in seawater with a normal concentration of 60-65 parts per million[iv]. The bromine is generated and released into seawater with the decomposition of seaweed, plankton, and certain mollusks[4, v]. An Arkansas Oil and Gas Commission chemist found that the brine from 4 oil fields producing from the Smackover had concentrations ranging from 4,000-4,600 parts per million, which is much higher than the that found in seawater[4]. The high concentrations of bromine offer the opportunity for the bromine to be extracted commercially from the brine that is pumped from the Smackover Formation in the subsurface of South Arkansas. The brine produced from the Smackover in south Arkansas and to a lesser degree the brine production from wells in Michigan meets nearly one-half of the world's bromine demand annually. In the infancy of the business the largest demand for bromine was to make ethylene dibromide, an additive to gasoline to stop lead build up in engines running on leaded gasoline[vi] [McCoy, 2014]. Today bromine and bromine compounds are used for fire retardant in plastics, water purification, agricultural pesticide products, oil field drilling fluids, and many other products and processes[4].

The Murphy Corporation in El Dorado, AR discovered oil from the Smackover Formation in June of 1950 at Catesville Field, Union Co, AR. In April of 1956, Murphy acting on behalf of Michigan Chemical Corp. applied for a saltwater disposal ("SWD") well to dispose of produced water from four Murphy oil wells producing from the Smackover. The produced water was to be processed through Michigan's El Dorado Bromine Plant, then disposed of into the subject SWD well (Figure 5-2).

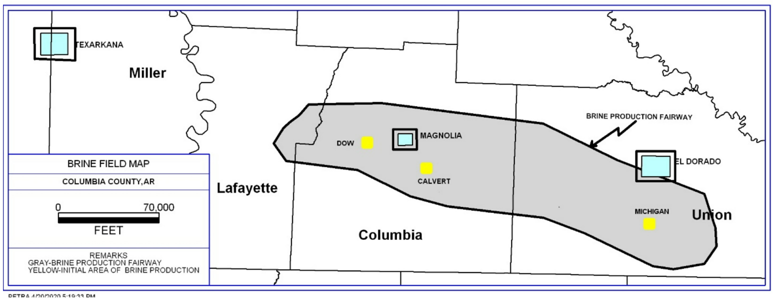

Figure 5-2: Brine Field Map

This was the beginning of the bromine extraction business in Arkansas where Michigan Chemical Corp, J-W Operating, Arkansas Chemical, and Great Lakes Chemical Corp. have been active in the brine business at times over the last 63 years in the El Dorado area. Great Lakes Chemical Corp. (now Lanxess AG) has been active since at least 1963 and currently is the only active operator in the El Dorado area.

In 1965, Brazos Oil and Gas Co. a division of Dow Chemical Co. drilled the first brine supply well near Magnolia, AR approximately 35 miles west of the Michigan Chemical Corp. operations in El Dorado (Figure 3-2). By February of 1967 six additional wells, 4 brine production supply wells and 3 brine injection wells were drilled and completed. These wells were all put into production in April of 1968 and are now called the West Field. In 1987 Ethyl Corporation took over operations of Dow Chemical in the West Field. A total of 36 brine supply and injection have been drilled through 2019 in this field.

In 1969, Bromet, a JV between Ethyl Corporation and Great Lakes Chemical Corp. expanded bromine production approximately 30 miles west of El Dorado and approximately 5 miles south of the town of Magnolia, Arkansas (Figure 5-2). Bromet drilled and completed twenty-three total wells, 18 brine production supply wells and 5 brine injection wells from 1/1968 to 10/1969. These 23 wells, in what is now called the South Field were put into operation by the end of 1969. Great Lakes left the JV in the early 1970s and Ethyl took over as the sole owner until they spun off to Albemarle in 1994. Through 2021 a total of 78 brine supply and injection wells have been drilled in this field.

The total development of these three areas combines to create a 600 square mile fairway of brine production that extends over a two-county area that is 60 miles long and 10 miles wide (Figure 5-2). Based on public records from the Arkansas Oil and Gas Commission ("AOGC"), brine production in Arkansas has averaged approximately 810,500 barrels per day or 295.8 million barrels per year from all operators for the past 10 years. An estimated total of 219 million barrels of brine was produced in 2021, which was down about 17,000 barrels per day from the previous year and 210,000 barrels per day off of the 10 year average daily production rate. The highest recorded annual production was in 2004 at 389million barrels of brine (Figure 5-3). The total cumulative production of brine from 1979 through 2021 for Arkansas is 12.5 MMbbls. As of the effective date of this report, December 31, 2022, the AOGC does not have any brine production data for the year 2022.

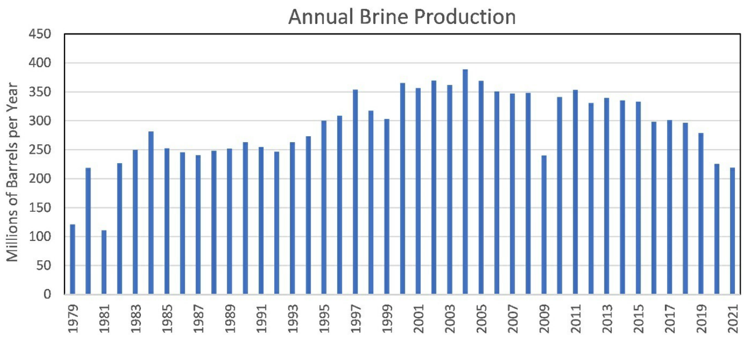

Figure 5-3: Historical Brine Production in South Arkansas

6 GEOLOGICAL SETTING, MINERALIZATION, AND DEPOSIT

6.1 Geologic Setting

The area of interest is located in South Arkansas which is on the north rim of the ancestral Gulf of Mexico. The early framework of the Gulf began with the rifting or parting of the North American Plate from the South American and African plates in Late Triassic Period and continued into the Early and Middle Jurassic Period from about 220 million years ago to 195 million years ago. During this time thick sequences of non marine clastic sediments filled the rifted basins in what is now called the Eagle Mills Formation (Figure 6-1). These initial deposits are predominately composed of red, purplish, greenish gray, or mottled shales, mudstones, and siltstones with some conglomerates and fine to very fine-grained sandstones. They are found around the rim of the Gulf of Mexico from Mexico through Texas, Arkansas, Mississippi, Alabama into Florida. Thicknesses have been recorded for Eagle Mills of over 6900' in South Arkansas[7].

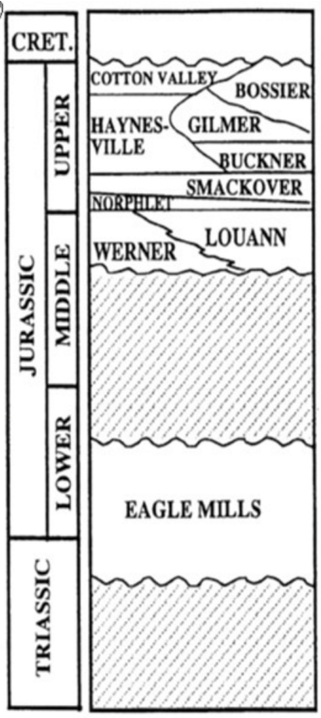

Figure 6-1: Generalized stratigraphic column for the Triassic through Jurassic section in South Arkansas[8,3].

Toward the end of the period of rifting in Middle Jurassic, the Gulf was a broad shallow restricted basin where evaporate deposits of anhydrite in the Werner Formation and thick salt deposits of the Louann Formation accumulated as marine waters periodically spilled into the basin probably across central Mexico9. The environment at that time was arid, where the evaporation exceeded the inflow of water with limited to no influx of terrigenous sediments, therefore the marine waters evaporated leaving layer upon layer of salt beds enriched with many other elements found in marine waters. The salt beds are approximately 3000' thick in East Texas and North Louisiana and thin to the north, coming out of the basin to a point of non deposition around the rim of the basin[7]. A fault system developed down dip of the salt around the north rim from Texas through Arkansas and Mississippi into Alabama marking the upper limits of the salt basin. The fault system lies immediately down dip of the Jurassic salt as described of the Mexia-Talco fault system in Texas[10]. This fault system extends northeastward into Arkansas and is identified as the South Arkansas fault system (Figure 6-2). The north limit of the salt in South Arkansas is thought to be up dip to this same system.

The extensive salt deposits were followed by a sea level low stand at the beginning of the Upper Jurassic (Figure 6-1), where sandstones, conglomerates and eolian or wind blown sediments of the Norphlet Formation were deposited directly onto the Louann Formation9. This was followed by a prolonged marine transgression or sea level rise that covered most of the present Gulf of Mexico basin. It reworked the upper most sandstones of the Norphlet Formation as the water level advanced shoreward over a broad, stable, ramp that dipped gently basinward[12, 7].

The Upper Jurassic sea level rise or transgressive sequence is thought to have progressed rapidly and initiated the production of deep water dark colored carbonate mudstones and shales in the lower sequence (commonly referred to as the "brown dense") of the Smackover Formation[13, 14]. The lower section consists of very thin fairly continuous lamina of clean carbonate mudstones and organic rich clay lamina or layers[12]. This organic rich lamina are thought to be source rocks from which much of hydrocarbons along the north rim of the ancestral Gulf of Mexico were generated[15]. The rise in sea level is thought to have increased rapidly throughout the lower portion of the Smackover, slowing through the middle and reaching a high stand that probably extended through the upper Smackover[14]. There were possibly some minor fluctuations in the sea level in the upper Smackover. The advance of the sea level up the shoreline ramp defines the limit of deposition of the Smackover Formation around the rim of the Gulf of Mexico Basin. In South Arkansas the Smackover Formation is identified in the subsurface as far north as southern Clark County (Figure 6-2).

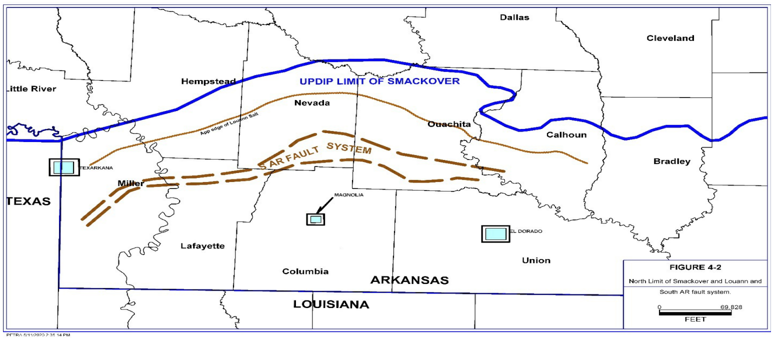

Figure 6-2: Northern Limit of Smackover and Louann and South Arkansas Fault System

The Smackover is divided by some into upper and lower[7] and some separate it into three members: upper, middle and lower with an overall thickness of over 1000' [12,14]. The lower as previously mentioned was deposited in a basinal, deep water setting below any turbulence from wave or storm action. The middle Smackover is that portion of the basin that is subtidal on the steeper part of the shelf between the basinal sediments and the shallow water shoal of the upper member. The sediments in the middle Smackover would be characterized as burrowed peloidal mudstones and burrowed peloidal to skeletal wackestones (mainly carbonate mud with some grains). The upper Smackover sediments commonly referred to as the Reynolds Oolite, were deposited above wave base in a high energy shoal beach system that consists of grainstone and packstones composed predominately of ooids, oncoids and pellets and lacking carbonate mud[16].

The upper Smackover grainstones are the main reservoir for oil, gas and brine deposits due to excellent porosity and permeability in these rocks. The lower and middle Smackover for the most part are lacking these characteristics of good porosity and permeability and are generally non reservoir type rocks. The middle Smackover in some areas will have zones of porosity and permeability development when sediments from the near shore were transported down slope and deposited. These are commonly dolomitized, enhancing the reservoir characteristics, porosity and permeability to the point of potential exploitation for the production of oil, gas or brine if present.

The upper and middle Smackover is a progradational system in that the sediment supply was great enough that the shoal complex of the upper sediments advanced seaward or prograded over the middle Smackover sediments, which in turn prograded over the lower Smackover to create the vertical sedimentary profile of the upper, middle and lower Smackover (Figure 6-3).

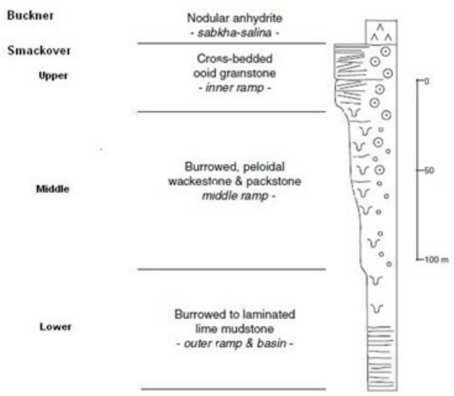

Figure 6-3: Vertical Stratigraphic Profile of the Smackover in Arkansas and Louisiana (modified from Hanford & Baria, 2007[17])

The Buckner Formation (Figure 6-1), which overlays the upper Smackover is composed of anhydrite and shale and was deposited in a restricted lagoonal, bay to tidal flat setting in an arid environment shoreward of the upper Smackover shoal/beach deposits. As the upper Smackover shoal/beach complex prograded seaward the dolomite, anhydrite, and shale of the Buckner followed, prograding over the upper Smackover. Toward the end of the Upper Jurassic, the sea level began a slow steady rise and deposited sandstone and shale of the Haynesville and Cotton Valley Formations that overlay these sediments[14].

6.2 Property Geology

The Smackover Formation is the aquifer that contains the bromine rich brine in South Arkansas and the data through well logs, core analysis and seismic is sufficient to determine its geometry and other characteristics for use in the modeling and resource estimation process. It is present throughout South Arkansas extending to the north edge of Ouachita and Nevada Counties. This line is generally considered the depositional limit of the Smackover in South Arkansas (Figure 6-2).

South of this line is the northern limit of the salt of the Louann Formation, which underlays the Norphlet, and Smackover Formations. The salt increases in thickness from there south across South Arkansas into the salt basins of North Louisiana. Down structural dip of the edge of the Louann is the South Arkansas fault system, which is a prominent graben faulting system that extends from Miller County eastward through southern Nevada and Ouachita Counties. This system basically parallels the up-dip edge of the

Louann Formation and is thought to have been initially caused by gravity sliding of the salt toward the basin[18]. The graben consists of opposing down thrown faults that create an east-west trending block that is structurally lower within the fault system. The structure of the Smackover Formation is dipping south to southwest at approximately 200 feet per mile, ranging from an elevation of 1000 feet below sea level in the north to 11,500 feet below sea level in the south along the Arkansas-Louisiana state line. The overall thickness of the formation ranges from 14 feet near the up-dip edge of Smackover to over 900 feet in the southern Columbia County. This thinning of the Smackover and of the Norphlet Formation is illustrated on the south to north cross section A-A' from southern Columbia County into Nevada County (Figure 6-4).

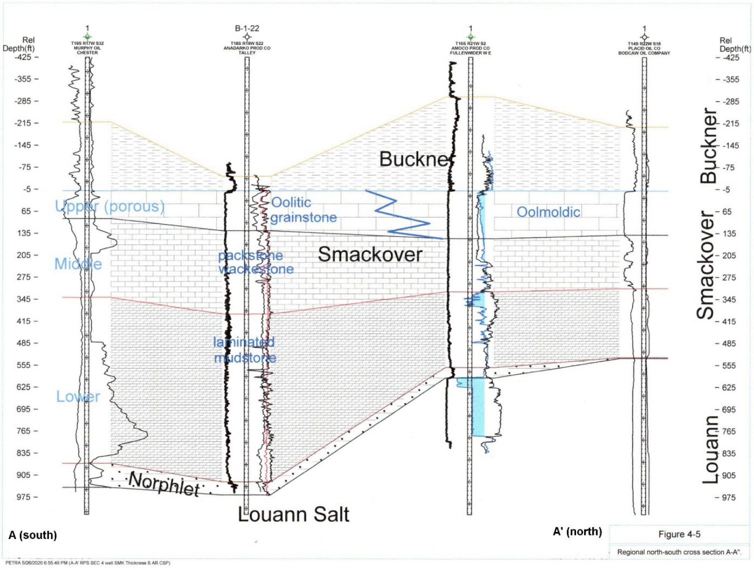

Figure 6-4: North to South Cross Section showing Norphlet and Smackover thinning

The upper Smackover is a thick porous and permeable body of oolitic-oncolitic grainstones composed of ooids, peloids, intraclasts and oncoids and was deposited throughout the area south of the updip limit and is present under the entire area of the Albemarle Property. It occurs at a depth of 7000 to 8500 feet below sea level and is a very good reservoir for the containment and extraction of bromide rich brine (Figure 6-5).

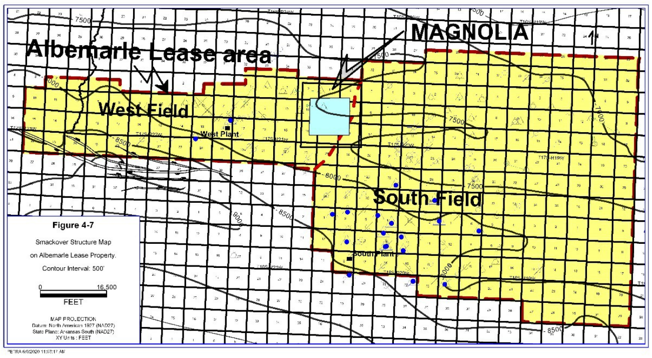

Figure 6-5: Smackover Structure Map

A significant number of wells, drilled to various depths, on and surrounding the Property were evaluated for use in understanding the Property Geology. Of these, several hundred were utilized due their possession of adequate information for this purpose. Information obtained from the wells includes:

- Wireline log data (gamma ray, spontaneous potential, resistivity, density, neutron, and acoustic) were evaluated to extract geological information about the reservoir including lithology, porosity, thickness, and stratigraphy of the Smackover
- Core analysis, where available, provided porosity and permeability data
- N-S and E-W wireline cross-sections of the logs were used to determine variation of geometry in the Smackover across the Property

The upper Smackover across South Arkansas from south to north has three distinctive east-west trends (Figure 6-6).

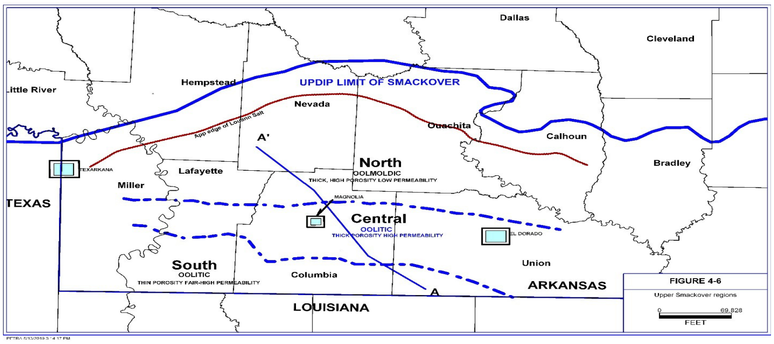

Figure 6-6: Upper Smackover Regions

The upper Smackover in the south region along the Arkansas State Line is generally an oolitic grainstone with relatively thin (less than 30 feet) intervals of sufficient porosity and having fair to high permeability. Many oil fields in this area are trapped stratigraphically. In the central area between the dashed lines, the upper Smackover is an oolitic grainstone having sufficient porosity and high permeability with thicknesses of total porosity that exceed 50 feet. The South Arkansas brine fields of Albemarle and Great Lakes Corporations are located in this area due to the thickness and the permeability of upper Smackover that allow for good reserves and high volume production. Also, located in this central portion are some of the largest oil fields in Arkansas that produce from salt cored anticlines in the Smackover. North of this region, oolitic grainstones were originally deposited in the upper Smackover with thicknesses similar to the central region. After deposition in this area, the oolitic grainstones were diagenetically altered by the dissolution of the ooids and calcite filling of the original pore space contemporaneously[14]. The result of this alteration creates a mold of the ooids that develops into rock with very high porosity (25-35%) and low to very low permeability that is called oolmoldic limestone.

The Smackover is subject to other diagenetic alterations after burial, most commonly the process of dolomitization which generally enhances the porosity and permeability.

The packstone-wackestone interval of the middle Smackover and the laminated mudstone of the lower Smackover both thin from south to north in South Arkansas (Figure 6-4). The middle interval generally has porosity less than 9% in the south region, with some porosity development to the north due to post deposition processes. This is evident in the central region where select intervals two to thirty feet thick in the middle Smackover are dolomitized, which generally enhances the original porosity and permeability of the rock. The laminated mudstones of the lower Smackover have very low porosity over the entire area of south Arkansas.

The environment of deposition of the Smackover is divided into coastal (beach facies), upper foreshore (beach to normal wave base), lower foreshore (normal wave base to storm wave base), subtidal (upper slope), deep subtidal (lower slope) and basinal (deep water, thin flat laminated strata). The upper Smackover grainstones were deposited in the coastal to lower foreshore regime of the coast line, while the middle Smackover packstone-wackestones were deposited on the slope in subtidal waters. These sediments are deposited contemporaneously as clinoforms and prograded seaward over the laminar basinal sediments of the lower Smackover. Fluctuations of the sea level during upper Smackover deposition allowed the clinoforms to stack resulting in very thick, porous and permeable grainstones in the central area where the brinefields are located. The anhydrite and shale of the Buckner Formation were deposited simultaneously behind the coastal region of the upper in lagoons and mudflats as the upper and middle Smackover prograded seaward.

6.3 Mineralization

High concentrations of bromine (Br) are found on Albemarle Corporation Property in South Arkansas. The bromine exists as sodium bromide ("bromide") in the formation waters or brine of the Jurassic age Smackover Formation in the subsurface at a depth of 7000 to 8500 feet below sea level. The bromine on the Property was first mined in 1965 by pumping the brine through well bores that penetrated the Smackover Formation.

The bromine concentrations, from independent sources[xix, 3] to 6609 parts per million with an average of 5702 (Figure 6-7).

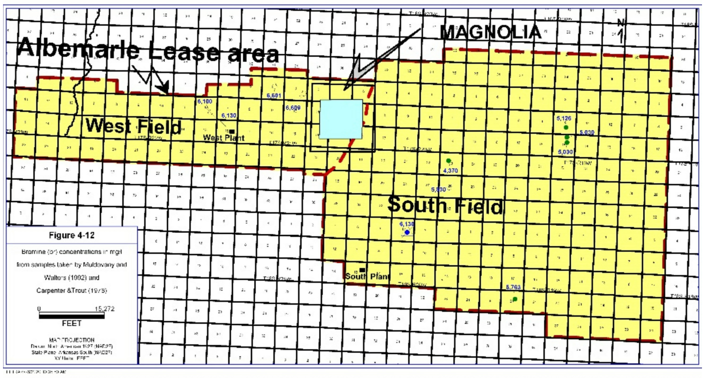

Figure 6-7: Bromine Concentration Map

The samples have good scatter across the Property with concentrations highest in the West Field diminishing slightly to the east in the South Field. These independent samples taken from producing oil or brine wells indicate excellent distribution of the bromine mineralization within the brine on the Property.

The upper and middle Smackover have porosities that range from 1% to over 28% and permeabilities from .1 millidarcy to over 8900 millidarcies. The rock with sufficient porosity ranges in thickness from 35 feet in the southern portion of the South Field to 262 feet in the northern portion of the South Field. Throughout most of the Property the porosity thickness is greater than 100 feet except in the southern half of the South Field where the average is less than 100'. The thick intervals tend to trend east and west following the depositional strike. The connectivity of the porous body of the upper Smackover is very good throughout the Property and can be recognized in the well performance between production and injection wells.

The mineralization occurs within the highly saline Smackover Formation waters or brine where the bromide has an abnormally rich composition. The bromine is more than twice as high as that found in normal evaporated sea water[19]. The bromine mineralization of the brine is distributed throughout the porous intervals of the upper and middle Smackover on the Property. The very good permeability and porosity of the Smackover grainstones provide excellent continuity of the bromine mineralization within the brine.

6.4 Deposit Type

Bromine is a chemical element with an atomic number of 35, an atomic weight of 79.904 and is a member of the halogen elements of the periodic table. It is a deep red noxious liquid that got its name from the Greek word bromos, meaning bad smell or stench[20]. It occurs naturally as soluble and insoluble bromides in the earth's crust and becomes concentrated in seawater from erosion of the crust and deposition into the sea with normal concentrations of 60-65 parts per million of bromine.

The bromine in sea water does not precipitate from sea water during the process of evaporation as does halite and other evaporate minerals, therefore the concentrations of bromine increase over time through the evaporation of the sea water. The brine water found in the Smackover Formation in some areas of South Arkansas contains up to 6600 parts per million or mg/l of bromine. These concentrations are similar to those found in the waters of the Dead Sea, which has over 2400 meters of halite deposits beneath it and is thought to be the main source of the bromine from the dewatering of the halite at depth[19]. Sodium-calcium chloride brines appear to originate as interstitial fluids in evaporates (salt or halite and other evaporites) and are subsequently expelled or dewatered as the result of compaction from the deposition of younger overlying sediments[21i,22]. The bromine rich brine of the Smackover Formation is thought to have originated from the interstitial fluids within the salt deposits of the Louann Formation and expelled upward through faults and fracture into the Smackover during deposition of the Smackover and younger overlying sediments. Moldovanyi and Walters (1992) suggest that the brine may have been further enriched in bromine through the dissolution and recrystallization of the Louann salt by meteoric waters that may have penetrated the Louann through faults of the South Arkansas Fault System releasing more bromine into the waters.

The deposit that occurs on Albemarle Corporation Property is a confined bromine enriched brine deposit. The brine is confined within the porous intervals of the Jurassic Smackover Formation mostly in the upper 300' of the formation. This being the aquifer, it is bounded at the top by the impermeable anhydrite and shale of the Buckner Formation. The base of the aquifer is bounded by impermeable carbonate mudstones and shale in the lower Smackover. There are no lateral boundaries to the east and west as well as to the north. Although no boundary is found on the south side, the porous interval does thin to less than 50 feet just south of the Property boundary.

6.5 Static Geological Model

In order to describe the Magnolia field geology for use in determining in-place bromine volumes, and deriving bromine production forecasts, RPS constructed a three-dimensional (3D) geological model of the reservoir. The geological model grid captures all the data and the knowledge available about the sedimentology, stratigraphy, structure and about the rock characteristics of the Smackover in the Magnolia field. This information was gathered, interpreted, and combined into the Static Geological Model from a variety of sources including:

- Historical Albemarle and publicly available drilling log data
- Historical geological interpretations via contract geologists
- Multiple iterations of clinoform based interpretation of Smackover formation

7 EXPLORATION

7.1 Historical Exploration

Exploration for bromine rich brine preceded the initial brine production, which began in 1965 in the West Field and 1969 in the South Field. Since that time, the two fields have been under development by Albemarle and its predecessors as wells were drilled to add to or extend the infrastructure of both fields to its current day extent. The Property has had many wells drilled to the Smackover Formation in the search for oil and gas over many years. These wells give Albemarle information about the thickness and quality of the permeability and porosity of the Smackover Formation in areas that have not been developed to this point. Regional studies on the Smackover brine in South AR done by Walters and Moldovanyl, 1992 and Carpenter and Trout, 1978, provide information on bromine concentrations from particular wells on the Property and the surrounding area. This information and information regarding the physical characteristics of the Smackover have reduced the need for exploration on the Property.

7.2 Current Exploration

No exploration has been conducted on the property in the past year, and as such, no exploration activity results are included in this report.

8 SAMPLE PREPARATION, ANALYSIS, AND SECURITY

As the Magnolia field is currently on full commercial production, sample preparation, analysis, and security are discussed in Sections 10.1 and 10.3 of this report.

9 DATA VERIFICATION

The data set used in this study was collected from various agencies, from companies and from data generated and collected from Albemarle Corporation's ongoing brine operations. Well logs, core analysis, production, and sampling data were all integrated to produce the mineral resource and reserve estimates. Well logs obtained from the client were compared with those available with the Arkansas Oil and Gas Commission (AOGC) in case of any discrepancy. The different gamma ray curves, density curves, acoustic curves and resistivity curves were compared with the well logs for accuracy. The Smackover subsea elevations were checked and compared with AOGC or Albemarle records for verification. Production data volumes were checked with AOGC records. Sampling of brine and authentication and procedures are described in the Sample Prep, Analysis and Security chapter of this technical report.

Due diligence on the collection of data, the validation of the data and the interpretation of the data has been sufficient to ensure the accuracy for use in this technical report. These available information and the sample or well density are adequate to allow a reasonable estimate of the geometry, tonnage, and continuity of the mineralization to model and establish confidence in the estimation of the mineral resources and mineral reserves of bromine on the Albemarle property found in this report.

10 MINERAL PROCESSING AND METALLURGICAL TESTING

The methods used to test the quality of the brine before it reaches the Magnolia plants are discussed in this chapter. Understanding the quality of the brine before it enters the plant is critical to ensure that the plant feed is consistent. The analytical procedures discussed herein are not typically used in the mining and exploration industry (e.g., geochemical assaying); however, the methods employed are sufficient for Albemarle to run its plants properly and efficiently. Site inspection was not possible because of COVID-19 travel restrictions; therefore, the sampling process has been described by Albemarle.

10.1 Brine Sample Collection

The Magnolia bromine field and production wells and facilities were designed for the explicit purpose of gathering substantial quantities of brine for transport to the central bromine production facilities. Once at the facilities, the bulk brine is processed to produce bromine. Concentration measurements of the bromide salts (hereafter referred to as bromides) are critical to the successful operation of the bromine plants. The brine consistency is critical for forecasting various bromine derivative production, alignment with forecast sales and the overall health of the Albemarle/Magnolia bromine business.

Bromide samples from the Magnolia brine plants are collected in two strategic locations: (1) upstream of the bromine tower and (2) downstream of the bromine tower. Because of the nature of brine collection, the feedbrine (i.e., upstream brine) concentration of bromine remains relatively consistent; however, the concentration does vary as would be expected from brine extracted from the Smackover geologic formation, the source of brine for the Magnolia plants. Feedbrine samples are therefore frequently taken to capture concentration changes and more effectively adjust downstream operating parameters.

Tailbrine (i.e., downstream brine) samples are also taken frequently, primarily to ensure that existing parameters at the bromine tower are set correctly. Magnolia operators collect brine samples multiple times per day and as requested by plant management. The sampling method includes the following steps:

1. Travel to each feedbrine and/or tailbrine sampling area within the plants
2. Slowly open the sample valves to purge out collected debris or stagnant brine to ensure that the samples collected are representative of the actual flow
3. Collect approximately 1 liter of brine within the sample bottle (roughly filling to the bottle’s capacity)
4. Label the sample bottle with the date, time, and name of the operator who collected the sample. The label also indicates if the sample corresponds to feedbrine or tailbrine. Cap the bottle and transport to the on-site analytical laboratory for testing.

Because of the long-established operation of the Magnolia bromine plant, the samples collected at both feedbrine and tailbrine collection sites are only regularly tested for bromide salts. The composition of the feedbrine and tailbrine, in terms of additional salt content outside of the bromide salts, has been very consistent over the last several years of production, and consists of magnesium, sodium, calcium, and potassium chlorides. Density measurements are not frequently taken based on the lack of density change in the brine over time.

10.2 Security

Samples are taken directly from the sampling points to the internal Magnolia quality control (“QC”) laboratory. Samples are verified by the QC laboratory technician and operator during delivery and tracked through an electronic sample monitoring system where samples are given a designated number and the results of analytical tests are posted. Samples are not sent to external laboratories for testing; however, some samples are sent to internal analytical laboratories at different Albemarle sites (primarily the Process Development Center in Baton Rouge, Louisiana) for various other tests that are immaterial to plant operations but do provide quality assurance as duplicate sample analysis.

A check standard is run for each titration and if the test passes the actual sample is analyzed. If the sample fails, the instrumentation is recalibrated. The laboratory does not hold any internationally recognized certifications.

10.3 Analytical Method

Halogen titration is the current process to measure bromine in brine. This method is widely used across the company for measuring bromine because of its simplicity and no complex machinery/analytical tools are required. The method involves use of different concentrations of chemicals for feedbrine and tailbrine. Firstly, a buffer solution is prepared by adding sodium fluoride and sodium dihydrogen phosphate in deionized water. Clorox bleach is then added, and the solution is heated on a hot plate for 15 minutes. Sodium formate is then added, after which the solution is heated for an additional 5 minutes and then cooled to room temperature. Potassium iodide and sulphuric acid is then added to the solution and then the solution is titrated with sodium thiosulfate until starch endpoint.

It is the QP's opinion that Albemarle's laboratory facilities meet or exceed the industry standard requirements for such facilities and that the implemented practices for the collection and preparation of samples, as well as the methodology followed to carry out the analytical work (including the sample security protocols) are based on industry best practices and, therefore, are adequate for their intended purposes.

The QP has reviewed the analytical method as provided by Magnolia and the method appears to be reasonable and well-established.

11 MINERAL RESOURCE ESTIMATES

All bromine mineral accumulations of economic interest and with reasonable prospects for eventual economic extraction within the Magnolia production lease area are either currently on production or subject to an economically viable future development plan and are classified as reserves. Therefore, there are no additional mineral resource estimates included in this evaluation.

The Magnolia facility has an established record of commercial production and, therefore, the reliability of the economic forecast operation is high. From the technical point of view, the quality of the feed, the expected recoveries and other key factors are well understood, by virtue of many years of operation.

The capital and operational costs correspond to a Class 1 estimate and therefore are also significantly accurate (between -10% and +10%), which minimizes the potential impact of those elements on the prospect of economic recovery. Economic factors have also been discussed at length in various sections of this technical report and it is the QP’s opinion that they do not present any significant risk that could jeopardize the expected economic recovery of the operations. Moreover, it is the QP’s opinion that no additional studies are required.

The observed reduction in resources, when compared to the figures reported in 2021 is due to the depletion corresponding to the production during 2022.

12 MINERAL RESERVE ESTIMATES

Bromine mineral reserves estimates have been derived using a reservoir simulation model of the Magnolia Smackover field. The simulation model was built using an industry standard modeling platform, utilizing the static geomodel described earlier in Section 6 of this report. The model was used to forecast brine production in the Albemarle licenced areas using the Albemarle corporate business development plan. This section of the report describes production forecasts and reserves estimate produced by the model.

The observed reduction in reserves, when compared to the figures reported in 2021 is due to the depletion corresponding to the production during 2022.

12.1 Mineral Reserves Classification and Production Forecasts

The production forecast generated by the reservoir simulation model was utilized to generate reserves values as follows:

a. Production forecasts for each of the Proved reserves case and Proved + Probable reserves case (also denoted as “1P” and “2P”, respectively, in this report), were input to an economic evaluation model to determine the commercial viability of production.

b. Both forecasts were generated for fifty years of production.

c. Then, economic models were run out in time to determine the economic limit for the field under each reserve case. The production volumes up to the point of economic limit then constitute the reserves for each case.

12.1.1 Probable Reserves

The fifty-year production forecast generated by the history matched reservoir simulation model, using the Albemarle business plan for future development of the field is considered to be the “most likely” forecast to be realized on the existing licenced area. Therefore, for the purposes of this reserve evaluation, utilizing the definitions of mineral reserves categories, RPS has classified this forecast as the Proved + Probable (“2P”) reserves level.

12.1.2 Proved Reserves

The Proved reserves, by definition, constitute reserves volumes where there is a higher degree of confidence in the forecasts. In generating the production forecasts using a history matched reservoir simulation model, with in turn is based on a geological model built using reservoir geometry and property data from existing wells, the major uncertainties in the forecasts are considered to be related to the reservoir properties at infill drilling locations (locations of the reservoir not yet supported by actual well data.) The uncertainties in reservoir properties are considered to be directly related to the distance of the respective locations from existing well control. For the proved reserves case, to incorporate these uncertainties and reflect them into a production forecast, RPS has discounted the “most likely” forecast derived by the simulation model as follows:

- All existing development wells: Discount forecast by 10%
- For new development wells:
  - For wells within 1 mile of existing well control: discount forecast by 20%
  - For wells within 1 to 2 miles of existing well control: discount forecast by 30%
  - For wells more than 2 miles from existing well control: discount forecast by 40%

12.1.3 Reserves Classified Production Forecasts

The production forecasts derived as described above for the Proved + Probable and Proved reserves cases are shown in the following chart (Figure 12-1):

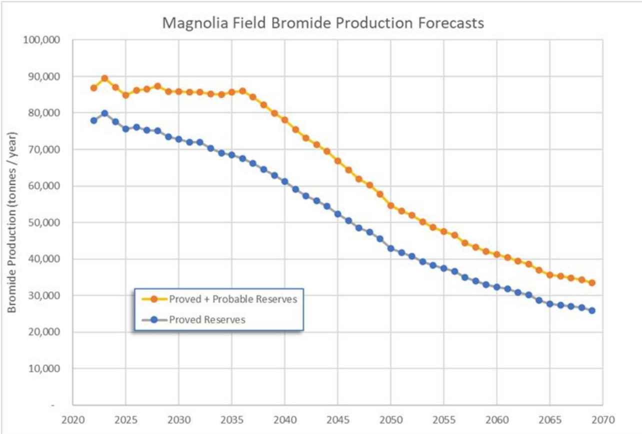

Figure 12-1: Bromide Production forecasts

The cumulative production as of the effective date of this report is 4.13 million tonnes (raw) and 3.87 million tonnes (sales).

The total future forecast production volumes and total ultimate recovery from the leased area of the Magnolia field are summarized in Table 12-1. The Bromine produced by Albemarle is essentially pure elemental Bromine, measured at >99.99% purity.

The cut-off grade is an industry-accepted standard expression used to determine what part of a mineral deposit can be considered a mineral resource. It is the grade at which the cost of mining and processing the ore is equal to the desired selling price of the commodity extracted from the ore.

The considered sales price ranges between USD 3,560 and USD 6,480 per tonne and the operating cost ranges between USD 850 and USD 1150 per tonne, as detailed in Section 18 of this report.

The cut-off grade of the Magnolia operation has been estimated to be at 1,000 ppm. The bromide ion concentration in the brine extracted from the Smackover Formation, which feeds to bromine plants, significantly exceeds the selected cut-off grade.

Table 12-1: Bromine Recovery Factors

	Bromine Recovery		
	Raw Bromine (Million Tonnes)	Sales Bromine (Million Tonnes)	Recovery Factor (%OBIP)*
Albemarle OBIP	8.48		
Cumulative Production	4.13	3.87	49%
Forecast Recovery (1P)	2.69	2.50	32%
Forecast Recovery (2P)	3.30	3.07	39%

Ultimate Recovery (1P)	6.82	6.37	75%
Ultimate Recovery (2P)	7.43	6.94	82%

*Recovery factor calculations (Sales/Raw OBIP) are based on sales production, as the difference between raw and sales volumes is injected back into the reservoir

Being a mature project with significant historical production information, the reliability of the modifying factors for Magnolia are considerably high and therefore the risks associated with those modifying factors are relatively low.

It is the QP's opinion that the material factors that could cause actual results to differ materially from the conclusions, estimates, designs, forecasts or projections, including recovery factors, processing assumptions, cut off grades, etc., are well understood and, due to the nature of the deposit and the established extraction and processing operations, they are unlikely to significantly impact the mineral reserve estimates.

13 MINING METHODS

All bromine mineral extraction is conducted using supply (production) wells, producing brine from the subsurface Smackover Sands aquifer, as described in previous sections of this report. The produced brine is transported from the production wells via underground pipelines to two production processing plant facilities, where the bromine is extracted. The tailwater from the processing plants is transported back to the Magnolia field via underground pipeline, where it is re-injected into the same Smackover Sands aquifer via injection wells, providing reservoir pressure maintenance support to the brine producing operations. Figure 13-1 shows a simplified schematic of the complete system used by Albemarle.

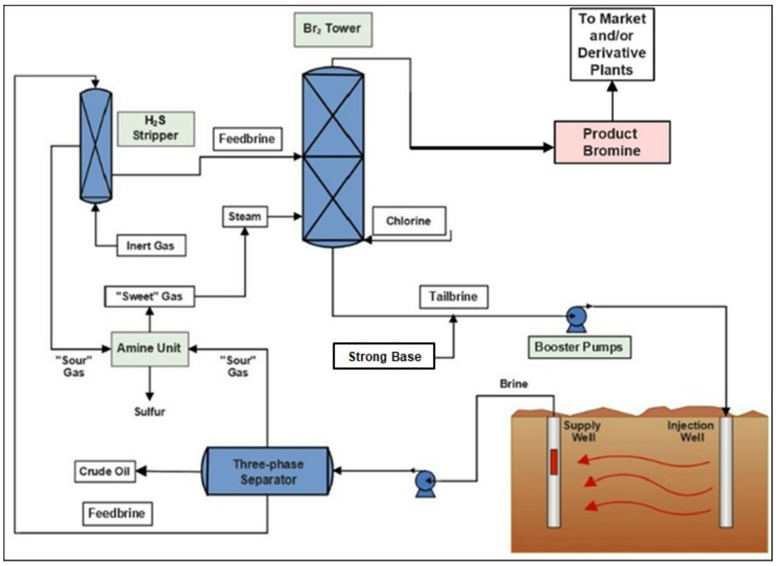

Figure 13-1: Schematic depiction of the bromine extraction and recovery process at Magnolia's South and West Plants

Previous sections of this report explain the importance of the two types of wells included in the brine extraction and reinjection used by Albemarle, namely the brine supply wells and brine injection wells, which are depicted in Figure 13-2.

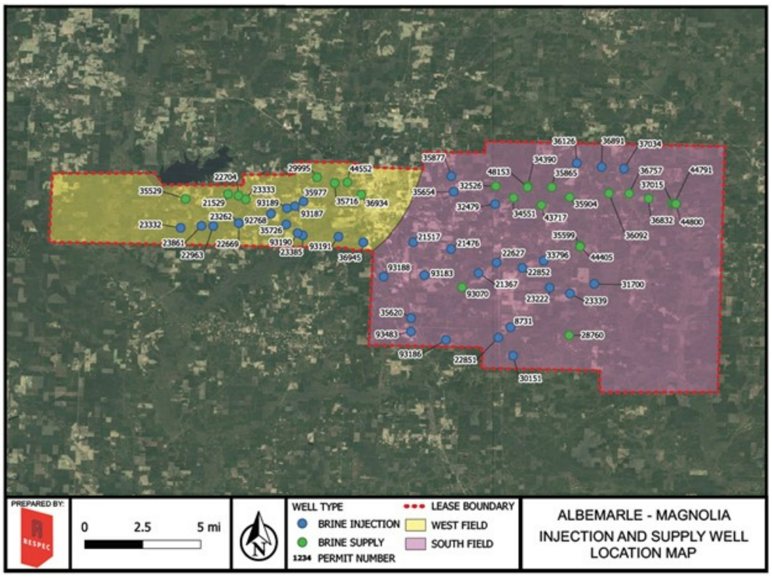

Figure 13-2: Albemarle Magnolia – Supply and Injection Wells

The bromine production process is not a typical mining/mineral processing sequence, however for the purposes of this report, all the steps involved in recovering the brine from the supply wells and its preliminary preparation to be put into the bromine separation plants will be considered “mining” activities, while the processes that takes place inside the bromine plants for the separation of the elemental bromine will be included under the processing and recovery methods.

Figure 13-3 shows a simplified schematic of the portion of the system used by Albemarle to extract the brine from the Smackover formation and prepare it for processing at Albemarle’s bromine plants.

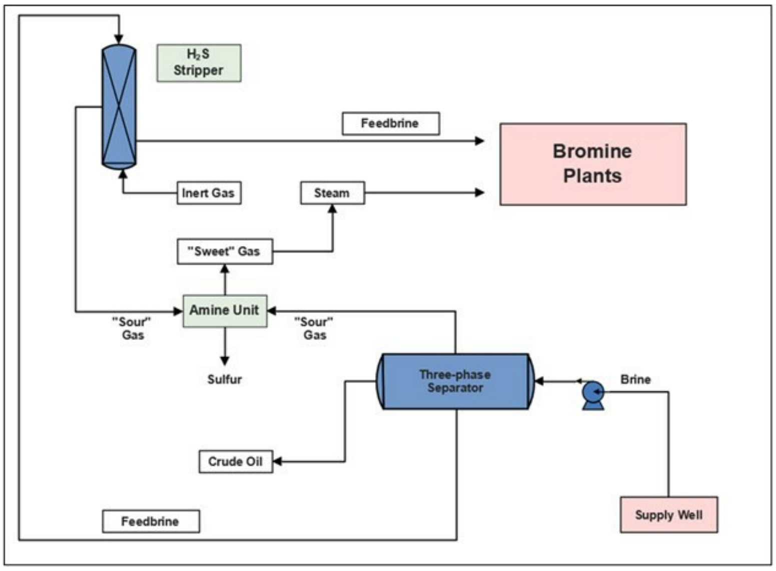

Figure 13-3: Schematic depiction of the brine extraction process at Magnolia's South and West Fields

13.1 Producing Brine at Supply Wells

Brine supply wells ("BSW"s) are utilized to pump brine from the Smackover formation to the surface. Downhole submersible pumps ("DHP"s) are used to elevate flow and pressure from the formation to the surface and are sized based on depth and downhole tubing size to provide an ideal production rate. The key components of the produced brine are chloride salts (primarily calcium and sodium, ~25 %) and bromide salts (sodium, ~1,000-5,000 parts per million ("ppm")). The high chloride-salt content results in the produced brine having a relatively high density (SG = ~1.2).

Figure 13-4 shows all the active Brine Supply Wells in Magnolia operated by Albemarle.

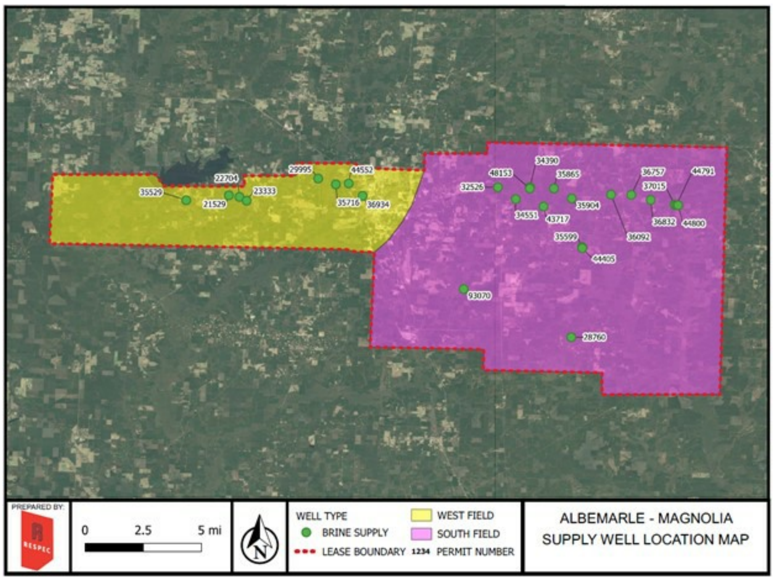

Figure 13-4: Albemarle Magnolia – Brine Supply Wells

After the brine reaches the surface, is processed in the field to remove co-produced oil and natural gas. Co-produced oil is separated into storage and later sales at the well head. Co-produced sour natural gas is fed into a gas handling system for transport to the main plants (South and West) for sweetening (H2S removal) and ultimately combusted as fuel for steam production. The magnitude of co-produced oil and natural gas depends upon location of the well in the field.

13.2 Transporting Brine and Gas from Wellheads to Processing Plants

Upon being discharged from the wellhead booster pumps, the brine flows into a network of pipelines which transports the brine to the main processing plant. A similar, separate system of pipeline transports the produced sour gas from the wellhead to the plant. Both networks operate in parallel in the same right of way ("ROW") to provide efficiency installation and maintenance.

The network of pipelines stretches over tens of miles and is comprised of a combination of both fiber-reinforced plastic ("FRP") and Transite (asbestos-cement) pipeline. Historically, Transite pipelines were used due to their relatively low-cost, availability, and effectiveness. However, since the field has considerably expanded and innovative technology/materials have become available, new pipeline additions use FRP to provide improved protection against leaks, improved compatibility, greater pressure ratings, in addition to overall safety. Ongoing maintenance includes replacing the current Transite pipeline with FRP, particularly closer to the plant.

The sour gas flows through a steel pipeline designed for sour gas service, meeting the demands of the National Association of Corrosion Engineers ("NACE") Standard MR0175 (Petroleum and Natural Gas Industries – Materials for Use in H_2S-containing environments in oil and gas production), and also FRP. Pipeline sizing is determined by flowrate and pressure drops requirements throughout the field.

The pressure with which the brine and gas exit the wellhead is not high enough to flow under natural pressure to the plant. Therefore, there are brine booster facilities as well as natural gas compressor stations to aid in transferring the brine along with gas to the Plants.

13.3 Sour Gas Treatment

Natural gas is usually considered sour if it contains more than 4 ppm by volume of hydrogen sulfide ("H_2S") at standard temperature and pressure conditions.

Amine gas treating, also known as amine scrubbing, gas sweetening and acid gas removal, refers to a group of processes that use aqueous solutions of various alkylamines (commonly referred to simply as amines) to remove H_2S and carbon dioxide ("CO_2") from gases.

At the Magnolia field, the sour gas enters an amine unit as soon as it arrives at the South Plant. This unit is designed to sweeten (remove H_2S) the gas, in order to improve its downstream processing and handling. The amine unit treats the gas using a counter-current absorption process in which the gas flows upwards and a lean amine flows downward. In the absorber, the amine reacts with H_2S and CO_2, removing it from the gas. Nearly all of the H_2S is consumed by the amine.

The sweetened gas, which at this point is primarily methane natural gas and nitrogen, is sent to the boilers for combustion and heat generation

The enriched amine is sent to a stripper unit where steam is directly injected to remove the sour gas from the amine.

Any residual water vapor within the sour gas is condensed/captured in knockout drums and the sour gas, containing nearly all of the H_2S and most of the CO_2, is sent further downstream.

The H_2S rich gas is sent to either a Claus Plant for further conversion to elemental sulfur or to a plant that produces NaHS.

13.4 Life of Mine Production Schedule

The following tables summarize the life of mine production schedule of the project for the 1P (Proved Reserves) and 2P (Proved + Probable Reserves) scenarios. Columns beyond year 2032 have been combined and the values under 2033+ correspond to the sum of the individual figures through year 2069. When applicable, like in the case of well counts, the reported number corresponds to the annual average number of wells between the years 2033 and 2069.

Table 13-1: Life of Mine Production schedule (1P Scenario)

SUMMARY OF BROMINE FIELD RESERVES, PRODUCTION AND CASHFLOW

COMPANY: Albemarle Corporation
OPERATOR: Albemarle Corporation

FIELD: Magnolia
WORKING INTEREST: 100.0%
RESERVES CLASS: Proved (1P)

EFFECTIVE DATE OF ANALYSIS: 12/31/2022

RESERVES		Total Field Gross	Total Field Net	Company Share Gross	Company Share Net
Bromine	(K Tonnes)	2,419	2,419	2,419	2,419

FULL FIELD GROSS PRODUCTION Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Production Wells		21	21	21	22	19	20	20	21	22	22	24	-
Injection Wells		34	35	36	36	36	36	37	38	38	38	39	-
Annual Gross Production & Injection													
Brine Production	(MMbbl)	151.6	150.2	150.5	149.9	143.1	145.1	145.7	147.7	149.3	149.5	4,598.1	6,081
Brine Injection	(MMbbl)	153.4	156.7	158.5	154.5	145.9	146.8	152.0	159.2	161.1	160.6	4,980.4	6,529
Bromine Production	(k Tonne)	80	78	76	76	75	75	73	73	72	72	1,669	2,419

Table 13-2: Life of Mine Production schedule (2P Scenario)

SUMMARY OF BROMINE FIELD RESERVES, PRODUCTION AND CASHFLOW

COMPANY: Albemarle Corporation
OPERATOR: Albemarle Corporation

FIELD: Magnolia
WORKING INTEREST: 100.0%
RESERVES CLASS: Proved + Probable (2P)

EFFECTIVE DATE OF ANALYSIS: 12/31/2022

RESERVES		Total Field Gross	Total Field Net	Company Share Gross	Company Share Net
Bromine	(K Tonnes)	2,984	2,984	2,984	2,984

FULL FIELD GROSS PRODUCTION Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Production Wells		21	21	21	22	19	20	20	21	22	22	24	-
Injection Wells		34	35	36	36	36	36	37	38	38	38	39	-
Annual Gross Production													
Brine Production	(MMbbl)	151.6	150.2	150.5	149.9	143.1	145.1	145.7	147.7	149.3	149.5	4,598.1	6,081
Brine Injection	(MMbbl)	153.4	156.7	158.5	154.5	145.9	146.8	152.0	159.2	161.1	160.6	4,980.4	6,529
Bromine Production (Sales)	(k Tonne)	90	87	85	86	87	87	86	86	86	86	2,119.7	2,984

14 PROCESSING AND RECOVERY METHODS

This chapter will describe the methods employed by Albemarle to process the bromine-rich brine from and obtain essentially pure (>99.99%) elemental bromine at its South and West Plants.

Figure 14-1 shows a simplified schematic of the portion of the system used by Albemarle to process the bromide-rich brine from the Smackover formation and recover elemental bromine.

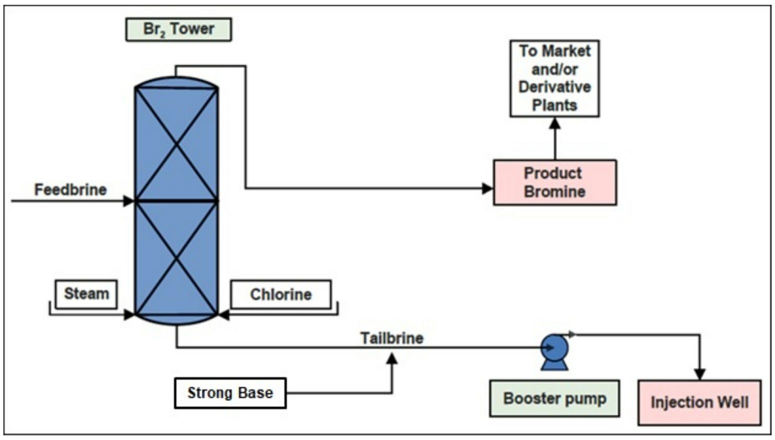

Figure 14-1: Schematic depiction of the bromine recovery process at Magnolia's South and West Plants

14.1 Bromine Production

Feedbrine from the brinefield supply wells in the South Field enters the plant downstream of the DS-7 booster station at a flow rate of between 8,000 and 10,000 gpm. The feedbrine then passes through a hydrogen sulfide (H_2S) stripper that removes the bulk of H_2S. This gas is then sent to the Amine/Claus plant described in previous chapters of this document. The stripped brine flows to the feedbrine tank, which acts as a surge capacity vessel and allows for a small amount of oil removal through extended residence time.

Feedbrine is pumped out of the feedbrine tank to the bromine tower. The feedbrine generally enters the tower with a temperature of 180-190°F.

The main reaction to transform the bromide salts in the feedbrine into bromine consists of the inclusion of chlorine in the tower. Liquid chlorine is brought into place by railcars and vaporized through chlorine vaporizers. The quantity of chlorine necessary is determined by the bromide salt concentration of the feedbrine. The inclusion of chlorine changes the bromide salts to elemental bromine and creates chloride salts within the feedbrine.

In order to strip the bromine from the feedbrine, steam is put into a tower to boil the bromine.

The stripped bromine leaves the tower overhead with water, chlorine, and light natural impurities as a vapor. The vapor stream then goes through a main condenser and secondary condenser, using water as their cooling medium. The condensed fluid out of both exchangers is combined into a phase separator, in which the bromine settles to the bottom as a result of its higher density. At this point of the process, the bromine is classified as "crude" due to the presence of organic impurities, chlorine, and water. The crude bromine drains by gravity and is then pumped to the purification train and derivative plants.

The process described above is the same in the West Plant, with the only difference being the sizing and capacities of the equipment

14.2 Tailbrine Treatment

At the bromine tower, once the bromine has been stripped of its bromine content, the brine is referred to as tailbrine. Normal conversion rates of bromide salts within the tower are over 90%, and sometimes more than 95%.

Considering the existence of acid and residual chlorine and bromine, the pH level of the tailbrine is particularly low and has to be dealt with before disposal.

Soon after passing through a heat recovery system, the tailbrine flows by gravity towards the neutralization tanks where a strong base to adjust the pH. After pH adjustment the tail brine is cooled before being reinjected. There is adequate tail brine surge capacity between the plant and the injection operations.

14.3 Disposing of Tailbrine at Injection Wells

Albemarle currently operates approximately 37 brine injection wells (“BIW”) between the South and West fields. All BIWs inject the tailbrine into the Smackover Formation, the same reservoir zones as the supply wells’ completions.

Figure 14-2 shows all the active BIWs in Magnolia operated by Albemarle.

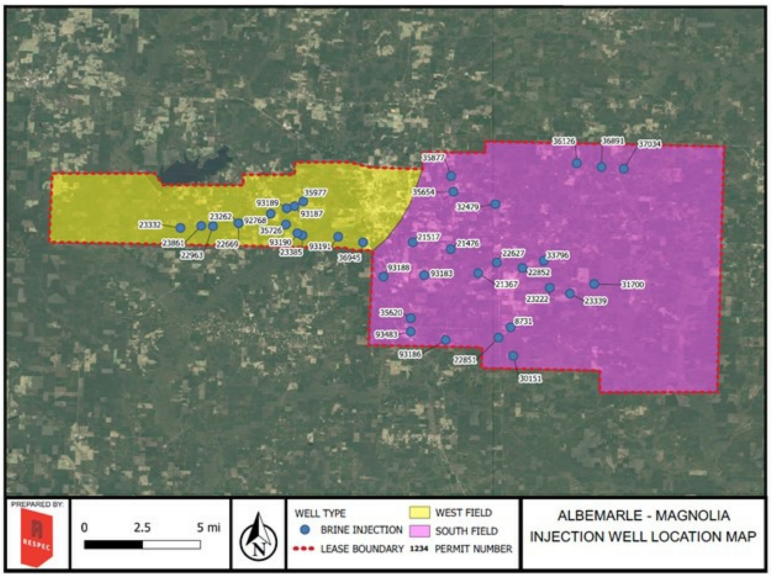

Figure 14-2: Albemarle Magnolia – Brine Injection Wells

In the South Field, tailbrine is pumped from the tailbrine tank into the brinefields with its final destination being 21 injection wells from where it is pumped back into the Smackover Formation for disposal.

15 INFRASTRUCTURE

Albemarle operates two production facilities in Columbia County, Arkansas: The West Plant and the South Plant. The West Plant is located approximately seven miles west of Magnolia, Arkansas. The South Plant is located approximately three miles south of the City of Magnolia. Pipelines run between the two plants and from the plants back to subsurface brine supply (production) wells. The production wells produce bromine rich brine from the Smackover geological formation.

The Magnolia-area operation dates back to 1969 when the Bromet Company began a small bromine extraction operation at a Smackover Brine Formation plot located south of the city along Hwy. 79. The plot is now the site of Albemarle's South Plant.

Ethyl, as the company was later known, in 1987 absorbed Dow Chemical's operation at what is now the West Plant. In 1994, Ethyl's chemical operations were spun off into the Albemarle Corporation.

The principal use of the South Plant is production of flame retardants, bromine, inorganic bromides, agricultural intermediates and tertiary amines, while the West Plant's produces flame retardants and bromine.

15.1 Road and Rail

15.1.1 Roads

The City of Magnolia, the South Plant, and the West Plant are serviced by several roadways. The South plant is accessible via US Route 79 ("US-79") that runs north-south to the City of Magnolia to the north and the State of Louisiana to the south. The West Plant is accessible by US-371 that runs east-west to the City of Magnolia to the east. Additional major thoroughfares in the area include Arkansas Highway 19, 98, 160, and 344. These smaller roads are used for travel to the decentralized well sites around the brinefields.

US-79 is a United States highway in the southern United States. The route is officially considered and labeled as a north-south highway. The highway's northern/eastern terminus is in Russellville, Kentucky, at an intersection with U.S. Highway 68 and KY 80. Its southern/western terminus is in Round Rock, Texas, at an intersection with Interstate 35, ten miles (16 km) north of Austin.

In Columbia county US-79 continues northward from Louisiana into Emerson and then Magnolia, where it has a brief concurrency with US-82 through the city. From there, the route turns to the northeast, through Camden, where it intersects US-278, and Fordyce, in which it has a brief concurrency with US-167.

Figure 15-1 shows the road network that serves the Albemarle plants.

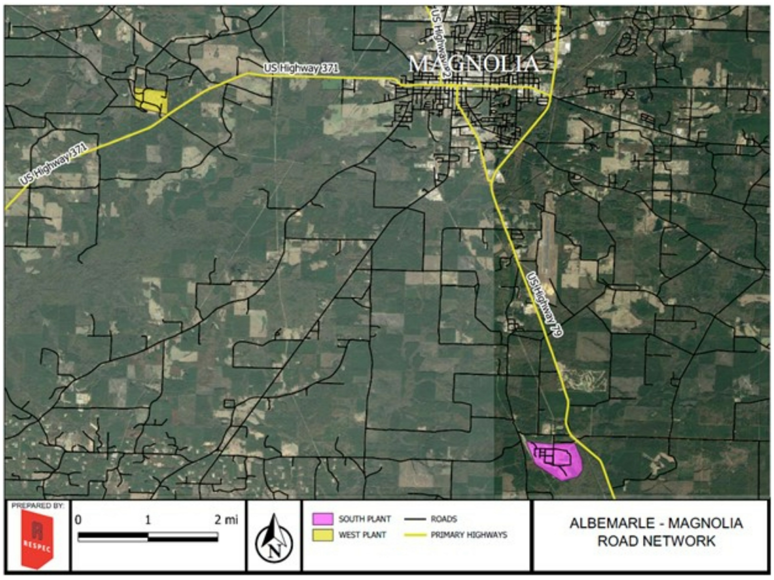

Figure 15-1: Road Network

15.1.2 Rail

Union Pacific ("UP") and the Louisiana & Northwest Railroad ("LNW") provide rail service in Columbia County, Arkansas. UP owns and operates Class I lines nationwide and LNW is a 68-mile, freight short line railroad (Class III). Both Albemarle plants have dedicated rail spurs that provide access to the UP and LNW lines, allowing the transportation of products all over the country.

Figure 15-2 shows the rail network that serves the Albemarle plants.

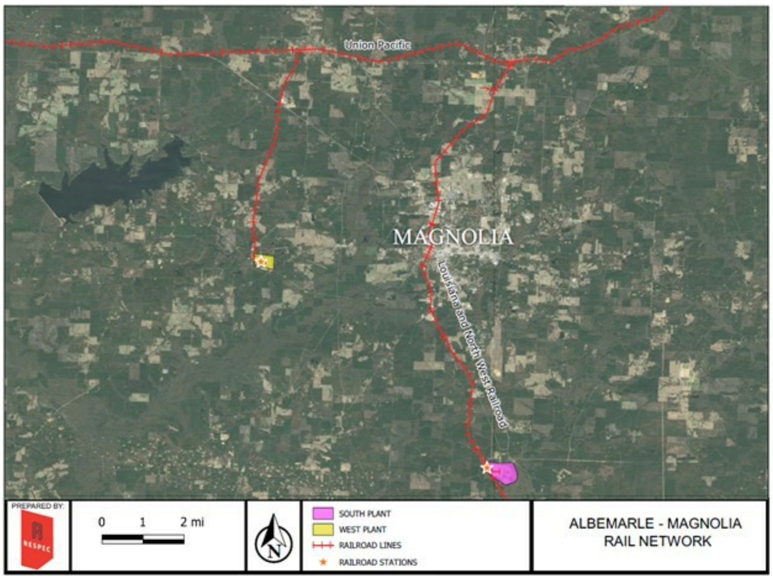

Figure 15-2: Rail Network

15.2 Port Facilities

The closest port is the Port of Houston. Several warehouses in the Houston area stockpile Albemarle finished products for distribution around the country and around the world. Products and supplies that are offloaded in Houston (or other nearby ports including New Orleans), are transported by road to Magnolia via trailer. The port system is not heavily involved in day-to-day production in Magnolia.

15.3 Plant Facilities

15.3.1 Water Supply

Fresh water is supplied to both the South and West plants via Albemarle owned and operated water wells. The wells are drilled into the Sparta Aquifer, a confined aquifer within the Mississippi embayment aquifer system, mostly localized in Arkansas but extending into Louisiana, Mississippi, Missouri, and Tennessee.

The Sparta aquifer is an excellent source of water because of favorable hydrogeologic characteristics. The thickness of the Sparta aquifer in Arkansas ranges from less than 100 feet ("ft") near the outcrop area up to 1,000 ft in the southeastern part of the State. Through most of the aquifer's extent in Arkansas, it is underlain by the Cane River formation and overlain by the Cook Mountain formation. These two formations are low-permeability, fine-grained, clay-rich units that confine flow within the much more permeable sands of the Sparta Sand. Water enters (recharges) the Sparta aquifer from the outcrop areas and adjacent geologic units. The outcrop areas provide hydraulic connection between the aquifer and surface-water sources such as rivers, lakes, and percolation of rainfall. Before development of the aquifer as a water resource (predevelopment), flow in the aquifer was predominantly from the topographically high outcrop areas downdip to the east and southeast. The aquifer in Arkansas County is confined by the Cook Mountain confining unit. Depth to the Sparta aquifer in Arkansas County ranges from 300 to 700 feet below land surface, with thickness varying from 500 to 800 feet.

The water quality of the Sparta is such that it is used as residential potable water in the City of Magnolia and surrounding areas. Three water wells are used to supply potable water to the South plant with a nominal flow of 1000-1200 gallons per minute to supply the whole site. Process requirements, including injection wells are approximately 650 GPD.

Two additional water wells are used to the supply potable water to the West plant, where the demand from the plant is far outstripped by the water capacity of those two wells.

15.3.2 Power Supply

Electricity is provided to the South Plant, West Plant, and brinefields by Entergy Arkansas, LLC (“Entergy”), a utility company that has served Arkansas customers for more than 100 years. Entergy companies serve approximately 715,000 customers in 63 counties and have approximately 3,500 employees in Arkansas. Entergy owns and operates the substation(s) at each property and within the brinefields.

Arkansas ranks among the 10 states with the lowest average retail price for electricity. According to the Energy Information Administration, industrial electricity in Arkansas[23] is approximately 11 percent less expensive than the U.S. average as shown in Figure 15-3, which represents a strategic comparative advantage for industries located in the state.

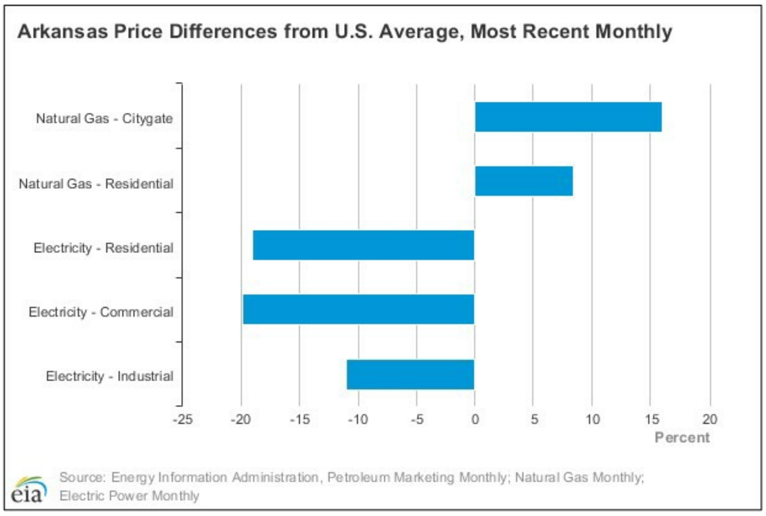

Figure 15-3: Arkansas Energy

115-kV systems are responsible for transmitting power from the larger transmission systems and generation facilities throughout the entire state of Arkansas. Some large industrial customers, such as Albemarle, are served directly from 115-kV systems.

Figure 15-4 shows the main power and distribution lines, as well as the location of the substations that serve the Albemarle plants in Magnolia.

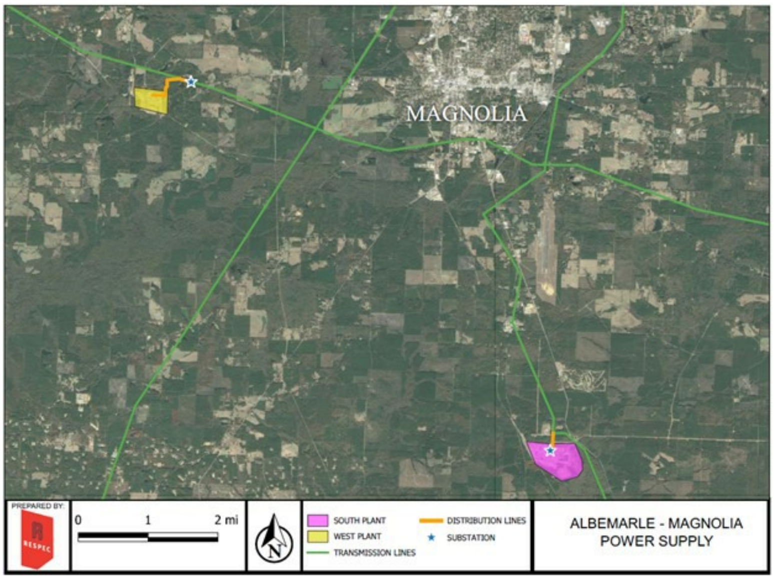

Figure 15-4: Albemarle-Magnolia Power Supply

Most industries need 2,400 to 4,160 volt power supply to run heavy machinery and they usually have their own substation at their facilities, as is the case of Albemarle's South and West Plants.

For the South Plant, there are two transformers within the substation: (1) 20MVA transformer dedicated to the plant itself where approximately 13 MVA is used when the plant is fully operational. The other transformer is a 10 MVA transformer that feeds offsite loads including some brinefield operations, the nearby nitrogen generation plant, and others.

For the West Plant, there are two substations. The Magnolia Dow substation rated at 12.5MVA provides supply to the plant itself where approximately 13 MVA is used when the plant is fully operational. The Magnolia West substation is rated at 27 MVA and feeds offsite loads including some brinefield operations and others.

15.3.3 Brine Supply

The brine produced from the wells is conveyed to the plants via a network of gathering lines with pumps/booster stations as necessary. Depleted brine is returned and injected back into the formation. This process is discussed in detail in the Mining Chapter, Section 13.2.

15.3.4 Waste Steam Management

There are no significant dump sites for the brine/bromine process other than that described in the “Process Description” Section. Various derivative processes have solid waste streams that capture solids via filters. These are collected in localized areas around the plant sites and shipped off site for disposal. Due to the local climate, open air ponds for evaporation are not feasible so there has been an extended focus on stream recycling and process waste minimization over the 50-year lifetime of the Magnolia site.

16 MARKET STUDIES

16.1 Bromine Market Overview

As reported by Technavio [2021][24], a market research company, the global bromine market is expected to grow steadily at a Compound Annual Growth Rate ("CAGR") of around 4.02 percent from 2022-27. One major reason for this trend is the increased demand for plastics. Flame-retardant chemicals use bromine to develop fire resistance. Plastics are widely used in packaging, construction, electrical and electronics items, automotive, and many other industries. The increasing demand for plastics across various end-user industries is driving the demand for flame-retardant chemicals that in turn, will propel the bromine market.

Another trend that is responsible for a growing bromine market forecast is the growth in bromine and bromine derivatives used as mercury-reducing agents. Bromine derivatives are used in reducing mercury emissions from coal combustion in coal-fired power plants. Mercury emissions in the environment is a major concern for public health. The rising health concern along with stringent government regulations may increase global bromine market demand. The increased use of specialty chemicals in various end-use industries such as oil and gas, automobile, pharmaceuticals, and construction will also drive the demand for bromine.

16.1.1 Major producers

The major world producers of elemental bromine are Israel, Jordan, China, and the United States, as shown in Table 16-1. The bromine production from the United States is withheld to avoid disclosing company proprietary data. The world total values exclude the bromine produced in the United States.

Table 16-1: Bromine Production in Metric Tons by Leading Countries (2016-2021)

[Source: USGS Mineral Commodity Summary- Bromine]

Country	2016 (MMt)	2017 (MMt)	2018 (MMt)	2019[(a)] (MMt)	2020 (MMt)	2021[(e)] (MMt)
Israel	162,000	180,000	175,000	180,000	170,000	180,000
Jordan	100,000	100,000	100,000	150,000	84,000	110,000
China	57,600	81,700	60,000	60,000	70,000	75,000
Japan	20,000	20,000	20,000	20,000	20,000	20,000
Ukraine	3,500	4,900	4,500	4,500	4,500	4,500
India	1,700	1,700	2,300	2,300	3,300	3,000
Turkmenistan	500	—	—	—	—	—
United States	W	W	W	W	W	W
World Total (Rounded)	**345,000**	**388,000**	**362,000**	**420,000**	**352,000**	**390,000**

(a) estimated
W = withheld.

The prominent players in the global bromine market are Israel Chemicals Limited (Israel), Albemarle Corporation (United States), Chemtura Corporation (United States), Tosoh Corporation (Japan), Tata Chemicals Limited (India), Gulf Resources Inc. (China), TETRA Technologies, Inc. (United States), Hindustan Salts Limited (India), Honeywell International Inc. (United States), and Perekop Bromine (Republic of Crimea). The production from the major global bromine producers is also provided in Table 16-1.

16.2 Major Markets

The global bromine market is dominated by manufacturers who have an extensive geographical presence with massive production facilities, all around the world. Competition among the major players is mostly based on technological innovation, price, and product quality.

According to a report by Market Research Future [2021][25], which forecasts the global bromine market until 2023, the market is divided into five regions: Latin America, the Middle East and Africa, Asia Pacific, North America, and Europe. Among these, Market Research Future [2021][25] predicts that Asia would be the fastest-growing region for bromine consumption because of a growing population and increasing purchasing power in the developing nations. The growth of agriculture and automobile industries in countries such as China and India will also drive the increasing demand for bromine. North America will remain a dominant market, and developed industries such as cosmetics, automobile, and pharmaceuticals will affect the demand for bromine. The European region is expected to experience a moderate growth that will be driven by the cosmetic and automobile industries. The growing oil-and-gas drilling activities in Russia will also contribute to the growth of the bromine market.

16.3 Bromine Price Trend

The price of bromine gradually increased during the period 2014-2021. The price in January 2014 was approximately $2,800 per tonne and in January 2021 it had increased to approximately $5,200 per tonne.

In 2021, the price of bromine significantly increased, reaching a peak of $10,700 per tonne in November. The bromine spot price on the effective date of this report, December 31, 2022, was US$ 6,480 per tonne and the overall trend is towards a progressive decrease.

The above-described behavior of the market is the product of a combination of factors, including China's decrease in bromine production from brine due to the country's electricity curtailment policy.

Because the market for bromine is expected to grow and oversupply is not foreseen, the price of bromine is expected to stay strong in the near future.

Figure 16.1 illustrates the behavior of bromine prices in the period January 2014-December 2022.

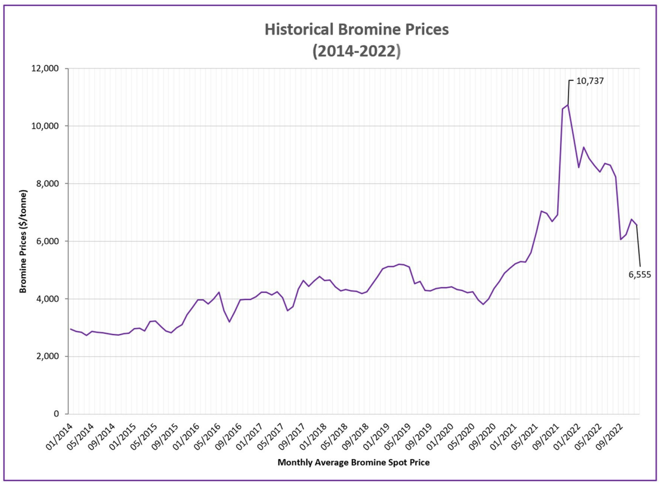

Figure 16-1: Bromine Price Trend as per China Petroleum and Chemical Industry Federation (Price Is in US$)[26]. Available at: http://www.sunsirs.com/uk/prodetail-643.html.

16.4 Bromine Applications

Albemarle produces a variety of substances from bromine [www.albemarle.com]. The specific derivatives produced are not discussed in detail in this technical report for proprietary reasons. The following list illustrate the ways that elemental bromine or bromine derivatives are used in a variety of products:

- Flame Retardants: Bromine is very efficient as a constituent element when used in producing flame retardants; therefore, only a small amount is needed to achieve fire resistance.
- Biocides: Bromine reacts with other substances in water to form bromine-containing substances that are disinfectants and odorless.
- Pharmaceuticals: Bromide ions have the ability to decrease the sensitivity of the central nervous system, which makes them effective for use as sedatives, anti-epileptics, and tranquillizers.
- Mercury Emission Reduction: Bromine-based products are used to reduce mercury emissions from coal-fired power plants.
- Energy Storage: Bromine-based storage technologies are a highly efficient and cost-effective electro-chemical energy storage solution that provides a range of options to successfully manage energy from renewable sources, minimize energy loss, reduce overall energy use and cost, and safeguard supply.

- Water Treatment: Bromine-based products are ideal solutions for water-treatment applications because of bromine’s ability to kill harmful contaminants.
- Oil-and Gas Industry Drilling Fluids: Bromine is used in clear brines to increase the efficiency and productivity of oil-and-gas wells.

17 ENVIRONMENTAL STUDIES, PERMITTING, AND PLANS, NEGOTIATIONS, OR AGREEMENTS WITH LOCAL INDIVIDUALS OR GROUPS

17.1 Environment

In 2014, Albemarle officially joined the ENERGY STAR as a partner (the ENERGY STAR program is an initiative of the EPA), by making a fundamental commitment to protect the environment through the continuous improvement in energy performance.

For two straight years, Albemarle facilities have been awarded the Energy Efficiency Award by the American Chemistry Council ("ACC") to high-performing Responsible Care® member companies. Responsible Care® is the chemical manufacturing industry's environmental, health, safety, and security performance initiative, and it helps ACC member companies to enhance their performance and improve the health and safety of their employees, the communities in which they operate, and the environment as a whole.

Already certified by the Wildlife Habitat Council ("WHC") since 2006, Albemarle's Magnolia plants achieved Corporate Lands for Learning ("CLL") certification in 2009.

WHC Conservation Certification programs can be found in 47 U.S. states and 28 countries. This certification is the only standard designed for broad-based biodiversity enhancement on corporate landholdings. It is a continual process by which activities are maintained to offer ongoing benefit to biodiversity and people.

The CLL certification is accredited by the Wildlife Habitat Council, a nonprofit, non-lobbying charitable organization comprised of a group of corporations, conservation organizations, and individuals dedicated to restoring and enhancing wildlife habitat. This designation recognizes the learning opportunities created by Albemarle's commitment to environmental conservation and increasing native biodiversity across Magnolia's 100-acre tract of reforested land and 70-acre artificially created marsh.

Magnolia's South Plant and West Plant have artificial wetlands[27], which meet the needs of numerous wildlife species while also providing an economic and environmentally friendly solution for industrial water treatment.

The Magnolia sites have a wetland mitigation bank, which allows needed wetland permitting if required for any new brine well or pipeline construction that may fall within jurisdictional land.

17.2 Permitting

The purpose of environmental permits is to ensure that businesses and individuals understand and comply with all applicable federal and state environmental standards to protect the air, land, and water.

It is established that the State has primacy in issuing relevant permits for the whole operation of the brine extraction and processing plants. The Environmental Protection Agency ("EPA") has delegated responsibility for many of the regulatory programs under its jurisdiction to the State; these could be Title V Air Permits, underground injection control ("UIC"), National Pollutant Discharge Elimination System ("NPDES"), among others.

The organizations responsible for issuing most of these permits are the Arkansas Department of Energy and Environment ("E&E") and the Arkansas Oil & Gas Commission ("AOGC"). Currently between the two plants there is a combined total of 60 permits obtained from AOGC related to the supply and injection wells used in the brine extraction process.

17.2.1 Division of Environmental Quality (DEQ)

In Arkansas, the regulatory body in the area of environmental protection is the Arkansas Department of Energy and Environment (“E&E”), which absorbed the former Arkansas Department of Environmental Quality (“ADEQ”), which is now named the Division of Environmental Quality (“DEQ”). It was established in 2019 as part of the Transformation and Efficiencies Act of 2019 (Act 910).

The DEQ has four offices, with specific areas of competence:

- **Office of Air Quality**: regulates industries that emit air pollutants.
- **Office of Energy**: works to promote energy efficiency, clean technology, and sustainable strategies that encourage economic development, energy security, and environmental well-being.
- **Office of Land Resources**: regulates activities to ensure that Arkansas's land is protected.
- **Office of Water Quality**: regulates stormwater runoff and industrial discharges.

Albemarle’s operation at Magnolia are regulated by the Office of Air Quality and the Office of Water Quality.

17.2.1.1 Office of Air Quality

The Office of Air Quality consists of four branches: Permits, Compliance, Planning, and Air Quality Analysis, and Enforcement and Asbestos. Each branch of the Office of Air Quality has specific duties and addresses various aspects of the air program. The branches work together to meet Arkansas’s federal obligations under the Clean Air Act; and protect air quality to enhance the lives and health of all Arkansans and visitors to the State, while fostering responsible economic expansion opportunities. Albemarle’s South Plant and West Plants air emissions are regulated by this office.

The Permits Branch issues new permits and permit modifications to existing facilities after reviewing and evaluating permit applications for administrative and technical completeness and ensuring that each application meets regulatory adequacy. The permit is written to meet state and federal regulations to include information on which pollutants are being released, how much may be released, and what kinds of steps the source's owner or operator is taking to reduce pollution. All permits will include a mechanism to demonstrate compliance with the permit conditions. There are two types of air permits: Minor Source and Major Source/Title V.

The Office of Air Quality Compliance Branch’s primary responsibility is to ensure that permitted facilities are operating according to state and federal air pollution regulations. This is accomplished through annual compliance inspections, stack testing, and monitoring of reporting requirements. Compliance inspectors also investigate citizen complaints relative to air pollution.

The Policy & Planning Branch is responsible for developing plans to implement DEQ’s program to protect outdoor air quality in the state in accordance with Arkansas law and the Clean Air Act. The Branch is also responsible for gathering and evaluating information on air quality conditions and emissions of air pollutants in the state. The Branch provides technical expertise to the other branches of the Office of Air Quality and helps to educate the public about air quality issues.

The Asbestos Section is focused on providing assistance and training to office staff, the regulated community, and the general public on asbestos related issues (mainly abatement, stabilization, and remediation).

17.2.1.2 Office of Water Quality

Each of the Office of Water Quality’s four branches, Compliance, Enforcement, Permits, and Water Quality Planning, has different duties. Their common goal is protecting and enhancing Arkansas's waterways.

The Compliance Branch performs compliance inspections at municipal wastewater treatment plants, construction sites, industrial properties, animal waste facilities, and oil and gas drilling sites.

The Enforcement Branch outlines corrective actions, sets corrective action schedules and civil penalties, and monitors instances of noncompliance throughout the state. The branch also oversees DEQ's wastewater licensing program.

The Permits Branch issues a range of individual and general permits. The permits not only set pollution limits but also lay out reporting and other requirements all aimed at preserving water quality.

The Water Quality Planning Branch develops water quality standards for waterways and closely monitors surface water and groundwater across the state.

The Water Office staff maintains a Water Quality Management Plan (WQMP) in accordance with Section 208 of the Clean Water Act. The WQMP is an inventory of point source dischargers and their associated permit limits and other information.

17.2.2 Arkansas Oil and Gas Commission

The mission of the Arkansas Oil and Gas Commission[28] is to prevent waste and encourage conservation of the Arkansas oil, natural gas, and brine resources, to protect the correlative rights associated with those resources, and to respect the environment during the production, extraction, and transportation of those resources.

The Commission's Regulatory Functions are the following:

- Issue permits to drill oil, natural gas, and brine production wells, and other types of exploratory holes.
- Issue authority to operate and produce wells through approval of well completions and recompletions.
- Initial production test to establish production allowable.
- Conduct compliance inspections during drilling process and operational life of well.
- Issue authority to plug and abandon wells to insure protection of freshwater zones and production intervals.
- Issue permits to conduct seismic operations for exploration of oil and natural gas.
- Issue permits to drill and operate Class II UIC (Underground Injection Control) enhanced oil recovery injection wells and saltwater disposal wells.
- Issue permits to drill and operate Class V UIC brine injection wells for the disposal of spent brine fluids following removal of bromine and other minerals.
- Conduct monthly administrative hearings to enforce provisions of the oil and gas statutes and regulations.

17.2.2.1 Underground Injection Control (UIC) Program

In 1974, Congress passed the Safe Drinking Water Act, which required the U.S. Environmental Protection Agency ("EPA") to establish a system of regulations for underground injection activities. The regulations are designed to establish minimum requirements for controlling all injection activities, to provide enforcement authority, and to provide protection for underground sources of drinking water.

In 1982, EPA gave to the State of Arkansas the authority to administer the UIC program[29], and the former Arkansas Department of Energy and Environment's Division of Environmental Quality now named Division of Environmental Quality, became the primary enforcement authority to regulate Class I, Class III, Class IV, Class V (other than spent brine from bromine production wells), and Class VI UIC wells. At present, there are no Class III, Class IV, or Class VI UIC wells in Arkansas.

The Arkansas Oil and Gas Commission (AOGC) regulates Class II UIC wells and Class V bromine-production-related spent brine UIC disposal wells.

Class IV wells are banned by CFR 144.13 and APC&EC Regulation 17, except for EPA- or state-authorized groundwater cleanup actions.

17.2.2.2 Underground Injection Control Well Classes

The Underground Injection Control program[30] consists of six classes of injection wells. Each well class is based on the type and depth of the injection activity, and the potential for that injection activity to result in endangerment of an underground source of drinking water (USDW).

- Class I wells are used to inject hazardous and non-hazardous wastes into deep, isolated rock formations.
- Class II wells are used exclusively to inject fluids associated with oil and natural gas production.
- Class III wells are used to inject fluids to dissolve and extract minerals.
- Class IV wells are shallow wells used to inject hazardous or radioactive wastes into or above a geologic formation that contains a USDW.
- Class V wells are used to inject non-hazardous fluids underground. Most Class V wells are used to dispose of wastes into or above underground sources of drinking water.
- Class VI wells are wells used for injection of carbon dioxide (CO_2) into underground subsurface rock formations for long-term storage, or geologic sequestration.

17.2.3 Albemarle South and West Plant Permits

A detailed examination of the permits issued by the corresponding regulators showed that the Albemarle South and West plants were in full compliance with local, state, and federal regulations and related requirements for their current operations.

Each permit associated with both existing Albemarle plants require a certain issuance time and it varies depending on whether the application is for a renewal or for a new permit. Table 17-1 shows the estimated time it takes for the whole permitting process.

Table 17-1: Typical Processing Times for Modification or Issuance of New Permits

PERMIT	MODIFICATION	NEW APPLICATION
Class I Underground Injection Control (UIC) Well (non-hazardous waste)	≥ 3 mo ≤ 6 mo	≥ 6 mo ≤ 9 mo
NPDES Industrial Wastewater Discharge	≥ 3 mo ≤ 6 mo	≥ 6 mo ≤ 9 mo
Title V Air Operating Permit	≥ 3 mo ≤ 6 mo	≥ 6 mo ≤ 12 mo

Table 17-2 and Table 17-3 show a list of the current active permits corresponding to the South and West plants as well as a brief description of each permit. Voided permits and permits that are pending or under review as of the date of this report were not listed in the tables. The permits listed below are only those shown as “Active” in DEQ data base. The validity of the permits can vary between two and 10 years.

Table 17-2: Existing Permits for Albemarle South Plant

ALBERMARLE SOUTH / AFIN # 14-00028			
MEDIA	PERMIT TYPE	STATE PERMIT # (IF APPLICABLE)	DESCRIPTION
AIR	Title V	0762-AOP-R29	Authorization to construct, operate and maintain the equipment and/ or control apparatus at the plant.
AIR	Minor Source	1394-A	Authorization to operate a portable flare at the well site during periods of maintenance in the case of brine leak.
WATER-NPDES	Cooling Water	AR0038857	Authorization to discharge to all receiving waters in accordance with conditions set forth in this permit.
SOLID WASTE	Class III Non-Commercial	0175-S	Authorization to construct, maintain and/or operate a Solid Waste Disposal Facility.
SOLID WASTE	Class III Non-Commercial	0251-S3N-R1	Authorization of the Waste Disposal Facility set forth in the original permit renewal application.
WATER-UIC	UIC Class I	0004-UR-3	Non-discharge Water Permit: This permit is for the operation and maintenance of a nonhazardous Class I underground injection Waste Disposal Well.
WATER	Waste Storage	3419-WR-6	Authorization to construct, operate and maintain a facility with no discharge of process waste directly on to waters of the state.
WATER	Brine	2189-WR-8	This is the authorization to operate and maintain storage impoundments and transmission pipelines, consisting of storage and handling of brine and tail brine for and from chemical manufacturing process units, with no discharge of process waste directly on to waters of the state.
WATER	Waste Storage	3532-WR-9	This is the authorization to operate and maintain storage impoundments and transmission pipelines, consisting of storage and handling of wastewater from chemical manufacturing process units, with no discharge of process waste directly on to waters of the state.

Table 17-3: Existing Permits for Albemarle West Plant

ALBERMARLE WEST / AFIN # 14-00011			
MEDIA	PERMIT TYPE	STATE PERMIT # (IF APPLICABLE)	DESCRIPTION
AIR	Minor Source	0779-AR-1	Authorization to operate a portable flare at the well site during periods of maintenance in the case of brine leak
AIR	Minor Source	0882-AR-9	Authorization to construct, operate and maintain the equipment and/ or control apparatus at the plant.
WATER-NPDES	Cooling Water	AR0047635	Authorization to discharge treated sanitary wastewater, non-contact cooling water, boiler blowdown, boiler de-aerator blowdown, and other miscellaneous sources from a facility.
WATER-NPDES	Stormwater	ARR00A588	Authorization to discharge receiving storm water in accordance with conditions set forth in this permit.
WATER	Brine	0690-WR-5	This is the authorization to operate the plant brine pre-treatment and management system.
WATER	Brine	4007-WR-4	This is the authorization to operate and maintain storage impoundments and transmission pipelines, consisting of storage and handling of brine and tail brine for and from chemical manufacturing process units, with no discharge of process waste directly on to waters of the stat

17.2.3.1 Title V Air Permits

The DEQ Office of Air Quality, oversees issuing new permits or renewals for the existing plants. They achieved this after evaluating and reviewing permit applications received to check for compliance with all the requirements and regulations stipulated in Title V of the Clean Air Act. It is a legally enforceable document designed to improve compliance by clarifying what facilities (sources) must do to control air pollution. EPA Region 6 provides oversight for air regulatory programs in Arkansas.

17.2.3.2 Underground Injection Control (UIC) Permits

The Underground Injection Control (“UIC”) program is designed to ensure that fluids injected underground will not endanger drinking water sources. All Class I wells have strict siting, construction, operation and maintenance requirements designed to ensure protection of the uppermost sources of drinking water (“USDW”s). Wells injecting hazardous wastes have siting requirements to show that, with a reasonable degree of certainty, there will be no migration of hazardous constituents from the injection interval. Any Class I wells that dispose of hazardous wastes via injection then they would have to have a no migration petition (which only EPA issues) in addition to an DEQ state permit for injection well operations.

17.2.3.3 National Pollution Discharge Elimination System

The permit program addressing water pollution by regulating point sources that discharge pollutants to waters of the United States is the National Pollutant Discharge Elimination System (“NPDES”), which was created by the Clean Water Act (“CWA”) in 1972. Its objective is achieved by regulating the point sources that discharge pollutants into the waters of the State. These discharges can include discharges from industrial process wastewater discharges and runoff conveyed through a storm sewer system.

17.2.4 Albemarle Well Permits

Albemarle has a total of 62 active well permits corresponding to the Magnolia Operations.

17.2.4.1 Communities

Albemarle Corp. is one of the largest employers in Columbia County[31], with about 375 employees at its two plants in Magnolia and another approximately 200 contractors who work on-site.

Albemarle's advocacy efforts are focused on promoting sustainable solutions to global challenges, supporting its communities and customers, and defending the science upon which its chemistry solutions are based. Societal concerns raised by multiple stakeholders about certain chemicals is of particular concern to Albemarle.

Albemarle has a strong commitment towards sustainability, indicating that it is the cornerstone of its community and stakeholder engagement efforts. The corporation acknowledges that its social license to operate is contingent on the trust and reputation that comes with engagement.

Albemarle regularly engages with many stakeholder groups to maintain strong relationships, share information, and gather feedback.

Most of Albemarle's US sites, including Magnolia, organize Community Advisory Panels ("CAP"s) under the Responsible Care Management System. In these CAPs, site leaders and employees meet regularly with members of the community in order to inform them about their operations and progress on important initiatives as well as to gather feedback and suggestions from local community members.

Albemarle sites also donate funds and volunteer time toward community initiatives, typically with the assistance of the Albemarle Foundation[31], a private endowed charitable (501(c)(3)) entity created in 2007, with the mission of making a positive, sustainable difference in the communities where the corporation operates.

To date, the Albemarle Foundation has granted over $39.5 million into the communities where it operates, in the form of matching gifts, volunteer grants, scholarships, and nonprofit grants.

In 2019, the Albemarle Foundation donated over $250,000 to the Magnolia community for a variety of projects including a park on the town square and Southern Arkansas University's engineering program. Employee's volunteerism includes a youth program called "Play It Safe" to teach outdoor safety, internet safety, fire response, and prom and graduation night safety reminders.

The Albemarle Foundation has also worked closely with Southern Arkansas University (SAU), giving $100,000 over four years to help the engineering program earn accreditation last year from the Accreditation Board for Engineering & Technology (ABET). SAU's Muleriders Kids College, a day camp, also receives Albemarle support.

Albemarle bought the naming rights to the stage in a new "pocket park" on the town square in Magnolia, and it sponsors musical programs at the Magnolia Arts Center.

In 2019 Albemarle conducted a materiality assessment[32], in which some of its key stakeholders helped it to review its environmental, social and governance efforts. The assessment included efforts to identify, assess, and prioritize the main issues on which Albemarle should focus and report.

17.3 Qualified Person's Opinion

The QP opines that the Magnolia facility is operating in conformance with high industrial standards and is comparable with other similar facilities worldwide.

Albemarle's robust Corporate Social Responsibility strategy is targeted at supporting sustainable community development projects and creating and funding sustainable social, cultural, and economic initiatives that service to local and national needs.

An example of good environmental practices in Magnolia is the initiative to convert stormwater captured in an artificial marsh to freshwater for the Albemarle operations, reducing the burden on the local underground aquifer. Albemarle's plants in Magnolia utilize aquatic plants to treat non-contact water and storm water runoff from within the main plant and adjacent areas. This is an innovative and economical solution to treating industrial water using a naturally occurring biological process that does not harm the environment or consume vast amounts of valuable energy resources.

The QP found that the environmental policies implemented by Albemarle at the Magnolia operation met or exceeded the requirements of local and international industry standards.

18 CAPITAL AND OPERATING COSTS

The economic evaluation of the bromine reserves accounts for capital and operating costs for the Magnolia field operations as well as the mineral processing operations at the West and South plants. Cost forecasts were based on data supplied by Albemarle, including corporate P&L statements for Bromine operations from 2014 through 2022, annual historical production data from 2013 through 2022, business plan forecasts for 2020 through 2026. All cost estimates and forecasts are shown in real 2023 USD terms.

The Albemarle operation is a mature project which has been in commercial production for years. The accuracy of the capital and operating cost estimates used in the technical report are based on best industry practices and detailed historical information from the operation; therefore, they correspond to an AACE International Class 1 Estimate (AACE International Recommended Practice No. 18R-97).

As indicated by AACE, “Class 1 estimates are typically prepared to form a current control estimate to be used as the final control baseline against which all actual costs and resources will now be monitored for variations to the budget, and form a part of the change/variation control program. They may be used to evaluate bid checking, to support vendor/contractor negotiations, or for claim evaluations and dispute resolution.”

Typical accuracy ranges for Class 1 estimates are -3% to -10% on the low side, and +3% to +15% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Albemarle’s capital and operating cost estimates have an accuracy of -10% to +10%.

18.1 Capital Costs

Capital costs required to produce the bromine reserves have been forecast based on analysis of historical field and plant capital costs, the Company’s field development plans, and the Company’s associated capital budget forecast. RPS estimates that Albemarle will require a working interest share capital investment of US$1.0 to US$1.4 billion to develop the Proved and Probable reserves.

18.1.1 Development Drilling Costs

The cost for drilling new development production (BSW) and injection (BIW) wells have been estimated based on actual costs incurred by Albemarle when drilling their last two BSWs, which were drilled in 2019 and 2021.

18.1.2 Development Facilities Costs

No further facilities/plant capital has been included in the business plan. No facilities capital costs have been included in the economic analysis.

18.1.3 Plant Maintenance Capital (Working Capital)

Albemarle historically spends maintenance capital costs to cover ongoing well and plant upgrades in order to maintain production and processing operations, and to conduct workovers and pump replacements on the producing wells in the field. Albemarle’s five year budget plan forecasts includes a schedule of maintenance capital from which RPS has estimated the following capital costs:

- Production (source) well workovers: $400k per workover
  - One workover on each production well every two years
- Process plant maintenance capital: $18.9 million per year

18.2 Operating Costs

The operating costs required for the production of brine and processing the brine to obtain bromine reserves have been forecast based on analysis of historical field and plant operating costs, the Company's field development plans, and the Company's associated operating budget forecast. The field and plant operating costs are combined for each of the West Field and Plant and the South Field and Plant. The operating cost estimates shown are based on the approximate midpoint of a range of uncertainty associated with each estimate.

18.2.1 Plant and Field Operating Costs

In evaluating the historical operating cost data, RPS has split operating costs into fixed and variable components to allow forecasting with variable product volumes, variable producing well counts, and variable injection well counts. Fixed costs include all costs not directly related to production/injection volumes and well counts, including annual lease payments on the multiple leased licence areas. Producing well variable costs include base costs for routine field operations which would vary depending on producing well count, but do not include production well workover costs, which have been included in maintenance capital. Injection well variable costs include the base well costs plus an amount to cover costs of regular acid stimulation treatments in order to maintain injectivity. Operating costs have some uncertainty associated with them, typically +/- 10% in a given year. Total operating costs for the Magnolia operation are forecast to be in the range of US$850 - US$1,150 per tonne of elemental bromine.

18.2.2 General and Administrative Costs

Albemarle's historical expenditures on general, sales, R&D, and administrative costs have been reviewed and analyzed for the past six years, with a fractional portion of total corporate G&A costs being allocated to the elemental bromine sales business and incorporated into the economic analysis.

18.2.3 Abandonment and Reclamation Costs

RPS has estimated abandonment and reclamation costs as follows:

18.2.3.1 Well Abandonments:

Albemarle includes well abandonment cost estimates in its operating costs forecasts of $185k per well for each production and injection well, plus $50k per well for site reclamation for a total of $235k per well. This cost estimate, which has been reviewed and adopted by RPS for this analysis, covers all rig and operations cost to remove all downhole tubing and equipment, set a plug over the producing formation plug, cement the well to surface, remove the wellhead and surface flowline equipment, decommission all subsurface flowlines, and reclaim the well site to original purpose use.

18.2.3.2 Plant Abandonments

Albemarle does not include plant decommissioning, abandonment, and reclamation in its business plan for the two Magnolia bromine plants. The rationale for this plan is that the active commercial activity of both plants is planned to survive the field abandonment, and the plants will continue in operation sourcing bromine and other possible feedstock materials.

On this basis, RPS has not included plant abandonment costs in its economic evaluation.

The following tables contain details on Albemarle's annual capital by major components and operating costs by major cost centers for the 1P (Proved Reserves) and 2P (Proved + Probable Reserves) scenarios. Columns beyond year 2032 have been combined and the values under 2033+ correspond to the sum of the individual figures through year 2069. When applicable, like in the case of well counts, the reported number corresponds to the annual average number of wells between the years 2033 and 2069.

Table 18-1: Summary of Operating and Capital Expenses (1P Scenario)

SUMMARY OF BROMINE FIELD RESERVES, PRODUCTION AND CASHFLOW

COMPANY: Albemarle Corporation
OPERATOR: Albemarle Corporation
CASHFLOW FORECAST CASE: Real 2023$
FIELD: Magnolia
WORKING INTEREST: 100.0%
RESERVES CLASS: Proved (1P)

FULL FIELD GROSS PRODUCTION Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Bromine Production	(k Tonne)	80	78	76	76	75	75	73	73	72	72	1,669	2,419
COMPANY SHARE CASHFLOW Year		**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033+**	**Total**
Operating Costs													
Field and Plant Opex	($MM/yr)	72.2	71.2	70.5	70.7	70.3	70.2	69.6	69.5	69.2	69.2	2,121.5	2,824
G&A	($MM/yr)	35.1	34.9	34.8	34.8	34.7	34.7	34.6	34.6	34.5	34.5	1,201.7	1,549
Abandonmnet and Reclamation	($MM/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.7	35
Total Opex, G&A, Abex	**($MM/yr)**	**107.3**	**106.1**	**105.3**	**105.5**	**105.0**	**105.0**	**104.2**	**104.1**	**103.7**	**103.7**	3,358.0	4,408
Operating Cash Income Before Tax	**($MM/yr)**	**410.6**	**397.0**	**384.8**	**387.3**	**383.2**	**382.0**	**371.6**	**367.5**	**362.7**	**362.8**	7,455.9	11,265
Capital Costs													
Field	**($MM/yr)**	4.2	13.8	23.3	13.9	3.9	23.1	32.7	13.8	14.0	14.0	207.4	364
Plant	**($MM/yr)**	18.8	16.8	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	627.6	799
Total Capital Costs	**($MM/yr)**	**23.0**	**30.6**	**40.3**	**30.8**	**20.8**	**40.0**	**49.7**	**30.8**	**30.9**	**30.9**	835.0	1,163

Table 18-2: Summary of Operating and Capital Expenses (2P Scenario)

SUMMARY OF BROMINE FIELD RESERVES, PRODUCTION AND CASHFLOW

COMPANY: Albemarle Corporation
OPERATOR: Albemarle Corporation
CASHFLOW FORECAST CASE: Real 2023$
FIELD: Magnolia
WORKING INTEREST: 100.0%
RESERVES CLASS: Proved + Probable (2P)

ANNUAL GROSS PRODUCTION Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Bromine Production	(k Tonne)	90	87	85	86	87	87	86	86	86	86	2,119.7	2,984
COMPANY SHARE CASHFLOW Year		**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033+**	**Total**
Operating Costs													
Field and Plant Opex	($MM/yr)	76.4	75.3	74.6	75.2	75.2	75.6	75.1	75.3	75.2	75.2	2,320.6	3,074
G&A	($MM/yr)	35.8	35.6	35.5	35.6	35.6	35.6	35.5	35.5	35.5	35.5	1,235.6	1,591
Abandonmnet and Reclamation	($MM/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.7	35
Total Opex, G&A, Abex	**($MM/yr)**	**112.2**	**110.9**	**110.0**	**110.8**	**110.8**	**111.3**	**110.6**	**110.8**	**110.8**	**110.8**	3,590.9	4,700
Operating Cash Income Before Tax	**($MM/yr)**	**467.8**	**452.5**	**439.7**	**448.2**	**449.9**	**454.7**	**445.6**	**445.7**	**444.2**	**444.3**	10,144.9	14,637
Capital Costs													
Field	**($MM/yr)**	4.2	13.8	23.3	13.9	3.9	23.1	32.7	13.8	14.0	14.0	207.4	364
Plant	**($MM/yr)**	18.8	16.8	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	627.6	799
Total Capital Costs	**($MM/yr)**	**23.0**	**30.6**	**40.3**	**30.8**	**20.8**	**40.0**	**49.7**	**30.8**	**30.9**	**30.9**	835.0	1,163

19 ECONOMIC ANALYSIS

An economics model has been used to forecast cash flow from bromine production and processing operations to derive a net present value for the bromine reserves. As there is uncertainty associated with the input capital and operating cost estimates, the approximate midpoint of the range of uncertainty has been used as an input to the cash flow forecasts, in order to develop a single deterministic cash flow forecast and valuation for each of the reserve categories. Cash flows have been generated using annual forecasts of production, sales revenues, operating costs and capital costs. The cash flow model can generate forecasts in either "nominal dollar" (money of the day) or "real dollar" (2023$) terms. The salient features of the cash flow model include:

19.1 Burdens on Production

The production leases include the following burdens:

a. Production Royalties:
   - Oil: 12.5% of production
   - Gas: 12.5% of gas sales revenues
   - Solution gas: 12.5% of gas sales revenues
   - Other minerals (except brine and minerals contained in brine): 10% of mineral sales revenue
   - Brine: No production royalty

b. Production Lease Licences Fees:
   - Lease Years 1, 2, 3, & 4: $1.00 per acre
   - Lease Years 4 through 14: $10.00 per acre
   - Lease Years 15 onward: $25.00 per acre
   - For the purposes of lease licencing fees, the above lease fees have been superseded by the Arkansas Code, Title 15, Subtitle 6, Chapter 76 (15-76-315) which specifies that in lieu of royalty, an annual lease compensation payment of $32.00 per acre payable to the lease owner. This payment amount is indexed to the March 1995 US Producer Price Index for Intermediate Materials, Supplies and Components, then later the Producer Price Index for Processed Goods for Intermediate demand, which specifies that prices and costs are based on a datum cost base at March 1995 and are escalated annually based on the USA Producer Price Index. In 2022 the average lease cost was $67.84 per acre per year.

Production lease licence fees have been included in the fixed field operating costs.

19.2 Bromine Market and Sales

Bromine produced from the Magnolia field is marketed and sold as both elemental bromine, as well as a constituent in a number of derivative products. The market value of the elemental bromine produced has been estimated from the historical records of elemental bromine sales revenues which the Company has supplied for analysis. Based on discussions with the Company, RPS has generated cash flow cases based on China Spot bromine price at December 31, 2022, with discounts of 0%, 15%, 30%, and 45% (Table 19-1) applied in order to produce a range of estimated values for the reserves. Prices are held flat for the full life of the production forecasts.

Table 19-1: Price Forecast Summary

Bromine Price Forecasts $/tonne			
Spot	Spot less 15%	Spot less 30%	Spot less 45%
$6,480	$5,510	$4,540	$3,560

19.3 Capital Depreciation

Albemarle depreciates capital on a unit of production ("UOP") basis. Based on the historical depreciation from the Albemarle PL statements, utilizing data from 2016 to 2020, RPS has utilized a UOP capital depreciation rate of $154/tonne

19.4 Income Tax

Albemarle has advised RPS that its combined state and federal tax rate on income is 23.2%. RPS has utilized this rate in the economic cash flow calculations.

19.5 Economic Limit

Using the bromine production forecasts, and above estimates of capital, operating, and G&A costs, RPS forecasts cash flow until the operating cash income becomes negative. At this point the field is deemed to have reached its economic limit of production. At that point, the field assumed to be shut in. In the following year of the cash flow forecast, all remaining production and injection wells are assumed to be abandoned, and the appropriate abandonment costs applied. The plant is assumed to not be abandoned, as per advice from Albemarle that the plant will continue operations, processing alternate bromine feedstock sources after the abandonment of the Albemarle field, and therefore no plant abandonment and reclamation costs are applied.

19.6 Cash Flow and Net Present Value Estimates

With the above inputs, RPS has generated cash flow forecasts for the Proved and Proved + Probable reserves cases. The economic viability of the reserves is such that in both the Proved (1P) and Proved + Probable (2P) reserves cases, the economic limit is reached beyond 2069, which is the end of the production forecast. Therefore, for the integrity of this cash flow analysis, the field abandonment costs are applied in the year after the end of the production forecast, i.e., in 2070. Cash flow forecasts were run in real 2023$ terms. The results are summarized in the following tables:

Table 19-2: Albemarle Working Interest Bromine Reserves as of December 31, 2022 – Spot Prices

Albemarle Working Interest Bromine Reserves as of December 31, 2022 Spot Price Forecast											
	Mineral Reserves ('000 tonnes)	Net Present Value Before Tax					Net Present Value After Tax				
		0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)	0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)
Proved	**2,419**	**10,102**	**5,093**	**3,261**	**2,386**	**1,889**	**7,607**	**3,839**	**2,460**	**1,801**	**1,426**
Probable	565	3,372	1,400	776	513	377	2,611	1,084	601	397	292
Proved + Probable	**2,984**	**13,474**	**6,494**	**4,038**	**2,899**	**2,265**	**10,218**	**4,923**	**3,061**	**2,198**	**1,718**

Table 19-3: Albemarle Working Interest Bromine Reserves as of December 31, 2022 – Spot Prices less 15%

Albemarle Working Interest Bromine Reserves as of December 31, 2022 Spot Price Forecast less 15%											
	Mineral Reserves ('000 tonnes)	Net Present Value Before Tax					Net Present Value After Tax				
		0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)	0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)
Proved	**2,419**	**7,751**	**3,980**	**2,567**	**1,884**	**1,494**	**5,801**	**2,983**	**1,927**	**1,416**	**1,123**
Probable	565	2,822	1,172	650	429	315	2,189	909	504	333	245
Proved + Probable	**2,984**	**10,574**	**5,152**	**3,217**	**2,313**	**1,809**	**7,990**	**3,892**	**2,431**	**1,748**	**1,368**

Table 19-4: Albemarle Working Interest Bromine Reserves as of December 31, 2022 – Spot Prices less 30%

Albemarle Working Interest Bromine Reserves as of December 31, 2022 Spot Price Forecast less 30%											
	Mineral Reserves ('000 tonnes)	Net Present Value Before Tax					Net Present Value After Tax				
		0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)	0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)
Proved	**2,419**	**5,400**	**2,866**	**1,873**	**1,382**	**1,099**	**3,996**	**2,128**	**1,393**	**1,030**	**820**
Probable	565	2,273	944	523	346	254	1,767	734	407	269	197
Proved + Probable	**2,984**	**7,673**	**3,809**	**2,396**	**1,728**	**1,353**	**5,763**	**2,861**	**1,800**	**1,299**	**1,017**

Table 19-5: Albemarle Working Interest Bromine Reserves as of December 31, 2022 – Spot Prices less 45%

Albemarle Working Interest Bromine Reserves as of December 31, 2022 Spot Price Forecast less 45%											
	Mineral Reserves ('000 tonnes)	Net Present Value Before Tax					Net Present Value After Tax				
		0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)	0% ($MM)	5% ($MM)	10% ($MM)	15% ($MM)	20% ($MM)
Proved	**2,419**	**3,049**	**1,752**	**1,178**	**880**	**704**	**2,190**	**1,272**	**860**	**644**	**517**
Probable	565	1,723	716	397	262	193	1,345	558	310	204	150
Proved + Probable	**2,984**	**4,773**	**2,467**	**1,575**	**1,142**	**897**	**3,535**	**1,831**	**1,170**	**849**	**667**

Per the NPV estimate analysis, the 10% discounted NPV of the Magnolia project is estimated to be between $1.78 billion and $3.26 billion for Proved reserves and between $1.57 billion and $4.04 billion for Proved + Probable reserves as of December 31, 2022, demonstrating that the operations are economic and supporting the estimation of reserves. The following Figure 19-1 and Figure 19-2 show the full distribution of the NPV range for each price forecast for Proved and Proved plus Probable reserves.

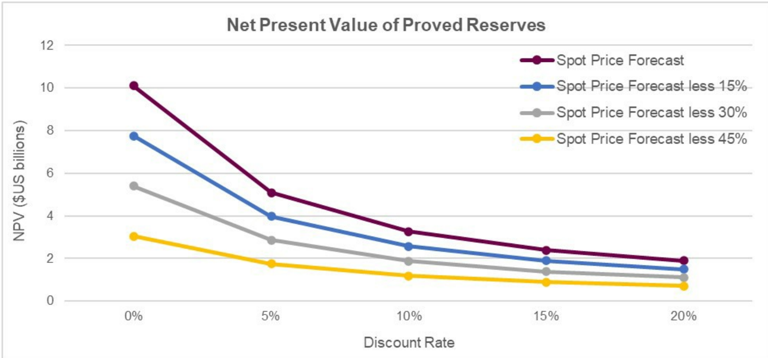

Figure 19-1: Net Present Value Distribution of Proved Reserves by Price Forecast

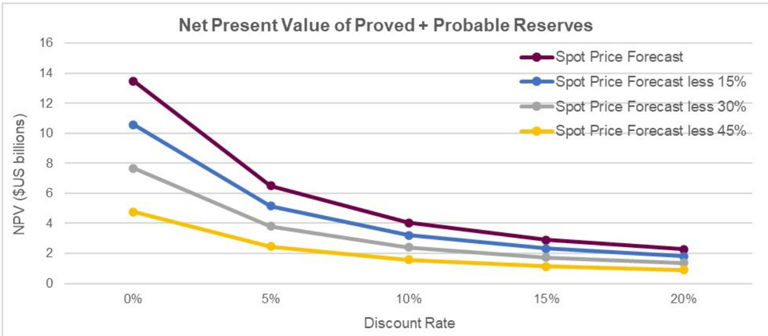

Figure 19-2: Net Present Value Distribution of Proved + Probable Reserves by Price Forecast

Summaries of the cash flow analysis on an annual basis are shown in the following tables. Columns beyond year 2032 have been combined and the values under 2033+ correspond to the sum of the individual figures through year 2069. When applicable, like in the case of well counts, the reported number corresponds to the annual average number of wells between the years 2033 and 2069.

Table 19-6: Annual Cash Flow Summary – Proved Reserves – Spot Prices

SUMMARY OF BROMINE FIELD RESERVES, PRODUCTION AND CASHFLOW

COMPANY: Albemarle Corporation	CASHFLOW FORECAST CASE: Real 2023$	FIELD: Magnolia
OPERATOR: Albemarle Corporation	PRICE FORECAST: Spot	WORKING INTEREST: 100.0%
	ANNUAL COST INFLATION: 0.0%	RESERVES CLASS: Proved (1P)
	EFFECTIVE DATE OF ANALYSIS: 12/31/2022	

RESERVES		Total Field Gross	Total Field Net	Company Share Gross	Company Share Net
Bromine	(K Tonnes)	2,419	2,419	2,419	2,419

PRESENT VALUE - COMPANY SHARE (Million US$) Discount Rate:	0%	5%	10%	15%	20%
Gross Revenue	15,673	7,426	4,629	3,347	2,632
Net Revenue	15,673	7,426	4,629	3,347	2,632
Operating Costs, G&A & Aband	4,408	1,819	1,058	740	573
Operating Income	11,265	5,606	3,571	2,607	2,059
Capital Costs	1,163	513	310	220	171
Cash Flow Before Tax (CFBT)	10,102	5,093	3,261	2,386	1,889
Tax Payable	2,530	1,258	802	585	462
Cash Flow After Tax (CFAT)	7,607	3,839	2,460	1,801	1,426

PRODUCT PRICES Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual Average 2033+
Bromine	(US$/Kg)	$6.48	$6.48	$6.48	$6.48	$6.48	$6.48	$6.48	$6.48	$6.48	$6.48	$6.48

FULL FIELD GROSS PRODUCTION Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Production Wells		21	21	21	22	19	20	20	21	22	22	24	-
Injection Wells		34	35	36	36	36	36	37	38	38	38	39	-
Annual Gross Production & Injection													
Brine Production	(MMbbl)	151.6	150.2	150.5	149.9	143.1	145.1	145.7	147.7	149.3	149.5	4,598.1	6,081
Brine Injection	(MMbbl)	153.4	156.7	158.5	154.5	145.9	146.8	152.0	159.2	161.1	160.6	4,980.4	6,529
Bromine Production	(k Tonne)	85.99	83.54	81.38	81.83	81.06	80.85	79.02	78.30	77.44	77.46	1795.6	2,603
Recovery	(%)	93	93	93	93	93	93	93	93	93	93	93	93
Bromine Production (Sales)	(k Tonne)	80	78	76	76	75	75	73	73	72	72	1,669	2,419

COMPANY SHARE CASHFLOW Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Bromine Gross Sales Revenue	($MM)	517.9	503.1	490.1	492.8	488.2	486.9	475.9	471.6	466.4	466.5	10,813.9	15,673
Production Royalty	($MM)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Sales Revenue	($MM)	517.9	503.1	490.1	492.8	488.2	486.9	475.9	471.6	466.4	466.5	10,813.9	15,673
Operating Costs													
Field and Plant Opex	($MM/yr)	72.2	71.2	70.5	70.7	70.3	70.2	69.6	69.5	69.2	69.2	2,121.5	2,824
G&A	($MM/yr)	35.1	34.9	34.8	34.8	34.7	34.7	34.6	34.6	34.5	34.5	1,201.7	1,549
Abandonmnet and Reclamation	($MM/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.7	35
Total Opex, G&A, Abex	**($MM/yr)**	**107.3**	**106.1**	**105.3**	**105.5**	**105.0**	**105.0**	**104.2**	**104.1**	**103.7**	**103.7**	3,358.0	4,408
Operating Cash Income Before Tax	**($MM/yr)**	**410.6**	**397.0**	**384.8**	**387.3**	**383.2**	**382.0**	**371.6**	**367.5**	**362.7**	**362.8**	7,455.9	11,265
Capital Costs													
Drilling	($MM/yr)	0.0	9.6	19.1	9.6	0.0	19.1	28.7	9.6	9.6	9.6	57.3	172
Facilities	($MM/yr)	4.2	4.2	4.2	4.3	3.9	4.0	4.1	4.3	4.4	4.4	150.1	192
Pipelines	($MM/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Field	($MM/yr)	4.2	13.8	23.3	13.9	3.9	23.1	32.7	13.8	14.0	14.0	207.4	364
Plant	($MM/yr)	18.8	16.8	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	627.6	799
Total Capital	**($MM/yr)**	**23.0**	**30.6**	**40.3**	**30.8**	**20.8**	**40.0**	**49.7**	**30.8**	**30.9**	**30.9**	835.0	1,163
Cash Flow Before Tax	**($MM/yr)**	387.6	366.4	344.5	356.5	362.3	341.9	321.9	336.7	331.7	331.8	6,621.0	10,102
Income Tax	($MM/yr)	92.2	89.2	86.4	87.0	86.0	85.8	83.4	82.5	81.4	81.4	1,674.8	2,530
Cash Flow After Tax	**($MM/yr)**	**295.3**	**277.2**	**258.1**	**269.5**	**276.3**	**256.1**	**238.5**	**254.2**	**250.3**	**250.4**	4,980.9	7,607

Table 19-7: Annual Cash Flow Summary – Proved Reserves – Spot Prices less 15%

SUMMARY OF BROMINE FIELD RESERVES, PRODUCTION AND CASHFLOW

COMPANY: Albemarle Corporation	CASHFLOW FORECAST CASE: Real 2023$	FIELD: Magnolia
OPERATOR: Albemarle Corporation	PRICE FORECAST: Spot -15%	WORKING INTEREST: 100.0%
	ANNUAL COST INFLATION: 0.0%	RESERVES CLASS: Proved (1P)
	EFFECTIVE DATE OF ANALYSIS: 12/31/2022	

RESERVES

		Total Field Gross	Total Field Net	Company Share Gross	Company Share Net
Bromine	(K Tonnes)	2,419	2,419	2,419	2,419

PRESENT VALUE - COMPANY SHARE (Million US$)

Discount Rate:	0%	5%	10%	15%	20%
Gross Revenue	13,322	6,312	3,935	2,845	2,237
Net Revenue	13,322	6,312	3,935	2,845	2,237
Operating Costs, G&A & Aband	4,408	1,823	1,058	740	573
Operating Income	8,914	4,492	2,877	2,105	1,664
Capital Costs	1,163	513	310	220	171
Cash Flow Before Tax (CFBT)	7,751	3,980	2,567	1,884	1,494
Tax Payable	1,985	1,000	641	469	371
Cash Flow After Tax (CFAT)	5,801	2,983	1,927	1,416	1,123

PRODUCT PRICES

Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual Average 2033+
Bromine	(US$/Kg)	$5.51	$5.51	$5.51	$5.51	$5.51	$5.51	$5.51	$5.51	$5.51	$5.51	$5.51

FULL FIELD GROSS PRODUCTION

Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Production Wells		21	21	21	22	19	20	20	21	22	22	24	-
Injection Wells		34	35	36	36	36	36	37	38	38	38	39	-
Annual Gross Production													
Brine Production	(MMbbl)	151.6	150.2	150.5	149.9	143.1	145.1	145.7	147.7	149.3	149.5	4,598	6,081
Brine Injection	(MMbbl)	153.4	156.7	158.5	154.5	145.9	146.8	152.0	159.2	161.1	160.6	4,980	6,529
Bromine Production	(k Tonne)	86.0	83.5	81.4	81.8	81.1	80.8	79.0	78.3	77.4	77.5	1,794.2	2,601
Recovery	(%)	93	93	93	93	93	93	93	93	93	93	93	93
Bromine Production	(k Tonne)	80	78	76	76	75	75	73	73	72	72	1,667	2,417

COMPANY SHARE CASHFLOW

Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Bromine Gross Sales Revenue	($MM)	440.2	427.6	416.6	418.9	415.0	413.9	404.5	400.8	396.4	396.5	9,191.8	13,322
Production Royalty	($MM)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Sales Revenue	($MM)	440.2	427.6	416.6	418.9	415.0	413.9	404.5	400.8	396.4	396.5	9,191.8	13,322
Operating Costs													
Field and Plant Opex	($MM/yr)	72.2	71.2	70.5	70.7	70.3	70.2	69.6	69.5	69.2	69.2	2,121.5	2,824
G&A	($MM/yr)	35.1	34.9	34.8	34.8	34.7	34.7	34.6	34.6	34.5	34.5	1,201.7	1,549
Abandonmnet and Reclamation	($MM/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.7	35
Total Opex, G&A, Abex	**($MM/yr)**	**107.3**	**106.1**	**105.3**	**105.5**	**105.0**	**105.0**	**104.2**	**104.1**	**103.7**	**103.7**	3,358.0	4,408
Operating Cash Income Before Tax	**($MM/yr)**	**332.9**	**321.5**	**311.3**	**313.4**	**309.9**	**308.9**	**300.3**	**296.8**	**292.7**	**292.8**	5,833.8	8,914
Capital Costs													
Field	**($MM/yr)**	4.2	13.8	23.3	13.9	3.9	23.1	32.7	13.8	14.0	14.0	207.4	364
Plant	**($MM/yr)**	18.8	16.8	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	627.6	799
Total Capital	**($MM/yr)**	**23.0**	**30.6**	**40.3**	**30.8**	**20.8**	**40.0**	**49.7**	**30.8**	**30.9**	**30.9**	835.0	1,163
Cash Flow Before Tax	**($MM/yr)**	309.9	290.9	271.0	282.6	289.1	268.9	250.6	266.0	261.8	261.8	4,998.9	7,751
Income Tax	**($MM/yr)**	74.2	71.7	69.4	69.8	69.1	68.8	66.9	66.1	65.2	65.2	1,298.5	1,985
Cash Flow After Tax	**($MM/yr)**	**235.7**	**219.3**	**201.7**	**212.7**	**220.0**	**200.1**	**183.7**	**199.9**	**196.6**	**196.6**	3,735.1	5,801

Table 19-8: Annual Cash Flow Summary – Proved Reserves – Spot Prices less 30%

SUMMARY OF BROMINE FIELD RESERVES, PRODUCTION AND CASHFLOW

COMPANY:	Albemarle Corporation
OPERATOR:	Albemarle Corporation
CASHFLOW FORECAST CASE:	Real 2023$
PRICE FORECAST:	Spot - 30%
ANNUAL COST INFLATION:	0.0%
EFFECTIVE DATE OF ANALYSIS:	12/31/2022
FIELD:	Magnolia
WORKING INTEREST:	100.0%
RESERVES CLASS:	Proved (1P)

RESERVES

		Total Field Gross	Total Field Net	Company Share Gross	Company Share Net
Bromine	(K Tonnes)	2,419	2,419	2,419	2,419

PRESENT VALUE - COMPANY SHARE (Million US$)

Discount Rate:	0%	5%	10%	15%	20%
Gross Revenue	10,971	5,198	3,240	2,343	1,842
Net Revenue	10,971	5,198	3,240	2,343	1,842
Operating Costs, G&A & Aband	4,408	1,823	1,058	740	573
Operating Income	6,563	3,379	2,183	1,603	1,270
Capital Costs	1,163	513	310	220	171
Cash Flow Before Tax (CFBT)	5,400	2,866	1,873	1,382	1,099
Tax Payable	1,439	741	479	352	279
Cash Flow After Tax (CFAT)	3,996	2,128	1,393	1,030	820

PRODUCT PRICES

Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual Average 2033+
Bromine	(US$/Kg)	$4.54	$4.54	$4.54	$4.54	$4.54	$4.54	$4.54	$4.54	$4.54	$4.54	$4.54

FULL FIELD GROSS PRODUCTION

Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Production Wells		21	21	21	22	19	20	20	21	22	22	24	-
Injection Wells		34	35	36	36	36	36	37	38	38	38	39	-
Annual Gross Production													
Brine Production	(MMbbl)	151.6	150.2	150.5	149.9	143.1	145.1	145.7	147.7	149.3	149.5	4,598	6,081
Brine Injection	(MMbbl)	153.4	156.7	158.5	154.5	145.9	146.8	152.0	159.2	161.1	160.6	4,980	6,529
Bromine Production	(k Tonne)	86.0	83.5	81.4	81.8	81.1	80.8	79.0	78.3	77.4	77.5	1,796	2,603
Recovery	(%)	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9	92.9	93	93
Bromine Production (Sales)	(k Tonne)	80	78	76	76	75	75	73	73	72	72	1,669	2,419

COMPANY SHARE CASHFLOW

Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Bromine Gross Sales Revenue	($MM)	362.5	352.2	343.1	345.0	341.7	340.8	333.1	330.1	326.5	326.5	7,569.8	10,971
Production Royalty	($MM)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Net Sales Revenue	($MM)	362.5	352.2	343.1	345.0	341.7	340.8	333.1	330.1	326.5	326.5	7,569.8	10,971
Operating Costs													
Field and Plant Opex	($MM/yr)	72.2	71.2	70.5	70.7	70.3	70.2	69.6	69.5	69.2	69.2	2,121.5	2,824
G&A	($MM/yr)	35.1	34.9	34.8	34.8	34.7	34.7	34.6	34.6	34.5	34.5	1,201.7	1,549
Abandonmnet and Reclamation	($MM/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.7	35
Total Opex, G&A, Abex	**($MM/yr)**	**107.3**	**106.1**	**105.3**	**105.5**	**105.0**	**105.0**	**104.2**	**104.1**	**103.7**	**103.7**	3,358.0	4,408
Operating Cash Income Before Tax	**($MM/yr)**	**255.3**	**246.0**	**237.8**	**239.5**	**236.7**	**235.9**	**228.9**	**226.0**	**222.8**	**222.8**	4,211.8	6,563
Capital Costs													
Field	**($MM/yr)**	4.2	13.8	23.3	13.9	3.9	23.1	32.7	13.8	14.0	14.0	207.4	364.0
Plant	**($MM/yr)**	18.8	16.8	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	627.6	799
Total Capital	**($MM/yr)**	**23.0**	**30.6**	**40.3**	**30.8**	**20.8**	**40.0**	**49.7**	**30.8**	**30.9**	**30.9**	835.0	1,163
Cash Flow Before Tax	**($MM/yr)**	232.2	215.5	197.5	208.6	215.9	195.8	179.2	195.2	191.8	191.9	3,376.8	5,400
Income Tax	**($MM/yr)**	56.2	54.1	52.3	52.7	52.1	51.9	50.3	49.7	49.0	49.0	922.2	1,439
Cash Flow After Tax	**($MM/yr)**	**176.0**	**161.3**	**145.2**	**156.0**	**163.8**	**144.0**	**128.9**	**145.5**	**142.9**	**142.9**	2,489.4	3,996

Table 19-9: Annual Cash Flow Summary – Proved Reserves – Spot Prices less 45%

SUMMARY OF BROMINE FIELD RESERVES, PRODUCTION AND CASHFLOW

COMPANY: Albemarle Corporation	CASHFLOW FORECAST CASE: Real 2023$	FIELD: Magnolia
OPERATOR: Albemarle Corporation	PRICE FORECAST: Spot -45%	WORKING INTEREST: 100.0%
	ANNUAL COST INFLATION: 0.0%	RESERVES CLASS: Proved (1P)
	EFFECTIVE DATE OF ANALYSIS: 12/31/2022	

RESERVES		Total Field Gross	Total Field Net	Company Share Gross	Company Share Net
Bromine	(K Tonnes)	2,419	2,419	2,419	2,419

PRESENT VALUE - COMPANY SHARE (Million US$) Discount Rate:	0%	5%	10%	15%	20%
Gross Revenue	8,620	4,084	2,546	1,841	1,448
Net Revenue	8,620	4,084	2,546	1,841	1,448
Operating Costs, G&A & Aband	4,408	1,823	1,058	740	573
Operating Income	4,212	2,265	1,488	1,101	875
Capital Costs	1,163	513	310	220	171
Cash Flow Before Tax (CFBT)	3,049	1,752	1,178	880	704
Tax Payable	894	483	318	236	188
Cash Flow After Tax (CFAT)	2,190	1,272	860	644	517

PRODUCT PRICES												
Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual Average 2033+
Bromine	(US$/Kg)	$3.56	$3.56	$3.56	$3.56	$3.56	$3.56	$3.56	$3.56	$3.56	$3.56	$3.56

FULL FIELD GROSS PRODUCTION													
Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Production Wells		21	21	21	22	19	20	20	21	22	22	24	-
Injection Wells		34	35	36	36	36	36	37	38	38	38	39	-
Annual Gross Production													
Brine Production	(MMbbl)	151.6	150.2	150.5	149.9	143.1	145.1	145.7	147.7	149.3	149.5	4,598	6,081
Brine Injection	(MMbbl)	153.4	156.7	158.5	154.5	145.9	146.8	152.0	159.2	161.1	160.6	4,980	6,529
Bromine Production	(k Tonne)	86.0	83.5	81.4	81.8	81.1	80.8	79.0	78.3	77.4	77.5	1,795.6	2,603
Recovery	(%)	93	93	93	93	93	93	93	93	93	93	93	92.9
Bromine Production (Sales)	(k Tonne)	80	78	76	76	75	75	73	73	72	72	1,669	2,419

COMPANY SHARE CASHFLOW													
Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Bromine Gross Sales Revenue	($MM)	284.8	276.7	269.6	271.1	268.5	267.8	261.7	259.4	256.5	256.6	5,947.7	8,620
Production Royalty	($MM)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Net Sales Revenue	($MM)	284.8	276.7	269.6	271.1	268.5	267.8	261.7	259.4	256.5	256.6	5,947.7	8,620
Operating Costs													
Field and Plant Opex	($MM/yr)	72.2	71.2	70.5	70.7	70.3	70.2	69.6	69.5	69.2	69.2	2,121.5	2,824
G&A	($MM/yr)	35.1	34.9	34.8	34.8	34.7	34.7	34.6	34.6	34.5	34.5	1,201.7	1,549
Abandonmnet and Reclamation	($MM/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.7	35
Total Opex, G&A, Abex	**($MM/yr)**	**107.3**	**106.1**	**105.3**	**105.5**	**105.0**	**105.0**	**104.2**	**104.1**	**103.7**	**103.7**	3,358.0	4,408
Operating Cash Income Before Tax	**($MM/yr)**	**177.6**	**170.6**	**164.3**	**165.5**	**163.5**	**162.8**	**157.5**	**155.3**	**152.8**	**152.9**	2,589.7	4,212
Capital Costs													
Field	**($MM/yr)**	4.2	13.8	23.3	13.9	3.9	23.1	32.7	13.8	14.0	14.0	207.4	364
Plant	**($MM/yr)**	18.8	16.8	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	627.6	799
Total Capital	**($MM/yr)**	**23.0**	**30.6**	**40.3**	**30.8**	**20.8**	**40.0**	**49.7**	**30.8**	**30.9**	**30.9**	835.0	1,163
Cash Flow Before Tax	**($MM/yr)**	154.5	140.0	124.0	134.7	142.6	122.8	107.8	124.5	121.9	121.9	1,754.7	3,049
Income Tax	**($MM/yr)**	38.2	36.6	35.3	35.5	35.1	34.9	33.8	33.3	32.7	32.7	545.8	894
Cash Flow After Tax	**($MM/yr)**	**116.4**	**103.4**	**88.7**	**99.2**	**107.5**	**87.9**	**74.0**	**91.2**	**89.1**	**89.2**	1,243.6	2,190

Table 19-10: Annual Cash Flow Summary – Proved + Probable Reserves – Spot Prices

SUMMARY OF BROMINE FIELD RESERVES, PRODUCTION AND CASHFLOW

COMPANY: Albemarle Corporation
OPERATOR: Albemarle Corporation

CASHFLOW FORECAST CASE: Real 2023$
PRICE FORECAST: Spot
ANNUAL COST INFLATION: 0.0%
EFFECTIVE DATE OF ANALYSIS: 12/31/2022

FIELD: Magnolia
WORKING INTEREST: 100.0%
RESERVES CLASS: Proved + Probable (2P)

RESERVES		Total Field Gross	Total Field Net	Company Share Gross	Company Share Net
Bromine	(K Tonnes)	2,984	2,984	2,984	2,984

PRESENT VALUE - COMPANY SHARE (Million US$) Discount Rate:	0%	5%	10%	15%	20%
Gross Revenue	19,337	8,947	5,473	3,904	3,041
Net Revenue	19,337	8,947	5,473	3,904	3,041
Operating Costs, G&A & Aband	4,700	1,944	1,125	785	605
OCIBT	14,637	7,006	4,348	3,119	2,436
Capital Costs	1,163	513	310	220	171
Cash Flow Before Tax (CFBT)	13,474	6,494	4,038	2,899	2,265
Tax Payable	3,291	1,574	977	701	547
Cash Flow After Tax (CFAT)	10,218	4,923	3,061	2,198	1,718

PRODUCT PRICES												
Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual Average 2033+
Bromine	(US$/Kg)	$6.48	$6.48	$6.48	$6.48	$6.48	$6.48	$6.48	$6.48	$6.48	$6.48	$6.48

FULL FIELD GROSS PRODUCTION													
Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Production Wells		21	21	21	22	19	20	20	21	22	22	24	-
Injection Wells		34	35	36	36	36	36	37	38	38	38	39	-
Annual Gross Production													
Brine Production	(MMbbl)	151.6	150.2	150.5	149.9	143.1	145.1	145.7	147.7	149.3	149.5	4,598.1	6,081
Brine Injection	(MMbbl)	153.4	156.7	158.5	154.5	145.9	146.8	152.0	159.2	161.1	160.6	4,980.4	6,529
Bromine Production	(k Tonne)	96.3	93.6	91.3	92.8	93.1	94.0	92.4	92.4	92.1	92.2	2,280.8	3,211
Recovery	(%)	93	93	93	93	93	93	93	93	93	93	93	93
Bromine Production (Sales)	(k Tonne)	90	87	85	86	87	87	86	86	86	86	2,119.7	2,984

COMPANY SHARE CASHFLOW													
Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Bromine Gross Sales Revenue	($MM)	580.0	563.4	549.7	559.0	560.7	566.0	556.2	556.6	554.9	555.0	13,735.8	19,337
Production Royalty	($MM)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Sales Revenue	($MM)	580.0	563.4	549.7	559.0	560.7	566.0	556.2	556.6	554.9	555.0	13,735.8	19,337
Operating Costs													
Field and Plant Opex	($MM/yr)	76.4	75.3	74.6	75.2	75.2	75.6	75.1	75.3	75.2	75.2	2,320.6	3,074
G&A	($MM/yr)	35.8	35.6	35.5	35.6	35.6	35.6	35.5	35.5	35.5	35.5	1,235.6	1,591
Abandonmnet and Reclamation	($MM/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.7	35
Total Opex, G&A, Abex	($MM/yr)	112.2	110.9	110.0	110.8	110.8	111.3	110.6	110.8	110.8	110.8	3,590.9	4,700
Operating Cash Income Before Tax	($MM/yr)	467.8	452.5	439.7	448.2	449.9	454.7	445.6	445.7	444.2	444.3	10,144.9	14,637
Capital Costs													
Field	($MM/yr)	4.2	13.8	23.3	13.9	3.9	23.1	32.7	13.8	14.0	14.0	207.4	364
Plant	($MM/yr)	18.8	16.8	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	627.6	799
Total Capital	($MM/yr)	23.0	30.6	40.3	30.8	20.8	40.0	49.7	30.8	30.9	30.9	835.0	1,163
Cash Flow Before Tax	($MM/yr)	444.8	421.9	399.4	417.4	429.1	414.7	395.9	414.9	413.2	413.3	9,309.9	13,474
Income Tax	($MM/yr)	105.1	101.7	98.8	100.7	101.1	102.2	100.1	100.2	99.8	99.8	2,281.6	3,291
Cash Flow After Tax	($MM/yr)	339.6	320.2	300.6	316.6	328.0	312.5	295.7	314.8	313.4	313.5	7,063.0	10,218

Table 19-11: Annual Cash Flow Summary – Proved + Probable Reserves – Spot Prices less 15%

SUMMARY OF BROMINE FIELD RESERVES, PRODUCTION AND CASHFLOW

COMPANY: Albemarle Corporation	**CASHFLOW FORECAST CASE:** Real 2023$	**FIELD:** Magnolia
OPERATOR: Albemarle Corporation	**PRICE FORECAST:** Spot -15%	**WORKING INTEREST:** 100.0%
	ANNUAL COST INFLATION: 0.0%	**RESERVES CLASS:** Proved + Probable (2P)
	EFFECTIVE DATE OF ANALYSIS: 12/31/2022	

RESERVES

		Total Field Gross	Total Field Net	Company Share Gross	Company Share Net
Bromine	(K Tonnes)	2,984	2,984	2,984	2,984

PRESENT VALUE - COMPANY SHARE (Million US$)

Discount Rate:	0%	5%	10%	15%	20%
Gross Revenue	16,437	7,605	4,652	3,318	2,585
Net Revenue	16,437	7,605	4,652	3,318	2,585
Operating Costs, G&A & Aband	4,700	1,944	1,125	785	605
OCIBT	11,737	5,664	3,527	2,534	1,980
Capital Costs	1,163	513	310	220	171
Cash Flow Before Tax (CFBT)	10,574	5,152	3,217	2,313	1,809
Tax Payable	2,618	1,263	786	565	442
Cash Flow After Tax (CFAT)	7,990	3,892	2,431	1,748	1,368

PRODUCT PRICES

Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual Average 2033+
Bromine	(US$/Kg)	$5.51	$5.51	$5.51	$5.51	$5.51	$5.51	$5.51	$5.51	$5.51	$5.51	$5.51

FULL FIELD GROSS PRODUCTION

Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Production Wells		21	21	21	22	19	20	20	21	22	22	24	-
Injection Wells		34	35	36	36	36	36	37	38	38	38	39	-
Annual Gross Production													
Brine Production	(MMbbl)	151.6	150.2	150.5	149.9	143.1	145.1	145.7	147.7	149.3	149.5	4,598.1	6,081
Brine Injection	(MMbbl)	153.4	156.7	158.5	154.5	145.9	146.8	152.0	159.2	161.1	160.6	4,980.4	6,529
Bromine Production	(k Tonne)	96.2	93.5	91.2	92.7	93.0	93.9	92.3	92.3	92.0	92.1	2,278.5	3,208
Recovery	(%)	93	93	93	93	93	93	93	93	93	93	93	93
Bromine Production (Sales)	(k Tonne)	90	87	85	86	87	87	86	86	86	86	2,120	2,984

COMPANY SHARE CASHFLOW

Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Bromine Gross Sales Revenue	($MM)	493.0	478.9	467.2	475.1	476.6	481.1	472.7	473.1	471.7	471.8	11,675.4	16,437
Production Royalty	($MM)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Sales Revenue	($MM)	493.0	478.9	467.2	475.1	476.6	481.1	472.7	473.1	471.7	471.8	11,675.4	16,437
Operating Costs												0.0	0
Field and Plant Opex	($MM/yr)	76.4	75.3	74.6	75.2	75.2	75.6	75.1	75.3	75.2	75.2	2,320.6	3,074
G&A	($MM/yr)	35.8	35.6	35.5	35.6	35.6	35.6	35.5	35.5	35.5	35.5	1,235.6	1,591
Abandonmnet and Reclamation	($MM/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.7	35
Total Opex, G&A, Abex	**($MM/yr)**	**112.2**	**110.9**	**110.0**	**110.8**	**110.8**	**111.3**	**110.6**	**110.8**	**110.8**	**110.8**	3,590.9	4,700
Operating Cash Income Before Tax	**($MM/yr)**	**380.8**	**368.0**	**357.2**	**364.3**	**365.8**	**369.8**	**362.1**	**362.3**	**360.9**	**361.0**	8,084.5	11,737
Capital Costs													
Field	**($MM/yr)**	4.2	13.8	23.3	13.9	3.9	23.1	32.7	13.8	14.0	14.0	207.4	364
Plant	**($MM/yr)**	18.8	16.8	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	627.6	799
Total Capital	**($MM/yr)**	**23.0**	**30.6**	**40.3**	**30.8**	**20.8**	**40.0**	**49.7**	**30.8**	**30.9**	**30.9**	835.0	1,163
Cash Flow Before Tax	**($MM/yr)**	357.8	337.4	316.9	333.5	345.0	329.8	312.4	331.5	330.0	330.1	7,249.5	10,574
Income Tax	**($MM/yr)**	85.0	82.1	79.7	81.3	81.6	82.5	80.8	80.8	80.5	80.5	1,803.6	2,618
Cash Flow After Tax	**($MM/yr)**	**272.8**	**255.3**	**237.2**	**252.3**	**263.4**	**247.3**	**231.7**	**250.7**	**249.5**	**249.6**	5,480.7	7,990

Table 19-12: Annual Cash Flow Summary – Proved + Probable Reserves – Spot Prices less 30%

SUMMARY OF BROMINE FIELD RESERVES, PRODUCTION AND CASHFLOW

COMPANY: Albemarle Corporation	CASHFLOW FORECAST CASE: Real 2023$	FIELD: Magnolia	
OPERATOR: Albemarle Corporation	PRICE FORECAST: Spot - 30%	WORKING INTEREST: 100.0%	
	ANNUAL COST INFLATION: 0.0%	RESERVES CLASS: Proved + Probable (2P)	
	EFFECTIVE DATE OF ANALYSIS: 12/31/2022		

RESERVES		Total Field Gross	Total Field Net	Company Share Gross	Company Share Net
Bromine	(K Tonnes)	2,984	2,984	2,984	2,984

PRESENT VALUE - COMPANY SHARE (Million US$) Discount Rate:	0%	5%	10%	15%	20%
Gross Revenue	13,536	6,263	3,831	2,733	2,129
Net Revenue	13,536	6,263	3,831	2,733	2,129
Operating Costs, G&A & Aband	4,700	1,944	1,125	785	605
OCIBT	8,836	4,322	2,706	1,948	1,524
Capital Costs	1,163	513	310	220	171
Cash Flow Before Tax (CFBT)	7,673	3,809	2,396	1,728	1,353
Tax Payable	1,945	951	596	429	336
Cash Flow After Tax (CFAT)	5,763	2,861	1,800	1,299	1,017

PRODUCT PRICES Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual Average 2033+
Bromine	(US$/Kg)	$4.54	$4.54	$4.54	$4.54	$4.54	$4.54	$4.54	$4.54	$4.54	$4.54	$4.54

FULL FIELD GROSS PRODUCTION Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Production Wells		21	21	21	22	19	20	20	21	22	22	24	-
Injection Wells		34	35	36	36	36	36	37	38	38	38	39	-
Annual Gross Production													
Brine Production	(MMbbl)	151.6	150.2	150.5	149.9	143.1	145.1	145.7	147.7	149.3	149.5	4,598.1	6,081
Brine Injection	(MMbbl)	153.4	156.7	158.5	154.5	145.9	146.8	152.0	159.2	161.1	160.6	4,980.4	6,529
Bromine Production	(k Tonne)	96.21	93.46	91.19	92.72	93.02	93.88	92.26	92.33	92.05	92.07	2278.5	3,208
Recovery	(%)	93	93	93	93	93	93	93	93	93	93	93	93
Bromine Production (Sales)	(k Tonne)	90	87	85	86	87	87	86	86	86	86	2,120	2,984

COMPANY SHARE CASHFLOW Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Bromine Gross Sales Revenue	($MM)	406.0	394.4	384.8	391.3	392.5	396.2	389.3	389.6	388.4	388.5	9,615.1	13,536
Production Royalty	($MM)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Sales Revenue	($MM)	406.0	394.4	384.8	391.3	392.5	396.2	389.3	389.6	388.4	388.5	9,615.1	13,536
Operating Costs													
Field and Plant Opex	($MM/yr)	76.4	75.3	74.6	75.2	75.2	75.6	75.1	75.3	75.2	75.2	2,320.6	3,074
G&A	($MM/yr)	35.8	35.6	35.5	35.6	35.6	35.6	35.5	35.5	35.5	35.5	1,235.6	1,591
Abandonmnet and Reclamation	($MM/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.7	35
Total Opex, G&A, Abex	**($MM/yr)**	**112.2**	**110.9**	**110.0**	**110.8**	**110.8**	**111.3**	**110.6**	**110.8**	**110.8**	**110.8**	3,590.9	4,700
Operating Cash Income Before Tax	**($MM/yr)**	**293.8**	**283.5**	**274.8**	**280.5**	**281.7**	**284.9**	**278.7**	**278.8**	**277.7**	**277.8**	6,024.1	8,836
Capital Costs													
Field	**($MM/yr)**	4.2	13.8	23.3	13.9	3.9	23.1	32.7	13.8	14.0	14.0	207.4	364
Plant	**($MM/yr)**	18.8	16.8	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	627.6	799
Total Capital	**($MM/yr)**	**23.0**	**30.6**	**40.3**	**30.8**	**20.8**	**40.0**	**49.7**	**30.8**	**30.9**	**30.9**	835.0	1,163
Cash Flow Before Tax	**($MM/yr)**	270.8	252.9	234.5	249.7	260.9	244.9	229.0	248.0	246.7	246.8	5,189.2	7,673
Income Tax	**($MM/yr)**	64.8	62.5	60.5	61.8	62.1	62.8	61.4	61.4	61.2	61.2	1,325.6	1,945
Cash Flow After Tax	**($MM/yr)**	**206.0**	**190.4**	**173.9**	**187.9**	**198.8**	**182.1**	**167.6**	**186.5**	**185.5**	**185.6**	3,898.3	5,763

Table 19-13: Annual Cash Flow Summary – Proved + Probable Reserves – Spot Prices less 45%

SUMMARY OF BROMINE FIELD RESERVES, PRODUCTION AND CASHFLOW

COMPANY: Albemarle Corporation	**CASHFLOW FORECAST CASE:** Real 2023$	**FIELD:** Magnolia
OPERATOR: Albemarle Corporation	**PRICE FORECAST:** Spot -45%	**WORKING INTEREST:** 100.0%
	ANNUAL COST INFLATION: 0.0%	**RESERVES CLASS:** Proved + Probable (2P)
	EFFECTIVE DATE OF ANALYSIS: 12/31/2022	

RESERVES

		Total Field Gross	Total Field Net	Company Share Gross	Company Share Net
Bromine	(K Tonnes)	2,984	2,984	2,984	2,984

PRESENT VALUE - COMPANY SHARE (Million US$)

Discount Rate:	0%	5%	10%	15%	20%
Gross Revenue	10,636	4,921	3,010	2,147	1,673
Net Revenue	10,636	4,921	3,010	2,147	1,673
Operating Costs, G&A & Aband	4,700	1,944	1,125	785	605
OCIBT	5,936	2,980	1,885	1,363	1,067
Capital Costs	1,163	513	310	220	171
Cash Flow Before Tax (CFBT)	4,773	2,467	1,575	1,142	897
Tax Payable	1,272	640	406	293	230
Cash Flow After Tax (CFAT)	3,535	1,831	1,170	849	667

PRODUCT PRICES

Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Annual Average 2033+
Bromine	(US$/Kg)	$3.56	$3.56	$3.56	$3.56	$3.56	$3.56	$3.56	$3.56	$3.56	$3.56	$3.56

FULL FIELD GROSS PRODUCTION

Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Production Wells		21	21	21	22	19	20	20	21	22	22	24	-
Injection Wells		34	35	36	36	36	36	37	38	38	38	39	-
Annual Gross Production													
Brine Production	(MMbbl)	151.6	150.2	150.5	149.9	143.1	145.1	145.7	147.7	149.3	149.5	4,598.1	6,081
Brine Injection	(MMbbl)	153.4	156.7	158.5	154.5	145.9	146.8	152.0	159.2	161.1	160.6	4,980.4	6,529
Bromine Production	(k Tonne)	96.2	93.5	91.2	92.7	93.0	93.9	92.3	92.3	92.0	92.1	2278.5	3,208
Recovery	(%)	93	93	93	93	93	93	93	93	93	93	93	93
Bromine Production (Sales)	(k Tonne)	90	87	85	86	87	87	86	86	86	86	2,120	2,984

COMPANY SHARE CASHFLOW

Year		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033+	Total
Bromine Gross Sales Revenue	($MM)	319.0	309.9	302.3	307.4	308.4	311.3	305.9	306.1	305.2	305.3	7,554.7	10,636
Production Royalty	($MM)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Sales Revenue	($MM)	319.0	309.9	302.3	307.4	308.4	311.3	305.9	306.1	305.2	305.3	7,554.7	10,636
Operating Costs													
Field and Plant Opex	($MM/yr)	76.4	75.3	74.6	75.2	75.2	75.6	75.1	75.3	75.2	75.2	2,320.6	3,074
G&A	($MM/yr)	35.8	35.6	35.5	35.6	35.6	35.6	35.5	35.5	35.5	35.5	1,235.6	1,591
Abandonmnet and Reclamation	($MM/yr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.7	35
Total Opex, G&A, Abex	**($MM/yr)**	**112.2**	**110.9**	**110.0**	**110.8**	**110.8**	**111.3**	**110.6**	**110.8**	**110.8**	**110.8**	3,590.9	4,700
Operating Cash Income Before Tax	**($MM/yr)**	**206.8**	**198.9**	**192.3**	**196.6**	**197.6**	**200.0**	**195.3**	**195.3**	**194.4**	**194.5**	3,963.8	5,936
Capital Costs													
Field	**($MM/yr)**	4.2	13.8	23.3	13.9	3.9	23.1	32.7	13.8	14.0	14.0	207.4	364
Plant	**($MM/yr)**	18.8	16.8	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	627.6	799
Total Capital	**($MM/yr)**	**23.0**	**30.6**	**40.3**	**30.8**	**20.8**	**40.0**	**49.7**	**30.8**	**30.9**	**30.9**	835.0	1,163
Cash Flow Before Tax	**($MM/yr)**	183.8	168.4	152.0	165.8	176.7	160.0	145.6	164.5	163.5	163.6	3,128.8	4,773
Income Tax	**($MM/yr)**	44.6	42.9	41.4	42.4	42.6	43.1	42.1	42.1	41.9	41.9	847.6	1,272
Cash Flow After Tax	**($MM/yr)**	**139.2**	**125.5**	**110.6**	**123.5**	**134.2**	**116.9**	**103.5**	**122.4**	**121.6**	**121.7**	2,315.9	3,535

20 ADJACENT PROPERTIES

20.1 Brine Producing Properties

Immediately east of the Albemarle property, in the west-southwestern portion of Union County, Arkansas, is a brine production venture operated by Great Lakes Chemical Corporation ("GLCC") out of El Dorado, Arkansas. GLCC produces brine from the Smackover Formation through wells with depths ranging from 7400 feet to 8700 feet. The characteristics of the Smackover Formation are similar to those found to the west in Columbia County. GLCC has been producing brine in Union County since at least 1963. It has a plant located in El Dorado and is the only active operator in Union County currently producing brine.

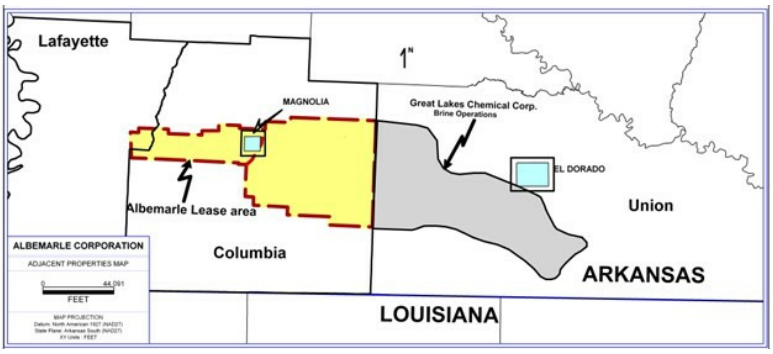

Figure 20-1: **Adjacent Properties**

20.2 Oil Producing Properties

There are both active and inactive oil fields within and adjacent to the Albemarle Magnolia Field property. The active oil fields within the outline of the property are Atlanta, Pine Tree, Village, Magnolia, Kerlin, and Columbia. All of these active fields, with the exception of the Pine Tree field produce reservoir fluids from horizons shallower than the Smackover Formation. Magnolia, Atlanta, and Pine Tree Fields all produce from the Smackover Formation with Magnolia being the most significant producing field within the confines of the Albermarle property. Two other oil fields in the area, the Big Creek and Kilgore Lodge Fields are inactive and have not produced in many years.

The active oil fields immediately adjacent to the Albemarle Property include McKamie-Patton, Grayson, Dorcheat-Macedonia, and Mt. Holly. These are all very mature fields that produce oil from the Smackover Formation. Dorcheat-Macedonia Field is the largest field outside the property outline with most of the current oil production coming from horizons above the Smackover. Oil production from Mt. Vernon Field ceased a few years ago and is currently inactive.

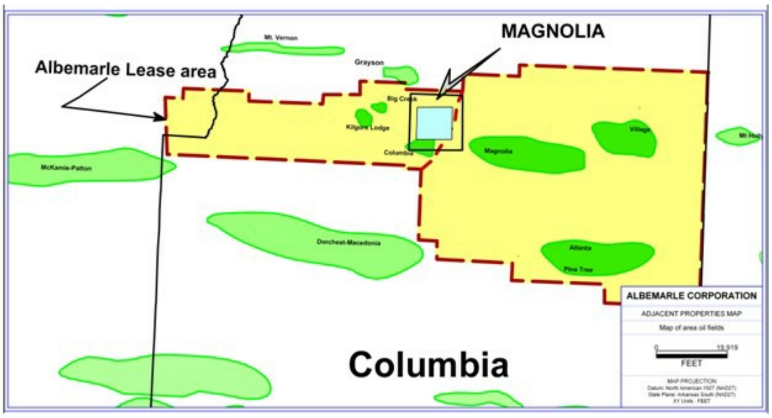

Figure 20-2: Adjacent Oil Fields

21 OTHER RELEVANT DATA AND INFORMATION

This section is intentionally left blank, as there is no additional relevant data and information to be included in this section.

22 INTERPRETATION AND CONCLUSIONS

- The Albemarle Magnolia Field bromide production and processing operations in Columbia County, Arkansas, USA represent an ongoing viable commercial source of bromine, both historically and for the future.
- The portion of the Magnolia field, under bromide production lease contracts to Albemarle contains an original bromide in place ("OBIP") resource of 13.6-15.0 million tonnes, of which Albemarle's working interest share is 10.2-11.2 million tonnes.
- Albemarle operates two bromide processing plants which extract the bromine from the raw bromide production, which results in an overall bromide sales production to bromide raw production ratio averaging about 92.8% over life.
- The Smackover formation can be vertically subdivided into the upper Smackover, EOD 0-5, historically known as the Reynolds Oolite, and the lower Smackover, EOD 7-9, sometimes split into middle and lower in the literature. The reserves estimated in this report have been confined to the upper Smackover due to technology limitations. Based on current understanding, there may be additional volumes in the lower Smackover, which will likely require advanced technologies to unlock.
- The cumulative bromide production forecast to the effective date of this report (December 31, 2022) has been 4.13 million tonnes (raw) and 3.87 million tonnes (bromine sales), which represents 37% of Albemarle's share of original bromide in place under leased areas.
- The Magnolia field is forecast to continue to produce bromide until 2069, with continued development of the proved and probable reserves.
- The forecast production of sales bromide is 2,419 thousand tonnes for the Proved reserves case, plus an additional 565 thousand tonnes of Probable reserves, for a total Proved plus Probable reserves of 2,984 thousand tonnes. The ultimate recovery at the end of this forecast represents a bromide recovery factor of 75% and 82% for the 1P and 2P cases respectively
- To maintain field bromide productivity and fully exploit the future reserves, in addition to maintaining the current production and processing operations, Albemarle will require an estimated capital investment of US$1.0 to $1.4 billion to develop the Proved reserves, with no additional capital required to develop the Probable reserves. These estimates are in Constant 2023 dollars and are exclusive of abandonment and reclamation costs.

23 RECOMMENDATIONS

The qualified persons contributing to this evaluation report offer the following recommendations:

1. Continue to operate the Magnolia field and bromine extraction plants with due regard to all environmental, safety, and social responsibility standards followed to date
2. Continue to assess future field development opportunities on the leased bromine lands, including opportunities for outstep drilling to optimize overall bromine recovery efficiency.
3. Implement a full electronic land and lease database management system to replace the current manual paper-based land records systems.
4. Maintain and update the geological static models if/when additional drilling data becomes available and continue to monitor the Magnolia field brine production reservoir performance utilizing reservoir simulation modeling technology to optimize production performance of the reservoir.

24 RELIANCE ON INFORMATION PROVIDED BY THE REGISTRANT

This report is based on information from a variety of sources, including data available in the public domain, various technical and commercial reference materials, and also information provided by the registrant. The sections of this report for which rely upon information provide by the registrant to a significant degree are summarized in the following table:

All such information provided by the registrant has been reviewed for consistency and deemed to be reasonable and reliable by the qualified persons conducting this evaluation.

Table 24-1: Reliance on Information Provided by the Registrant

Category	Report Item/ Portion	Disclose why the Qualified Person considers it reasonable to rely upon the registrant
Property Description	Section 3	The registrant holds the information on lease ownership. The QP crossed checked this information with lease information in the public domain.
Sample Processing, Analysis, and Security	Section 8 and Section 10.2	The registrant has sampling procedures in place, the description of which was accepted by the QP.
Data Verification	Section 9	Well logs, core analysis, production and sampling data on the project are owned by the registrant and were relied upon by the QP, in concert with using like data available in the public domain.
Mineral Processing and Metallurgical Testing	Section 10	The processing and testing methods used for the Magnolia operations were obtained from the registrant, then reviewed and deemed reasonable by the QP.
Mining Methods	Section 13	The brine extraction and bromine processing system and operations data is all proprietary to the registrant. This data was obtained by the QP from the registrant and deemed to be reasonable and reliable information.
Processing and Recovery Methods	Section 14	The brine extraction and bromine processing system and operations data is all proprietary to the registrant. This data was obtained by the QP from the registrant and deemed to be reasonable and reliable information.
Marketing information	Section 16.1	Market overview information obtained from Technavio, a market research company with expertise in the field.
Major Producers	Section 16.2	Major producer information was sourced from USGS Mineral Commodity Summary for Bromine. The USGS is considered by the QP as a reliable source of such data. The USGS canvasses very thoroughly the world mineral markets and its commodity specialists gather first-hand information from both producers and consumers of minerals.
Major Markets	Section 16.3	Information on major markets was sourced from Market Research Future, a source considered as reliable by the QP, as well as of gather publicly available market indicators.
Bromine Applications	Section 16.5	Albemarle provided information on bromine applications which was reviewed by the QP and considered reasonable. The QP also reviewed the public domain in order to obtain general information on bromine applications.

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