NI 43 - 101 Technical Report

Preliminary Assessment and Economic Evaluation of the Cauchari-Olaroz Lithium Project, Jujuy Province, Argentina

PREPARED FOR:

LITHIUM AMERICAS

TORONTO, CANADA

PREPARED BY:

ARA WorleyParsons

Effective: April 30th 2011

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LIST OF ABBREVIATIONS

%:	Percent
°C:	Temperature in Celsius degrees
ASL:	Alex Stewart Laboratories S.A.
ASTM:	American Society for Testing and Materials
B:	Boron
B_2O_3:	Boron oxide
B. Sc.:	Bachelor of Science
Ca:	Calcium
CAPEX:	Capital Expenditures
$CaCl_2$:	Calcium chloride
$CaCO_3$:	Calcium Carbonate
Cc:	Coefficient of curvature
CEO:	Chief executive officer
CHP:	Combined Heat and Power
Cl:	Chloride
cm:	Centimetre
CO_3:	Carbonate
Cu:	Coefficient of uniformity
DD:	Diamond drilling
EIA:	Environmental Impact Assessment
EV:	Electric vehicles
g/cm^3:	Grams per cubic centimetre
GEC:	Geophysical Exploration Consulting
GEM:	Gestión y Economía de Minerales Ltda
g/L:	Grams per litre
GPS:	Global positioning system
H_3BO_3:	Boric acid
ha:	Hectare
HCl:	Hydrochloric acid
H_2O:	Water
HEV:	Hybrid electric vehicles
HQ:	Diamond drilling diameter
Hz:	Hertz
ICP:	Inductively coupled plasma
IFC:	International Finance Corporation
IRR:	Internal rate of return
JORC:	Joint ore reserve committee
K:	Potassium
KCl:	Potassium chloride
K/Li:	Potassium per lithium ratio
kg:	Kilogram

km:	Kilometre
L:	Litre
LAC:	Lithium Americas Corporation
LCE:	Lithium Carbonate Equivalent
L/s:	Litre per second
Li:	Lithium
Li_2CO_3:	Lithium Carbonate
m:	Metre
masl:	Metres above sea level
mg:	Milligram
Mg:	Magnesium
$Mg(OH)_2$:	Magnesium hydroxide
mg/L:	Milligrams per litre
Mg/Li:	Magnesium to lithium ratio
mGal:	milligal
MIT:	Massachusetts Institute of Technology
mm:	Millimetre
MMBTU:	Millions of British thermal units
m/s:	Metre per second
M. Sc.:	Master of Science
MWh:	Megawatt hour
Na:	Sodium
$Na_2B_4O_7.10H_2O$:	Borax, Sodium borate (Tincal)
$Na_2B_8O_{13}.4H_2O$:	Disodium octoborate tetrahydrate
$NA_2SO_4.3K_2SO_4$.:	Aphthitalite (Glaserite)
NaOH:	Sodium hydroxide
Na_2SO_4:	Sodium sulphate
$Na_2SO_4.10H_2O$:	Mirabilite (Glauber's salt)
NPV:	Net present value
ODEX:	Drilling method
OPEX:	Operating Expenditures
P. Geo.:	Professional Geoscientist
P. Eng.:	Professional Engineer
pH:	Measure of hydrogen ion activity
Ph.D:	Doctor of Philosophy
PHEV:	Plug-in hybrid electric vehicles
PPM:	Parts per million
PQ:	Drilling diameter in diamond drilling
PVC:	Polyvinil chloride
QA/QC:	Quality Assurance / Quality Control
QP:	Qualified person
RC:	Reverse Circulation
rpm:	Rotations per minute
RBRC:	Relative brine release capacity
SO_4:	Sulphate

SO_4/K:	Sulphate to potassium ratio
SO_4/Li:	Sulphate to lithium ratio
SO_4/Mg:	Sulphate to magnesium ratio
SQM:	Sociedad Química y Minera de Chile
TDS:	Total dissolved solids
TEM:	Time Domain Electromagnetic
TPA:	Tonnes Per Annum
US$:	United States dollars
USDA:	United States Department of Agriculture
WB:	World Bank
wt.%:	Weight percent
XRF:	X-Ray fluorescence

SUMMARY

S.1. Terms of Reference

This report was prepared by ARA WorleyParsons (ARAWP) for Lithium Americas Corporation (LAC) to provide an NI 43-101 compliant Preliminary Economic Assessment ("PEA") of the Cauchari-Olaroz properties. The primary focus of the PEA is to prepare an independent technical appraisal of the potential economic viability of the lithium contained in these properties, in conformance with the standards required by NI 43-101 and mineral reserve classifications adopted by the Canadian Institute of Mining, Metallurgy and Petroleum ("CIM") Council in December 2005.

This report is based on the NI 43-101 compliant document "Measured, Indicated, and Inferred Resource Estimation of Lithium and Potassium at the Cauchari and Olaroz Salars, Jujuy Province, Argentina", prepared by Mark King, Ph.D. P. Geo. in all matters referring to resource estimation. Chapters 4 and 9 through 15 of the above referred report have been herein incorporated. Chapter 16 was prepared by Mr. Pedro Pavlovic, an independent consultant to LAC. Section 17.6, Environment, was prepared by Ausenco Vector of Argentina. Section 17.7 presents a summary of the GEM Ltda. Lithium Marketing Report.

In addition, ARAWP relied extensively on LAC and on its independent consultants, as cited on the text of the study and the references, for information on costs, prices, legislation and tax in Argentina, as well as for general project data and information.

S.2. Property Location, Description and Ownership

The Cauchari and Olaroz Salars are located in the Department of Susques of the Province of Jujuy in north-western Argentina, approximately 250 km northwest of San Salvador de Jujuy, the provincial capital, and 100 km east of the international border with Chile. Average ground elevation of the salars is 3,950 masl.

LAC, through its Argentinian subsidiary Minera Exar S.A., has requested legal title to mining and exploration permits covering a total of 82,498 ha over the Cauchari and Olaroz Salars (the "Cauchari-Olaroz Project"), of which 64,572 ha have been granted to date. The Provincial Government of Jujuy approved the LAC Environmental Impacts Report for the Cauchari-Olaroz Project exploration work by Resolution No.25/09 on August 26, 2009.

S.3. Geology and Mineralization

The geology and mineralization have been described in the NI 43-101 report "Measured, Indicated and Inferred Resource Estimation of Lithium and Potassium at the Cauchari and Olaroz Salars, Jujuy Province, Argentina" (King, 2010b) and filed in SEDAR on December 6th, 2010 and there has been no material changes since that filing.

S.4. Exploration

The following exploration programs have been conducted to evaluate the lithium development potential of the Project area:

- Surface Brine Program
- Seismic Geophysical Program
- Gravity Survey
- TEM Survey
- Numerical Modeling
- Surface Water Sampling Program
- Pumping Test Program
- Air Lift Testing Program
- Reverse Circulation (RC) Borehole Program
- Diamond Drilling (DD) Borehole Program

S.5. Mineral Resource Estimate

A Measured, Indicated and Inferred Resource Estimate was developed for the LAC Cauchari properties using the Vulcan three-dimensional block modeling software. The software was operated by Mining Engineer and Geostatistician Danilo Castillo, a specialist in Vulcan from Maptek Chile. The modelling was supported by geological, hydrogeological and geochemical data and interpretations provided by the LAC Project experts. The modeling procedure and results were reviewed in detail by Mark King (independent QP) and are considered valid and appropriate for development of a Measured, Indicated and Inferred Resource Estimate, as defined by the CIM and referenced by NI 43-101.

S.6. Lithium Recovery Process for the Cauchari Project

The process begins with the extraction of the brine through production wells spread out in the salar. From the wells the brine is pumped out to the solar evaporation ponds. The evaporation process in the solar ponds starts with a pre-concentration stage where near 90% of sodium chloride (halite) crystallizes out. This pre-concentration stage has an evaporation period of 160 to 180 days, during which time the volume of brine is reduced by 80 – 90%, depending on the current composition of brine.

The pre-concentrated brine is now subjected to chemical treatment with calcium solutions (slaked lime and calcium chloride) in order to remove most of the magnesium and residual sulphate present. The additional treatment with $CaCl_2$ also results in further precipitation of sulphate as gypsum.

In order to favour the production of lithium carbonate at the lowest possible cost, the solar evaporation process will be designed in such a way that the lithium concentration in the brine reaches values in the range of 4%. This step of the evaporation process is carried out in another set of much smaller ponds called Lithium ponds. In addition to the increase in lithium concentration in these ponds, the crystalline precipitation of salts containing potassium chloride, sulphates and borates occurs.

The initial stages of the lithium carbonate processing plant include steps for the final purification of the concentrated lithium brine feeding the LCE precipitation. For this purpose, the conventional process used by lithium carbonate plants under operation, has been taken as reference, such as the following:

- Elimination of the boron content by solvent extraction.
- Treatment of the boron-free brine with a mixture of slaked lime and soda ash, to remove low levels of magnesium

The purified brine, containing 1% lithium dissolved as LiCl, a concentration that is reached by dilution with soda ash solution and/or recycled mother liquor from the plant, is transferred to three reactors in series, where lithium carbonate is precipitated by the addition of sodium carbonate solution (at 26 wt.%). The slurry containing the precipitated product is separated from the mother liquor by filtration and will be washed with soft water. Finally, the product is dried, classified and packed.

S.7. Capital and Operating Cost Estimate

Table S.1: Capital Costs Summary

Description	Total Projected Budget US$000 1ST Phase	Total Projected Budget US$000 2ND Phase	Total Projected Budget US$000
Production Wells	6,794	6,114	12,908
Ponds	93,391	88,722	182,113
Lithium Carbonate Plant	66,590	49,659	116,250
General Infrastructure	17,883	7,512	25,395
Subtotal	184,658	152,007	336,665
% Contingencies	17.6%	19.4%	18.4%
Contingencies	32,495	29,424	61,919
TOTAL	217,153	181,431	398,584

Note: Totals in all tables may not add up due to rounding, and percentages shown may not be exact for the same reason.

Table S.2: Operating Costs Summary

Description	US$ / Tonne Li_2CO_3
DIRECT COSTS	
Pond Chemical Reagents	290
Li Plant Chemical Reagents	510
SX Boron Removal Plant Reagents	31
Salt Removal and Transport	143
Energy	142
Manpower	69
Catering & Camp Services	12
Maintenance	145
Transportation to Port	54
DIRECT COSTS SUBTOTAL	**1,396**
INDIRECT COSTS	
General & Administration - LO	38
INDIRECT COSTS SUBTOTAL	**38**
PRODUCTION Li_2CO_3 TOTAL COSTS	**1,434**

S.8. Economic Analysis

Table S.3: Project Evaluation Medium Price Scenario (expressed in 000 US$)

Period	-1	0	1	2	3	4	5	10	15	20	Total
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2023**	**2028**	**2033**	
Revenue			**18,000**	**94,400**	**116,000**	**114,000**	**205,200**	**220,000**	**220,000**	**220,000**	**3,851,600**
Lithium carbonate			18,000	94,400	116,000	114,000	205,200	220,000	220,000	220,000	**3,851,600**
Expenses			**-48,124**	**-202,063**	**-81,023**	**-82,675**	**-142,906**	**-70,850**	**-70,850**	**-72,488**	**-1,690,745**
Direct Costs			-5,363	-29,036	-29,882	-29,882	-50,643	-55,833	-55,833	-55,833	**-982,297**
Indirect Costs			-338	-1,352	-1,352	-1,352	-1,497	-1,534	-1,534	-1,534	**-28,899**
Provincial Royalties (3%)			-399	-2,065	-2,706	-2,646	-4,840	-5,148	-5,148	-5,148	**-89,996**
Royalties Los Boros			-300	-7,000	0	0	0	0	0	0	**-7,300**
Royalties Borax			-200	-200	-200	-200	-200	-200	-200	-200	**-4,000**
Export Retention (5%)			-893	-4,676	-5,745	-5,645	-10,163	-10,893	-10,893	-10,893	**-190,710**
Refunds of Export Retention				447	2,338	2,872	2,822	5,446	5,446	5,446	**89,909**
Mining Licenses			-45	-45	-45	-45	-45	-45	-45	-45	**-900**
Depreciation			-40,587	-158,135	-43,431	-45,777	-78,341	-2,644	-2,644	-4,282	**-476,551**
Income Before Tax			**-30,124**	**-107,663**	**34,977**	**31,325**	**62,294**	**149,150**	**149,150**	**147,512**	**2,160,855**
Income Tax (35%)			0	0	0	0	0	-52,203	-52,203	-51,629	-756,299
Depreciation			40,587	158,135	43,431	45,777	78,341	2,644	2,644	4,282	476,551
Gross After Tax Cash Flow			**10,463**	**50,472**	**78,407**	**77,102**	**140,635**	**99,592**	**99,592**	**100,165**	**1,881,107**
Other income and expenses											
Total Investment	-28,017	-75,895	-113,240		-76,295	-105,137					**-398,584**
Sustaining Capital							-8,966	-8,966	-14,889	-8,966	**-70,498**
Working Capital			-3,570			-3,570					**-7,141**
Residual Value										1,344,219	**1,344,219**
Full Equity Basis Project Cash Flow	**-28,017**	**-75,895**	**-106,348**	**50,472**	**2,113**	**-31,605**	**131,669**	**90,625**	**84,702**	**1,435,418**	**2,749,103**

Table S.4: Project Evaluation Medium Price Scenario Results (expressed in 000 US$)

BEFORE TAX		AFTER TAX	
NPV 8%	982,504	NPV 8%	714,820
IRR	30.0%	IRR	26.0%
PAY OUT	5 Y, 4 M	PAY OUT	5 Y, 6 M

S.9. Conclusions and Recommendations

ARA WorleyParsons concludes that the Cauchari project has favourable economic potential to be a low cost brine lithium carbonate producer. The capital expenditures of the project (±30%) are US$ 399 million for a two phase project that starts at 20,000 tonnes of Lithium Carbonate per year and ramps up to 40,000 after 4 years of the first phase. Project economic analysis indicates that for the base case, Before Tax (BT) NPV (8%) is US$ 982.5 million and the Internal Rate of Return (IRR is 30.0%). The base case After Tax (AT) NPV is (8%) is US$ 715 million and IRR is 26.0%

Project sensitivity analysis shows that the revenue driver variables (Lithium carbonate long term price and production) have the highest impact in project results.

The project strengths are:

- Large resource (at full capacity the project only consumes about 50% of the measured and indicated resource estimate in 40 years)
- Excellent infrastructure is available at project
- The alluvial cone by the salar allows for inexpensive pond construction, a major driver in the overall CAPEX
- Very low operating costs (one of the lowest in industry) thanks to:
  - Access to efficient inexpensive energy through a nearby gas pipeline
- Very favourable brine chemistry that generates low consumption of pond reagents
  - The high sulphate content is neutralized by the low average temperature of the salar, generating very low consumption of calcium chloride

The two phase construction program of 20,000 + 20,000 TPA lithium carbonate production maximize the advantages of the low operating costs, while also taking into account the market study that indicates future higher demand for lithium carbonate after the year 2015.

The recommendations of the Preliminary Economic Assessment are:

- Proceed to complete a Full Feasibility Study under the premises established in this report.
- Continue the process studies to incorporate potash, boric acid and other potential by-products to the project.
- Complete the work to move the current in-situ resource into extractable reserves.
- Proceed to build a pilot production facility to certify the product.

1 INTRODUCTION AND TERMS OF REFERENCE

1.1 Introduction

The Cauchari-Olaroz project is situated in the Jujuy province, in northwestern Argentina, in the Puna de Atacama region, a high Andean plateau shared by Argentina, Bolivia and Chile, and where most of world resources of brine extractable lithium are located.

In June 2009, LAC entered into an usufruct agreement with Grupo Minero Los Boros S.A. and other parties, whereby LAC obtained the rights to explore and exploit lithium and other minerals contained in the brines of the Cauchari and Olaroz salars (salt lakes), in Jujuy, Argentina. In addition, LAC is the direct owner of other mineral properties in the same area. The aggregate of these properties cover most of the Cauchari salar and the eastern part of the Olaroz salar.

From the above date onwards, LAC has conducted an exploration program in these salars, whose results have been published in the NI 43-101 compliant report "Measured, Indicated, and Inferred Resource Estimation of Lithium and Potassium at the Cauchari and Olaroz Salars, Jujuy Province, Argentina", prepared by Mark King, Ph.D. P. Geo.

The following report was prepared to provide an NI 43-101 compliant Preliminary Economic Assessment ("PEA") of the Cauchari-Olaroz properties. The primary focus of the PEA is to prepare an independent technical appraisal of the potential economic viability of the lithium contained in these properties, in conformance with the standards required by NI 43-101 and mineral reserve classifications adopted by the Canadian Institute of Mining, Metallurgy and Petroleum ("CIM") Council in December 2005.

This report was prepared for LAC by ARA WorleyParsons of Santiago, Chile, and is based on the above-mentioned report in all matters referring to resource estimation. Chapters 4, and 9 through 15 of the above referred report have been herein incorporated. Chapter 16 was prepared by Mr. Pedro Pavlovic, an independent consultant to LAC. Section 17.6, Environment, was prepared by Ausenco Vector of Argentina. Section 17.7 presents a summary of the GEM Ltda. Lithium Marketing Report cited in Section 20 "References".

ARA WorleyParsons was retained by LAC in June 2010 to review the findings of the work that had already been undertaken on the Cauchari-Olaroz Project, in order to prepare the preliminary design to turn the project into an operating extraction and processing facility. Initial studies were prepared for a 20,000 TPA Lithium Carbonate (Li_2CO_3) facility, with the option of expanding the capacity to 40,000 TPA. Preliminary results indicated that this option was the most favourable; therefore it was decided to implement the project in two closely-linked phases of 20,000 TPA. In addition, ARA WorleyParsons' commission included facilities for the production of Potassium Chloride (KCl). However, initial process findings indicated even though production of KCl was technically feasible, it still requires further studies. For this reason, KCl production facilities have not been included in this PEA report, but LAC and its consultants continue working on the issue and an updated report will be released in the future on the topic.

Mr. **R. J. Kelley**, B. Sc. Chem. Eng., a qualified person under the terms of NI 43-101, and under contract to ARA WorleyParsons, conducted a site visit to the Cauchari and Olaroz salars on March 08 and 09, 2011. Mr. Kelley also visited the project's offices in San Salvador de Jujuy, Argentina, during the same field trip. In addition to the site visit, a study of all relevant parts of the available literature and documented results concerning the project as well as discussions with technical personnel from the company regarding all pertinent aspects of the project was undertaken. The reader is referred to Section 20.0 "References" of this report, for further detail on the project.

1.2 Sources of Information

This report is based on information and data provided to ARA WorleyParsons by LAC and its independent consultants. This includes internal company technical reports, maps, published government reports, company letters and memoranda, budget quotations from contractors and service providers, and public information, as listed in the "References" Section 20.0 of this report. In addition, ARA WorleyParsons used in the report cost and design information from its project data base and requested budget quotations from third parties for some capital equipment items and for chemical raw materials. Several sections from reports authored by other consultants have been directly quoted in this report, and are so indicated in the appropriate sections.

1.3 Units and Currency

Unless otherwise stated all units used in this report are metric. Salt contents in the brine, including lithium and potassium are reported in weight percentages. All values in the report are expressed in constant USA dollars for 2010.

Table 1.1: Currency Exchange rate, 2010 & 2011

US$	ARS $[i]		CAD $[ii]	
	2010	2011	2010	2011
1	3.91	4.02	1.03	0.98

Source: i) Banco Central de la República de Argentina
ii) Bank of Canada

1.4 Use of Report

This report was prepared in accordance with National Instrument 43-101and NI 43-101F1 for Lithium Americas Corporation (LAC or Client) by ARA WorleyParsons (ARAWP) of Santiago, Chile, pursuant to their contract agreement. The report is based in whole or in part on information and data provided to ARAWP by LAC and/or third parties. ARAWP represents that it exercised reasonable care in the preparation of this report and that the report complies with published industry standards for such reports, to the extent such published industry standards exist and are applicable. However, ARAWP has not verified or audited any such data or information provided by LAC and/or third parties, therefore it makes no warranty or representation as to its accuracy or correctness, and disclaims all liability with respect thereto.

The recommendations and opinions contained in this report assume that unknown, unforeseeable, or unavoidable events will not occur. Such events may adversely affect the cost, progress, scheduling or ultimate success of the Project.

Any discussion of legal issues contained in this report merely reflects technical analysis of ARAWP and does not constitute legal opinions or the advice of legal counsel.

ARAWP makes no representations, guarantees, or warranties except as expressly stated herein and all other representations, guarantees, or warranties, whether express or implied, are specifically disclaimed.

Except to the limited extent that may be required for this report to qualify as a “technical report” by a “qualified person” in accordance with National Instrument 43- 101 as adopted by rulemaking authority of the Ontario Securities Commission and entering into force on December 30, 2005, or as otherwise required by applicable securities laws, the use of this report or the information contained herein is at the users sole risk.
Expected accuracy of the estimates contained in this report is ± 30%.

This report is considered current as of May 2nd, 2011.

2 RELIANCE ON OTHER EXPERTS

The preparation of this Report was supervised by the independent QP, Roger J. Kelley, B. Sc. Chem. Eng., at the request of ARAWP. Mr. Kelley is a chemical engineer with more than 40 years of experience in the mining industry.

Many technical disciplines are required for the objective of preparing an economical evaluation of a mining project. In this case these disciplines start with geology and hydrogeology and other related disciplines which provide the estimation and characterization of the lithium resource, a task which was accomplished in the already cited King report. Main expertise areas required for this Report are chemical and process engineering, mechanical engineering, cost estimating engineering, economics and metal market knowledge. In preparing the Report, these disciplines were led by experts in each area. Overall review and verification of materials prepared by these experts was conducted by Mr. Kelley. It is acknowledged that Mr. Kelley is not an expert in all these disciplines, however, his expertise in chemical processes and mining project experience allows him to evaluate the reasonableness and level of engineering and technical content of the PEA for the overall project.

Main experts that participated in this study are as follows:

- **Roger J. Kelley, B.Sc. Chemical Engineer** – Serves as principal author and is the Qualified Person, responsible for coordinating the PEA Report.
- **Pedro Pavlovic, M.Sc., Chemical Engineer** – Mr. Pavlovic is a world renowned expert in the area of lithium and potassium processing;
- **Eduardo Montegu, P. Mechanical Engineer** – Expert in process plant design, his background includes experience on other brine projects in South America;
- **Waldo Perez Ph.D., P. Geo.** – CEO and President of Lithium Americas Corp.; exploration geologist. Mr. Perez provided general guidance throughout the study.
- **Juan Ignacio Guzmán, P. Industrial Engineer Ph.D.** – General Manager of Gestión y Economía Minera Ltda. Mr Guzmán is the principal author of the “Lithium Marketing Report” cited in the references section.
- **Daniel Brieba, P. Industrial Engineer, M.B.A.** – Expert in minerals project evaluation. Experience includes projects in Chile, as well as in Africa, Siberia and Peru.
- **Mark King, Ph.D., P.Geo -** QP. Dr. King is a hydrogeologist with 25 years of experience.

The various roles of the above experts in preparing Report materials and their affiliation are presented in the following table:

Table 2.1: Author Summary

Report Section		Expert	
		Affiliation	Name
	Summary	Independent	Roger Kelley
1	Introduction	ARAWP	Daniel Brieba
2	Reliance on Other Experts	ARAWP	Daniel Brieba
3	Property Description and Location	King (2010b)	
4	Accessibility, Climate, Local Resources, Infrastructure and Physiography	King (2010b)	
5	History	King (2010b)	
6	Geological and Hydrogeological Setting	King (2010b)	
7	Deposit Types	King (2010b)	
8	Mineralization	King (2010b)	
9	Exploration	King (2010b)	
10	Drilling	King (2010b)	
11	Sampling Method and Approach	King (2010b)	
12	Sample Preparation, Analysis and Security	King (2010b)	
13	Data Verification	King (2010b)	
14	Adjacent Properties	King (2010b)	
15	Mineral Resource Estimate	King (2010b)	
16	Brine Processing	Independent	Pedro Pavlovic
17	Additional Requirements for Technical Reports on Development and Production Properties		
17.1	Mining	ARAWP	Eduardo Montegu
17.2	Process Plant Design	ARAWP	Eduardo Montegu
17.3	Site Infrastructure and Support Systems	ARAWP	Eduardo Montegu
17.4	Tailings Disposal	ARAWP	Eduardo Montegu
17.5	Tailings Dam Construction	ARAWP	Eduardo Montegu
17.6	Environment	Ausenco Vector	Bernardo Parizeck
17.7	Marketing Study	GEM	Juan I. Guzman
17.8	Capital Costs Estimate	ARAWP	Daniel Brieba
17.9	Operating Costs Estimate	ARAWP	Daniel Brieba
17.10	Economic Analysis	ARAWP	Daniel Brieba
18	Interpretations	Independent	Roger Kelley
19	Recommendations	Independent	Roger Kelley
20	References	ARAWP	Daniel Brieba

i) Mark King, and LAC have advised ARAWP that it is authorized to use the contents of the report he prepared for LAC, for specific inclusion in this PEA report.

ii) The summary of the Lithium Marketing Study that is presented in section 17.7 was prepared by Daniel Brieba.

The methods, results and interpretations provided in this Report have been developed by the above noted experts. Subsequent review and evaluation is provided by the independent QP, based on background expertise and observations from the Project site and dataset. In evaluating this information, the key issue considered by the independent QP is whether the methods, results and interpretations are appropriate and acceptable to support a preliminary economic evaluation of the development of the lithium brine deposit.

The above-listed authors of this report have relied on the fact that all the information and existing technical documents listed in Section 20 "References" of this report are accurate and complete in all material aspects. While all of the available information presented to the authors was examined and is believed to be reliable as determined to the best of their professional abilities, the accuracy and completeness of such information cannot be guaranteed and the authors have relied on the belief that the previous documents have been subject to peer review and prepared in a professional and ethical manner. The authors reserve the right, but will not be obligated, to revise the report and conclusions if additional information becomes known subsequent to the date of this report.

For the purpose of this Report, the independent QP and ARAWP have relied on an ownership and claim Title Opinion provided by the law firm of De Pablos & Associates. This opinion states that agreements with third parties are valid, enforceable and comply with local laws. Neither the QP, nor ARAWP, have researched title or mineral rights of the Project and express no legal opinion as to the ownership status of the Cauchari-Olaroz Project. The authors have not verified the legality of any underlying agreement(s) that may exist concerning the usufruct, licenses or other agreement(s) between LAC and third parties but have relied on the Client's solicitor(s) to have conducted the proper legal due diligence.

A draft copy of the report has been reviewed for factual errors by the client and the authors have relied on LAC's historical and current knowledge of the property in this regard. The statement and opinions expressed in this document are given in good faith and in the belief that such statements and opinions are not false and misleading at the date of this report.

3 PROPERTY DESCRIPTION AND LOCATION

The property description and location has been described in the 43-101 report "Measured, Indicated and Inferred Resource Estimation of Lithium and Potassium at the Cauchari and Olaroz Salars, Jujuy Province, Argentina" (King, 2010b). This report was filed in SEDAR on December 6th, 2010 and there have been no material changes since that filing.

3.1 Property Area

LAC has negotiated, through its Argentinean subsidiary Minera Exar S.A., mining and exploration permits, and has requested from mining authorities exploration permits covering a total of 82,498 ha in the Department of Susques, of which 64,572 ha have been granted to date.

Figure 3.2 shows the location of the LAC claims in the Olaroz-Cauchari Project. The claims are contiguous and cover most of the Cauchari Salar and the eastern portion of the Olaroz Salar. Table 3.1 provides a summary overview of the 84 properties acquired for the Project. The aggregate property payment required by LAC under the agreements referenced in Figure 3.2 is USD 6,480,000. Of this amount, LAC has thus far paid USD 3,360,000. Payment of USD 3,120,000 is pending, including USD 985,000 for a section of mining property located in northern Olaroz, which is in dispute with the property sellers but outside the Resource Estimate zone (Figure 3.2 Property 121-M-03).

Under LAC's usufruct agreement with Grupo Minero Los Boros S.A., LAC agreed to pay Grupo Minero Los Boros S.A. a royalty of USD 300,000 at the beginning of the commercial production and a three percent net profit interest on commercial production from the Project. LAC has the option to purchase such royalty by a one-time payment of USD 7,000,000. Under LAC's usufruct agreement with Borax Argentina S.A., LAC is required to pay Borax Argentina S.A. an annual royalty of USD 200,000 commencing once LAC exercises its usufruct option. The usufruct agreement with Borax has already been exercised and LAC royalty payments start in 2011. There are no other royalties related to LAC's Cauchari-Olaroz Properties.

Figure 3.1: Location map

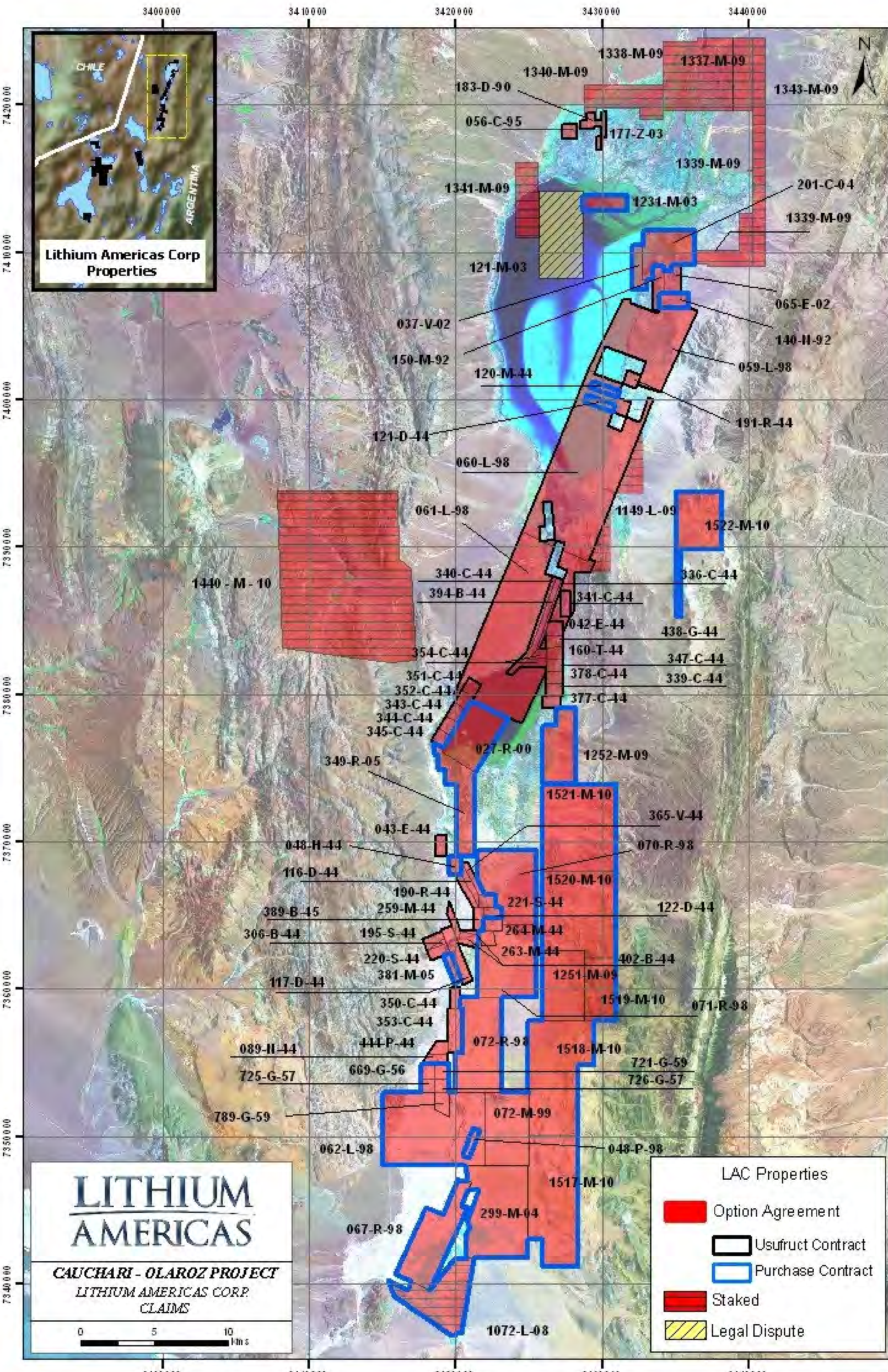


Figure 3.2: LAC property claims at the Cauchari-Olaroz Project.

3.2 Type of Mineral Tenure

There are two types of mineral tenure in Argentina: Mining Permits and Exploration Permits. Mining Permits are licenses that allow the property holder to exploit the property, providing environmental approval is obtained. Exploration Permits are licenses that allow the property holder to explore the property for a period of time that is proportional to the size of the property (5 years per 10,000 ha approximately). An Exploration Permit can be transformed into a Mining Permit any time before the expiry date of the Exploration Permit by presenting a report and paying canon rent.

LAC acquired its interests in the Cauchari and Olaroz Salars through either direct staking or concluding exploration contracts with third party property owners, giving LAC the option to make graduated payments over a period of time that varies from 12 months to five years depending on the contract. A final payment would result in one of the following, depending on the arrangement with the owner:

- Full ownership by LAC; or
- LAC acquires the right to mine the brines from depth through pumping but the vendor retains the right to mine borax from the surface (Usufruct Contracts).

LAC can abandon a contract on any mineral property at any time.

3.3 Title

The LAC claims are recorded in the Provincial Catastro at the Juzgado Administrativo de Minas in the provincial capital of San Salvador of Jujuy. LAC has provided a Title Opinion from Belen Rivera of the law firm of De Pablos & Associates that is included in Appendix 22.1. This opinion states that agreements with third parties are valid, enforceable and comply with local laws. Mining concessions have been properly registered and are in “good-standing”.

Table 3.1: List Mineral Properties

Claim	File	Owner	Claim	Requested	Received	Aboriginal Community	Contract
Eduardo Daniel	120-M-44	Fundacion Misión de la Paz	MP	100	100	Olaroz Chico	Option to Purchase
Verano I	299-M-04	Luis Austin Cekada and Camilo Alberto Morales	MP	2,488	2,488	Puesto Sey	Option to Purchase
San Antonio	72-M-99	Grupo Minero Santa Rita S.R.L	MP	2,500	2,500	Puesto Sey	Option to Purchase
Tito	48-P-98	Grupo Minero Santa Rita S.R.L	MP	200	100	Puesto Sey	Option to Purchase
Miguel	381-M-05	Mario Moncholi	MP	100	100	Puesto Sey	Option to Purchase
Chico	1231-M-09	Mario Moncholi	MP	300	300	Olaroz Chico	Option to Purchase
Chico 3 (1)	1251-M-09	Mario Moncholi	MP	300	1,400	Olaroz Chico	Option to Purchase
Chico 4 (1)	1252-M-09	Mario Moncholi	MP	1,500	1,066	Olaroz Chico	Option to Purchase
La Yaveña	27-R-00	Silvia Rojo	MP	1,117	1,116	Manantiales	Option to Purchase
Sulfa 6	70-R-98	Silvia Rojo	MP	1,759	1,683	Puesto Sey	Option to Purchase
Sulfa 7	71-R-98	Silvia Rojo	MP	1,824	1,824	Puesto Sey	Option to Purchase
Sulfa 8	72-R-98	Silvia Rojo	MP	1,946	1,842	Puesto Sey	Option to Purchase
Sulfa 9	67-R-98	Silvia Rojo	MP	1,570	1,570	Puesto Sey	Option to Purchase
Cauchari Norte	349-R-05	Silvia Rojo	EP	998	998	Manantiales	Option to Purchase
Becerro De Oro	264-M-44	Silvia Schapiro	MP	100	100	Puesto Sey	Option to Purchase
Osiris	263-M-44	Silvia Schapiro	MP	100	100	Puesto Sey	Option to Purchase
Alsina	48-H-44	Silvia Schapiro	MP	100	100	Puesto Sey	Option to Purchase
Minerva	37-V-02	Sylvia Valente	MP	250	230	Olaroz Chico	Option to Purchase
Irene	140-N-92	Triboro S.A.	MP	200	200	Huancar/ Olaroz Chico	Option to Purchase
Clotilde	121-D-44	Mario Moncholi	MP	100	100	Susques	Option to Purchase
Jorge	62-L-98	Luis Losi S.A	MP	2,352	2,352	Puesto Sey	Option to Purchase
Chin ChinChuli II	201-C-04	Vicente Costa	MP	1,000	931	Huancar/ Olaroz Chico	Option to Purchase
Grupo La Inundada	101-C-90	MINERA EXAR S.A.	MP	550	537	Puesto Sey	Purchase
Alegria I	1337-M-09	MINERA EXAR S.A.	MP	2,000	3,000	Susques	Staked
Alegria 2	1338-M-09	MINERA EXAR S.A.	MP	2,000	3,000	Susques	Staked
Alegria 3	1339-M-09	MINERA EXAR S.A.	MP	2,000	3,000	Susques	Staked
Alegria 4	1340-M-09	MINERA EXAR S.A.	MP	2,000	1,000	Susques	Staked
Alegria 5	1341-M-09	MINERA EXAR S.A.	MP	2,000	703	Susques	Staked
Alegria 7	1343-M-09	MINERA EXAR S.A.	MP	600	1,277	Susques	Staked
Cauchari Este	1149-L-09	MINERA EXAR S.A.	MP	5,900	980	Huancar	Staked
Cauchari Sur (1)	1072-L-08	MINERA EXAR S.A.	EP	1,501	1,501	Puesto Sey	Staked
Cauchari Oeste	1440-M-10	MINERA EXAR S.A.	MP	9,751	9,751	Susques	Staked
Maria Victoria (2)	121-M-03	Grupo Minero Santa Rita S.R.L	MP	1,800	1,800	Olaroz Chico	Legal Dispute
Zoila	341-C-44	Borax Argentina S.A.	MP	100	101	Olaroz Chico	Usufruct Agreement
Mascota	394-B-44	Borax Argentina S.A.	MP	300	302	Manantiales	Usufruct Agreement
Union	336-C-44	Borax Argentina S.A.	MP	300	100	Manantiales	Usufruct Agreement
Julia	347-C-44	Borax Argentina S.A.	MP	300	100	Puesto Sey	Usufruct Agreement
Saenz Peña	354-C-44	Borax Argentina S.A.	MP	300	100	Puesto Sey	Usufruct Agreement
Demasia Saenz Peña	354-C-44	Borax Argentina S.A.	MP	100	59	Puesto Sey	Usufruct Agreement
Montes De Oca	340-C-44	Borax Argentina S.A.	MP	100	99	Puesto Sey	Usufruct Agreement
Julio A. Roca	444-P-44	Borax Argentina S.A.	MP	100	100	Puesto Sey	Usufruct Agreement
Elena	353-C-44	Borax Argentina S.A.	MP	300	301	Puesto Sey	Usufruct Agreement
Emma	350-C-44	Borax Argentina S.A.	MP	100	100	Puesto Sey	Usufruct Agreement
Uruguay	89-N-44	Borax Argentina S.A.	MP	100	100	Puesto Sey	Usufruct Agreement
Uno	345-C-44	Borax Argentina S.A.	MP	100	100	Manantiales	Usufruct Agreement

Claim	File	Owner	Claim	Requested	Received	Aboriginal Community	Contract
Tres	343-C-44	Borax Argentina S.A.	MP	100	100	Manantiales	Usufruct Agreement
Dos	344-C-44	Borax Argentina S.A.	MP	100	100	Manantiales	Usufruct Agreement
Cuatro	352-C-44	Borax Argentina S.A.	MP	100	100	Manantiales	Usufruct Agreement
Cinco	351-C-44	Borax Argentina S.A.	MP	100	100	Manantiales	Usufruct Agreement
Avellaneda	365-V-44	Borax Argentina S.A.	MP	100	100	Puesto Sey	Usufruct Agreement
Buenos Aires	122-D-44	Borax Argentina S.A.	MP	100	100	Puesto Sey	Usufruct Agreement
Moreno	221-S-44	Borax Argentina S.A.	MP	100	100	Puesto sey	Usufruct Agreement
Sarmiento	190-R-44	Borax Argentina S.A.	MP	100	100	Puesto sey	Usufruct Agreement
Porvenir	116-D-44	Borax Argentina S.A.	MP	100	100	Puesto sey	Usufruct Agreement
Sahara	117-D-44	Borax Argentina S.A.	MP	300	300	Puesto sey	Usufruct Agreement
Alicia	389-B-45	Borax Argentina S.A.	MP	100	99	Puesto sey	Usufruct Agreement
Siberia	306-B-44	Borax Argentina S.A.	MP	24	24	Puesto sey	Usufruct Agreement
Clarisa	402-B-44	Borax Argentina S.A.	MP	100	100	Puesto sey	Usufruct Agreement
Demasia Clarisa	402-B-44	Borax Argentina S.A.	MP	19	19	Puesto sey	Usufruct Agreement
Paulina	195-S-44	Borax Argentina S.A.	MP	100	98	Puesto sevicatua	Usufruct Agreement
Ines	220-S-44	Borax Argentina S.A.	MP	100	102	Puesto sevicatua	Usufruct Agreement
Maria Esther	259-M-44	Borax Argentina S.A.	MP	100	100	Puesto Sey	Usufruct Agreement
Maria Central	43-E-44	Borax Argentina S.A.	MP	100	100	Puesto Sevicatua	Usufruct Agreement
Delia	42-E-44	Borax Argentina S.A.	MP	100	101	Manantiales	Usufruct Agreement
Graziella	438-G-44	Borax Argentina S.A.	MP	100	100	Manantiales	Usufruct Agreement
Linda	160-T-44	Borax Argentina S.A.	MP	100	100	Manantiales	Usufruct Agreement
Maria Teresa	378-C-44	Borax Argentina S.A.	MP	100	100	Manantiales	Usufruct Agreement
Juancito	339-C-44	Borax Argentina S.A.	MP	100	100	Manantiales	Usufruct Agreement
Archibald	377-C-44	Borax Argentina S.A.	MP	100	100	Manantiales	Usufruct Agreement
San Nicolas	91-R-44	Borax Argentina S.A.	MP	100	100	Huancar	Usufruct Agreement
Nelida	56-C-95	Electroquimica El Carmen S.A.	MP	100	100	Olaroz Chico	Usufruct Agreement
Maria Angela	177-Z-03	Electroquimica El Carmen S.A.	MP	100	100	Olaroz Chico	Usufruct Agreement
Hekaton	150-M-92	Electroquimica El Carmen S.A.	MP	200	200	Huancar/Olaroz Chico	Usufruct Agreement
Victoria I	65-E-02	Electroquimica El Carmen S.A.	MP	200	200	Huancar/Olaroz Chico	Usufruct Agreement
Eduardo	183-D-90	Electroquimica El Carmen S.A.	MP	100	100	Olaroz Chico	Usufruct Agreement
Luisa	61-L-98	Grupo Minero Los Boros S.A	MP	4,706	4,705	Huancar/Olaroz Chico	Usufruct Agreement
Arturo	60-L-98	Grupo Minero Los Boros S.A	MP	5,100	5,061	Huancar/Olaroz Chico	Usufruct Agreement
Angelina	59-L-98	Grupo Minero Los Boros S.A	MP	2,346	2,252	Huancar/Olaroz Chico	Usufruct Agreement
Payo II	1517-M-10	Mario Moncholi	MP	2,885		Puesto Sey	Option to Purchase
Payo IV	1518-M-10	Mario Moncholi	MP	2,968		Puesto Sey	Option to Purchase
Payo V	1519-M-10	Mario Moncholi	MP	917		Puesto Sey	Option to Purchase
Payo VI	1520-M-10	Mario Moncholi	MP	2,806		Puesto Sey	Option to Purchase
Payo VII	1521-M-10	Mario Moncholi	MP	2,977		Puesto Sey	Option to Purchase
Payo VIII	1522-M-10	Mario Moncholi	MP	1,344		Puesto Sey	Option to Purchase
TOTAL				**82,498**	**64,572**		

4 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

4.1 Topography

The topography has been described in the 43-101 report "Measured, Indicated and Inferred Resource Estimation of Lithium and Potassium at the Cauchari and Olaroz Salars, Jujuy Province, Argentina" (King, 2010b). The report was filed in SEDAR on December 6th, 2010 and there have been no material changes since that filing.

4.2 Access

The access has been described in the 43-101 report "Measured, Indicated and Inferred Resource Estimation of Lithium and Potassium at the Cauchari and Olaroz Salars, Jujuy Province, Argentina" (King, 2010b). The report was filed in SEDAR on December 6th, 2010 and there have been no material changes since that filing.

4.3 Population Centres

The population centres have been described in the 43-101 report "Measured, Indicated and Inferred Resource Estimation of Lithium and Potassium at the Cauchari and Olaroz Salars, Jujuy Province, Argentina" (King, 2010b). The report was filed in SEDAR on December 6th, 2010 and there have been no material changes since that filing.

4.4 Climate

The climate in the region of the Cauchari-Olaroz Salares is severe as a result of its geographical position bordering elevations of 4,000 m, and due to the effect of two high semi-permanent pressure systems. The Pacific anticyclone, which operates mainly in winter, provides very dry air to the region, and the Atlantic anticyclone which brings warm and moist air to the region, mainly in the summer. These pressure systems converge on the continent, creating the South American Continental Low that during the summer, reaches deeper into the region and down to the salt flats with moist air generating great development of orographic clouds and precipitation.

The climate favours the recovery of some minerals such as lithium through processes that depend on the evaporation caused by the severe conditions and the large amount of solar radiation available all year

4.4.1 Vaisala Station

In late May 2010 in order to record meteorological data in the Salars, LAC installed a Vaisala brand automatic weather station, model MAWS301, with the following features which provides quality controlled data both in meteorological and climatological applications support for the extractive processes in the project.

4.4.2 Solar Radiation

The amount of solar radiation reaching the region remains high throughout the year. Figure 4.1 shows the records of maximum solar radiation (global and direct), recorded between May 19, 2010 and January 31, 2011. The maximum global solar radiation lies in the range of between 706.9 and 1,498.5 watts/m^2, while the maximum direct solar radiation varies between 335.2 and 1,199.6 watts/m^2.

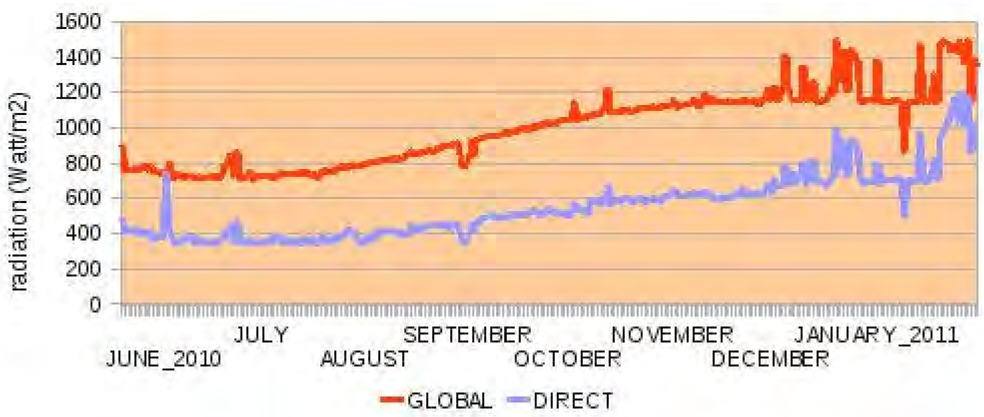


Figure 4.1: Solar Radiation Max

4.4.3 Temperature

As the Olaroz-Cauchari salars are located in a plateau at approximately 4,000 masl, the temperature varies considerably between day and night, over 20°C on many days.
The temperature is also affected by the seasons, with winter minimum temperatures dropping to between -25°C and -30°C, while summer maximum temperatures reach between 15°C and 25°C. The yearly average temperature is 5.1°C. The meteorological stations most representative of these weather conditions are shown in Table 4.1.

Table 4.1: Climate Records Northwest Argentina

Station	Latitude	Longitude	Elevation	Period
Coranzuli	23.03 S	66.40 W	4,100 m	1972/96
Castro Tolay	23.35 S	66.08 W	3,430 m	1972/90
Susques	23.43 S	66.50 W	3,675 m	1972/96
Mina Pan de Azucar	23.62 S	66.03 W	3.690 m	1982/90
Olacapato	24.12 S	66.72 W	3,820 m	1950/90
San Antonio de Los Cobres	24.22 S	66.32 W	3,775 m	1949/90
Salar de Pocitos	24.38 S	67.00 W	3,600 m	1950/90

The mean temperatures recorded by the stations in Table 4.1, are shown in Figure 4.2:

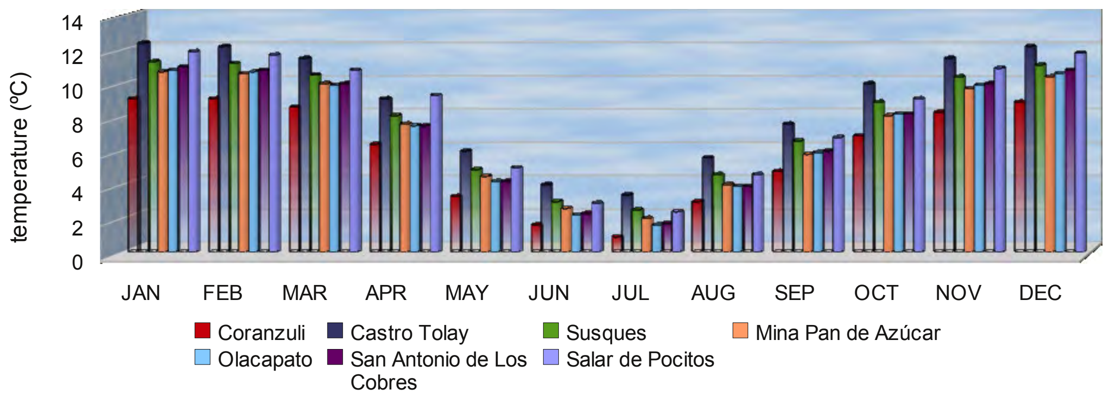


Figure 4.2: Mean Temperature representative of thermal conditions prevailing in Cauchari & Olaroz

The observed temperature fluctuations in Cauchari by the automatic weather station are shown in Figure 4.3. The average of these oscillations during the period from May 19, 2010 to January 31, 2011, was 22.2°C. Extreme temperatures during this period had an absolute maximum of 25.9°C (January 11, 2011) and an absolute minimum of -19°C (July 1, 2010). The average temperature during this period was 5.1°C.

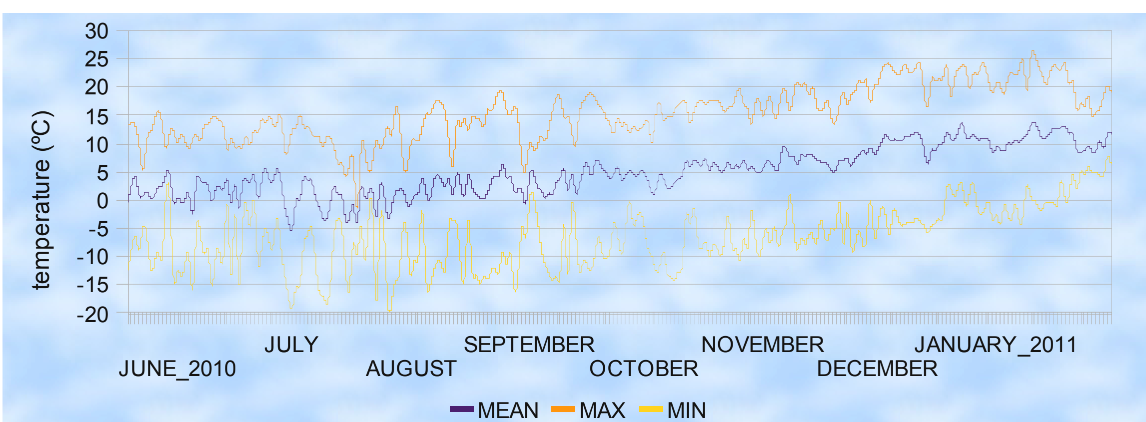


Figure 4.3: Daily Temperature, Vaisala Station, Cauchari. Registered between May 19, 2010 and January 31, 2011.

4.4.4 Rainfall

The desert climate of Cauchari and Olaroz, is also known as Puna climate (Hoffmann, 1971). The Puna region is exposed to a substantial warming due to the enormous amount of radiation received and the limited availability of moisture to use this energy in a process of transformation in the atmosphere. These extreme conditions make the location very attractive for the use of processes that depend on evaporation, since in addition; rainfall is usually less than 50 mm during the year (Cabrera, 1976).

Rainfall originates during the summer season plateau, between December and March when the Southamerican Continental Low approaches the region of the salt flats, bringing hot and humid air from the jungles of the Amazon, causing very active convective cloud development with abundant rainfall of the storm type.

The rainfall in the region according to the stations in Table 4.1, are shown in the following Figure 4.4.

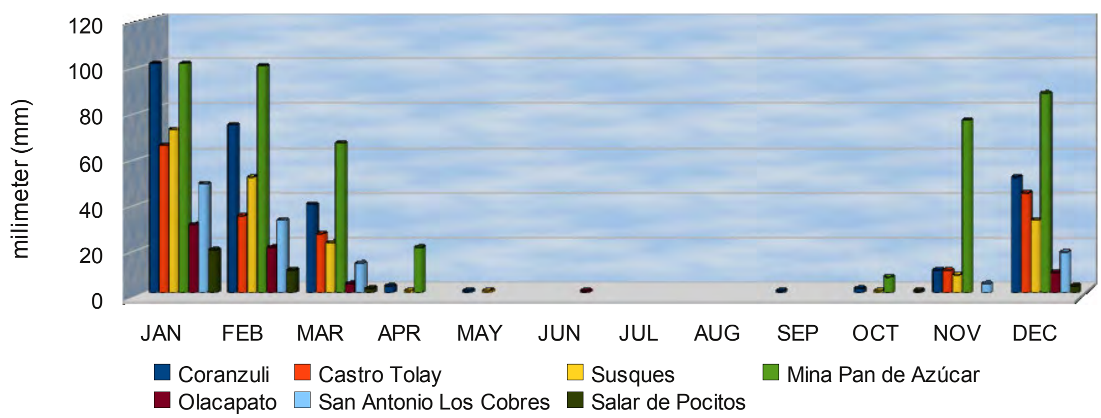


Figure 4.4: Rainfall representative in the conditions prevailing at Salares Cauchari and Olaroz.

The rainfall in the Vaisala automatic weather station, from installation to January 31, 2011 (Figure 4.5), shows a recent rainy winter past and also a dry summer until the last days of January, which is related to the ENSO (El Niño – Southern Oscillation, Houston, 2006a) that began in May 2010 and is still present. However, the ENSO phenomenon has begun to weaken and it is expected that by mid-year the conditions should be back to normal.

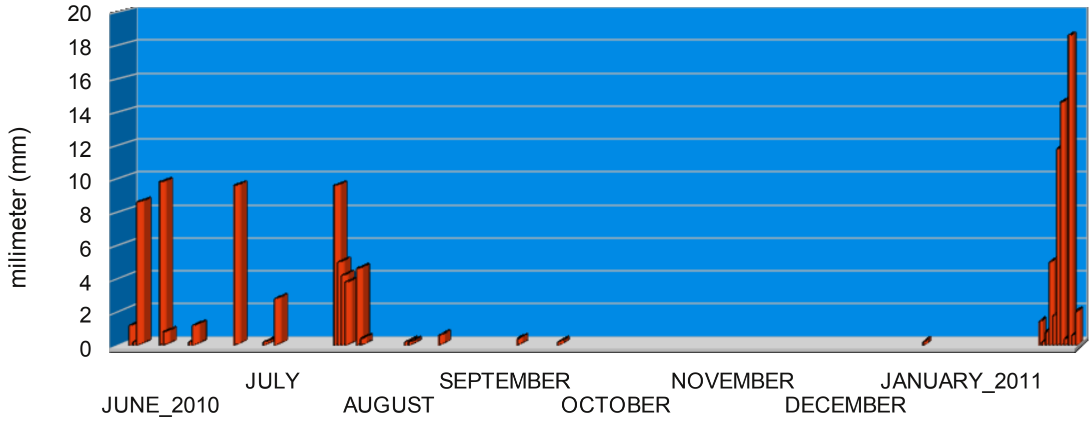


Figure 4.5: Daily Rainfall, Vaisala Station, Cauchari. Registered between May 19, 2010 and January 31, 2011.

4.4.5 Humidity

Puna desert climate is extremely dry for most of the year. However, in summer due to the incursion of the Southamerican Continental Low, the air is changed by acquiring high moisture content that sometimes causes heavy precipitation as described above. The daily records show these changes of moisture during the summer period (Figure 4.6).

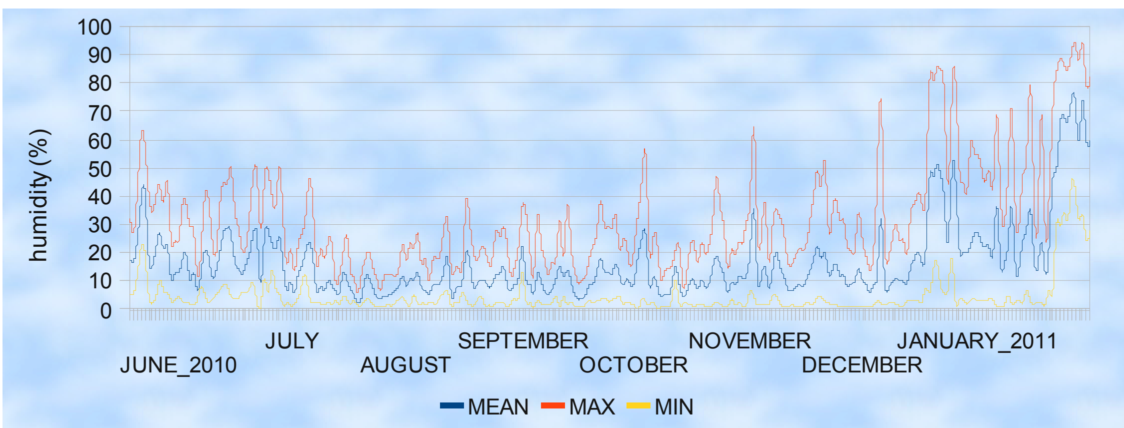


Figure 4.6: Daily Humidity, Vaisala Station, Cauchari. Registered between May 19, 2010 and January 31, 2011.

4.4.6 Winds

The Puna desert is usually visited by a current low-level jet stream, which arises as a secondary branch of the subtropical jet stream that is generated as a result of the horizontal surface and intertropical convergence of trade winds on the cell (Hadley, Holton, 2004), which pushes the air molecules to higher levels of the atmosphere. The air transported to the upper atmosphere, due to the high potential energy gained by the elevation, during the descents acquires great speed, and converts the potential energy into kinetic energy allowing the molecules to reach high speeds, in the range of jet streams.

The intensities of these low flows, which reached speeds of 39.5 m/s (142.2 km/h) is often observed in the salt flats of Olaroz and Cauchari (Figure 4.7).

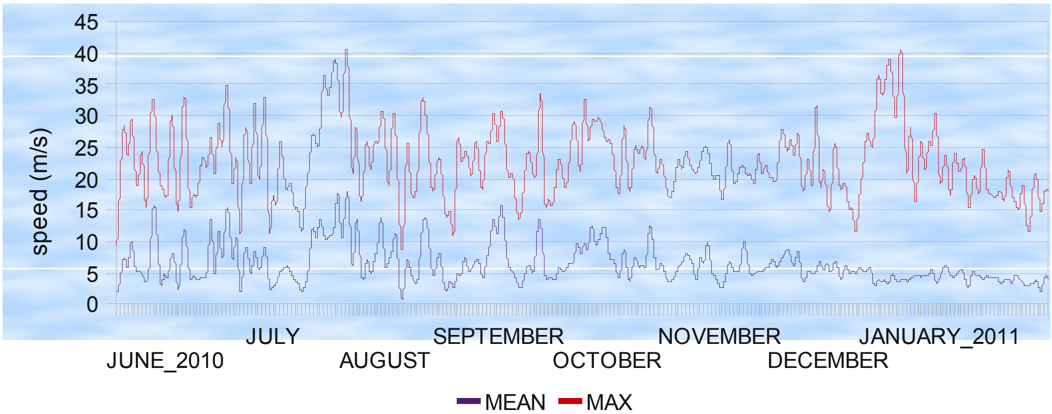


Figure 4.7: Daily Intensity of Wind Intensity, Vaisala Station, Cauchari. Registered between May 19, 2010 and January 31, 2011.

4.4.7 Evaporation

Records of water evaporated are more complex to perform in the Puna desert because the water tanks of evaporimeters freeze most of the year during the night. Therefore, most readings, including those from remote sensors have a large associated error (WMO, 1971) which is another added difficulty. Because of these difficulties, the Vaisala station installed on the Cauchari Salar uses an indirect method to calculate evaporation, which in practice is very effective because the adjustments of the curve that assesses the rate of evaporation work well.

However, extreme climate conditions favour evaporation of the liquid surface because the air in the Puna is extremely dry, so the large amount of solar radiation available explains almost entirely the evaporation process. Additionally, wind frequently intensities, providing kinetic energy that is delivered through the transfer of momentum between molecules facilitating the process of evaporation. The daily records of evaporation rates recorded during the period of operation of the Vaisala automatic weather station are shown in Figure 4.8.

It is noted that the region has a large fluctuation in general evaporation rates, but these remain high in general, with a daily average for the period of 5.4 mm. Making a simple extrapolation would correspond to a total yearly evaporation rate of 2,100 mm.

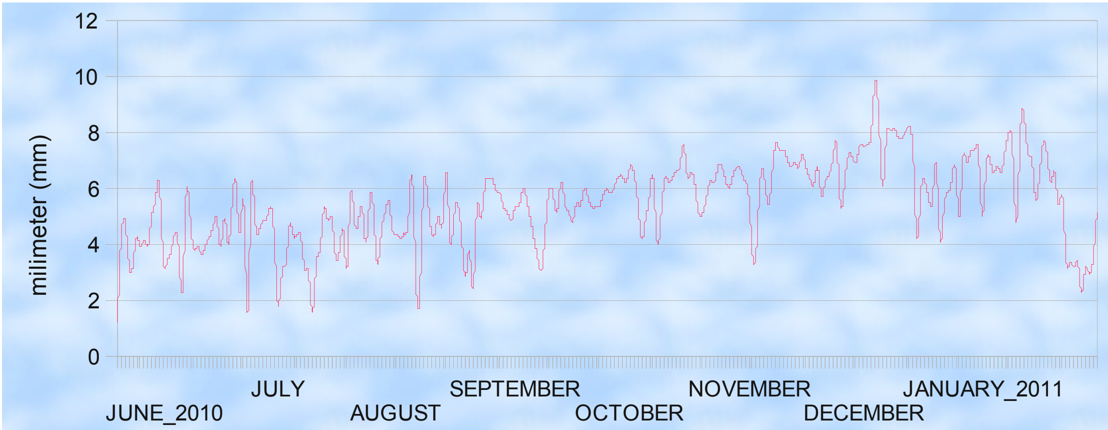


Figure 4.8: Daily Evaporation Rates, Vaisala Station, Cauchari. Registered between May 19, 2010 and January 31, 2011.

4.5 Infrastructure

The project site, in spite of being located in a desert area, at a very high altitude (3,950 m), is very well situated from an infrastructure point of view, as shown in the following sections.

4.5.1 Roads and Ports

The Jujuy – Antofagasta International Highway (Routes 52 and 9) practically passes through the project site; in fact it crosses the salar area from East to West, separating this area into the Cauchari salar south of the road and Olaroz salar north of the road. This is a paved, well maintained road that carries considerable international traffic between the Antofagasta and Mejillones ports in Chile and the NW Argentina, Southern Bolivia and Paraguay hinterland. Antofagasta and Mejillones are protected, deep water ports that serve the large Chilean mining industry, as well as the previously mentioned hinterland. Therefore, they are regularly served by shipping lines going to North America, Europe and Asia. Road distance from the project to Antofagasta is 550 km and 580 km to Mejillones. Alternative ports in Argentina are Rosario and Buenos Aires which are 1,570 and 1,790 km, respectively, from the project site

Access to the lithium carbonate plant site itself is through the above mentioned route, with a subsequent 10 kilometres travel through the Argentinean Route 70, which is a consolidated gravel road kept in good condition.

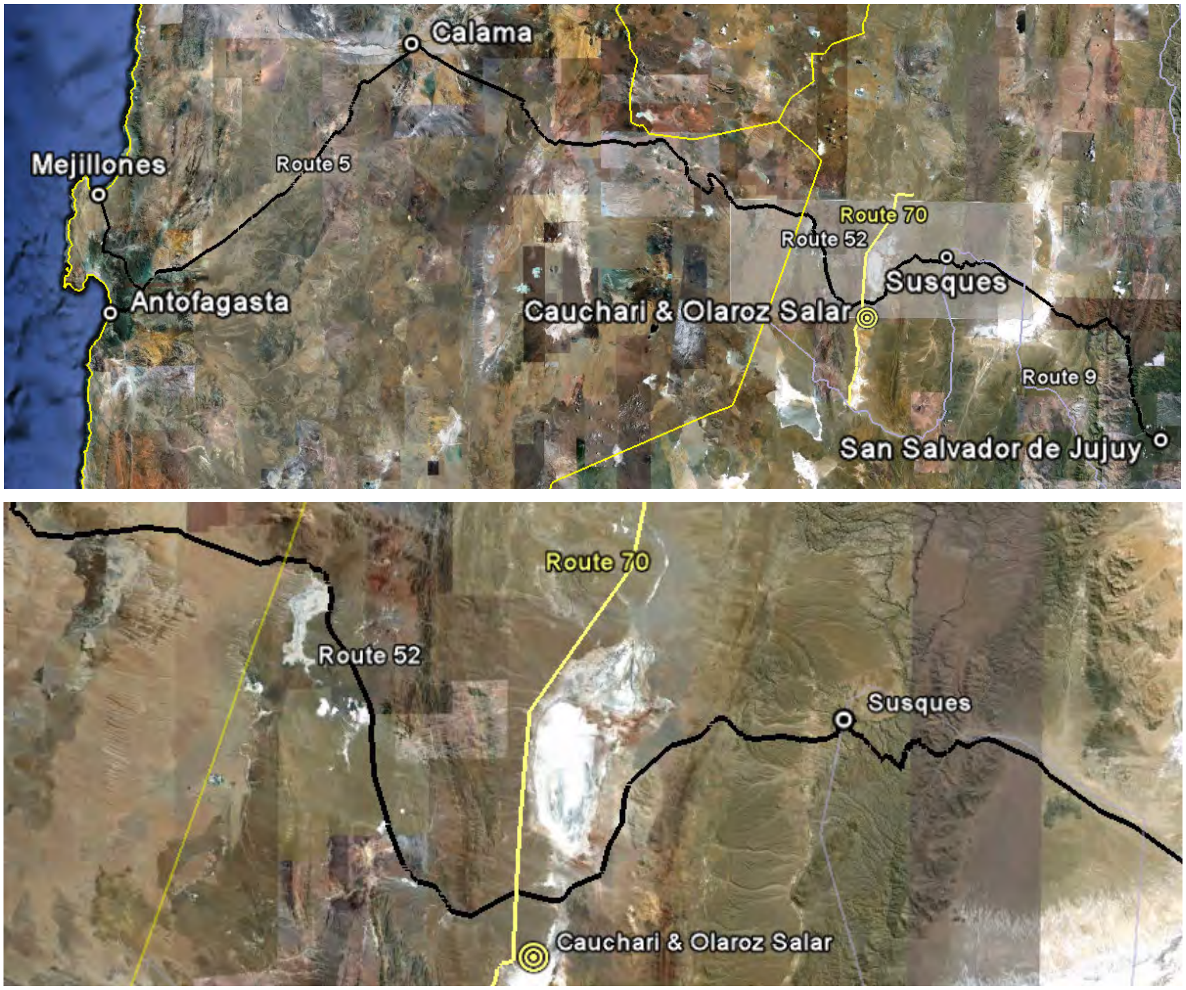


Figure 4.9: Road map of the Project Area

Table 4.2: Road distances (approximate values)

Route		Km
B-400, 1, B-272	Route 5 – Mejillones	63
26, 5, 25	Antofagasta – Calama	216
27	Calama – Paso de Jama	255
52, 70	Paso de Jama – Cauchari & Olaroz Salar	110
52	Paso de Jama – Susques	155
52	Susques – Route 9 Intersection	133
9	Route 9 Intersection – San Salvador de Jujuy	65

4.5.2 Railways

It should also be noted that the Salta-Antofagasta international railway passes through the town of Olacapato Chico, in the far south of the Cauchari Salar, 65 kilometres from the project site. This line could also be an alternative for lithium carbonate transportation to the port and for the importation of chemicals from the port.

However, this possibility has not been considered in the study, since the mentioned railway operates only occasionally in the Argentinean side, contrary to the Chilean side where it is fully operational.

Figure 4.10: Railway near the Project Area

Table 4.3: Rail distances (approximate values)

	Km
Mejillones – Antofagasta	70
Antofagasta – Socompa	335
Socompa – Olacapato Chico	310
Olacapato Chico – Salta	260

4.5.3 Power and Gas

Although the Project site is located only 70 kilometres from the InterAndes electrical line which connects the Chilean *Sistema Interconectado del Norte Grande* (SING) with the Argentinean *Sistema Argentino de Interconexión* (SADI), economical and engineering considerations make it preferable for the project to generate its own power and heat with a separate plant that will operate with natural gas. This is feasible because the Rosario Compression Station of the GasAtacama pipeline, that carries natural gas from Argentina to Chile, is located only 50 kilometres north of the project site, and to which the project will be connected by pipeline.

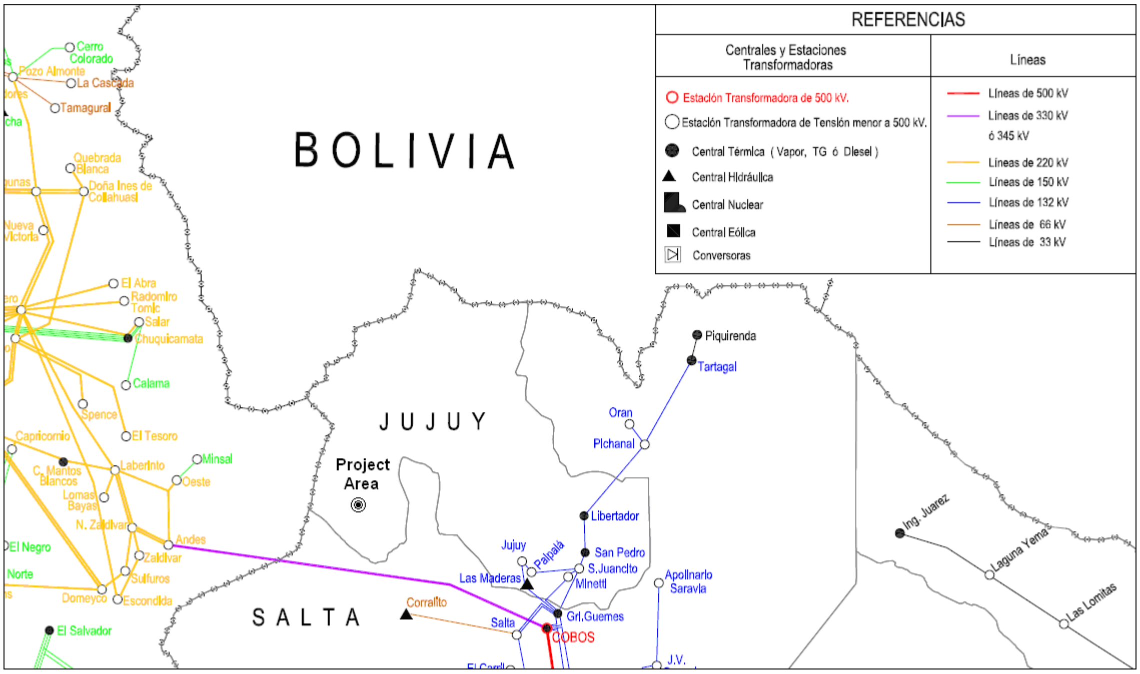


Figure 4.11: Geographical Outline Interconnected System, Chile - Argentina

Figure 4.12: Gas line near Project Area

4.5.4 Water

Unlike the situation in the Chilean side of the Puna de Atacama, the Argentinean side of this region receives some rainfall, diminishing from East to West and averaging approximately 50 mm/y in the general area of the project. For this reason, the industrial water and freshwater required by the project will be obtained from wells located near the plant, in an area on which preliminary explorations already detected the existence of a fresh water table. This issue is discussed further in section 17.3.6. Figure 4.13 shows the rain pattern in the Jujuy Province.

4.5.5 Accommodation and Utilities

The largest community closest to the Project site is the village of Susques, located at a distance of 70 kilometres. Susques has only 3,757 inhabitants; therefore it can not provide the required accommodation facilities for the project personnel. Due to the above, for purposes of the project, construction of a mining camp and project offices located near the plant has been considered.

On the other hand, Susques has a small public hospital with medical offices, X ray room, clinical laboratory, operating room, delivery room, 12 beds for hospitalized patients and neonatology room.

As for food services, due to the fact that Susques is located in an area with relatively significant commercial and touristic traffic, there are existing operators in the food and accommodation industry, willing to provide this type of services required for the project.

4.5.6 Personnel

As said before, the Project is located in a desert mountain area and has a small population dedicated mainly to subsistence husbandry and farming.

The project will make efforts on training local personnel as a means of promoting integral development in the area. However, it will be also necessary to hire better trained personnel from the cities of San Salvador de Jujuy and possibly Salta.

5 HISTORY

The history has been described in the 43-101 report “Measured, Indicated and Inferred Resource Estimation of Lithium and Potassium at the Cauchari and Olaroz Salars, Jujuy Province, Argentina” (King, 2010b). The report was filed in SEDAR on December 6th, 2010 and there have been no material changes since that filing.

6 GEOLOGICAL AND HYDROLOGICAL SETTING

The geological and hydrological setting has been described in the 43-101 report "Measured, Indicated and Inferred Resource Estimation of Lithium and Potassium at the Cauchari and Olaroz Salars, Jujuy Province, Argentina" (King, 2010b). The report was filed in SEDAR on December 6th, 2010 and there have been no material changes since that filing.

7 DEPOSIT TYPES

The deposit types have been described in the 43-101 report “Measured, Indicated and Inferred Resource Estimation of Lithium and Potassium at the Cauchari and Olaroz Salars, Jujuy Province, Argentina” (King, 2010b). The report was filed in SEDAR on December 6th, 2010 and there have been no material changes since that filing.

8 MINERALIZATION

The mineralization has been described in the 43-101 report “Measured, Indicated and Inferred Resource Estimation of Lithium and Potassium at the Cauchari and Olaroz Salars, Jujuy Province, Argentina” (King, 2010b). The report was filed in SEDAR on December 6th, 2010 and there have been no material changes since that filing.

9 EXPLORATION

9.1 Overview

This section is largely reproduced from King (2010b), to extend a description of the exploration information into the current document. The following exploration programs have been conducted to evaluate the lithium development potential of the Project area:

- Surface Brine Program – Brine samples were collected from shallow pits throughout the salars to obtain a preliminary indication of lithium occurrence and distribution.
- Seismic Geophysical Program – Seismic surveying was conducted to support delineation of basin geometry, mapping of basin-fill sequences, and siting borehole locations.
- Gravity Survey – A limited gravity test survey was completed to evaluate the utility of this method for determining depths to basement.
- TEM Survey – TEM surveying was conducted to attempt to define fresh water and brine interfaces within the salar.
- Numerical Modeling – A preliminary numerical evaluation of natural brine processes and expected responses to pumping was conducted to support an upcoming Reserve Evaluation.
- Surface Water Sampling Program – An ongoing program is conducted to monitor the flow and chemistry of surface water entering the salars.
- Pumping Test Program – Pumping and monitoring wells are currently being installed. Pumping tests will be conducted at three central locations, to estimate aquifer properties related to brine recovery.
- Air Lift Testing Program – Testing was conducted within individual boreholes as a preliminary step in estimating aquifer properties related to brine recovery.
- Reverse Circulation (RC) Borehole Program – Dual tube reverse circulation drilling was conducted to develop vertical profiles of brine chemistry at depth in the salars and to provide geological and hydrogeological data.
- Diamond Drilling (DD) Borehole Program – This program was conducted to collect continuous cores for geotechnical testing (RBRC, grain size and density) and geological characterization. Some of the boreholes were completed as observation wells for future brine sampling and monitoring.

The RC Borehole Program is described in the following sections:

- 10.1 (drilling methods and summary of results);
- 11.2 (brine sample collection and field analysis);
- 12.2 (brine sample preparation); and
- 12.3 (brine laboratory analysis).

The DD Borehole Program is described in the following sections:

- 10.2 (drilling methods and summary of results);
- 11.3 (field core sampling);
- 11.4 (brine sampling);
- 12.2 (sample preparation);
- 12.3 (brine laboratory analysis); and
- 12.4 (laboratory geotechnical analysis).

Methods and results for the remaining ten Programs are summarized below.

9.2 Surface Brine Program

In 2009, a total of 55 surface brine samples were collected from shallow hand-dug test pits excavated throughout the Project Site. Results from this early program indicated favourable potential for significant lithium grades at depth. Additional exploration work was initiated on the basis of these results. A full description of the Surface Brine Program is provided in the Inferred Resource Estimate Report for the Project (King, 2010a).

9.3 Seismic Geophysical Program

A high resolution seismic tomography survey was conducted primarily on the Cauchari Salar and to a lesser extent on the Olaroz Salar, during 2009 and 2010. The survey was contracted to Geophysical Exploration Consulting (GEC) of Mendoza, Argentina. Measurements were conducted along 12 survey lines, as shown in Figure 9.1. Nine lines are oriented east-west (1, 2, 3, 4, 5, 6, 9, 11, and 12), two lines (7 and 10) have a north-south orientation, and Line 8 is a northeast trending diagonal line parallel to the western property boundary and covering the Archibarca Fan. A total of 62,500 m of seismic survey data was acquired.

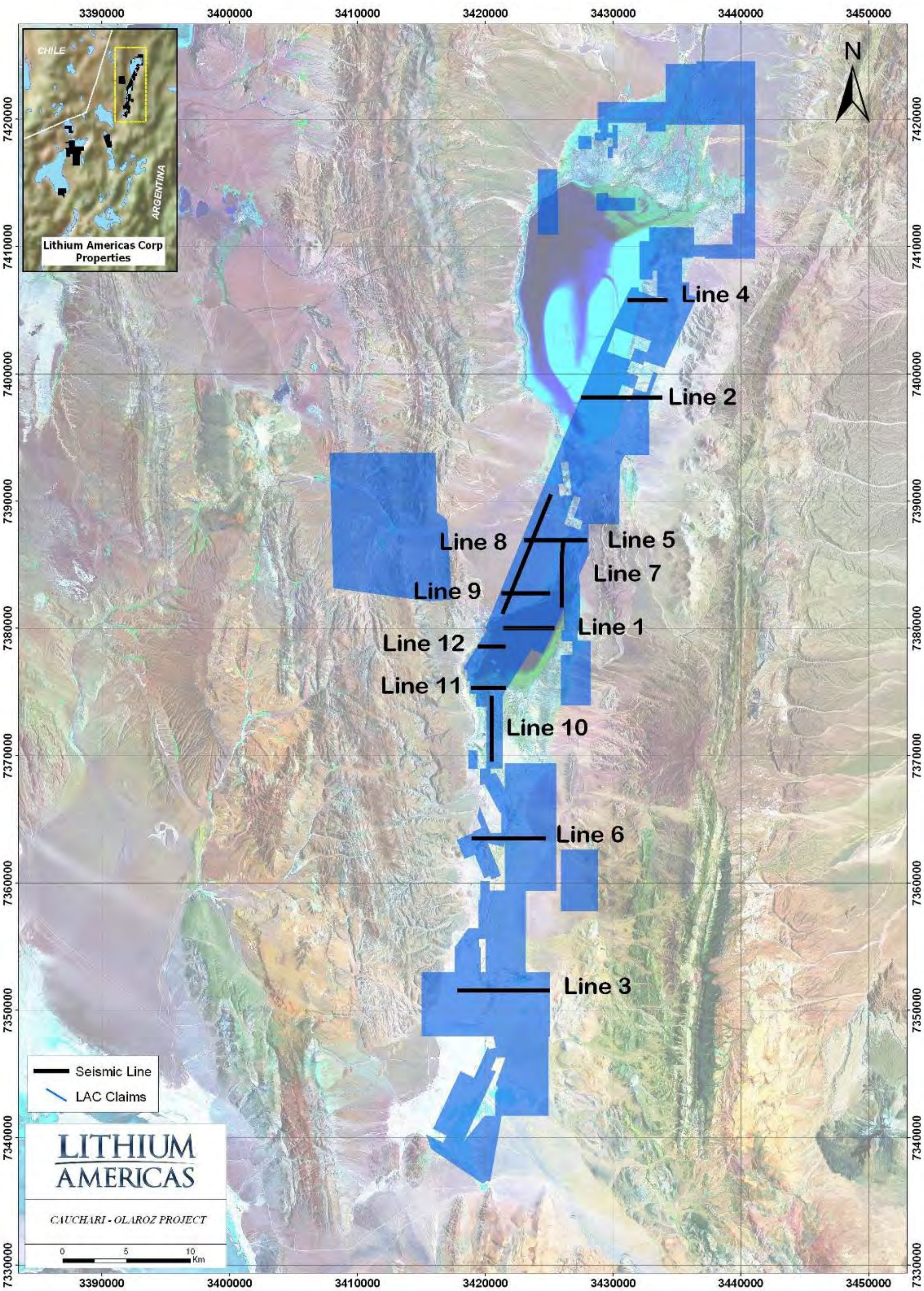


Figure 9.1: Seismic tomography lines completed during 2009-2010.

The survey configuration utilized a five-metre geophone separation, and a semi-logarithmic expanding drop-weight source array symmetrically bounding the central geophone array. The geophone array comprised 48 mobile measurement sites utilizing Geode Geoelectrics 8 Hz geophones. Symmetrically surrounding the 48 geophones were accelerated, 150 kg drop-weight sites moving away from the geophone array as follows: 15, 30, 60, 90, 120, 150, 250, 500, 750, and 900 m. Based on standard methods for depth resolution, the outer drop-weight positions would provide sufficient velocity detail to depths on the order of 500 to 600 m.

Data acquisition took place from early July of 2009 to May of 2010, at which time the seismic program reached completion. The seismic survey data supported the identification of drilling sites for the RC and DD Programs in 2009 and into 2010. The seismic inversions are shown in Figure 9.2.

The maximum interpreted depth of the salars for each of the twelve seismic lines ranged from approximately 300 to 600 m. This variance in the apparent depth of the basin is attributed to two factors: 1) actual basin depth, and 2) property limitations which restricted the placement of the source hammer, and therefore the depth of exploration.

To date, none of the boreholes drilled at the site (24 for the RC Borehole Program and 29 for the DD Borehole Program) have reached the underlying basement to confirm depth of basin estimates. Consequently, it remains unknown whether the very high velocities of > 4,000 m/sec indicated at depth are related to highly-compacted halite, the compression of other lithologies (and possibly the removal of liquids and subsequent changes in porosity) due to the weight of overlying salar sediments, or to basement rocks. Any of these could have similar velocity characteristics, and all would likely have low RBRC values relative to shallower materials.

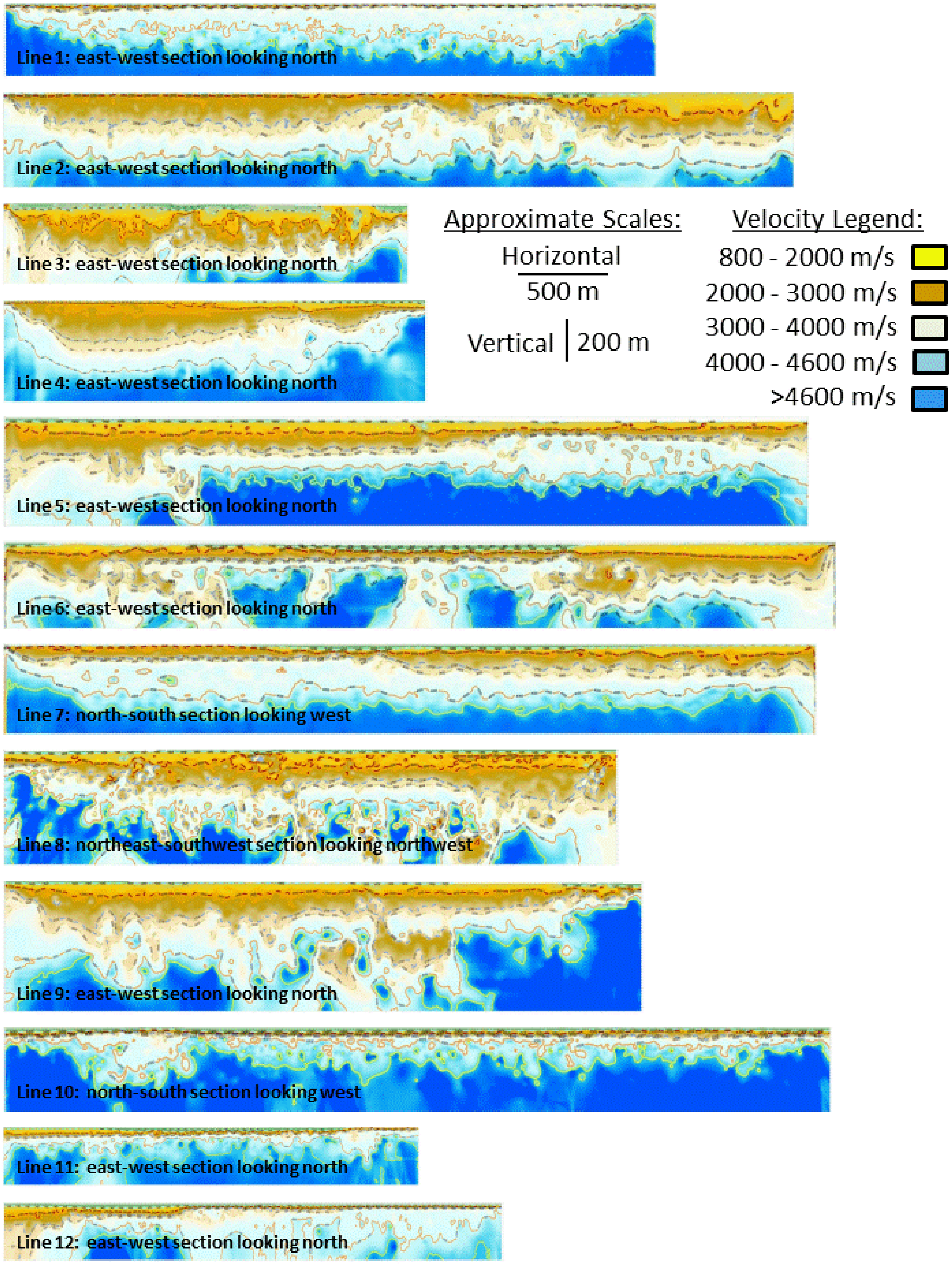


Figure 9.2: Seismic tomography results for the 12 survey lines shown on Figure 9.1.

9.4 Gravity Survey

A reconnaissance gravity survey was completed at the Cauchari Salar during July of 2010. The survey was a test to evaluate the effectiveness of the gravity method to define basement morphology and grabens that could represent favourable settling areas for dense brine. Data were collected at 200 m intervals along the two survey profiles shown in Figure 9.3. These profiles extended to outcrop locations outside the salar limits, to facilitate final gravity data processing and inversion.

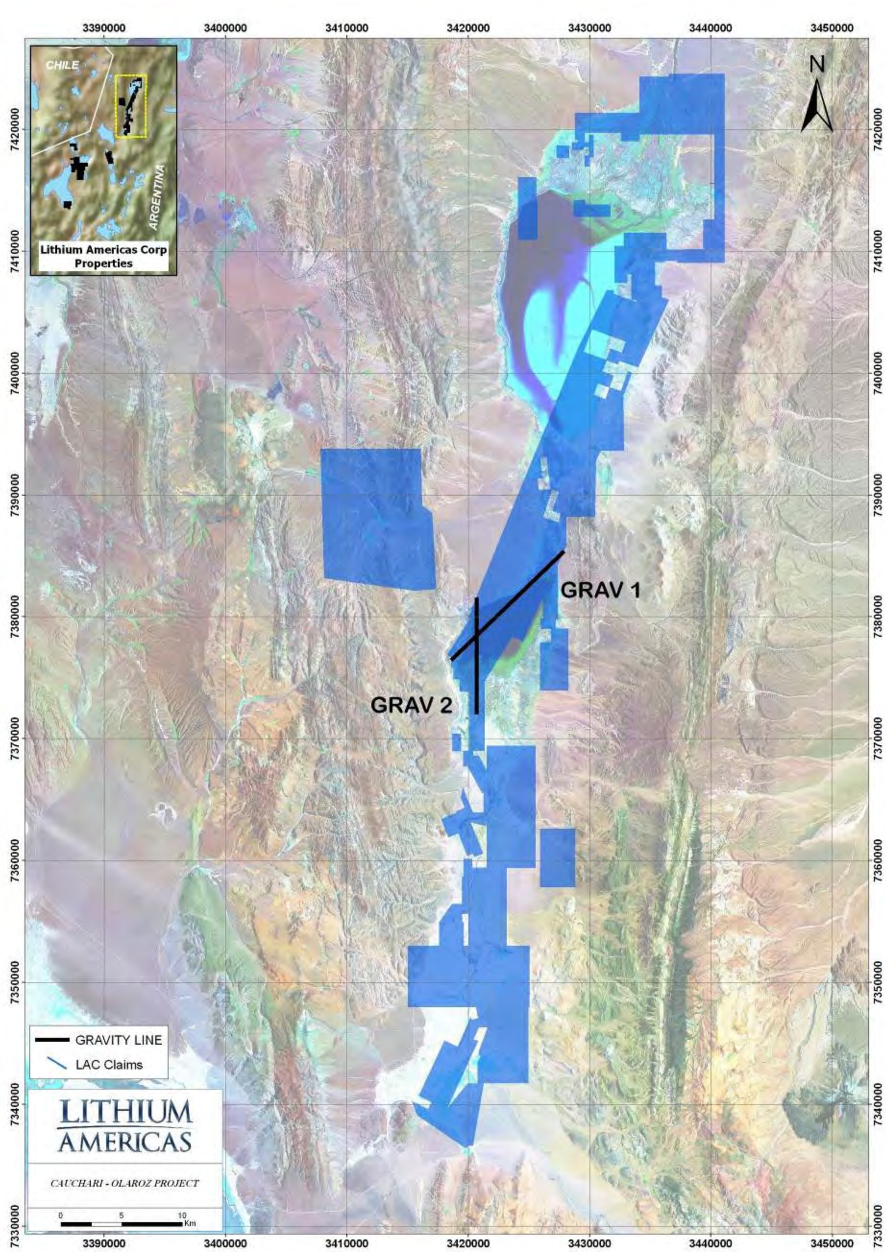


Figure 9.3: Location of gravity survey traverses at the Cauchari Salar.

Instrumentation used for the survey was a LaCoste and Romberg #G-470 gravimeter with an accuracy of ± 0.01 mGal. The gravity survey field procedure included repetition of survey control points at intervals of less than five hours, to minimize instrument drift control errors. Initial gravity data processing was completed with Oasis software, using the Gravity and Terrain Correction module. Inversions were also produced with Oasis software, using the gravity module GM-SYS.

Differential GPS measurements provided the station control with an accuracy level of ± 1 cm. A GPS base station using a Trimble DGPS 5700 model was employed in two locations within five kilometres of the survey lines and operated continuously during the measurement of the survey GPS points along the gravity traverses. A Trimble model R3 was used for the gravity station placement.

Modelling results for the northeast oriented gravity survey line (GRAV 1) are shown in Figure 9.4. The image shows the location of boreholes, the input densities used for model generation, and the calculated Bouger results from the field data. The upper profiles indicate an excellent fit of observed and modeled data based on the coloured model shown in the lower part of the figure. The lower red portion is the modeled depth to basement, or more dense lithologies, using the starting model densities and the observed field data. There is good correlation between the gravity and seismic results which indicate changes in density and velocity, respectively, at approximately 300 m depth. It is interpreted that this approximate depth represents an increase in compaction of the sand-salt mix encountered during drilling.

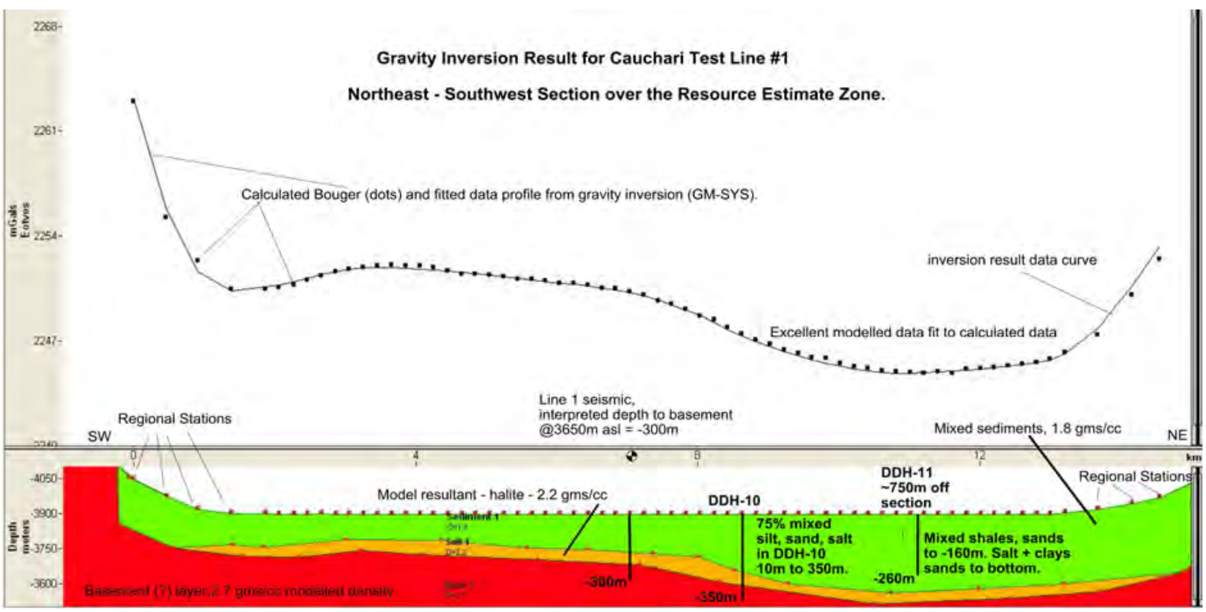


Figure 9.4: Modeling results for the northeast oriented gravity line (GRAV 1) over the Resource Estimate zone.

Modeling results for the north-south gravity profile (GRAV 2) across the southwest portion of the Resource Estimate zone are shown in Figure 9.5. Drilling results for DDH-04 show a change at 160m depth to thick and dense halite with low porosity. This is marginally higher than the red area indicated by the gravity inversion modeling program. Similarly, for DDH-

12, the intersection of the massive halite is slightly different than the model results, but is within acceptable limits. Overall an excellent fit is apparent between the observed and modeled data as seen in the profile on the upper section of the figure. This image demonstrates that the gravity method is effective for identifying relative density changes associated with different lithologies or increased compaction with depth in the salar.

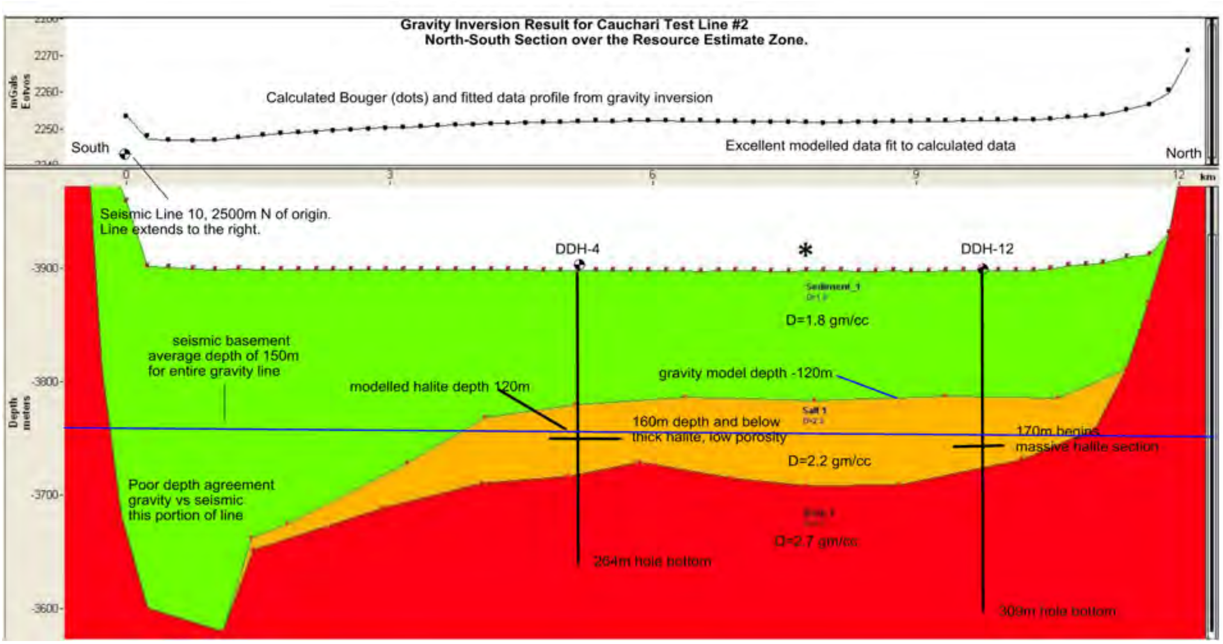


Figure 9.5: Modeling results for the north-south gravity line (GRAV 2) across the southwest portion of the Resource Estimate zone.

9.5 TEM Survey

A Time Domain Electromagnetic (TEM) survey was conducted in the Cauchari Salar during July, 2010, along the five TEM lines shown in Figure 9.6. The main purpose of the survey was to test the applicability of this method for determining resistivity contrasts that may relate to changes in groundwater salinity. In general, it is expected that saline brines will be more conductive (lower resistivity), whereas areas of fresh water will be less conductive (higher resistivity).The TEM survey parameters included:

- the use of Zonge GDP-16 Rx and GGT-20 Tx instrumentation;
- in-loop sounding configuration using 200m x 200m square transmitting loops and a base transmitting frequency of 4Hz;
- soundings completed at 100m station intervals from 45 msecs to 48 msecs;
- completion of a total of 12.6 linear survey kilometres.

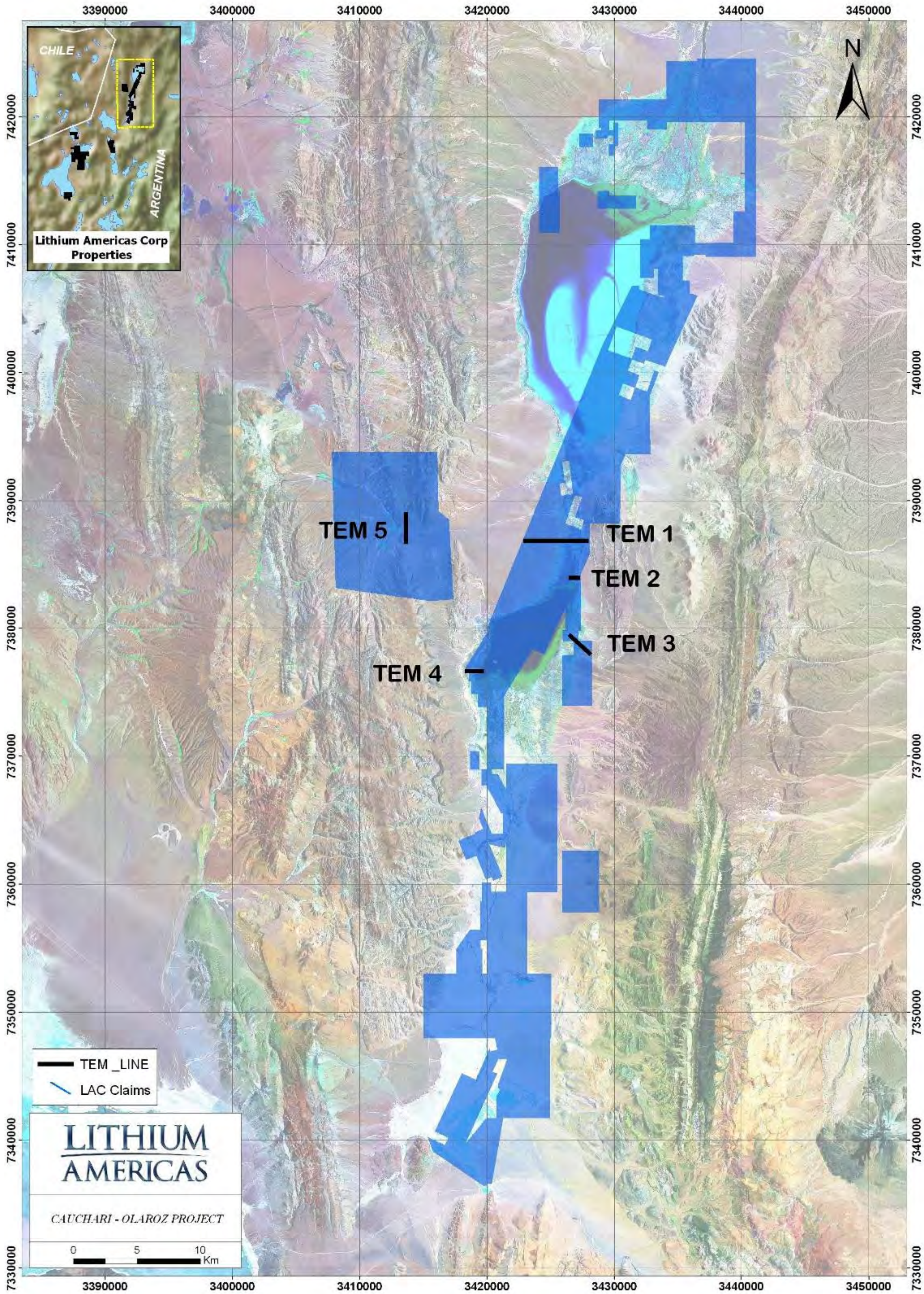


Figure 9.6: Location map of TEM sounding profiles conducted at the Cauchari Salar.

Survey results for each TEM line are discussed individually in the following:

- Line TEM 1 (Figure 9.7) – Borehole logs and brine sampling results for PE-07 and DDH-02 indicate that the top of the brine aquifer is at approximately 40 m depth. This is reasonably consistent with the low resistivity values seen in the inversion at this location where the resistivity drops in the presence of brine. For DDH-09, there is sand present to approximately 60 m depth, followed by variable salt, silt, and sand past the bottom of the TEM inversion depth. The resistivity section is in agreement with the logging results. Notably on this TEM line is the area on the west (left) side of the image, which corresponds to a portion of the alluvial Archibarca Fan, where fresh water inflow is suspected. The higher resistivity values in this area are consistent with the inflow of freshwater. The profile also shows two low resistivity anomalies that may be attributable to occurrence of brines at depth, possibly related to structures that intersect the TEM profile orthogonally at these locations.

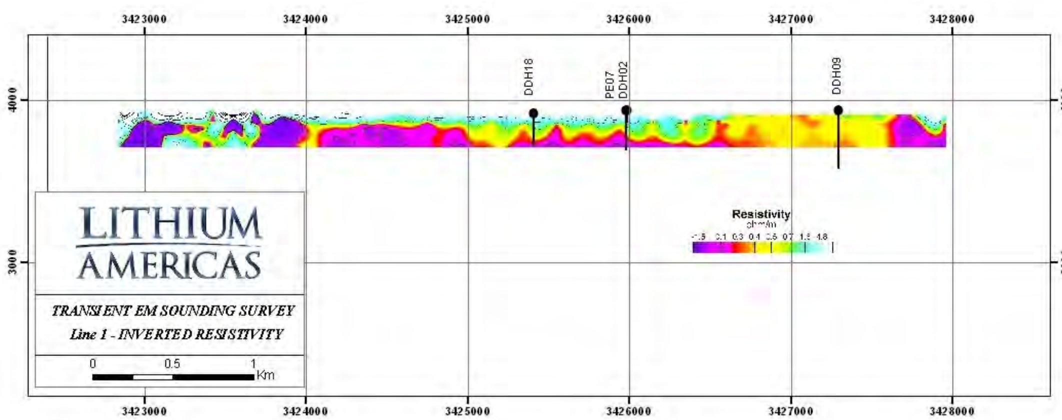


Figure 9.7: Survey results for line TEM 1.

- Line TEM 2 (Figure 9.8) – This TEM image shows a typical layered model in the vicinity of DDH-08 where sandy layers containing the brine resource are situated at 20 m depth. The deeper, low resistivity region associated with DDH-08 is associated with the sandy brine-containing layers continuing to depth. Further to the east (right) there is indication of another low resistivity, high conductivity source. The higher resistivity values in the center of the image may be associated with compacted halite, possibly related to a horst.

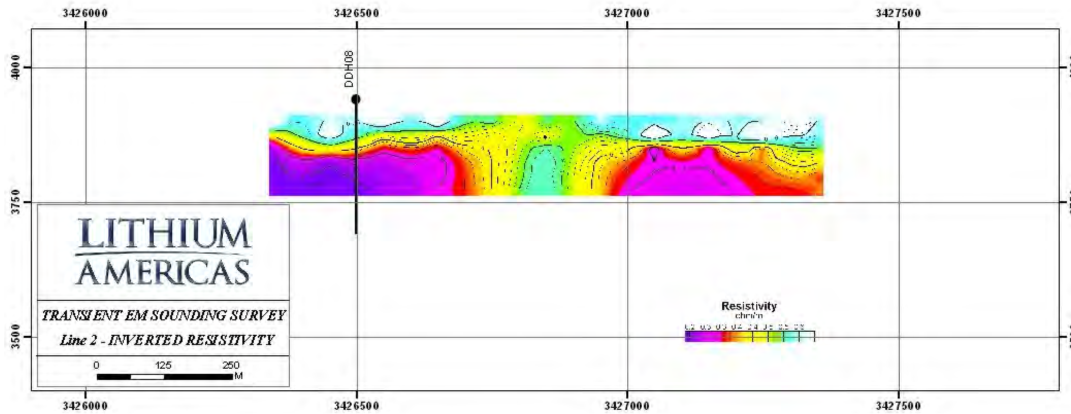


Figure 9.8: Survey results for line TEM 2.

- Line TEM 3 (Figure 9.9) – This northwest-southeast oriented line is situated in the eastern sector of the Cauchari Salar, where no drilling has occurred. It was selected to investigate the possibility of fresh water inflow and/or the presence of brine. The resistivity data suggests that both scenarios occur. Higher resistivity values are likely attributable to fresh water inflow from one of the alluvial fans in the area. The lower resistivity values may be related to brines, with typical resistivity values of < 1.0 ohm/m, associated with interpreted structural features within the basin.

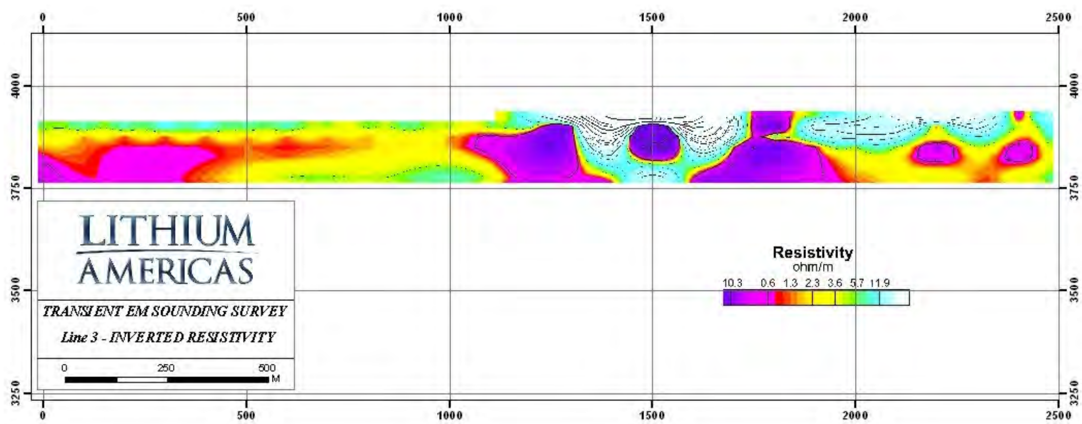


Figure 9.9: Survey results for line TEM 3.

- Line TEM 4 (Figure 9.10) – This line is situated along the western margin of the Cauchari Salar. PE-15 is cased from the surface to a depth of 65 m. Sampling results indicate the presence of a brine aquifer at the bottom of the casing. The resistivity values suggest continuity of the brine to surface. DDH-15 is also cased for the upper part of the borehole. However, below 65 m the lithology is characterized by high halite content. The resistivity values at this point are around 1 ohm/m, which is slightly more resistive than sandy brine responses, and consistent with high halite content. Further to the west (left) of the boreholes, a low resistivity feature may indicate brine in a structural feature along the margin of the salar. The higher resistivity at the left end of the section may indicate fresh water moving into the salar.

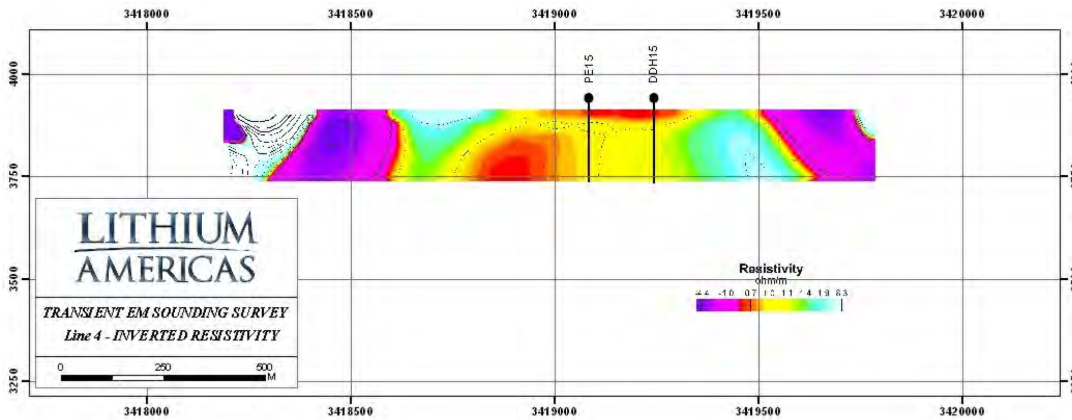


Figure 9.10: Survey results for line TEM 4.

- ➢ Line TEM 5 (Figure 9.11) - This line was located to investigate groundwater composition under the Archibarca alluvial fan. The central portion of the inversion shows an area of higher resistivity extending from the surface to a depth of approximately 75 m. Laterally, this zone could approach one kilometre in width. The resistivity values decrease under this interpreted body of fresh water, but not to the degree that would indicate brine presence. They may represent either background resistivity, or the upper portion of more saline water at depth. Some of the resistivity zones on this TEM line are greater than 1000 ohm/m, clearly indicating a highly resistive environment that is in contrast with the conductive brines of Cauchari. The higher resistivity values on the right side of the section may relate to the near-surface occurrence of bedrock.

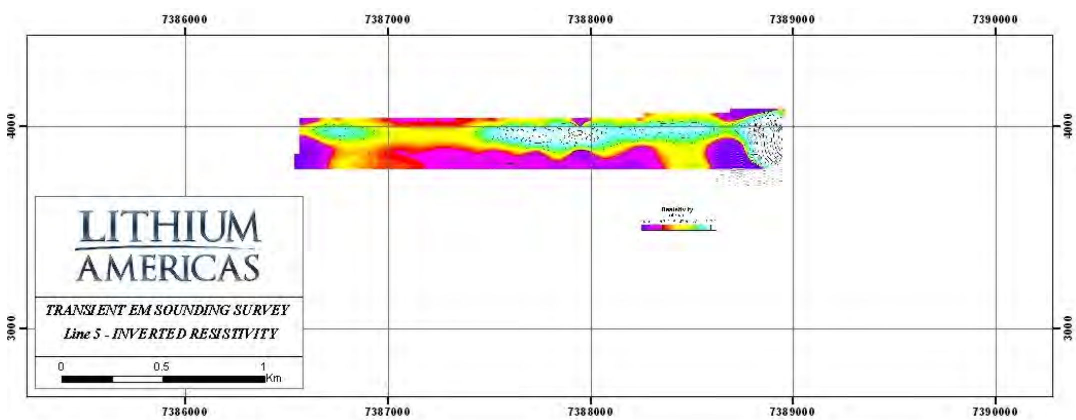


Figure 9.11: Survey results for line TEM 5.

In conclusion, the TEM survey results indicate that the method can be used to determine resistivity contrasts within the salar. However, resolution may be limited to depths on the order of 75 m – 100 m, due to the broad presence of low resistivity materials, as indicated by ambient resistivity values of near sub-ohm/m in many areas of the salar.

9.6 Vertical Electrical Sounding Survey

A vertical electrical sounding survey has been completed over the Archibarca fan (Figure 9.12)[1]. This simple methodology has proven to be the most efficient survey to probe the sediments surrounding the salar and identify salt layers, dry sediments, as well as brine and fresh water. The purpose of this program is to find and develop a fresh water aquifer to supply the plant.

Results of the survey show:

- The Archibarca fan is a sediment accumulation unit formed by gravel and thick sands which become finer sediments in distal areas. In the apex of the fan there is a water-meadow, which is supplying the pilot plant with freshwater.
- It is noted that water enters the permeable fan sediments from direct vertical infiltration and lateral inflow from up-slope areas.
- From a hydrogeological point of view, the fan sediments represent a promising aquifer.
- The inversions of all sections across the alluvial fan show that the salar extends under the alluvial fan (e.g. Figure 9.13)
- The inversions also show that the interface between the fresh water and the brine is located between 20 and 70 m deep
- Fresh water is found above the interface at an average depth of 50 m below surface.
- Exploration wells, DDH-06 and DDH-02, located at medium distance from the fan, were sampled using a low flow pump and they confirmed the existence of the 3 layers.
  - Fresh water
  - Brine and fresh water mix (brackish water)
  - Brine in the lower part

[1] Lopez, G. 2010

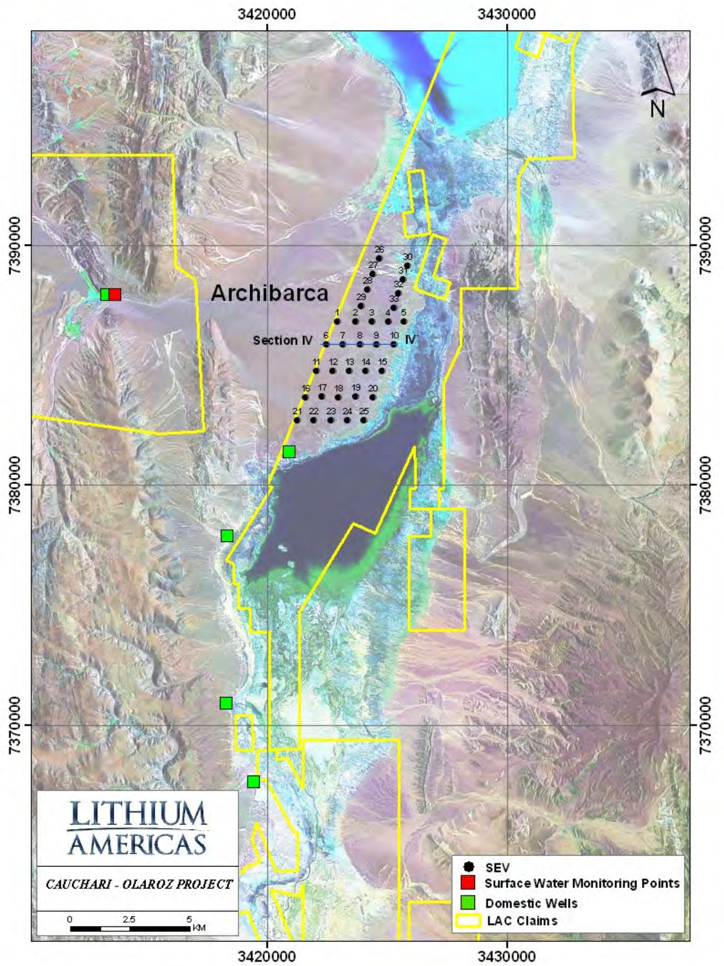


Figure 9.12: Vertical electrical sounding Survey on the Archibarca Alluvial fan

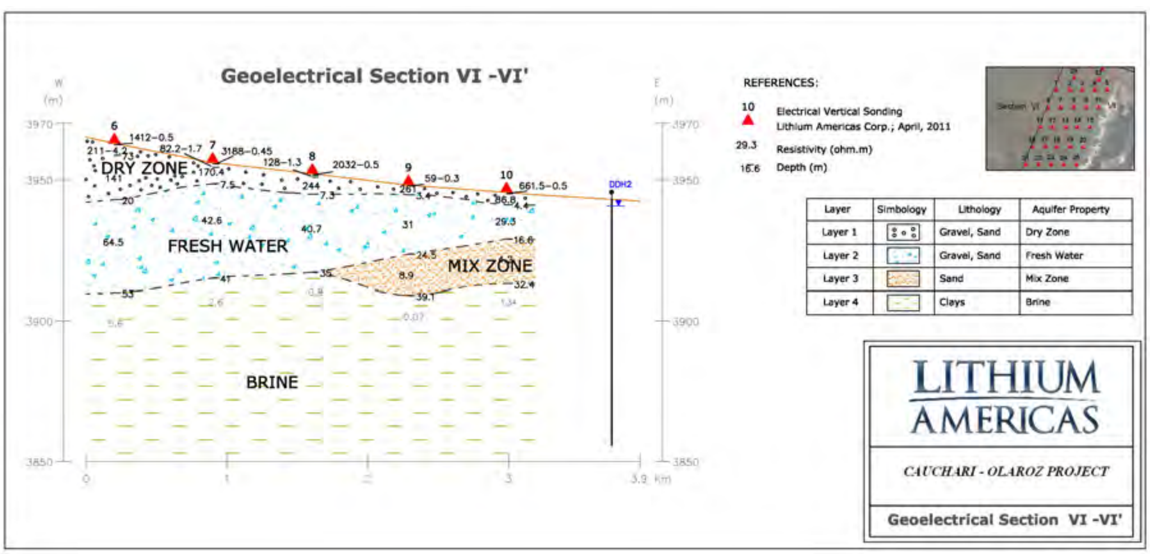


Figure 9.13: Vertical electrical sounding inverted Section with interpreted brine-fresh water interface

9.7 Brine Numerical Modelling Program

9.7.1 Modelling Work Completed to Date

The overall objective of this program is to develop a numerical brine model that can be used to optimize the rate and chemistry of brine production. In working towards this objective, a reasonable balance must be found between the following two issues:

- The final modeling approach must be sophisticated enough to simulate important brine/freshwater interactions during pumping and fresh water influx from the salar boundaries.
- The model itself must run and converge within a practical timeframe; if the model requires excessive run-time, it will be impractical to conduct the numerous runs required for calibration and evaluating pumping strategies.

To date, a two-dimensional, density-dependent model was constructed for a simplified cross-section through the Cauchari Salar. Modeling was conducted by AquaResource Inc. of Waterloo, Ontario. The purpose of this preliminary work was to determine the amount of detail that can be incorporated in the model while still achieving practical software run-times, and to determine the most appropriate format for a full-scale model. The following details pertain to this work:

- The software selected for the two-dimensional model was FEFLOW v6.0; the extended Boussinesq equations were used to simulate density-dependent flow;
- Lateral salar boundaries were defined as fresh water / brine interfaces (Figure 9.14); a total inflow rate of 0.28 m^3/d was specified at both these boundary, which was applied as a depth- dependent flux ranging from 0.14 m/yr at the ground surface to zero at 200 m depth; an inflow concentration of 10 g/L Total Dissolved Solids (TDS) was specified, based on concentrations observed on the salar perimeter;
- The upper salar boundary was simulated to lose water through evaporation and evapo- transpiration at a rate that was inversely proportional to the depth of the water table (Figure 9.14); consequently losses were greatest at the perimeter of the salar and decreased towards the centre; the maximum rate of evaporation was constrained to 1 mm/d, based on other salar environments;
- Stratigraphy was input to the model, based on a simplified geological interpretation for a representative cross-section;
- Lithium and potassium distributions were interpolated within the model, based on sampling data;
- Existing natural conditions were simulated, in an effort to reproduce existing brine distributions; output from this stage served as the input for simulation of brine pumping;
- A brine pumping well was simulated, to evaluate the potential for increased fresh water inputs to the salar in response to pumping, and the resulting effects on pumped brine concentrations.

Key results from the two-dimensional modeling were as follows:

- The expected relationship between brine and fresh water was reproduced in the model, as shown in Figure 9.14. Under natural conditions, a lens of fresh water entered the salar on top of the brine (due to the lower density of the former). As the fresh water flowed toward the centre of the salar, it was depleted by evaporation and became more concentrated in salts. Eventually, the fresh water encroachment was halted as a stable equilibrium was reached, due to a balance between fresh water inputs and evaporation outputs. This steady-state natural equilibrium was used as the initial condition for the pumping simulation.
- Simulation of brine pumping caused additional encroachment of freshwater into the salar. Pumping simulation results indicate that it will be feasible to predict the evolution of brine concentrations as pumping proceeds, and to use a model to optimize pumping scenarios, based on maximizing lithium recovery.
- In order of importance, the preliminary model was most sensitive to: a) variations in the flow resistance of sand, salt and clay, b) boundary conditions assumed for recharge and evaporation, c) initial concentration distributions for lithium and total salts, d) depth of the extraction well, and e) geological properties of unknown materials at depth.

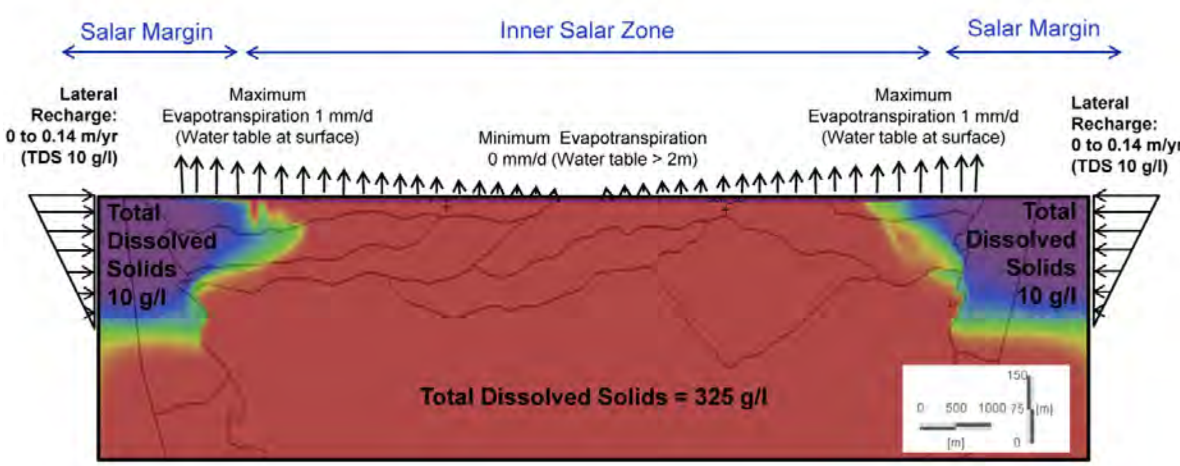


Figure 9.14: Simulation results from the two-dimensional model showing the natural steady-state configuration of the brine / fresh water interface; the equilibrium configuration of the interface is a function of the balance between fresh water inputs and evaporation / evapotranspiration outputs.

The two-dimensional model results help to focus the effort for full-scale modeling. The results indicate that density-dependent flow is necessary to match the long term (i.e., hundreds of years or more), natural equilibrium that develops between fresh water and brine. However, in modeling relatively short term pumping scenarios, it may be possible to remove density-dependent flow from the model and still achieve reliable predictions. This would be advantageous due to the substantial computational effort and run-time required to simulate density-dependent flow. The results indicate that for brine recovery predictions, it is likely more important to focus on representing the complexity of the hydrostratigraphic units.

The preliminary modeling results described above help to focus the effort for full-scale modeling. On the basis of these results, a full-scale three dimensional modelling effort was recently initiated, also based on the FEFLOW software platform. This model will be calibrated with results from upcoming pumping tests. Results from this full-scale model will be used to support the development of a Reserve Estimate, with consideration of technical and economic factors. It will also be used to evaluate and identify optimal production well field design and pumping strategy.

9.7.2 Modelling Work in Progress

The primary objective of the ongoing numerical modelling work is to support prediction, optimization and management of lithium and potassium in brine extracted from the salar. To meet this objective, the model must accurately simulate brine movement under both existing (no pumping) and future (pumping) conditions. FEFLOW will be used as the platform for this modelling work, due to its strengths in representing complex stratigraphy and brine transport while minimizing model run-times.

The modelling work is being conducted by AquaResource Inc., of Breslau, Ontario. AquaResource specializes in numerical modeling of groundwater flow and solute migration, as well as database design and data management. AquaResource will execute this work plan in consultation with Dr. Mark King (2010a and 2010b) and LAC personnel. The modelling work plan consists of the following Tasks:

9.7.2.1 Task 1: Expansion of the existing hydrostratigraphic model

The existing hydrostratigraphic model was developed within Vulcan, to support Resource Estimation of the brine deposit (King, 2010b). Consequently, it focuses on the distribution of porosity within the salar sediments. As the Project progresses to Reserve Estimate stage, the model must be expanded to consider permeability of the salar units, and salar boundary conditions. In Task 1, the existing hydrostratigraphic model will be expanded to incorporate these considerations.

In the first step of this process, all assumptions and designations related to hydrostratigraphic model layers will be refined to provide the most up to date representation in the FEFLOW model. In the second step, preliminary quantitative descriptions of salar boundary conditions will be generated. The distribution and potential inflow of freshwater on the side boundaries of the salar will be quantified, both for existing (no pumping) and potential future (pumping) conditions.

Net recharge to the top surface of the salar will be estimated using climate data and spring measurements. Surface water modelling will be conducted for the salar watershed, to estimate recharge from the areas surrounding the salar, including alluvial fan areas and non-fan areas.

9.7.2.2 Task 2: Field Program Support

The Pumping Test Program and other field data collection activities (in progress; Section 9), are key to numerical model development. Consequently, AquaResource will provide ongoing review and recommendations for these programs, to ensure that the data support the modelling work. In addition, AquaResource will interpret the pumping test data, as they are generated.

9.7.2.3 Task 3: Update and Finalize Hydrostratigraphic Model

Some ongoing adjustment of the hydrostratigraphic model may be required, on the basis of ongoing drilling results and evidence of hydrostratigraphic unit connectivity from the pumping tests.

9.7.2.4 Task 4: Phase 1 Numerical Modelling and Reserve Estimation

The numerical model representation of the hydrostratigraphic model will be developed in two phases. Phase 1 will proceed as soon as the first pump test is completed, and will include the following key work items:

- the extent of the model domain will be finalized, based on interpretations of lateral salar boundary conditions, and initial simulations of boundary effects;
- hydraulic properties will be assigned to the various hydrostratigraphic units, based on pumping test results and previous testing of hydraulic properties (e.g., porosity);
- physical processes at the top boundary of the model (salar) will be added, based on interpretation of the balance between recharge and evapotranspiration; and
- options for simulating density-driven flow will be evaluated, and the most effective approach will be incorporated into the model.

Model calibration will be performed in Phase 1, by adjusting parameters to minimize the difference between simulated and observed brine levels. The calibration will include both steady state analysis of existing conditions, and transient analysis of the results from the first pump test. The Phase 1 model will be used to define a preliminary production pumping scenario. This scenario will provide the basis for a brine Reserve Estimate, based on prediction of sustainable extraction rates, well-field capture, and the evolution of lithium, potassium, magnesium, sulphate and TDS concentrations in the extracted brine. The Resource Estimate will also be re-evaluated in this Task.

9.7.2.5 Task 5: Phase 2 Numerical Modelling and Prediction Refinement

This phase would proceed as soon as all results are available from the Pumping Test Program. In Phase 2, the model will be further refined by incorporating:

- an updated calibration using the remaining pumping test data, and information from any other relevant ongoing data collection activities; and
- engineering comments and considerations related to the preliminary production well field defined in Phase 1.

Modelling results to be developed for the resource extraction plan defined in Phase 2 will include the following:

- well capture analysis;

- concentrations of lithium, potassium, magnesium, sulphate and TDS in pumped brine over the lifespan of the extraction project;
- guidelines for the staged development of the production well field; and
- an assessment of prediction uncertainty, based on potential hydrostratigraphic unit discontinuities and long-term recharge variability.

In addition, recommendations will be formulated for additional well field optimization, and active production management to minimize freshwater inflows.

9.8 Surface Water Monitoring Program

A surface water monitoring program was initiated in early 2010 to record the flow and chemistry of surface water in the vicinity of the Cauchari-Olaroz Salars. Measurements are taken at each site for pH, conductivity, dissolved oxygen, and temperature, and samples are collected for laboratory analysis.

Flow rates are monitored every three months during the dry season, and monthly during the wet season. Measurements are derived by monitoring flow velocity across a measured channel cross-sectional area at each site. Where the flow is too small to measure it is estimated qualitatively. Typical dry and wet season flow monitoring results are shown in Figure 9.15 and Figure 9.16, respectively. Wet season sampling results for lithium and potassium are shown in Figure 9.17 and Figure 9.18, respectively. As shown, these parameters are somewhat elevated in surface water inflows to the north and south ends of the salars, relative to other surface water inflows.

The data acquired from the surface water monitoring program will support upcoming numerical modeling efforts (Section 9.6) and, ultimately, an estimate of brine reserves, as discussed in Section 1.4.

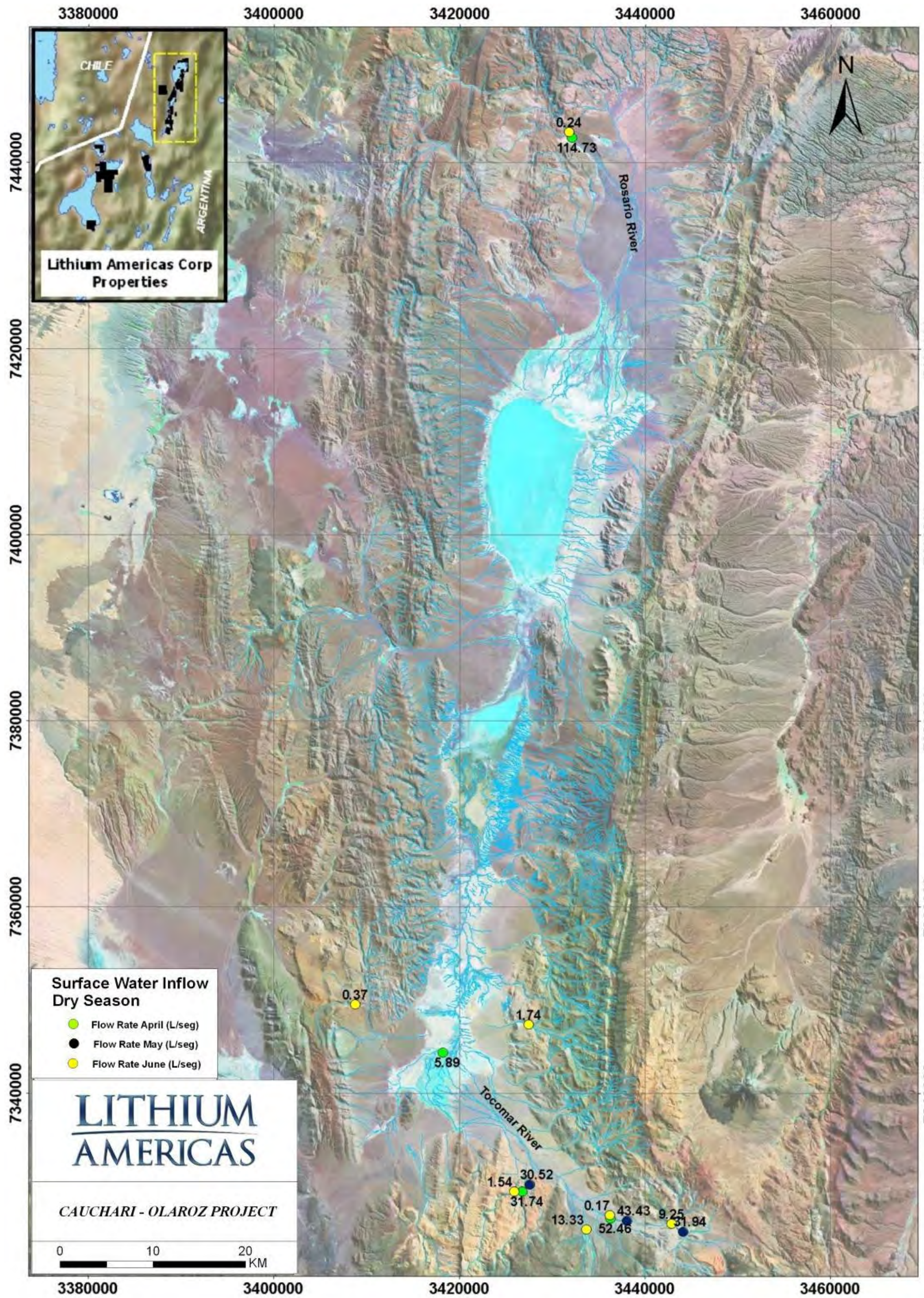


Figure 9.15: Surface water flow monitoring sites, with dry season flow results (L/s).

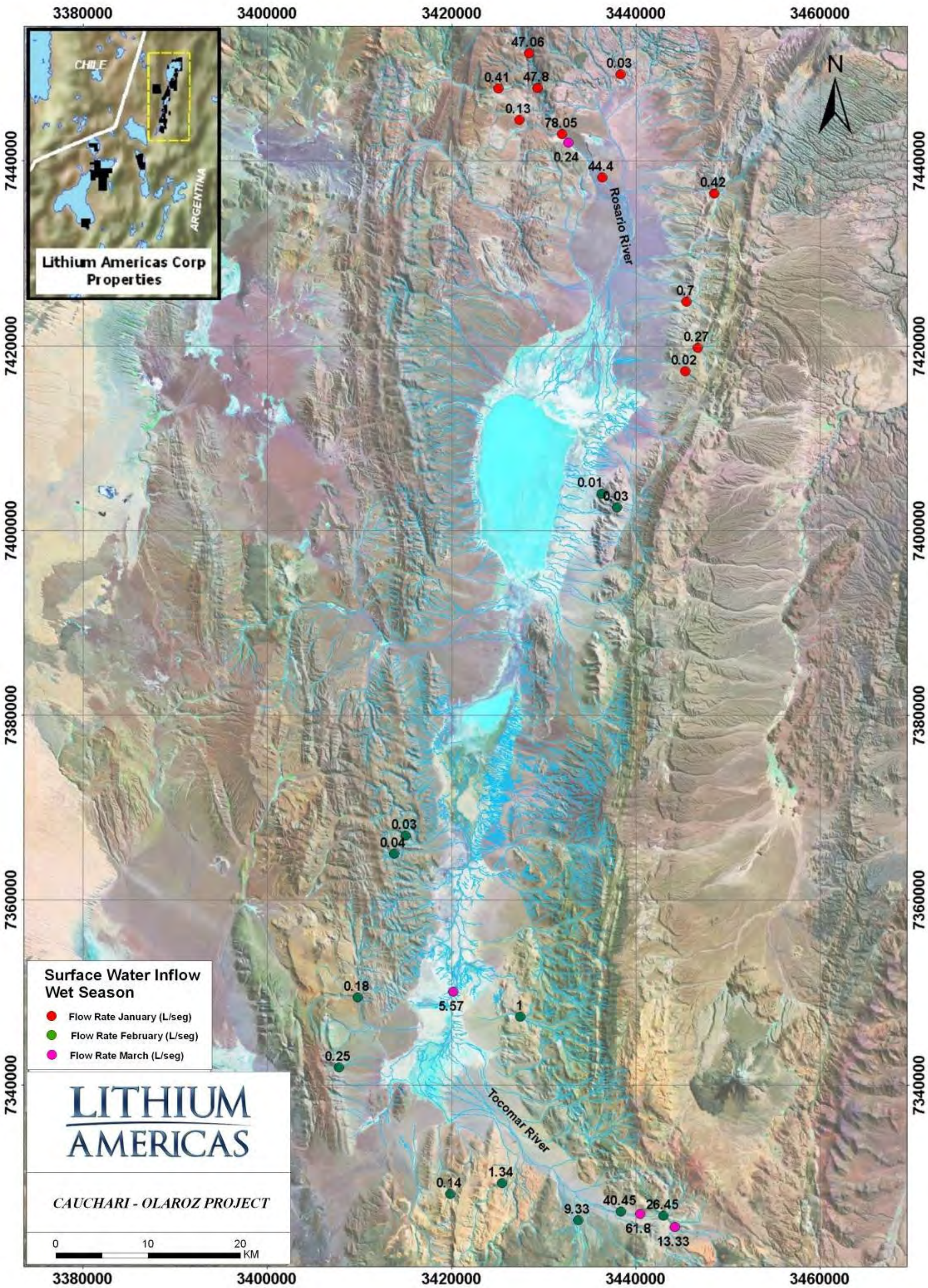


Figure 9.16: Surface water flow monitoring sites, with wet season flow results (L/s).

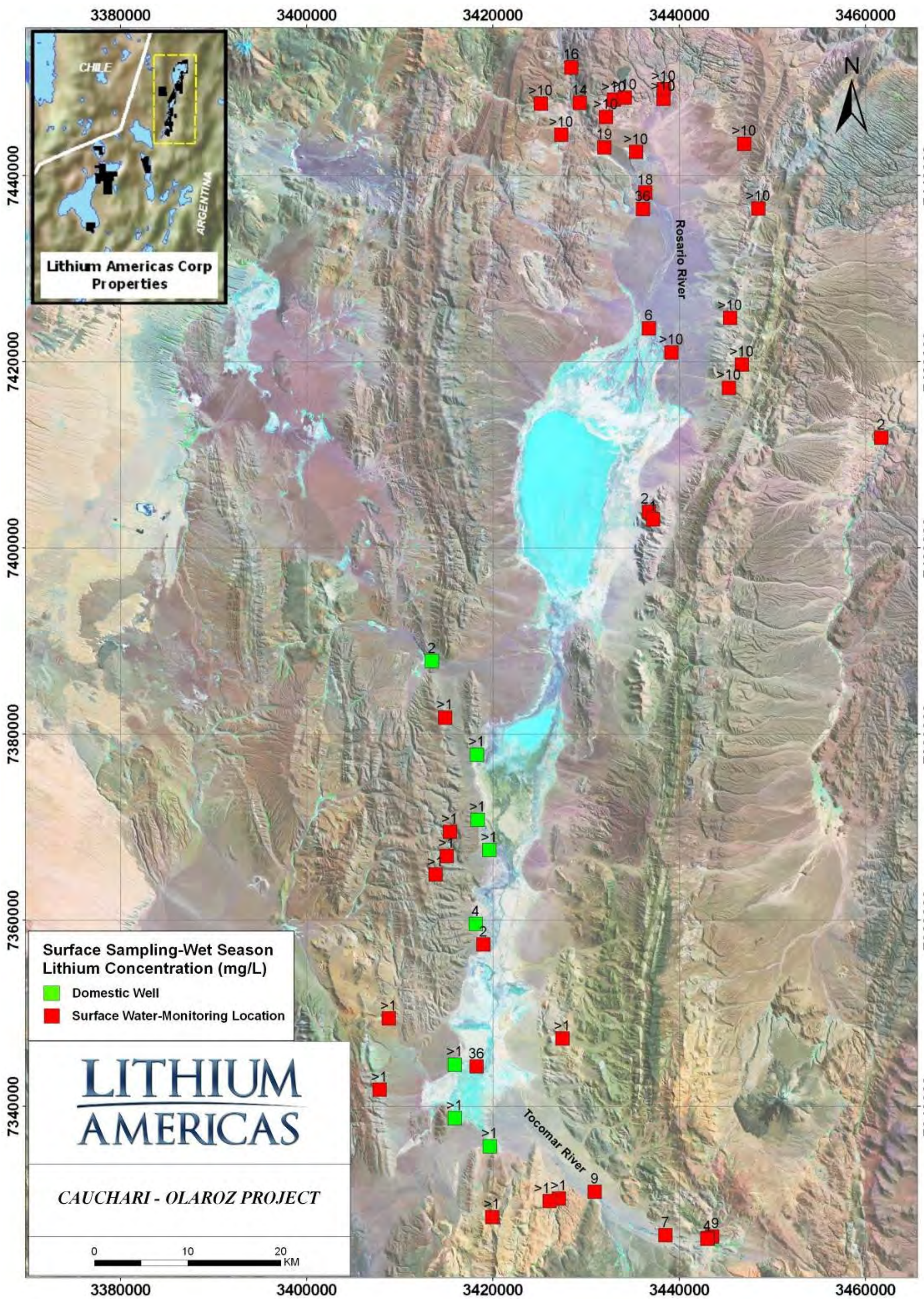


Figure 9.17: Lithium results (mg/L) for surface water sites, during the wet season (April-June 2010).

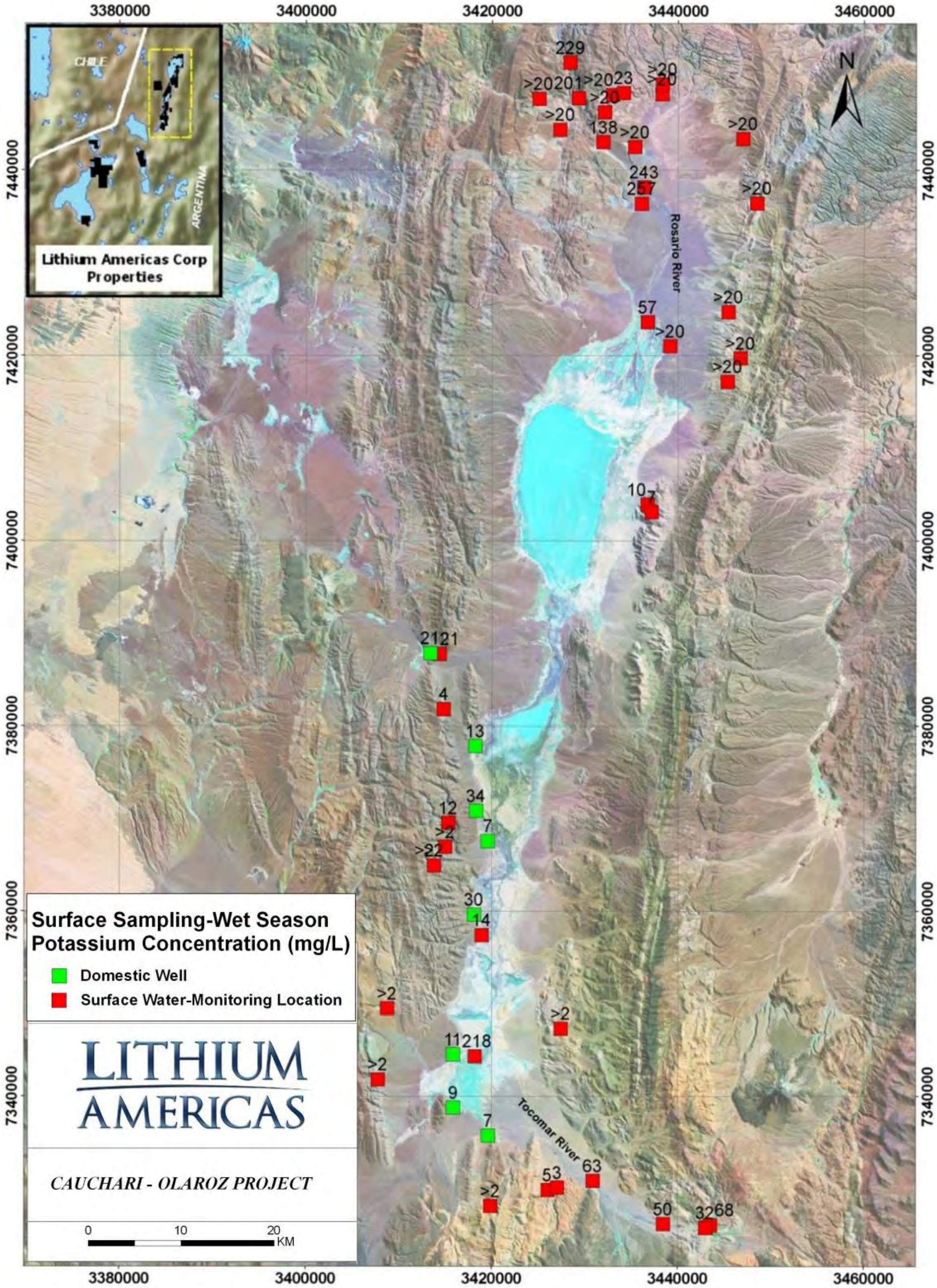


Figure 9.18: Potassium results (mg/L) for surface water sites, during the wet season (April-June 2010).

9.9 Brine Level Monitoring Program

The static level of subsurface brine is monitored on a weekly basis from an array of accessible boreholes within the salars. Monitoring is also conducted approximately every three months at three accessible, unused domestic water wells just outside the Cauchari Salar. Measurements are taken with a Solinst Model 101 Water Level Meter by lowering the meter probe down the borehole. The meter produces a sound when the probe contacts water. The depth to water is read from the tape attached to the probe. Measurements are summarized in Table 9.1.

Table 9.1: Static water level measurements, for the period from January to October, 2010.

Borehole	Monitoring Period	Water level range (m. below ground surface)
DDH-01	7/12 - 10/10	3.5 - 5.8
DDH-02	5/31 - 10/10	1.9 - 2
DDH-03	2/2 - 10/10	7.0 - 7.6
DDH-04	1/26 - 10/10	2.2 - 3.7
DDH-05	2/27 - 10/10	0.7 - 2.6
DDH-06	2/21 - 10/10	3.2 - 6.4
DDH-07	3/7 - 10/10	0 - 1.4
DDH-08	3/27 - 10/10	0 - 1.5
DDH-09	5/16 - 9/30	0.7 - 2.4
DDH-10	1/14 - 8/7	1.1 - 3.2
DDH-11	5/16 - 10/10	1.1 - 8.7
DDH-12	5/22 - 10/10	1.09 - 4.5
DDH-13	7/17 - 10/10	4.0 - 4.5
DDH-14	7/11 - 10/10	8.1 - 8.7
DDH-15	8/26 - 10/10	0.9 - 1.8
DDH-16	8/7 - 10/10	13.4 - 14.7
DDH-17	No data	
DDH-18	8/26 - 10/10	4.1 - 4.3
PE-1	1/16 - 10/10	1.24 - 1.66
PE-2	6/20 - 10/10	0.6 - 0.7
PE-3	1/17 - 10/10	3.0 - 4.8

Borehole	Monitoring Period	Water level range (m. below ground surface)
PE-4	1/16 - 10/10	5.2 - 5.9
PE-5	1/16 - 10/10	4.5 - 4.9
PE-6	1/16 - 10/10	8.1 - 8.3
PE-7	5/22 - 10/10	9.6 - 10.8
PE-8	1/16 - 10/10	0.8 - 1.15
PE-9	1/16 - 10/10	4.8 - 6.4
PE-10	No data	
PE-11	3/8 - 10/10	1.1 - 2.4
PE-12	3/14 - 8/26	1.1 - 1.7
PE-13	3/21 - 10/10	2.8 - 12.6
PE-14	3/28 - 10/10	0.9 - 3.2
PE-15	4/18 - 10/10	0.51 - 1.7
PE-16	No data	
PE-17	5/16 - 10/10	0.2 - 5.2
PE-17A	8/14 - 10/10	1.5 - 7.9
PE-18	5/22 - 8/14	3.8 - 6.3
PE-19	6/14 - 10/10	2.1 - 6.8
PE-20	7/12 - 10/10	2.91 - 6.4
PE-21	7/11 - 10/10	1.55 - 2.4
PE-22	8/2 - 10/10	4.85 - 7.83

9.10 Pump Test Program

A program is in progress to evaluate the hydraulic parameters of the primary hydrostratigraphic salar units. The program is currently at the stage where installation of the pumping wells and monitoring wells is almost complete. When installation is complete, 30-day pump tests will be conducted to stress the salar aquifer and to measure hydraulic responses. These data will support predictions of brine production rates. The Pump Test Program will utilize four to six test arrays located in areas of the Resource Estimate zone that have distinctive hydraulic characteristics (Figure 9.19). A third array was partially installed but was abandoned due to drilling issues. Implementation of long term pump tests in at least 4 locations is considered adequate to characterize the aquifer for the purposes of brine Reserve Estimation.

The conceptual layout of an example pumping test array is shown in Figure 9.20. Each array will include a central large-diameter pumping well, used to impose a prolonged hydraulic stress (i.e., pumping) on the intermediate-depth salar aquifer. It will also include some or all of the following well types, depending on the setting and preliminary hydraulic testing of the pumping well:

- a central large-diameter pumping well, used to impose a prolonged hydraulic stress (i.e., pumping) on the intermediate-depth salar aquifer;
- two deep monitoring wells located at varying distances from the pumping well, to measure the hydraulic response to pumping, and to estimate the hydraulic conductivity and storativity of the main hydrostratigraphic units in the salar;
- and Shallow and intermediate depth monitoring wells, to enable evaluation of the degree of hydraulic connection between the deep, intermediate and shallow zones in the salar.

Results from the Pump Test Program will be used to further the development of a conceptual hydrodynamic model of the basin, and to calibrate a numerical brine flow model. In the short term, both models would support the estimation of brine reserves, as discussed in Section 1.4. This estimate will be documented in an upcoming report.

As the arrays are completed, 30-day pump tests will be conducted at each pumping well, to stress the salar aquifer and to measure hydraulic responses. As shown in Figure 9.19, two pumping wells have been installed to date: PB1 and PB4. PB1 is screened primarily in halite, which is expected to have relatively low permeability and brine production rates. Meanwhile PB4 is screened primarily in sand, which is expected to have higher permeability and production rates. Short term tests have been conducted at each well for preliminary evaluation of hydraulic responses. Results are summarized as follows:

Table 9.2: PB1 and PB4 Results

	PB1	PB4
Depth (m)	208	305
Primary Screened Unit	Halite	Sand
Preliminary Test Duration (days)	57	54
Flow Rate (L/s)	4	20
Drawdown over test period (m)	48	47

PB1 and PB4 are installed in the halite and sand units, respectively, which are the two most commonly-occurring salar hydrostratigraphic units. These two units are considered to have highly contrasting hydraulic properties, with sand expected to be significantly more permeable than halite. Consequently, these results are used as a preliminary estimate of the range of potential pumping well yields from the salar. The mid-point of the range (12 L/s) is the preliminary estimate of average yield. These estimates will be updated as results from the long term pump tests become available, and the brine numerical model is developed.

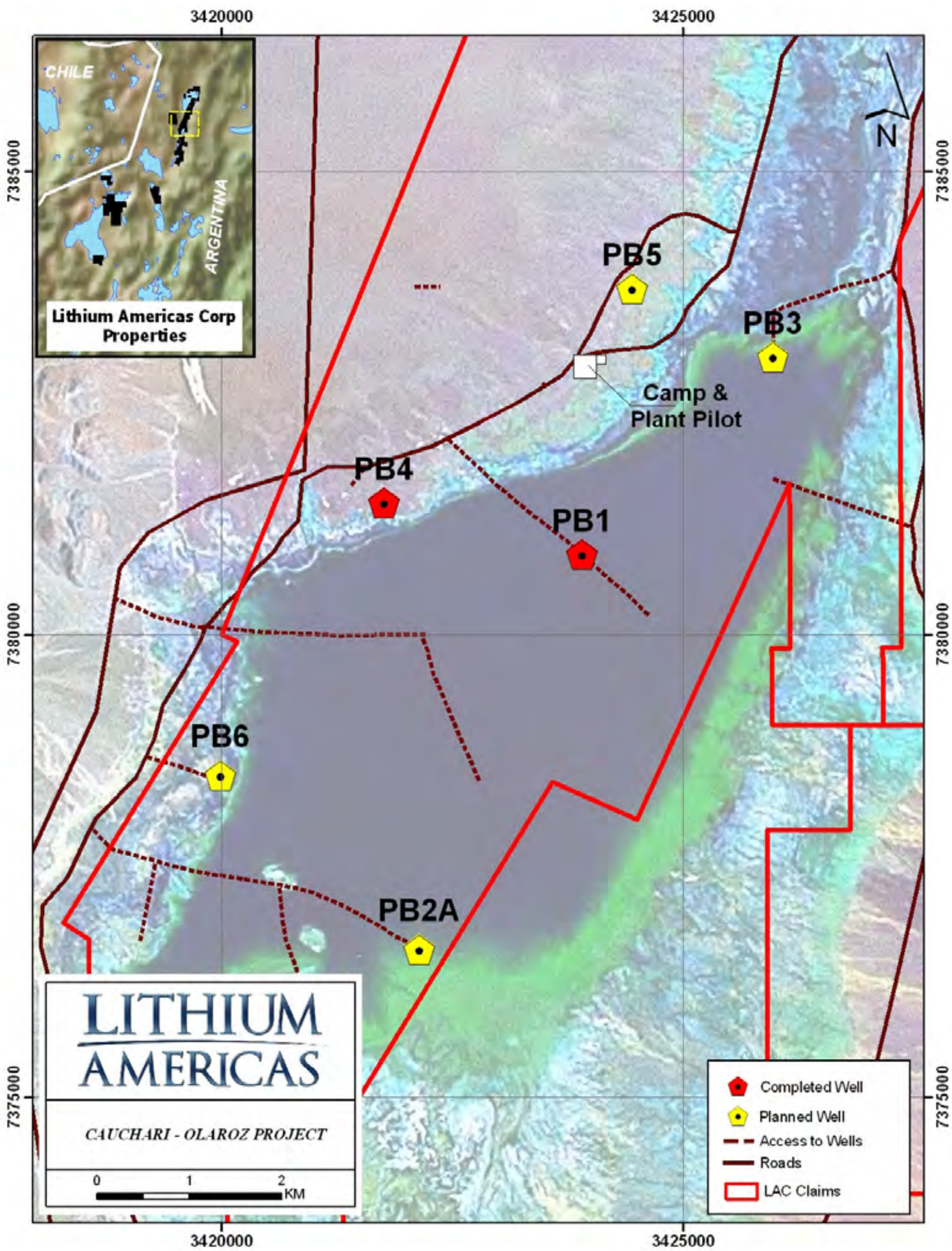


Figure 9.19: Existing and planned locations for Pumping Test Arrays.

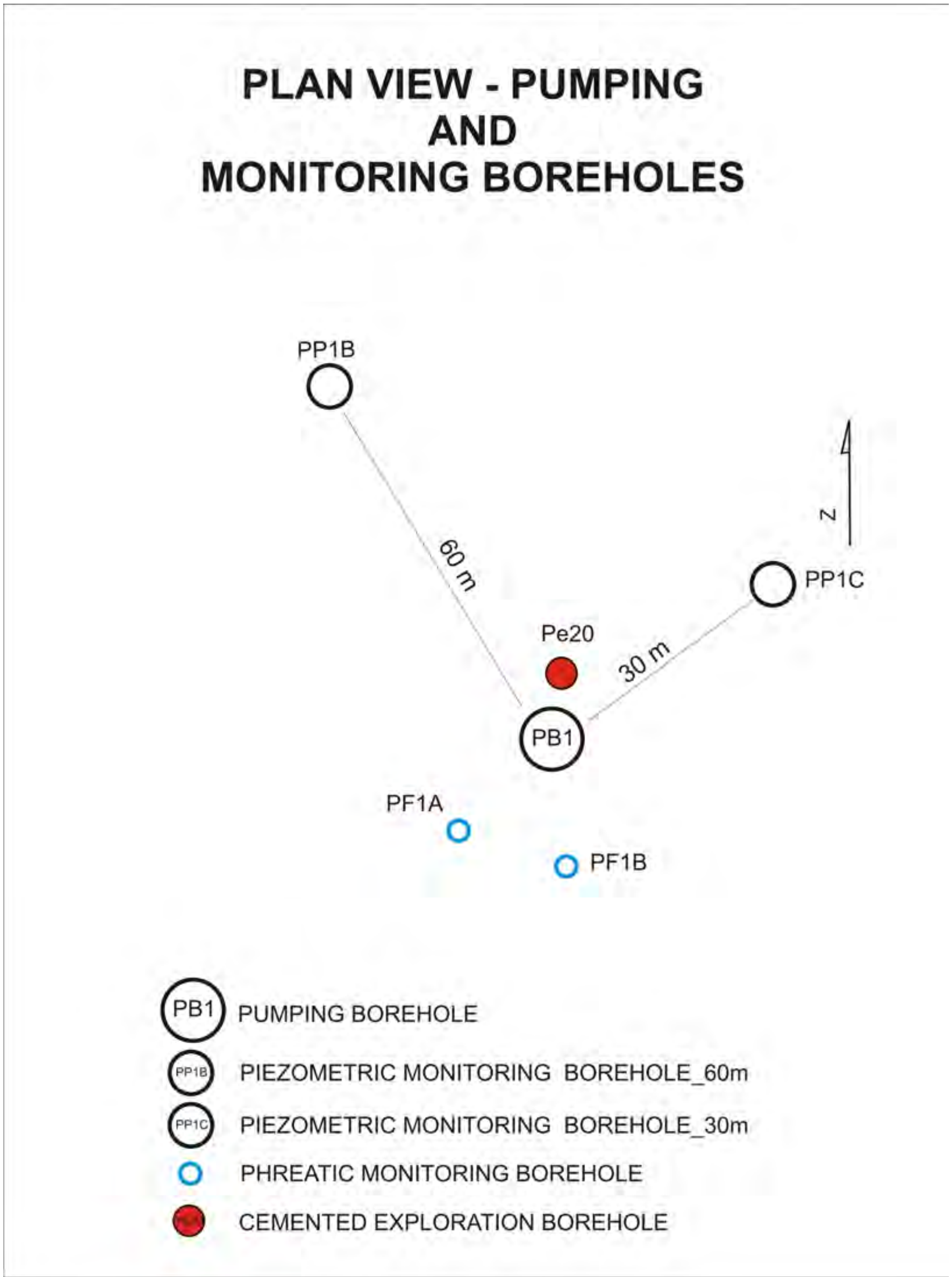


Figure 9.20: Schematic layout of an example Pumping Test Array for the Pump Test Program.

9.11 Air-Lift Testing

Air-lift testing was conducted to provide preliminary indications of aquifer yield and the relative permeability of salar sediments. The method consists of using a compressor to inject air into the annular space of the drill rods in an RC borehole. The brine in the borehole ascends to the surface through the interior of the drill rods, where it is then transferred by hose to a basin used to measure flow rate.

Air-lift tests were conducted at RC boreholes PE-14A, PE-17A, PE-19, PE-20, PE-21 and PE-22 from July to October, 2010. Results are shown graphically in Figure 9.21 to Figure 9.25 (PE-17A is not shown because one measurement was taken). Results are summarized in Table 9.3, and indicate an average yield of 6.53 l/s and maximum yield of 12.63 L/s. The air -lift results show that all the tested boreholes are capable of providing relatively high sustained yields.

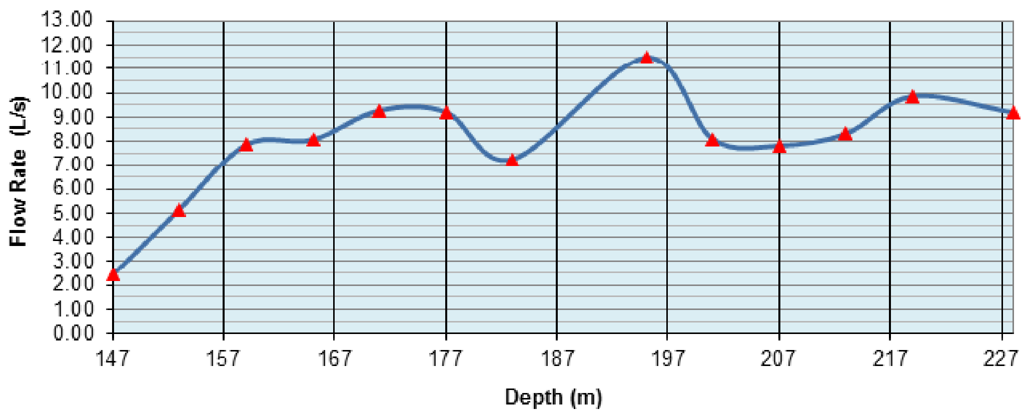


Figure 9.21: Air-lift testing results for PE-14A

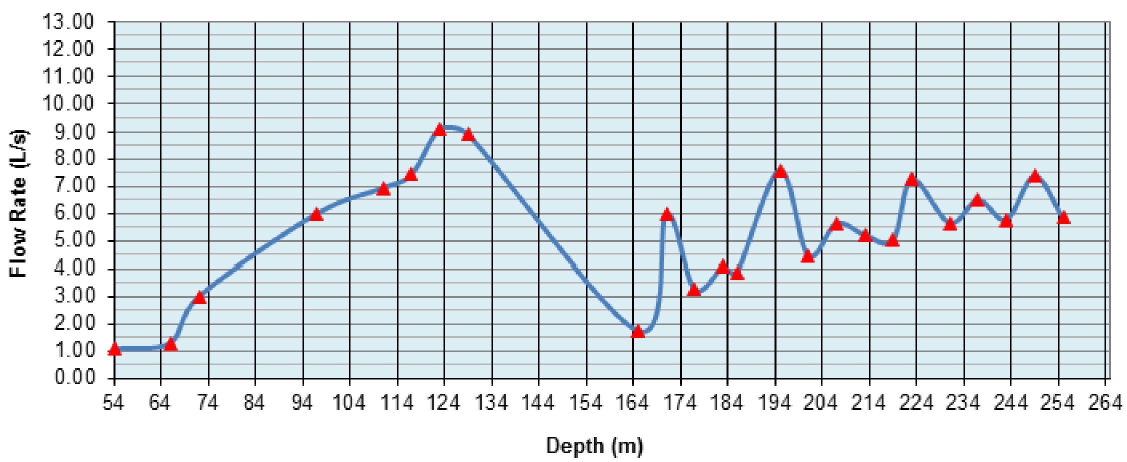


Figure 9.22: Air-lift testing results for PE-19.

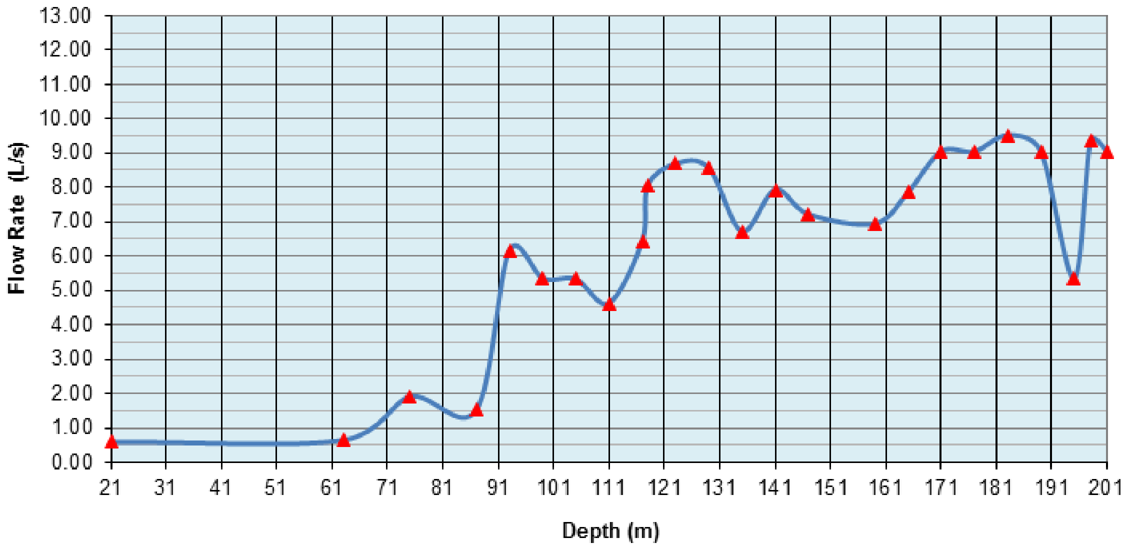


Figure 9.23: Air-lift testing results for PE-20.

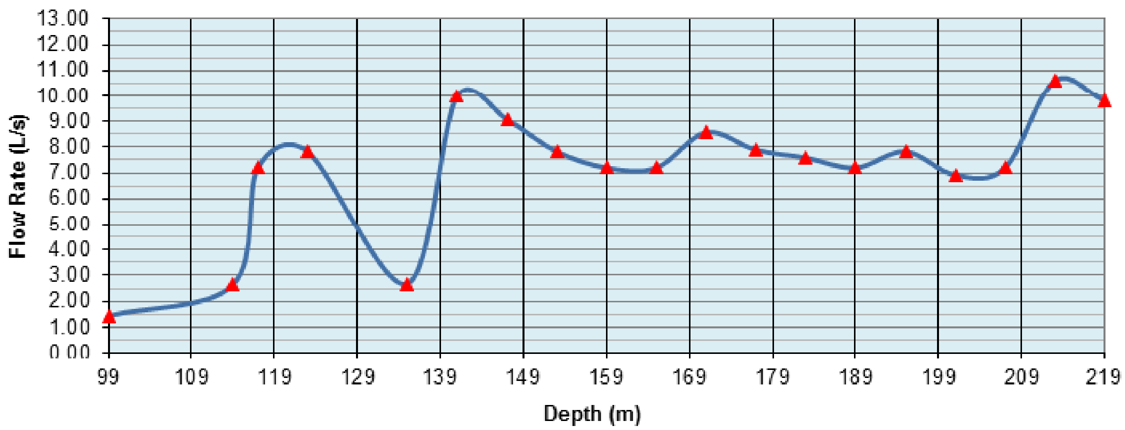


Figure 9.24: Air-left testing results for PE-21

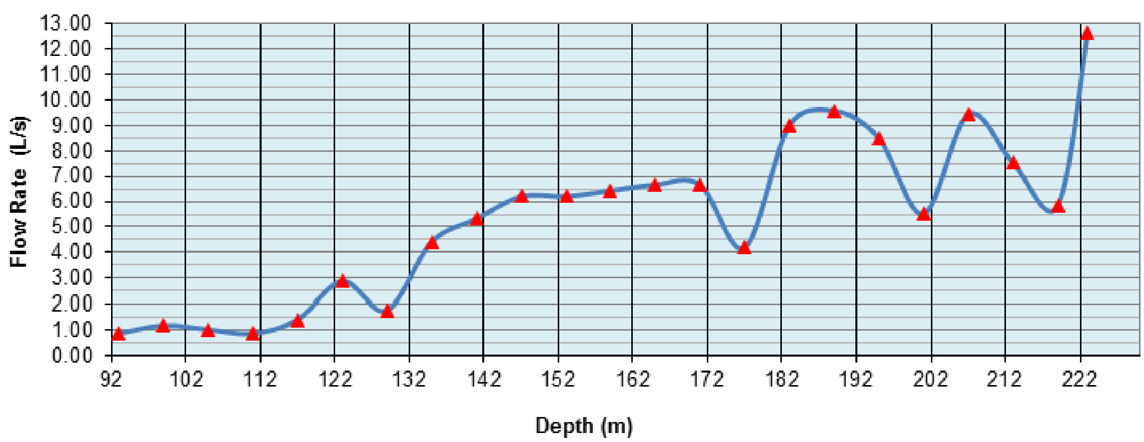


Figure 9.25: Air-lift testing results for PE-22.

Table 9.3: Summary of air lift testing results.

Borehole	Tested Depth Range (m)	Number of Tested Depths	Mean of all Measured Flow Rates (L/s)	Highest Flow Rate (L/s)
PE-14A	146-226	13	7.99	11.47
PE-17A	154	1	6.77	6.77
PE-19	54-255	22	5.38	9.11
PE-20	21-201	24	6.46	9.52
PE-21	99-219	19	7.19	10.6
PE-22	93-223	23	5.4	12.63
Average			**6.53**	**10.01**

10 DRILLING

10.1 Reverse Circulation (RC) Borehole Program

The objectives of this program were to: 1) develop vertical profiles of brine chemistry at depth in the salars, and 2) provide geological and hydrogeological data. This program is complete; the drilling reported herein was conducted between September 2009 and August 2010. The drilling conducted for this program is summarized in Table 10.1. Twenty-four RC boreholes (PE-01 through PE-22, plus two twin holes) were completed during this period, for total drilling of 4,176 m. Borehole depths range from 28 m (PE-01) to 371 m (PE-10).

Table 10.1: Borehole drilling summary for the RC Borehole Program conducted in '09 and '10.

RC Borehole	Drilling Interval (m)		Drilling Length (m)	RC Borehole	Drilling Interval (m)		Drilling Length (m)
	From	To			From	To	
PE-01	0	28	28	PE-13	0	209	209
PE-02	0	40	40	PE-14	0	144	144
PE-03	0	90	90	PE-14A	144	228	84
PE-04	0	187	187	PE-15	0	205	205
PE-05	0	210	210	PE-16	0	64	64
PE-06	0	165	165	PE-17	0	246	246
PE-07	78.9	249	170.1	PE-17A	0	220	220
PE-08	0	194	194	PE-18	0	312	312
PE-09	0	198	198	PE-19	0	267	267
PE-10	0	371	371	PE-20	0	204	204
PE-11	0	80	80	PE-21	0	222	222
PE-12	0	36	36	PE-22	0	230	230
Total Boreholes: 24 / Total drilling: 4,176 m							

Major Drilling, a Canadian drilling company with operations in Argentina, was contracted to carry out the RC drilling using a Schramm T685W rig and support equipment. The holes were initially drilled using ODEX and open-hole RC drilling methods at 10", 8" and 6" diameters. No drilling additives were used. A change was later made from ODEX and open-hole RC drilling to tri-cone bits of 17½" 16", 9½", 7⅞", 6" and 5½" diameters. Bit diameters were selected based on ambient lithological conditions at each borehole, with the objective of maximizing the drilling depth.

During drilling, chip and brine samples are collected from the cyclone at one-metre intervals. Occasionally, lost circulation resulted in the inability to collect samples from some intervals. Brine sample collection is summarized in Table 10.2. A total of 1487 brine samples were collected from 15 of the RC boreholes, and submitted for laboratory chemical analyses. For each brine sample, field measurements were conducted on an irregular basis, for potassium (by portable XRF analyzer), and regularly for electrical conductivity, pH and temperature. Sample collection, preparation and analytical methods are described in Sections 11.2, 12.2 and 12.3, respectively.

Table 10.2: Summary of brine samples from the RC and DDH Borehole Programs.

Total Field Samples	1,614
Total RC Borehole Program Field Samples	1,487
Total DDH Borehole Program Field Samples	127
Total Samples (Including QC)	2,390
Total Field Duplicates	260
Total Blanks	263
Total Standards	253

Air-lift flow measurements were conducted at six-metre intervals in six RC boreholes, when circulation was adequate. Results are presented in Section 9.10. Daily static water level measurements were carried out inside the drill string at the start of each drilling shift, using a water level tape. Boreholes were completed with steel surface casing, a surface sanitary cement seal and a lockable cap.

Average concentrations and chemical ratios of brine samples are shown in Table 10.3, for sampled intervals in 14 of the 15 sampled RC boreholes. This table has been updated from King (2010b). Results for PE-3 (a flowing artesian well) are not included in the table because it receives fresh water from the alluvial cone adjacent to its position on the eastern margin of the Olaroz Salar. The sampled brines have a relatively low Mg/Li ratio (lower than three in most sampling intervals), indicating that the brines would be amenable to a conventional lithium recovery process. RC borehole logs are provided in King (2010b), including available brine sampling results.

Table 10.3: Brine concentrations (mg/L) and ratios averaged across selected depth intervals for RC Program boreholes.

Borehole	Depth (m)	Length (m)	B	K	Li	Mg	SO_4	Mg/Li	K/Li	SO_4/Li
PE-04	Nov-32	21	795	5,987	692	2,458	20,498	3.55	8.65	29.62
	59-79	20	1,033	7,225	759	1,993	24,114	2.63	9.52	31.77
	83-187	89	935	6,226	623	1,844	22,568	2.96	9.99	36.22
PE-06	18-21	3	729	7,060	834	2,737	18,234	3.28	8.47	21.86
	54-165	111	1,261	6,982	870	2,031	16,731	2.33	8.03	19.23
PE-07	78-108	20	824	3,520	380	907	14,388	2.39	9.26	37.86
	109-113	4	1,078	5,328	768	1,924	16,961	2.51	6.94	22.08
	117-136	19	1,019	3,887	448	1,151	13,238	2.57	8.68	29.55
	145-205	54	1,054	4,558	579	1,461	16,420	2.52	7.87	28.36
	207-248	38	1,030	4,205	490	1,080	15,326	2.20	8.58	31.28
PE-09	72-105	33	921	4,229	530	1,482	17,379	2.80	7.98	32.79
	109-163	54	809	4,998	646	2,126	23,746	3.29	7.74	36.76
	164-197	33	827	5,998	741	1,734	16,445	2.34	8.09	22.19
PE-10	60-152	92	1,041	4,051	396	174	17,495	0.44	10.23	44.18
	152-234	82	1,398	6,072	598	1,144	20,401	1.91	10.15	34.12
PE-13	102-105	3	655	3,963	505	1,383	16,225	2.74	7.85	32.13
	108-120	12	751	4,433	533	1,379	20,465	2.59	8.32	38.40
PE-14	147-179	32	860	6,572	733	1,918	23,359	2.62	8.97	31.87
	179-192	13	874	6,287	681	1,821	20,763	2.67	9.23	30.49
	192-228	36	861	6,152	712	1,842	21,222	2.59	8.64	29.81
PE-15	62-92	30	981	5,096	527	1,174	16,079	2.23	9.67	30.51
	103-132	29	762	3,719	465	1,066	16,639	2.29	8.00	35.78
	144-156	12	883	4,794	582	1,238	13,966	2.13	8.24	24.00
	168-189	21	888	5,079	606	1,224	12,575	2.02	8.38	20.75
PE-17	78-84	6	968	3,910	537	1,623	17,021	3.02	7.28	31.70
	87-91	4	901	3,572	481	1,442	16,137	3.00	7.43	33.55
	103-107	4	669	4,229	482	1,121	18,481	2.33	8.77	38.34
	110-111	1	863	5,446	648	1,702	23,544	2.63	8.40	36.33
	154-156	2	1,044	4,026	472	935	12,167	1.98	8.53	25.78
	171-174	3	968	4,269	507	1,109	12,965	2.19	8.42	25.57
PE-18	140-260	120	1,396	7,216	717	1,489	27,284	2.08	10.06	38.05
PE-19	26-30	4	1,154	5,152	404	761	17,275	1.88	12.75	42.76
	42-62	20	1,182	7,601	911	3,050	20,347	3.35	8.34	22.33
	64-132	68	817	6,347	738	2,456	18,160	3.33	8.60	24.61
	145-267	122	757	5,957	655	1,906	21,467	2.91	9.09	32.77
PE-20	18-30	12	717	6,712	747	2,706	21,407	3.62	8.99	28.66
	60-127	64	821	5,759	650	1,778	22,117	2.74	8.86	34.03
	129-150	19	794	6,389	698	2,183	21,572	3.13	9.15	30.91
	155-204	49	795	6,193	691	2,193	21,464	3.17	8.96	31.06
PE-21	92-112	20	1,255	5,619	661	1,298	22,085	1.96	8.50	33.41
	113-134	21	1,235	5,587	735	1,412	22,605	1.92	7.60	30.76
	135-222	87	1,233	7,162	825	1,694	22,086	2.05	8.68	26.77
PE-22	72-89	17	1,095	6,414	656	1,456	26,397	2.22	9.78	40.24
	90-197	107	1,136	7,216	696	1,482	26,604	2.13	10.37	38.22
	198-230	32	1,051	7,036	733	1,913	24,928	2.61	9.60	34.01

10.2 Diamond Drilling (DD) Borehole Program

The objectives of this program were to collect: 1) continuous cores for mapping and characterization, 2) geologic samples for geotechnical testing, including Relative Brine Release Capacity (RBRC), grain size and density, 3) brine samples using low flow pumping methods, and 4) information for the construction of observation wells for future sampling and monitoring. This program is complete; the drilling reported herein was conducted between October 2009 and August 2010. DD Borehole Program drilling is summarized in Table 10.4. Twenty-nine boreholes (DDH-01 through DDH-18, plus twin holes) were completed, for total drilling of 5,713 m. Borehole depths range from 79 m (DDH-02) to 449.5 m (DDH-07).

Table 10.4: Borehole drilling summary for the DDH Program conducted in 2009 and 2010.

DDH Borehole	Drilling Interval (m)		Drilling Length (m)	DDH Borehole	Drilling Interval (m)		Drilling Length (m)
	From	To			From	To	
DDH-01	0	272.45	272.45	DDH-10B	0	36.8	36.80
DDH-02	0	78.9	78.90	DDH-11	165	260.8	95.80
DDH-03	0	322	322.00	DDH-12	0	309	309.00
DDH-04	0	264	264.00	DDH-12A	0	294	294.00
DDH-04A	0	264	264.00	DDH-13	0	193.5	193.50
DDH-05	0	115.5	115.50	DDH-13A	0	20.5	20.50
DDH-06A	0	338.5	338.50	DDH-13B	0	20.5	20.50
DDH-06	0	129	129.00	DDH-13C	0	20.5	20.50
DDH-07	371	449.5	78.50	DDH-13D	0	20.5	20.50
DDH-08	0	250.5	250.50	DDH-14	0	254.5	254.50
DDH-08A	0	252.5	252.50	DDH-15	0	206.5	206.50
DDH-09	0	362.5	362.50	DDH-16	0	270	270.00
DDH-09A	0	352	352.00	DDH-17	0	79	79.00
DDH-10	0	350.5	350.50	DDH-18	0	203.5	203.50
DDH-10A	0	258	258.00				
Total Boreholes: 29 / Total Drilling: 5,713 m							

Major Drilling, a Canadian drilling company with operations in Argentina, was contracted to carry out the drilling, using a Major-50 drill rig and support equipment. The boreholes were drilled using triple tube PQ and HQ drilling methods. During drilling, core was retrieved and stored in boxes for subsequent geological analysis. Borehole logs are provided in King (2010b). Undisturbed samples were taken from the core in PVC sleeves (two inch diameter and five inch length) at selected intervals, for laboratory testing of geotechnical parameters including: RBRC, grain size, and particle density. A total of 832 undisturbed samples were tested. Sample collection, preparation and testing methods are described in Sections 11.3 and 12.2 and 12.4, respectively. A summary of RBRC results is provided in Table 10.5.

Table 10.5: Summary of Relative Brine Release Capacity (RBRC) from the DDH Program.

Hydrostratigraphic Unit	Number of Samples	Mean (%)	Median (%)	Standard Deviation (%)
Sand	69	24.9	28.2	9.1
Sand Mix	109	16.0	16.9	9.3
Silt Mix	49	14.0	12.0	10.2
Clay	241	5.2	2.8	5.4
Halite	364	4.2	3.4	3.3

On completion of exploration drilling, selected DD boreholes were converted to observation wells to enable brine sample collection as a means of supplementing the brine data collected through the RC Borehole Program. The observation wells were prepared by installing Schedule 80, 2-inch diameter, PVC casing and slotted (1 mm) screen in the boreholes. The wells were completed with steel surface casing, a surface sanitary cement seal and lockable cap. Brine sampling was conducted from March to August, 2010. Sample collection, preparation and analytical methods are described in Sections 11.4, 12.2 and 12.3, respectively. Samples were initially collected with a low-flow pump. However, later samples were collected with a bailer, due to technical difficulties with the low-flow setup, as further described in Section 11.4. Analytical results are shown in Table 10.6.

Table 10.6: Brine concentrations (mg/L) averaged across selected depth intervals, for DDH Program boreholes.

Borehole	Depth (m)	Length (m)	B	K	Li	Mg	SO_4	Mg/Li
DDH-01	15-55	40	610	4,847	523	1,147	9,039	2.20
	70-105	40	765	5,253	596	1,399	10,901	2.35
	140-170	30	832	5,518	634	1,528	11,694	2.41
	205-260	55	839	5,558	636	1,463	11,572	2.30
DDH-04	15-190	175	668	4,968	544	1,039	23,038	1.91
DDH-06	100-115	15	674	3,961	515	1,100	15,934	2.14
	118-136	18	667	5,860	627	1,353	18,552	2.16
	140-190	51	719	6,698	732	1,579	20,853	2.16
DDH-08	20-75	50	611	3,735	408	1,409	10,537	3.46
	80-205	125	822	5,232	588	1,223	16,971	2.08
DDH-12	65-70	5	696	4,120	464	927	16,834	2.00
	170-185	10	800	5,050	545	1,161	17,888	2.13
	225-285	25	827	5,249	565	1,223	17,819	2.16
DDH-13	50-140	90	872	5,940	650	1,921	20,955	2.96

11 SAMPLING METHOD AND APPROACH

11.1 Background

The various field programs were executed under the direct field supervision of Dr. Waldo Perez, P. Geo., from Project startup (July 2008) to September 2009. The site work conducted since that time and reported by King (2010b) was conducted under the supervision of the Company QP, John Kieley (P. Geo. from Canada).

11.2 RC Borehole Sampling Methods

During RC drilling, rock chips and brine were directed from the drill cyclone into a plastic bag, over a one-metre drilling interval (Photo 11.1). If the output from the cyclone was dry (rock chips only), a geologist placed a representative sample from the plastic bag into a rock chip tray (Photo 11.2). If the output was wet (rock chips and brine), it was sieved. The separated solids were then placed in a rock chip tray and the brine was poured from the bottom of the sieve into a plastic bottle. The brine was then field-analyzed for the following:

- Potassium – using a Thermo Fisher Scientific Niton portable XRF analyzer (on an irregular basis);
- pH and temperature – using a Hatch HD-30 pH meter; and
- Conductivity – using a Hatch HD-30 conductivity meter.

After the field measurements were taken, the brine sample was split into three, one-litre, clean, plastic sample bottles. The three bottles were tagged with pre-printed tag numbers. Two samples were mixed to form one sample, which was shipped to the Alex Stewart Laboratories S.A. ("ASL") in Mendoza. One sample was maintained in the LAC Susques office as a backup. Results from the RC Borehole Program are provided in Section 10.1 and are shown on the RC borehole logs in King (2010b). Brine sample analysis is described in Section 12.3.

Photo 11.1: Cyclone with plastic bag (dry sample).

Photo 11.2: Rock chip tray with dry and wet samples.

11.3 DD Borehole Solids Sampling Methods

During diamond drilling, PQ or HQ diameter cores were collected through a triple tube sampler. The cores were taken directly from the triple tube and placed in wooden core boxes for geologic logging, sample collection, and storage. Undisturbed geologic samples were collected by driving a two inch diameter, five inch long PVC sleeve sampler into the core at three metre intervals (Photo 11.3 and Photo 11.4). A total of 1,244 undisturbed samples were collected from the cores of DDH-01 through DDH-18. Undisturbed samples were shipped to D.B. Stephens & Associates Laboratory in the USA for analysis of geotechnical parameters, including: RBRC (total of 832 samples), particle size (total of 58 samples), and dry bulk density (total of 36 samples). Geotechnical analytical methods are described in Section 12.4.

Photo 11.3: Collecting an undisturbed sample from sand core

Photo 11.4: Collecting an undisturbed sample from clay core.

11.4 DD Borehole Brine Sampling Methods

Brine sampling was conducted in selected DD Program borehole locations. Locations were selected to augment the results from the RC boreholes, which represent the primary source of brine data, as shown in Table 10.2. Some of the selected DD locations became unusable due to various physical borehole conditions, including: failure of the borehole walls, subsurface voids, sediment in-filling, decoupling of the PVC casing. Also, in some cases, DD sampling results were excluded from the Project database due to concerns associated with contamination by fresh water injected during drilling and well development. Reliable results were obtained from six DD borehole locations, as shown in Table 10.6.

A two-valve low-flow pump was used to extract brine samples from the subsurface using a pressurized nitrogen/oxygen gas mix. At some locations, samples were also retrieved with a bailer. Samples were taken at 5 to 10 m intervals along the screened section of the boreholes, where possible. They were tested in the field for pH, conductivity, temperature, and dissolved oxygen. Samples were further analyzed in the field laboratory for confirmation of field parameters. After analysis of field and field laboratory parameters, brine samples were split into three, one-litre, clean, plastic sample bottles. The three bottles were tagged with pre-printed tag numbers. Two samples were mixed to form one sample, which was shipped to Alex Stewart Laboratories S.A. ("ASL") in Mendoza. One sample was maintained in the LAC Susques office, as a backup.

12 SAMPLE PREPARATION, ANALYSIS AND SECURITY

12.1 Overview

This section is re-produced from King (2010b). The surface brine, RC brine, rock chip and core samples were prepared on site under the supervision of Dr. Waldo Perez, P. Geo. (Canada) from Project startup (July 2008) to September 2009. The site work conducted since that time and reported by King (2010b), was under the supervision of the Company QP, John Kieley, P. Geo. (Canada). Brine samples were analyzed by Alex Stewart Argentina S.A. (ASA), an ISO 9001-2008 certified laboratory with facilities in Mendoza, Argentina and headquarters in England.

Analytical methods and Quality Assurance / Quality Control (QA/QC) for all brine samples collected up to PE-09 are described in detail in the Inferred Estimate Report (King, 2010a). Brine analysis and QA/QC methods for subsequent brine samples are described in Section 12.3.

D.B. Stephens and Associates Laboratory in Albuquerque, New Mexico, USA were used for the geotechnical property analyses of the undisturbed core samples from the DD Borehole Program. D.B. Stephens and Associates is certified by the US Army Corps of Engineers and is a contract laboratory for the U.S. Geological Survey.

12.2 Sample Preparation

12.2.1 Brine Samples from the RC Borehole Program and DD Low Flow Sampling

These samples often contain high levels of turbidity. If turbidity is significant (more than one centimetre of sediment in the bottom of the sample bottle) then the sample is filtered in the LAC Susques field office. The filtration is carried out using a standard lab filter, Kitasato flask and a vacuum pump. Subsequent to borehole RC-12, all samples were also filtered by ASA as part of their standard analytical process. The samples were sent to the ASA laboratory in sealed one-litre plastic bottles with sample numbers clearly identified.

12.2.2 DD Borehole Brine and Core Sample Preparation

DD borehole core sample preparation and brine sampling methods are described in Sections 11.3 and 11.4, respectively.

12.3 Brine Analysis

12.3.1 Analytical Methods

ASA was the primary laboratory for analysis of brine samples. In order to provide a quick response, ASA employed Inductively Coupled Plasma ("ICP") as the analytical technique for the primary constituents of interest, including: sodium, potassium, lithium, calcium, magnesium and boron. Samples collected from RC borehole PE-08 onward were diluted by 100:1 before analysis. Additional method refinements have occasionally been implemented over the course of the analytical program.

For the first six RC boreholes (PE-1 through PE-6), sulphate was assayed using the turbidimetric method, with checking of 20% of samples using the gravimetric method. Subsequent samples were analyzed using only the gravimetric method. The argentometric method was used for assaying chloride and volumetric analysis (acid/base titration) was used for carbonates (alkalinity as $CaCO_3$). Laboratory measurements were conducted for Total Dissolved Solids ("TDS"), density, and pH. ASA was audited for Best Practice compliance by Smee and Associates Consulting Ltd. in April 2010, on behalf of LAC. ASA was found to be following industry standard practices; minor recommendations for improvement were made.

12.3.2 Analytical Quality Assurance and Quality Control ("QA/QC")

A full QA/QC Program monitored accuracy, precision and potential contamination of the entire sampling and analytical program. Accuracy was usually monitored by the insertion of certified standards and by check analysis at a secondary laboratory. Precision of the sampling and analytical process was monitored by submitting blind field duplicates to the primary laboratory. Contamination was monitored by inserting stable field blanks in the analysis chain, and assessing the results according to an established Warning Limit. Primary components of the QA/QC Program (including any limitations) for the Project were as follows:

- A field duplicate sample and a field blank were inserted at a frequency of 1 in 10 samples, to monitor sampling precision, contamination and possible sample mix-ups.
- A reference sample was inserted in sample sets collected from boreholes PE-3 to PE-10, as a control on accuracy. However, the following shortcomings were identified with regard to this reference sample: 1) it represented a different matrix than the normal brine samples, 2) it had a different concentration than the normal brine samples, 3) it was left open so that the concentrations were not necessarily stable, and 4) it was not certified by a consensus test. Consequently, the evaluation of analytical accuracy for samples collected from boreholes PE-3 to PE-10 is based only on duplicate analysis.
- ASA conducts an internal check on overall analytical accuracy for the primary parameters, using ion balance and the ratio of measured to calculated TDS. However, this method does not monitor individual elements and cannot be considered as a check on the accuracy of individual economic parameters.

- Four artificial "standards" were composed at the University of Antofagasta, from chemically pure compounds. These standards were submitted with samples from boreholes PE-18, DDH-01 and DDH-04 to monitor accuracy of the brine analysis.
- Four bulk brine samples were collected with a slow sampler pump from three selected horizons, in boreholes with differing concentrations of lithium. Five 200 ml sub-samples were collected from each bulk sample. These samples were submitted to six laboratories as a Round Robin to establish an accepted mean and error for the analytical variables. Statistics were done on the results and the standards certified for the elements that met the criteria of having a Relative Standard Deviation of near 5% or less after the data had "fliers" removed. The Certificates of Analysis are shown in King (2010b). These certified standards were used for boreholes PE-14, 15, 17, 19, 20, 21, 22 and DDH-06, 08, 12, and 13.

12.3.3 Analytical Accuracy

This section is supported by a series of 28 plots (Figures 12.1 through 12.28) which are provided in King (2010b).

12.3.3.1 Ion Balance

As mentioned in Section 12.3.2, the ion balance is used to evaluate analytical methods in total but not the individual elements or compounds. Only certified standards can be used to evaluate analytical accuracy for specific economic elements. The ion balance was reported in the previous Inferred Resource Report (King, 2010a) for samples collected up to and including borehole PE-9, before the use of certified standards. The sums of anions and cations were found to agree within 5 % for all but 21 out of 751 samples (i.e., 2.8 % of samples exceeded the 5 % ion balance). This was considered to be satisfactory. The ion balance will not be considered further, as formal standards are now in place.

12.3.3.2 Uncertified Analytical Standard

The uncertified high grade standard was used for boreholes PE-3 to PE-10 to monitor accuracy. Although the standard was not certified or sealed, the data in Figure 12.1 (King, 2010b) shows a drift of only 5% over time. This drift could be a result of a deteriorating standard or changes in analytical methods. Although there is no absolute proof of analytical accuracy of the lithium analysis for this standard, check assays shown below provide additional information on the accuracy of the ASA analyses for these boreholes.

12.3.3.3 Certified Analytical Standards

12.3.3.3.1 Composition and Analysis

Four artificial standards composed by the University of Antofagasta were used for boreholes PE-18 and DDH-01 and 4. The actual concentrations added to the artificial brines were used as a monitor of analytical accuracy. The element grades of the artificial standards were not confirmed with a consensus test of analysis, so analytical error could not be determined. However, it is reasonable to assume an acceptable variance of 10 % for the important analytical parameters. The data are plotted in Figure 12.2 (King, 2010b), with the assumption that all solutions contained equal concentrations, although minor differences in make-up were noted.

The two low failures shown in the figure correspond to DDH-01 data. Although the standard fell outside the recommended 10% limits, the analytical lithium concentration for DDH-10 can be considered conservative. A similar method was used for potassium analyses, using the artificial standards as controls (Figure 12.3, King, 2010b). The initial DDH-01 potassium analysis is also outside the 10 % limit. The analytical data for DDH-01 can also be considered conservative.

Magnesium results indicate that eight samples fall below the -10 % limit (Figure 12.4, King, 2010b). The low magnesium concentrations affect boreholes PE-18 and DDH-04. Sulphate was plotted for the artificial standards, with no discrepancies noted (Figure 12.5, King, 2010b).

The certified standards were inserted into the sample stream for boreholes PE-14, 15, 17, 19, 20, 21 and 22 and DDH-06, 08, 12, and 13. A standard failure in accuracy is defined as more than three (3) standard deviations from the mean. Standard failure in bias is defined as two or more standards in a row more than two (2) standard deviations from the mean, on the same side of the mean.

12.3.3.3.2 Certified Analytical Standard: RC-04

The Round Robin results are shown at the left side of the charts in Figures 12.6, 12.7 and 12.8 (King, 2010b), for lithium, potassium and magnesium, respectively. Actual data are shown on the right side of the charts. Standard RC-04 was plotted for the elements received as of the date of this report.

The analytical data for Standard RC-04 can be considered accurate with the exception of borehole PE-14. This sample failed low, which may result in the lithium concentration for this borehole being conservative. For potassium, Standard RC-04 is accurate with a slight low bias.

Standard RC-04 shows a high bias for magnesium, especially when compared to the ASA Round Robin data that were biased low. The magnesium concentration for these boreholes may be overstated.

12.3.3.3.3 Certified Analytical Standard: RC-08

The Round Robin results for Standard RC-08 are shown in Figures 12.9 and 12.10 (King, 2010b), for lithium and magnesium, respectively. Only one sample of RC-08 was used for borehole PE-14. The reason for this is not known, but the lack of data is problematic for assessing analytical accuracy. The lithium result for this one sample is more than two standard deviations below the mean of the standard, and significantly different from the concentrations determined by ASA in the Round Robin. The lithium concentration for PE-14 may be underestimated as the lithium was also low for Standard RC-04.

The one data point for magnesium is a failure low. It would appear that WO 102099 had a problem with the determination of lithium and magnesium.

12.3.3.3.4 Certified Analytical Standard: RC-09

The Round Robin results for standard RC-09 are shown in Figures 12.11, 12.12 and 12.13 (King, 2010b), for lithium, boron, and potassium, respectively. Standard RC-09 was used 78 times to monitor the accuracy of analysis in boreholes PE-15, 19, 20, 21 and DDH-06, 08, 12 and 13.

One work order which included part of PE-19 is biased low for lithium. The lithium concentration in this borehole may be understated. The lithium concentration in the remaining samples is accurate.

A similar pattern occurs for boron and potassium. Consequently, the boron and potassium concentration in PE-19 may be underestimated.

12.3.3.3.5 Certified Analytical Standard: RC-19

The Round Robin results for standard RC-19 are shown in Figures 12.14, 12.15 and 12.16 (King, 2010b), for lithium, potassium and magnesium, respectively. Standard RC-19 was inserted into the sample stream 24 times.

Lithium has several failures in bias, with the data biased high by an average of 6%. These data are significantly different than ASA results from the Round Robin, indicating that ASA had a bias in one work order. Potassium and magnesium analyses are stable over time and accurate.

12.3.3.3.6 Summary of Certified Analytical Standards Work

The results from the standard insertion indicate that the vast majority of the lithium, potassium and magnesium analysis is accurate.

12.3.3.4 Confirmatory Check Assays

12.3.3.4.1 ASA vs. Salta

Boreholes PE-4, 6, and 7 had 20 brine samples submitted to the Salta laboratory for confirmatory assays. The lithium, potassium and magnesium analytical results are shown in Figures 12.17, 12.18 and 12.19, respectively (King, 2010b).

The lithium data repeats well, but the potassium and magnesium show various grade-based biases as indicated by the regression lines. However, the data repeats within industry-expected limits, especially when the performance of the Salta laboratory in the Round Robin analysis is considered.

12.3.3.4.2 ASA vs. Spectrolab

Spectrolab was used for 45 check analyses from boreholes PE-18, 19 and DDH-04. No standards accompanied the check analyses so differences in assays between ASA and Spectrolab could not be checked against a known brine to determine which laboratory was more correct. The lithium, potassium and magnesium analytical results are shown in Figures 12.20, 12.21 and 12.22, respectively (King, 2010b).

The lithium data repeated reasonably well. One sample was mis-plotted because of a typographical error in the data base.

The potassium comparison shows a distinct bias toward Spectrolab when compared to ASA. Based on the results of the Round Robins, the Spectrolab results are considered to be in error. Similarly, a bias in magnesium occurs between the two laboratories, with the Spectrolab results higher than ASA. Again, based on the Round Robin results, ASA is more likely to be closer to the actual concentrations.

12.3.3.4.3 ASA vs. Acme

Acme Laboratory in Santiago received 37 brine samples for confirmatory analysis, from boreholes PE-14, 15, 17, 18, 19, 20, 21 and 22, and DDH-01, 04, 06, and 13. The lithium and potassium analytical results are shown in Figures 12.23 and 12.24, respectively (King, 2010b).

The comparison of lithium and potassium concentrations between the two laboratories is excellent. There is a slight bias toward Acme with lithium, but the data is well within industry-accepted limits.

The magnesium comparison shows a grade-based bias with Acme being comparatively higher in the low range and ASA being higher in high range. It appears that the inserted standards sent to Acme were compromised somehow and are not useful for determining which laboratory produces the most accurate magnesium analyses.

12.3.3.4.4 Summary of Check Assay Results

The check assays indicate that the economic cation concentrations are suitable for use in a resource calculation.

12.3.3.5 Sampling Precision

Part of the Industry Best Practices required by NI 43-101 requires a statement on the degree to which the samples used in a resource calculation are representative of the resource. Salt brines, being liquids, should not be subject to any form of matrix-based sampling error, as the liquids should be homogeneous. Even so, 233 duplicate samples were collected in the field to confirm the overall sampling precision.

Analytical results for the field duplicate lithium samples were evaluated for the degree to which they represent the overall resource, and for precision as calculated using the method of Thompson and Howarth (1978). The duplicate analysis repeats exceedingly well, as shown in Figure 12.25 (King, 2010b).

The overall precision estimate (Figure 12.26, King, 2010b) shows a sampling variability of less than 5% at 400 mg/l Li, which is primarily due to the analytical method variability.
Based on this evaluation, the analytical error associated with the brine samples used in the resource calculation is within normal limits.

12.3.3.6 Sample Contamination

Brine samples, unlike most geological samples, are not subjected to extensive sample preparation involving multiple manipulations or exposures to equipment. Primary potential sources of sample contamination are related to sample mis-ordering errors or insufficient washing of analytical equipment between samples.

A field blank consisting of local tap water was inserted into the normal sample stream 236 times during the course of brine analysis. The tap water composition was expected to be stable and consistent over time. The results were reviewed to assess whether the tap water blank samples had been inadvertently mixed with brine samples, and to assess whether the instrumentation was cleaned sufficiently between samples. Results are illustrated in Figures 12.27 and 12.28 (King, 2010b), for sulphate and lithium, respectively.

The sulphate results (Figure 12.27, King, 2010b) indicate that the anionic component of the tap water was variable. Over time, concentrations tended to drift upward weakly, and occasionally spike upward sharply. Lithium results (Figure 12.28, King, 2010b) are more consistent. A small variation in the lithium detection limit occurs over time. However, there is no evidence of sample mix-ups or contamination.

12.3.3.7 *Overall Brine Analysis Quality Control Conclusion*

The analytical data used in the calculation of resources for the LAC Project are acceptably accurate, precise and free from contamination, based on the extensive quality control program employed by LAC.

12.4 Geotechnical Analyses

12.4.1 Overview

D.B. Stephens and Associates Laboratory carried out selected geotechnical analyses on undisturbed samples from the geologic cores (DDH-01 through DDH-18) as summarized in Table 12.1. RBRC results were used in the Resource Estimate to estimate the volume of recoverable brine present in various geological materials. A summary of RBRC results, and the approach used for incorporation into the Measured, Indicated and Inferred Resource Estimate, is provided in Section 16.5.

Table 12.1: Summary of geotechnical property analyses.

Analysis	Procedure
Dry bulk density	ASTM D6836
Moisture content	ASTM D2216, ASTM D6836
Total porosity	ASTM D6836
Specific gravity (fine grained)	ASTM D854
Specific gravity (coarse grained)	ASTM C127
Particle size analyses	ASTM D422
Relative brine release capacity	Developed by D.B. Stephens (see Section 12.4.2)

12.4.2 Analytical Methods

12.4.2.1 *Specific gravity*

Specific gravity testing was conducted for four formation samples (012714, 012715, 012716, and 012743). Density results for these samples ranged from 2.47 g/cm^3 to 2.75 g/cm^3. It was subsequently determined that these values could be skewed due to the high salt content. Consequently, no attempt was made to apply these measured values to the remaining samples, and an assumed particle density of 2.65 g/cm^3 was used for all other samples.

12.4.2.2 Relative Brine Release Capacity (RBRC)

This method was developed by D.B. Stephens and Associates Laboratory, in response to some of the unique technical challenges in determining porosity for brine-saturated samples. It will be presented at an upcoming ASTM Geotechnical Testing Journal Symposium (Stormont *et al*, in preparation).

The method predicts the volume of solution that can readily be extracted from an unstressed geologic sample. The result is used by LAC as an estimate of the brine quantity that could be recovered from the geologic material. Undisturbed samples are saturated in the laboratory using a site-specific brine solution. The bottom of the samples are then attached to a vacuum pump using tubing and permeable end caps, and are subjected to a suction of 0.2 to 0.3 bars for 18 to 24 hours. The top of the sample is fitted with a perforated latex membrane that limits atmospheric air contact with the sample, to avoid evaporation and precipitation of salts. Depending on the pore structure of the material, there may be sufficient drainage so that a continuous air phase is established through the sample, and atmospheric air will be drawn through the sample. The vacuum system permits testing multiple samples simultaneously in parallel. The samples are then oven dried at 110°C.

The volumetric moisture (brine) content of the sample is calculated based on the density of the brine, the sample mass at saturation, and the sample mass at ”vacuum dry”. The difference between the volumetric moisture (brine) content of the saturated sample and the volumetric moisture (brine) content of the ”vacuum dry” sample is the specific yield or “relative brine release capacity”.

12.4.2.3 Particle size analyses

Particle size analyses were carried out on 58 undisturbed samples after the drainable porosity testing was completed. Uniformity and curvature coefficients (Cu and Cc) were calculated for each sample and samples were classified according to the USDA soil classification system.

12.5 Sample Security

There is an established and firm chain of custody procedure for Project sampling, storage and shipping. Samples were taken daily from the drill sites and stored at the Susques field office of LAC. All brine samples were stored inside a locked office, and all drill cores were stored inside a locked warehouse adjacent to the office. Brine samples were picked up from the Susques field office by the analytical laboratory every Friday and transported to Mendoza in a laboratory truck.

Solid samples were periodically driven in Project vehicles to Jujuy, approximately three hours from the site. In Jujuy, solid samples were delivered to a courier (DHL) for immediate shipment to the appropriate analytical laboratory.

13 DATA VERIFICATION

13.1 Overview

This section is re-produced from King (2010b). Dr. Mark King (independent QP) conducted the following forms of data verification for that report:

- Visits to the Project site and the LAC corporate office;
- Review of LAC sampling procedures, although it is noted that actual brine sampling was not viewed due to the nature of the geologic units encountered by the RC drill at the time of the site visits;
- Inspection of original laboratory results forms for the LAC brine dataset;
- Inspection of electronic copies of the LAC brine dataset and comparison with corresponding stratigraphic logs;
- Review of LAC field and laboratory QA/QC results;
- Review of publicly available information from an adjacent exploration property (Orocobre) in Olaroz Salar; and
- Detailed and ongoing technical discussion of the Project with key Project personnel, including the LAC field supervisor (John Kieley, a P. Geo. from Canada); the Independent Geologist (Dr. Gerardo Bossi) and the block model construction specialist (Danilo Castillo, Mining Eng.).

Dr. Barry Smee (independent QP) conducted the following forms of data verification:

- Visits to the Project site and the LAC corporate office;
- Review of LAC sampling procedures and all data handling methods and procedures;
- Inspection of original laboratory results forms for the LAC brine dataset, and the Project database;
- Inspection of LAC field and laboratory QA/QC methods and results;

Independent sampling and chemical analysis were not conducted by the independent QPs, although Dr. Smee inserted QA/QC samples in the sampling stream during his visit to the Project Site.

13.2 Site Visits

Dr. Mark King visited the Project site and field office on December 10-11, 2009, in preparing for the Inferred Resource Estimate Report (King, 2010a). A second site visit was conducted from June 1-5, 2010, as part of the preparation for the current Report. The following observations were made during these visits, which are relevant to data verification:

- Most of the past drilling sites were observed, including cuttings, borehole completions, brine ponds, and new gravel roads constructed to the sites;

- Sampling procedures for brine, rock chips and core were reviewed and are considered appropriate for maintaining data integrity;
- An active drilling site was observed, although it is noted that brine sampling was not conducted during the visit due to the nature of the salar units through which the RC drill was advancing at that time;
- The sample storage facility and security systems were observed and are considered appropriate;
- Example cores were inspected, compared with compiled logs, and a detailed review of core results in progress by Dr. Gerardo Bossi was observed;
- Field data entry and log production procedures were observed and determined to be appropriate;
- Interaction procedures with the central data storage technician at the Mendoza corporate office were reviewed and determined to be appropriate;
- Staff operations, responsibilities and mentoring were observed; it was determined that staff were conducting tasks appropriate to their training, and that the working environment encouraged scientific integrity, diligence, and mentoring through progressive levels of responsibility.

Dr. Mark King visited, and worked from, the corporate office in Mendoza from January 22-30, 2010, as part of the preparation for Inferred Resource Estimate Report (King, 2010a). A second visit to the Mendoza office was conducted from August 29 to September 3, 2010, to meet with LAC staff and consultants, and to review Project results. Project features inspected and reviewed during these visits, which are relevant to data verification, included the following:

- Hard copies of all analytical data available to that time were reviewed; spot comparisons were made with plotted borehole logs, maps and working spreadsheets; accurate transcription was confirmed;
- The derivation of the geologic conceptual model (used as input for the block model) was reviewed in detail and was determined to be a reasonable representation of site conditions;
- The development of the block model and the process for generating interim and final measured, indicated and inferred estimate results were reviewed in detail; during the visit, some adjustments were made to the block model by the LAC experts which added to the degree of conservatism in the estimate.

13.3 Project QA/QC

Dr. Barry Smee visited the LAC corporate office in Mendoza on April 23, 2010, the ASA laboratory on April 22, 2010, and the Project site from April 18-22, 2010. He also engaged in ongoing communication with LAC personnel regarding Project QA/QC. In his review of QA/QC, he performed the following data verification tasks:

- review of the initial QA/QC data, including organizing and certifying the analytical of standards (see King, 2010b);
- review of field sampling and field QA/QC procedures;

- review of data capture procedures and data base design;
- audit of the ASA laboratory;
- made recommendations for further QA/QC actions; and
- review of final QA/QC data.

Details of QA/QC Program results are provided in Sections 12.3.2 and 12.3.3. On the basis of this data verification work, Dr. Smee concluded that the analytical data used in the calculation of measured, indicated and inferred resources for the LAC Project are acceptably accurate, precise and free from contamination.

13.4 Technical Competence

Dr. Mark King has personally met, and had ongoing technical discussions with most of the technical experts working on the Project on behalf of LAC. These individuals are competent professionals, with deep experience within their respective disciplines. The actions of these experts show that they are committed to developing a technically-defensible Measured, Indicated and Inferred Resource Estimate. Their interpretations demonstrate a conservative approach in assigning constraints on the estimate, which increases the technical strength of the result.

14 ADJACENT PROPERTIES

This section is re-produced from King (2010b). Orocobre is an Australian-listed company that owns mining claims in the Olaroz and Cauchari Salars, adjacent to the LAC properties. Orocobre contracted the preparation of a Technical Report on the Olaroz properties (Houston and Ehren, 2010). This work was largely an assessment of an earlier JORC-compliant Inferred Resource Estimate completed by Geos Mining (July, 2009), using data obtained by Orocobre. Houston and Ehren (2010) concluded that the Geos results were reasonable.

Geos Mining determined average brine grades in Olaroz of 796 mg/L lithium and 6,660 mg/L potassium. Their inferred resource estimate was 1.5 million tonnes of lithium carbonate and 4.4 million tonnes of potash (potassium chloride). The primary factors limiting their confidence in this estimate were the following: high core losses during drilling, absence of accurate porosity data, minimal hydraulic testing results, significant analytical variability, grade variability with depth, and borehole spacing. The estimate zone extends to a depth of 55 m and the company states that exploration potential exists to a depth of 200 m. The company states that the brine chemistry is favourable, with low impurities.

A Technical Report was also prepared for the Orocobre properties in the Cauchari Salar (Houston, 2010). The objective of this report was to document reconnaissance studies and to provide recommendations for developing an Inferred Resource Estimate.

On April 1, 2011, Orocobre issued a press release updating its resource estimate. A Technical Report complying with NI 43-101 will be filed on SEDAR within 45 days.

Highlights of the press release identified:

- Measured Resource = 1.4 million tonnes of lithium carbonate with grade of 632 mg/L lithium, and 4.0 million tonnes of KCL with a grade of 4,930 mg/L potassium
- Indicated Resource = 5.0 million tonnes of lithium carbonate with a grade of 708 mg/L lithium, and 15.3 million tonnes of KCL with a grade of 6,030 mg/L potassium

Neither LAC nor the independent QPs have conducted an independent review of the validity of the Orocobre resource estimate and conclusions. It is noted that information from the Orocobre reports is not necessarily representative of the mineralization on the LAC Project.

15 MINERAL RESOURCE ESTIMATE

15.1 Overview

This section is re-produced from King (2010b). A Measured, Indicated and Inferred Resource Estimate was developed for the LAC Cauchari properties using the Vulcan three-dimensional block modeling software. The software was operated by Mining Engineer and Geostatistician Danilo Castillo, a specialist in Vulcan from Maptek Chile. The modelling was supported by geological, hydrogeological and geochemical data and interpretations provided by the LAC Project experts. The modeling procedure and results were reviewed in detail by Mark King (independent QP) and are considered valid and appropriate for development of a Measured, Indicated and Inferred Resource Estimate, as defined by the CIM and referenced by NI 43-101.

The modeling was conducted according to the following steps:

- A series of spatial constraints (e.g., claim boundaries, sampling depths, etc.) were applied to the broad area of the Cauchari and Olaroz Salars, in order to define a focussed Measured, Indicated and Inferred Resource Estimate zone in the northern area of the Cauchari Salar and southern Olaroz.
- A conceptual geological model was developed for the Measured, Indicated and Inferred Resource Estimate zone.
- The conceptual geological model was discretized into a block model within the Vulcan software.
- The measured brine concentrations from the RC and DD Borehole Programs were used to discretize three dimensional concentration fields within the block model for lithium and potassium (using Ordinary Kriging) and other brine constituents (using Inverse Distance method).
- The RBRC data from the DD Borehole Program were used to estimate representative RBRC values to apply within the block model to each geologic unit.
- The Measured, Indicated and Inferred Resource Estimate was developed for lithium.
- The Measured, Indicated and Inferred zones for lithium were applied to the distributions of potassium and other brine constituents.
- An analysis was conducted to evaluate the effect of different grade cut-off values on the estimate.

Additional detail is provided in the subsections below. LAC has advised the independent QP that it is unaware of any environmental, permitting, legal, title, taxation, socio-economic, marketing or political factors, which are not already described in Section 3 of this Report that may materially affect the Resource Estimate contained in this Report.

Readers should note that mineral resources that are not mineral reserves do not have demonstrated economic viability.

15.2 Conceptual Hydrostratigraphic Model

A conceptual hydrostratigraphic model of the Resource Estimate zone is described in Section 6.3.4.4, based on geological interpretations, logs from the DD and RC programs (Sections 10.1 and 10.2), and seismic data from the geophysical program (Section 9.3). Example cross-sections of the conceptual model are shown in King (2010b). A final relatively minor adjustment of the model was conducted as it was discretized into the Vulcan software, to represent two secondary units. The final representation of hydrostratigraphic units in the Vulcan block model (expressed as percent of total block model volume) is as follows[2]:

- Primary Hydrostratigraphic Units
  - Sand 30%
  - Clay 26%
  - Halite 37%
- Secondary Hydrostratigraphic Units
  - Sand Mix 5%
  - Silt Mix 2%

An RBRC value was assigned to each of these units, as described in Section 16.4. This approach represents a more complex stratigraphic model than the one used for the Inferred Resource Estimate (King, 2010a). The higher complexity is supported by new drilling and geophysical results. The approach used in the Inferred Resource Estimate (King, 2010a) started with three primary units that were represented in a consistent order from the top to the bottom of the model (Upper Mixed Sequence, Thin Bedded Sequence and Coarse Bedded Sequence). A single RBRC value was assigned to each of these three primary units based on the quantity of the four hydrostratigraphic subunits (clay, silt, sand and salt) in each, as estimated from borehole logs.

The approach used herein for the Measured, Indicated and Inferred Resource Estimate allows for a more complex representation of the RBRC field.

15.3 Block Model Construction and Resource Estimate Boundaries

The Vulcan block model was developed to represent the conceptual hydrostratigraphic model, based on the cross sections developed along each seismic survey line. The lateral extent of the block model was limited to a zone in the north end of Cauchari and the south end of Olaroz, where most of the drilling and investigation work was conducted. The block dimensions and orientation selected for the model are as follows:

- x (east-west) = 300 m;
- y (north-south) = 300 m; and
- z (vertical) = 10 m.

[2] Bossi, G. 2010.

The following series of spatial constraints were imposed within the model domain, to define the final shape of the Resource Estimate zone:

- Claim boundaries – Areas outside the LAC claims (Figure 3.2) were excluded from the Resource Estimate zone.
- Upper boundary – The upper boundary of the model coincides with the water table.
- Lower boundary – The bottom of the Resource Estimate zone varies according to the depth to which brine sampling was conducted within each of the boreholes in the zone.
- Width – The width of the Resource Estimate zone is based on either the claim boundaries or the physical boundaries of the salar.

A plan view of the Measured, Indicated and Inferred Resource Estimate zone is shown in Figure 15.1. The hydrostratigraphic representation in the block model is shown in Figure 15.2, for example model sections.

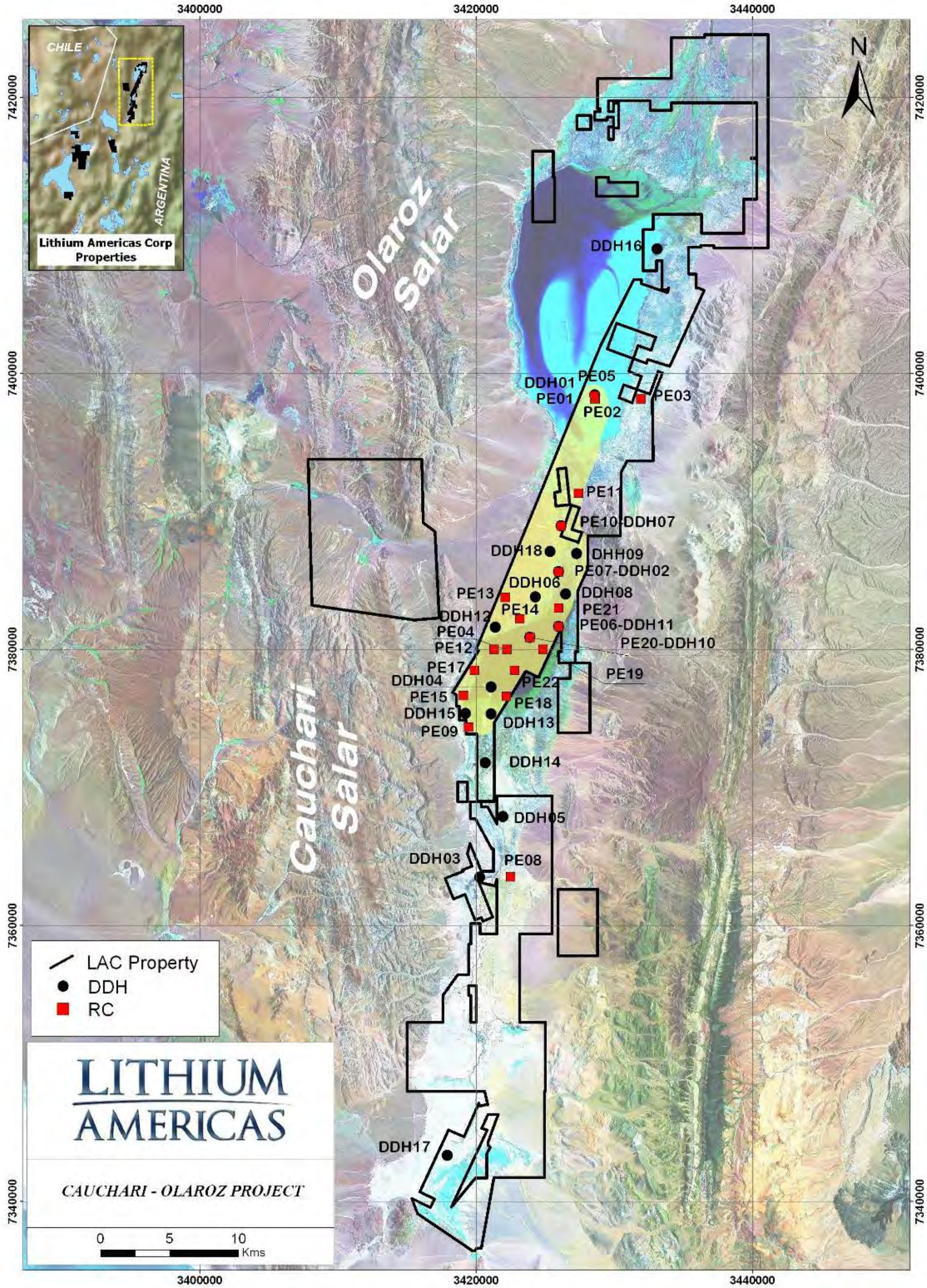


Figure 15.1: Plan view of the Measured, Indicated and Inferred Resource Estimate zone. (shown in yellow)

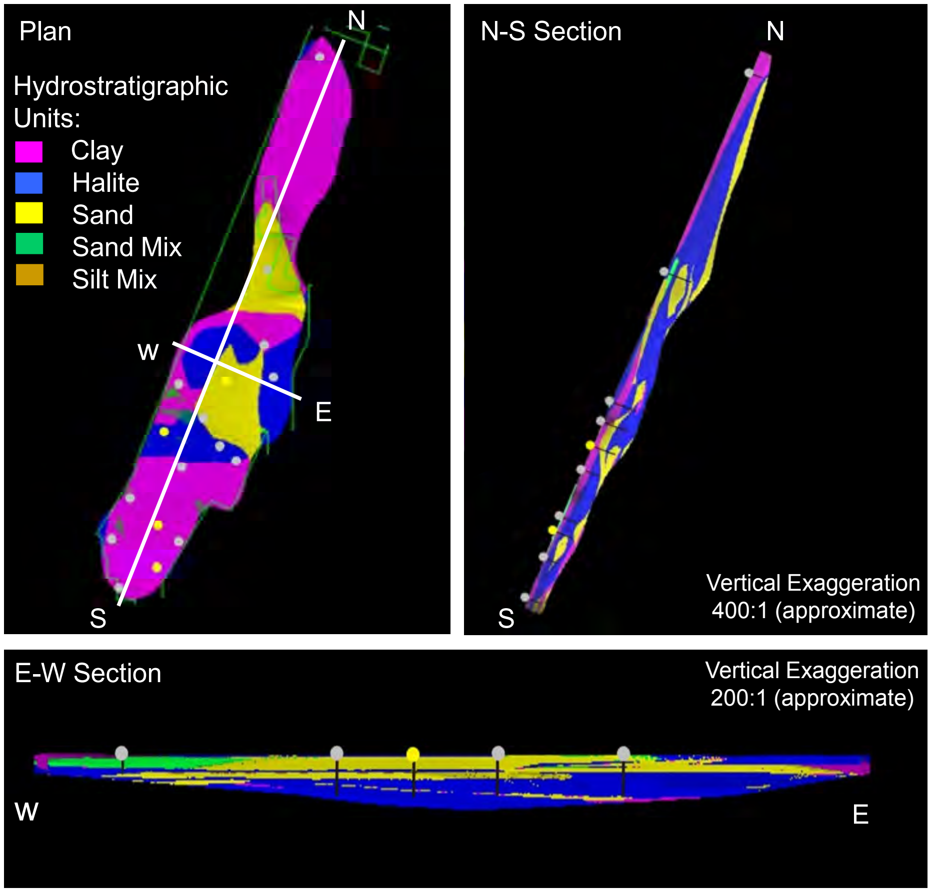


Figure 15.2: Section showing hydrostratigraphy within the block model.

15.4 Incorporation of RBRC Results

RBRC testing results are presented in Section 10.2. These results were subdivided into the five hydrostratigraphic units identified in Section 16.2, and a mean value was determined for each unit, as shown in Table 10.5. The mean RBRC values were assigned to the five hydrostratigraphic units in the block model.

15.5 Incorporation of Brine Grade Results

The methods and results of the brine sampling conducted as part of the RC Borehole Program and DD Borehole Program were described in Sections 10.1, 10.2, 11.2 and 11.4. Through these programs, brine samples were collected at 1614 locations throughout the salars. This data was incorporated into the block model in the following three-step process:

- The average concentration of all samples within any given block was assigned to the block. This step was conducted for lithium, potassium, magnesium, boron, calcium, sodium, chloride, carbonate and sulphate.

- For lithium and potassium, the averaged block concentration values were used to discretize the concentration field throughout the model with Ordinary Kriging which included the following:
  - exploratory data analysis, to evaluate the quality and representativeness of the data;
  - evaluation of spatial data correlation, through variogram analysis;
  - estimation of concentrations throughout the block model, using Ordinary Kriging; and
  - drift analysis to validate the use of Ordinary Kriging by comparison with the “nearest neighbour” (“NN”) method.
- For the remaining constituents (magnesium, boron, calcium, sodium, chloride, carbonate and sulphate), the averaged block model concentration values were used to discretize the concentration field throughout the model, with the Inverse Distance method.

Figure 15.3 shows lateral lithium distribution in the block model, for three example levels: 3,970 (surface), 3,850 and 3,750 masl. Vertical lithium distribution is illustrated in Figure 15.4. Results of the NN comparison are shown in Figure 15.5, Figure 15.6, and Figure 15.7, and indicate that the model grades are a reasonable representation of sampled grades.

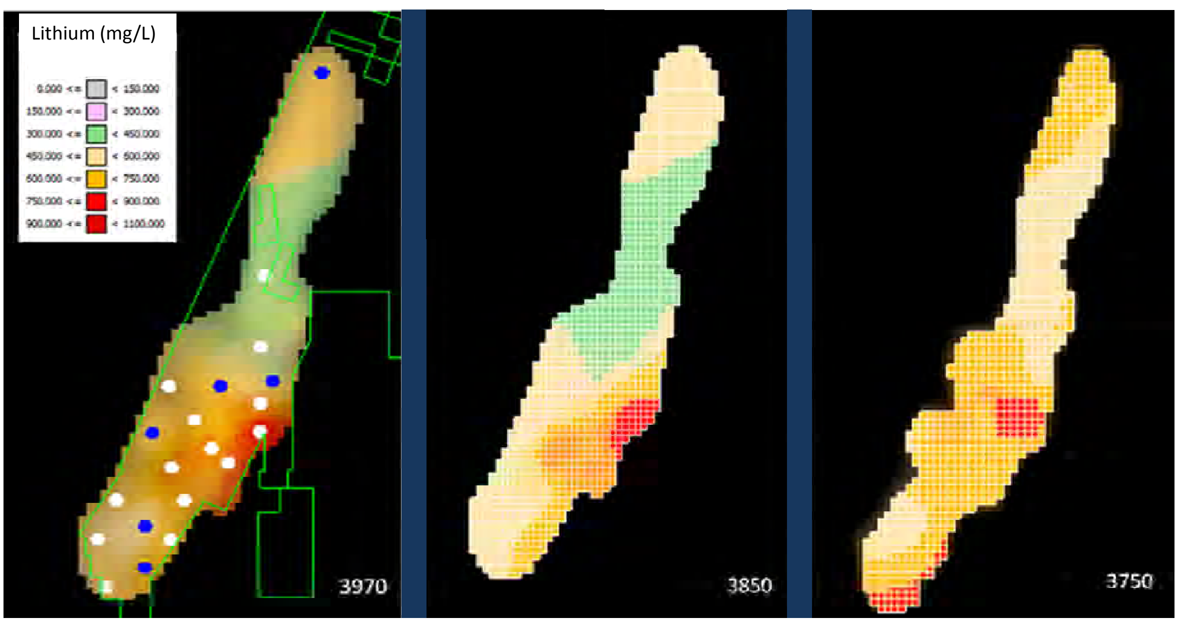


Figure 15.3: Plan view of lithium distribution (mg/L) at three elevations in the Measured, Indicated and Inferred Resource Estimate zone: 3,970, 3,850 and 3,750 masl. The 3970 elevation shows the DDH boreholes in blue and the RC boreholes in white and the LAC property boundary in green.

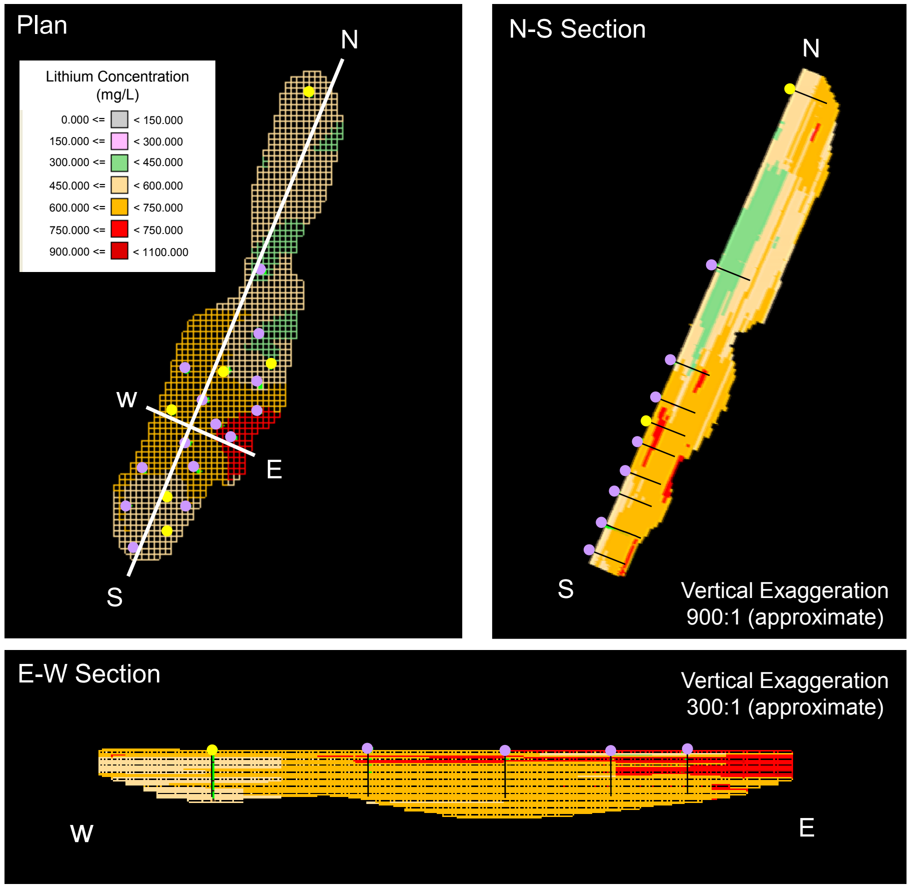


Figure 15.4: Longitudinal section across the Measured, Indicated and Inferred Resource Estimate zone showing the block model and grade (mg/L).

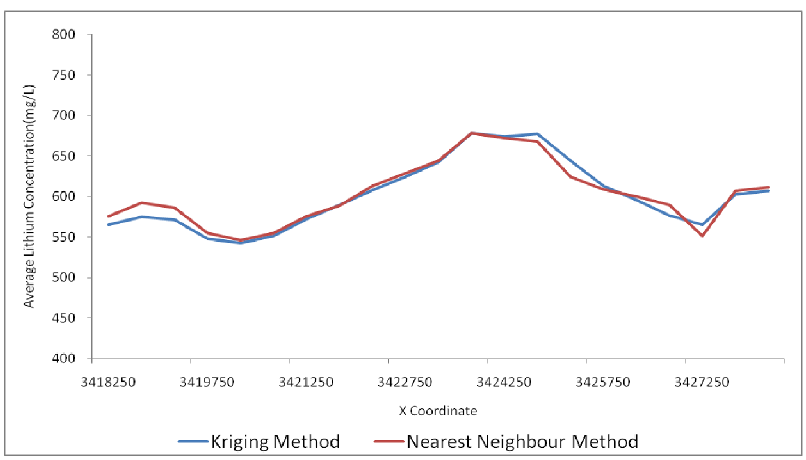


Figure 15.5: Drift analysis of the block model along the x-axis.

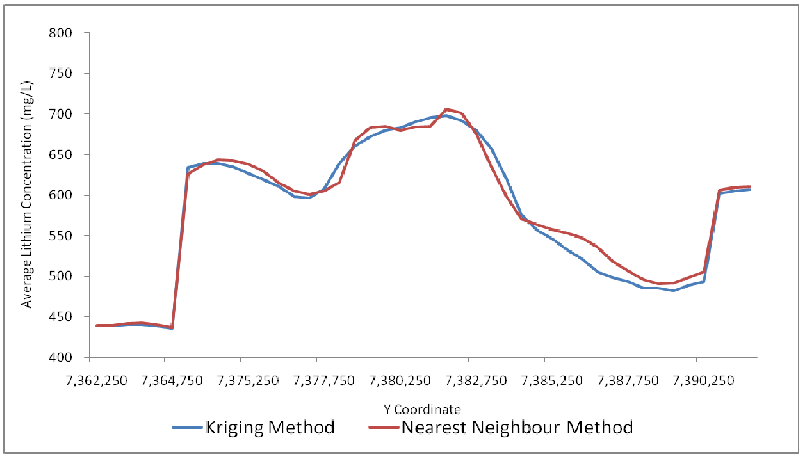


Figure 15.6: Drift analysis of the block model along the y-axis.

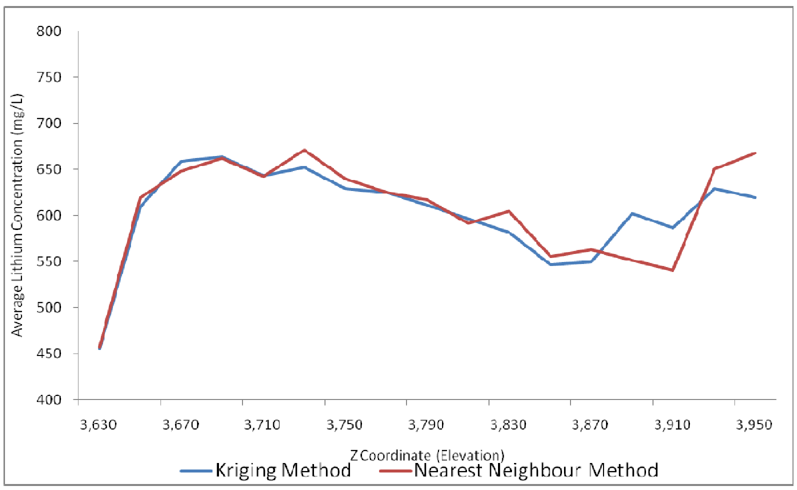


Figure 15.7: Drift analysis of the block model along the z-axis.

15.6 Resource Estimation

The categorization of lithium resources was determined for each model block, as a function of the block kriging variance for lithium, and the number of boreholes used to estimate the block lithium concentration. The categorization criteria are summarized in Table 15.1; plan and section views of the categorized blocks are shown in Figure 15.8.

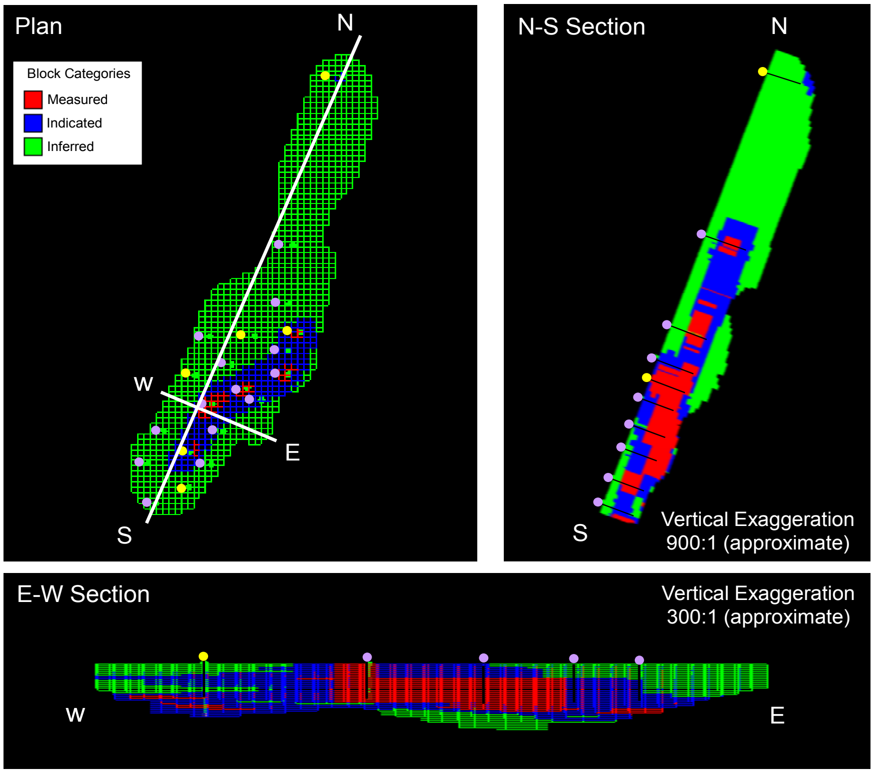


Figure 15.8: Plan and section views of resource categories within the Measured, Indicated and Inferred Resource Estimate zone. Delineated according to the criteria in Table 15.1.

Table 15.1: Criteria for resource categorization of each model block.

Category	Block Kriging Variance	Minimum Number of Boreholes Used in Block Lithium Estimate
Measured	Variance ≤ 0.25	3
Indicated	0.25 < Variance ≤0.5	2
Inferred	Variance > 0.5	1

Measured, Indicated and Inferred Resource Estimate results are summarized in Table 16.3, for lithium cut-off values of ≥500 mg/L and ≥0 mg/L (effectively the outer boundary of the Measured, Indicated and Inferred Resource Estimate zone). Comparison of the two sets of results indicates that the resource is relatively insensitive to cut-off values, with most results showing significantly less than a 20% change from the 500 mg/L cut-off to the 0 mg/L cut-off.

This stability in the resource estimate is due to the persistence of relatively high concentrations out to the boundary of the Resource Estimate zone. It is considered to be indicative of the broad and stable distributions of lithium and potassium throughout the zone. The ≥ 500 mg/L cut-off was selected as the optimal level for resource calculations because it allows for a relatively high average grade while still maintaining high tonnage, as illustrated in Figure 15.9. Cut-off grades are further evaluated according economic criteria, within this Preliminary Economic Assessment.

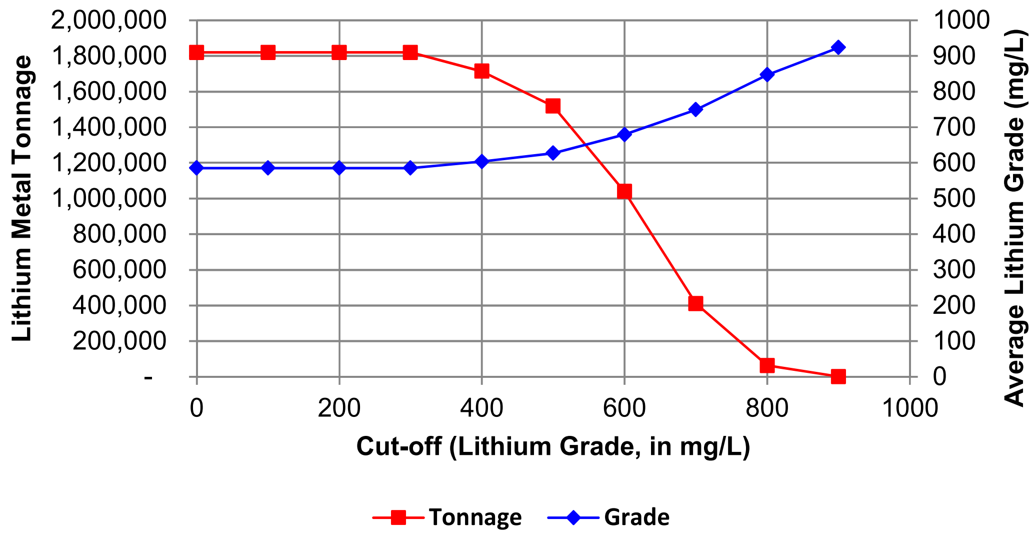


**Figure 15.9: Lithium metal tonnage and average grade, as a function of cut-off concentration.
(Measured, Indicated and Inferred Resource Estimate).**

As shown in Table 15.2, the results for the ≥ 500 mg/L cut-off for lithium are as follows:

- Measured Resource Estimate – average lithium grade of 656 mg/L in 8.09×10^8 m^3 of brine, for a total lithium carbonate (Li_2CO_3) tonnage of 2,884,000;
- Indicated Resource Estimate – average lithium grade of 637 mg/L in 7.20×10^8 m^3 of brine, for a total lithium carbonate tonnage of 2,420,000;
- Inferred Resource Estimate – average lithium grade of 603 mg/L in 8.50×10^8 m^3 of brine, for a total lithium carbonate tonnage of 2,708,000; and
- Measured and Indicated only - 5,304,000 tonnes of lithium carbonate in 1.53×10^9 m^3 of brine.

The results for the ≥ 500 mg/L cut-off for potassium are as follows, with brine volumes identical to those stated above for lithium:

- Measured Resource Estimate – average potassium grade of 5,915 mg/L and total potash (KCl) tonnage of 9,382,000;
- Indicated Resource Estimate – average potassium grade of 5,717 mg/L and total potash tonnage of 7,871,000;
- Inferred Resource Estimate – average potassium grade of 4,906 mg/L and total potash tonnage of 8,144,000; and
- Measured and Indicated only - 17,253,000 tonnes of potash (KCl).

Table 15.2 also provides additional information that comprises a relatively thorough overview of brine composition. Key information related to brine processing is as follows:

- The Magnesium/Lithium ratios for the Measured, Indicated, Inferred and Combined Resources range from 2.09 to 2.56, indicating that the brine would be amenable to conventional lithium recovery processing.

- The Sulphate/Lithium ratios for the Measured, Indicated, Inferred and Combined Resources range from 23.44 to 31.44, indicating that Cauchari is sulphate-type brine deposit. This means that most of the sulphate should be removed by both low temperature and/or chemical treatment.

A summary of the resource distribution between the five hydrostratigraphic units is presented in Table 15.3. As indicated, the large majority of the resource (74.1%) occurs in the Sand Unit. This is due to the combined effect of two factors:

- As indicated in Section 15.2, the Sand is the second most extensive unit at the Site, comprising 30% of the volume of the Measured, Indicated and Inferred Resource Estimate zone, which is only exceeded by Halite (37%).
- The Sand Unit has the highest RBRC of the five units (25%, as shown in Table 15.2).

Most of the resource within the Sand Unit is expected to be favourable for recovery of the brine, since sand units can generally be pumped at relatively high rates. Brine recovery will be evaluated in upcoming reserve estimation work.

Table 15.2: Summary of Resource Estimation results for two cut-off levels (≥500 and ≥0 mg/L).

	Lithium Grade Cut off ≥ 500 mg/L				Lithium Grade Cut off ≥ 0 mg/L			
	Measured	Indicated	Inferred	Combined	Measured	Indicated	Inferred	Combined
Volume (m^3)								
	8.09E+08	7.20E+08	8.50E+08	2.38E+09	8.89E+08	9.40E+08	1.28E+09	3.10E+09
Average Concentration (mg/L)								
Lithium	656	637	603	627	640	601	549	585
Potassium	5,915	5,717	4,906	5,417	5,778	5,438	4,687	5,156
Magnesium	1,677	1,589	1,262	1,470	1,636	1,502	1,190	1,383
Boron	916	926	805	870	910	920	825	871
Calcium	381	411	474	430	401	447	529	476
Sodium	116,542	116,111	104,882	111,295	115,722	114,228	103,595	109,417
Chloride	177,144	176,367	159,195	169,036	175,921	173,643	157,088	166,141
Carbonate	717	696	561	643	711	690	588	646
Sulphate	20,623	19,636	14,125	17,493	20,240	18,938	14,281	16,990
Lithium Metal	545,300	458,300	512,800	1,517,400	582,000	550,400	687,000	1,819,000
Lithium Carbonate	2,884,000	2,420,000	2,708,000	8,012,000	3,073,000	2,906,000	3,627,000	9,606,000
Potassium	4,912,000	4,121,000	4,264,000	13,297,000	5,248,000	5,002,000	5,917,000	16,167,000
Potash	9,382,000	7,871,000	8,144,000	25,397,000	10,024,000	9,554,000	11,301,000	30,879,000
Weight Percent								
Lithium	0.0539	0.0524	0.0496	0.0516	0.0526	0.0494	0.0452	0.0481
Potassium	0.4864	0.4702	0.4035	0.4455	0.4752	0.4472	0.3854	0.4240
Magnesium	0.1379	0.1307	0.1038	0.1209	0.1345	0.1235	0.0979	0.1137
Boron	0.0753	0.0761	0.0662	0.0715	0.0748	0.0756	0.0679	0.0717
Calcium	0.0313	0.0338	0.0390	0.0354	0.0330	0.0368	0.0435	0.0391
Sodium	9.5840	9.5486	8.6252	9.1526	9.5166	9.3938	8.5139	8.9981
Chloride	14.5677	14.5039	13.0917	13.9010	14.4672	14.2798	12.9184	13.6629
Carbonate	0.0589	0.0572	0.0462	0.0528	0.0585	0.0568	0.0484	0.0531
Sulphate	1.6960	1.6148	1.1616	1.4385	1.6645	1.5574	1.1744	1.3972
Ratios								
Mg/Li	2.56	2.49	2.09	2.34	2.56	2.50	2.17	2.36
K/Li	9.02	8.97	8.14	8.64	9.03	9.05	8.54	8.81
SO_4/Li	31.44	30.82	23.44	27.89	31.64	31.51	26.01	29.03
SO_4/Mg	12.30	12.36	11.19	11.90	12.38	12.61	12.00	12.29
SO_4/K	3.49	3.43	2.88	3.23	3.50	3.48	3.05	3.30

Table 15.3: Distribution of the Lithium Measured, Indicated and Inferred Resource (≥ 0 mg/L cut-off) between the five hydrostratigraphic units.

Hydrostratigraphic Unit	Percent of Resource
Clay	2.1
Halite	7.9
Sand	74.1
Sand Mix	6.8
Silt Mix	9.2

16 BRINE PROCESSING

Lithium Americas have been studying the brine process with its own personnel and independent consultants for over one year. Figure 16.1 shows the current status of the pilot facility at the Cauchari Salar.

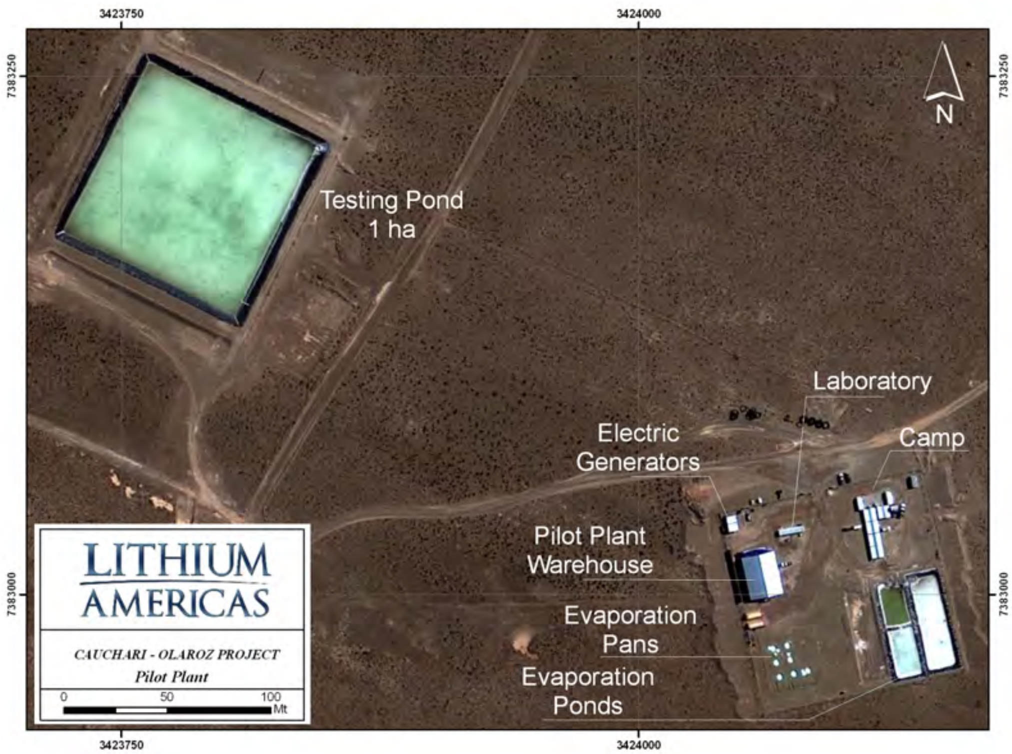


Figure 16.1: Pilot Plant facility at the Cauchari Salar

16.1 Brine Chemistry

The brine from Salar de Cauchari, saturated in sodium chloride with total dissolved solids (TDS) in the range of 26-27%, has a relatively low Mg/Li ratio (2.5 as an average). This means that magnesium removal can be carried out with slaked lime. Due to the high sulphate concentration in the brine, this salar can be classified as a "sulphate type brine deposit", as at Silver Peak in the USA.

The high SO_4/Mg+Ca molar ratio (2.56) provides enough sulphate in the brine to precipitate the calcium liberated during the magnesium removal step. The lithium recovery process to be developed should make use of the low temperatures at the salar to remove most of the high sulphate content; but it will be necessary to include the treatment with $CaCl_2$ in addition to liming during some periods of the year when the ambient temperatures are higher.

The boron levels are relatively high compared with lithium and potassium contents, so there is a necessity to remove boron from the brine before lithium carbonate precipitation.

The average composition (weight %), calculated from the lithium resource estimate[3] is as follows:

Table 16.1: Cauchari average brine composition, weight %

Na	K	Li	Ca	Mg	Cl	SO_4	CO_3	B as H_3BO_3
9.154	0.443	0.052	0.035	0.121	13.904	1.438	0.053	0.409

16.2 Process Description

The brine chemistry of the Cauchari deposit has been subjected to a process simulation by ARAWP and its consultants. This task has been carried out making use of state-of-the-art physicochemical properties estimation methods and process simulation techniques, which were specially assembled for this project. This work has been backed up by the results of laboratory evaporation test work, and the references to other similar process routes such as that at Silver Peak in U.S.A. and the Chilean lithium plants in actual operation.

The results of the simulation show that the most probable process route for the Cauchari brines will be the one presented in Figure 16.2 for the production of lithium carbonate with a purity of 99.5%.

3 Brine cut off 500 mg/L Li

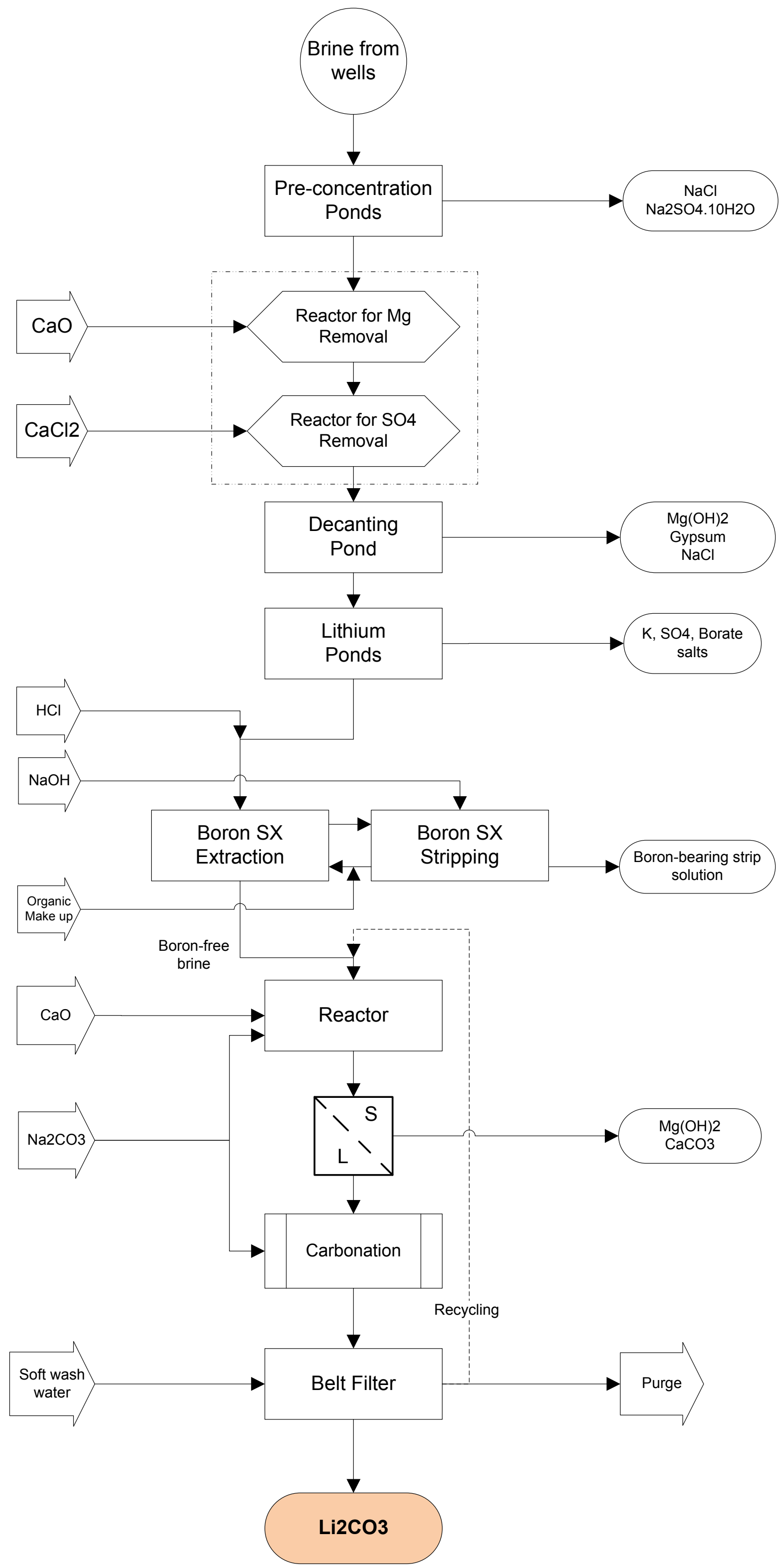


Figure 16.2: Process Block Diagram

16.2.1 Solar Evaporation Process

16.2.1.1 Effect of Temperature

The evaporation process in the solar ponds starts with a pre-concentration stage where near 90% of sodium chloride (halite) crystallizes out. The temperature of 5.1°C, one of the mean values used in the process simulation, reflects the weather conditions at Cauchari more closely, according to the historical meteorological data measured on site during the past year and in the neighbourhood areas[4]. This temperature was used to calculate the flows of a global mass balance in solar ponds and for estimating reagent requirements for removing Mg and SO_4.

This pre-concentration stage has an evaporation period of 160 to 180 days, during which time the volume of brine is reduced by 80 – 90%, depending on the current composition of brine.

The effect of temperature is very important in the phase chemistry of the brine components, particularly in Cauchari, whose brine is high in sulphate content.

Low temperatures at the salar will cause the crystallization of sulphate as Glauber's salt ($Na_2SO_4.10H_2O$) in the pre-concentration ponds, which is the stable phase at low temperatures. Seventy percent of the sulphate present in the feed brine is removed from the brine during this period. Therefore, there would be a dramatic reduction of $CaCl_2$ consumption to be used for removing most of the residual sulphate in the brine after the pre-concentration stage.

The Vaisala weather station at the project site started on May 19th 2010; therefore, one year of measurements have not yet been completed. However, the registered data for 6 months (June to November) were used to make a prediction of the average annual temperature by statistical modeling[5]. Figure 16.3 shows a graph where monthly modeled temperature (maximum, mean and minimum) values were plotted. As shown in Table 16.2, the annual average of the monthly modeled mean temperatures is 4.2°C, i.e., a little lower than 5°C, which was used in the simulation to estimate the consumption of calcium solutions, slaked lime and calcium chloride.

It should be pointed out that the mean temperature of automatic measurements by the Vaisala weather station during the period June 2010 to January 2011 (eight months) was 5.1°C[6].

[4] Houston, J., Ehren, P., 2010.
[5] Gutierrez, L., 2010.
[6] Gutierrez, L., 2011.

Table 16.2: Monthly modeled weather temperatures (ºC)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
MIN	-5.3	-6.3	-6.6	-10.1	-9.7	-7.7	-9.1	-8.2	-8.2	-8.4	-5.4	-5.9	-7.6
MEAN	7.3	7.2	6.3	1.5	0.8	1.9	0.0	2.4	3.7	5.1	7.2	6.6	4.2
MAX	18.9	19.1	17.2	12.0	10.1	11.4	9.2	13.4	15.8	19.0	18.0	18.3	15.2

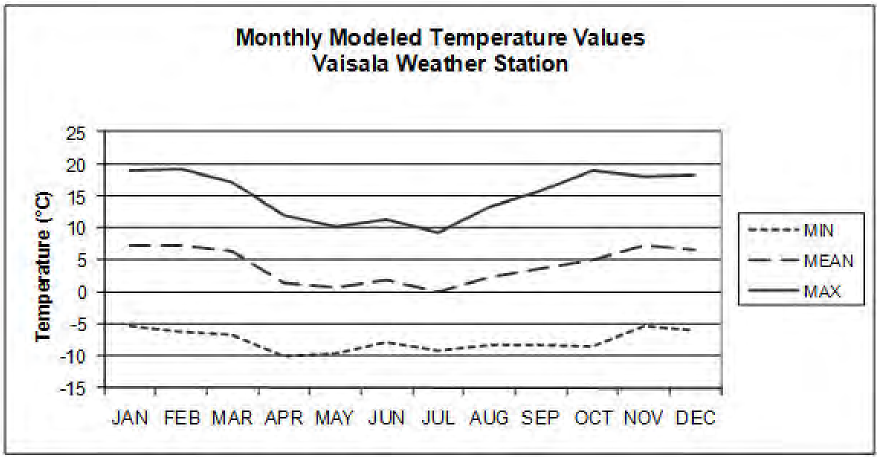


Figure 16.3: Monthly Modeled Temperature Values. Vaisala Weather Station

16.2.1.2 Liming and addition of calcium chloride to the pre-concentrated brine

The pre-concentrated brine is now subjected to chemical treatment with calcium solutions (slaked lime and calcium chloride) in order to remove most of the magnesium and residual sulphate present. Magnesium reacts instantaneously with the slaked lime to precipitate as magnesium hydroxide. Subsequently, the liberated calcium starts to react with the available sulphate, to precipitate gypsum. However, some of the boron in solution will also react with the liberated calcium.

The additional treatment with $CaCl_2$ also results in further precipitation of sulphate as gypsum.

Through the process simulation procedure, it was determined that the brine treatment with calcium solutions is advantageous at an intermediate stage, since a significant fraction of sulphate precipitates in the pre-concentration ponds (halite ponds) as Glauber's salt. This phenomenon substantially lowers the requirement of $CaCl_2$ during the brine treatment stage.

In order to minimize the operating cost of Li_2CO_3, the chemical treatment (liming and calcium chloride addition) is applied at the point where lithium saturation occurs. This procedure significantly reduces the consumption of $CaCl_2$, a costly reagent. Table 16.4 shows the estimated consumption of CaO and $CaCl_2$ calculated for the initial production of 20,000 TPA of lithium carbonate, where stoichiometric requirements were estimated.

The concentration of these solutions will be optimized during a planned pilot plant test work program. A high grade lime (circa 83% CaO) will be used for preparing the slaked lime.

As in Silver Peak, USA, the treatment will be carried out in a specific intermediate pond, which would also be used for decanting the $Mg(OH)_2$ and gypsum formed – the latter enhances the settlement of the former due to the compactness of the crystals formed during precipitation. After a period of time for settling the solids, they will be removed with a dredge to a sludge-containment reservoir. The alternative procedure of using mechanical separation equipment and eventual use of flocculants to reduce the losses of entrained brine in the precipitated solids (sludge) will be evaluated during the pilot plant test work program.

16.2.1.3 Lithium Ponds

In order to favour the production of lithium carbonate at the lowest possible cost, the solar evaporation process will be designed in such a way that the lithium concentration in the brine reaches values in the range of 4%, according to the process simulation[7]. This step of the evaporation process is carried out in another set of much smaller ponds called Lithium ponds. In addition to the increase in lithium concentration in these ponds, the crystalline precipitation of salts containing potassium chloride, sulphates and borates occurs.

The potential for recovering by-products such as potassium chloride are described in Section 16.5.

16.2.2 Lithium Carbonate Plant

The processing plant for producing lithium carbonate includes some previous stages for the final purification of the concentrated lithium brine feeding the carbonation stage. For that purpose, the conventional process used by lithium carbonate plants under operation, have been taken as reference, such as the following:

- Elimination of the boron content by solvent extraction.
- Treatment of the boron-free brine with a mixture of slaked lime and soda ash, to remove low levels of magnesium (in the order of 50 ppm).

16.2.3 Boron Solvent Extraction

The boron levels are relatively high in the Cauchari brine, so the boron in the concentrated lithium brine will be removed by the solvent extraction method (SX), using a specific extractant together with a suitable diluent.

Before the liquid-liquid extraction step, the brine will be acidified with HCl to a pH between 3 and 4. The boron-free brine can then be neutralized with the lithium carbonate mother liquor or a fresh Na_2CO_3 solution. The stripping (re-extraction) of boron from the organic phase is made with an alkaline aqueous phase (NaOH solution) at a pH of 10 - 11. The strip solution containing the boron is discarded to waste.

[7] Table 10, ARAWP, 2010.

16.2.4 Removal of Residual Magnesium

Most of the magnesium is removed by liming during the earlier brine concentration treatment stage. However, the boron-free brine can contain residual magnesium (at about 50 ppm). Its total elimination in the plant can be made by the treatment with a mixture of slaked lime and soda ash at a temperature of 60°C. The magnesium hydroxide formed and calcium carbonate solids are separated by filtration.

16.2.5 Lithium Carbonate Precipitation

The purified brine, containing 1% lithium dissolved as LiCl, a concentration that is reached by dilution with soda ash solution and/or recycled mother liquor from the plant, is transferred to three reactors in series, where lithium carbonate is precipitated by the addition of sodium carbonate solution (at 26 wt.%). The reaction takes place at elevated temperatures (80-83°C) to favour the inverse solubility of lithium carbonate. The slurry containing the precipitated product is separated from the mother liquor by filtration and will be washed with soft water (except Na and Cl contents, with no more than 50 ppm each) to meet the expected purity of 99.5%. Finally, the product is dried, classified and packed.

16.3 Global Mass Balance

As per the process description explained in Section 16.2, the process mass flows have been estimated for the first stage of the project (20,000 TPA of lithium carbonate). These process mass flows in Table 16.3 should be read in conjunction with the schematic flow diagram shown below, Figure 16.3

Table 16.3: Process mass flows for the initial production of 20,000 TPA Li_2CO_3.

Stream		Flow (TPA)	Distribution
	Inputs		
1	Brine from wells	13,062,179	94.09%
2	Ca Reagents to ponds	219,445	1.58%
3	Reagents to plant	38,875	0.28%
4	Process water	561,824	4.05%
	Total Inputs	13,882,323	100%
	Outputs		
5	Evaporated water	9,024,660	65.01%
6	Precipitated salts	3,265,545	23.52%
	Entrainment & Leakage	1,280,094	9.22%
	Chemical Plant		
7	Waste	292,024	2.10%
8	Li_2CO_3	20,000	0.14%
	Total Outputs	13,882,323	100%

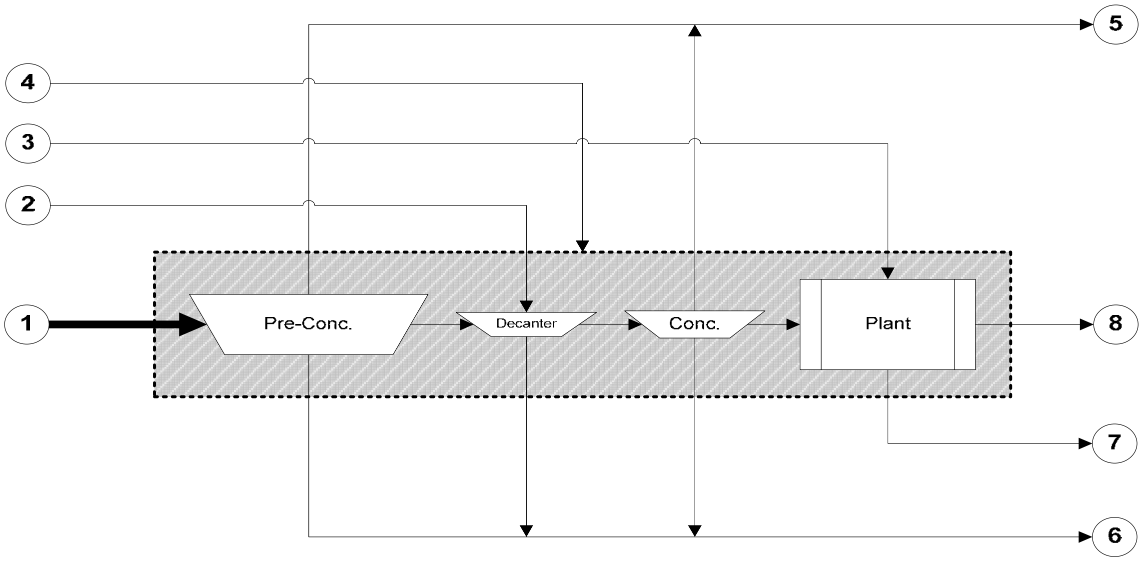


Figure 16.4: Schematic flowsheet for the global mass balance. Units in TPA

16.4 Process mass flows and solar evaporation area requirement

According to the process simulation for the case at 5°C[8], the estimated mass flows for the lithium carbonate production process (if the chemical treatment is applied in the saturation point of lithium) are shown in Table 16.4.

The third column illustrates the figures for the initial capacity of 20,000 TPA and the fourth column for the enlarged plant of 40,000 TPA

[8] Table 10, ARAWP, 2010.

Table 16.4: Process mass flows for 20,000 TPA Li_2CO_3 and 40,000 TPA Li_2CO_3

	Unit	Initial capacity 20,000 tonnes/year	Enlarged plant 40,000 tonnes/year
Feed brine	ktonne/yr	13,062	26,124
Average brine flow	L/s	345	690
Total evaporation area (90% availability)	000 m^2	7,402	14,804
Total evaporation area	000 m^2	6,662	13,323
Ponds			
Pond Area	000 m^2	6,662	13,323
Brine to be treated	ktonne/yr	967	1,933
CaO (100%) consumption	ktonne/yr	36	73
$CaCl_2$ (100%) consumption	ktonne/yr	0.9	1.8
Process water	ktonne/yr	392	784
Evaporation	ktonne/yr	9,025	18,049
Entrainment	ktonne/yr	705	1,411
Leakage	ktonne/yr	575	1,149
Precipitated salts	ktonne/yr	3,266	6,531
Li_2CO_3 Plant			
Conc. brine from ponds	ktonne/yr	103	206
Li concentration	%	4.30%	4.30%
Na_2CO_3 consumption	ktonne/yr	37	74
Process water	ktonne/yr	170	340
Lime consumption	ktonne/yr	0.14	0.28
Lithium recovery in ponds	%	66%	66%
Plant yield	%	85%	85%
LCE production	tonne/yr	20,000	40,000

16.5 Complementary Processes

The process description presented in Section 16.2 shows the most probable process route for lithium carbonate. There are, however, other salts and compounds which may be recovered economically from the various stages of the lithium recovery process. Each of these additional processes have to be evaluated individually both from technical and economic points of view.

These additional processes are now briefly described so as to show the potential advantages of recovering by-products.

16.5.1 Recovery of Sodium Sulphate

As mentioned previously in the section of the Process Description, low temperatures at the salar will cause the crystallization of sulphate as Glauber's salt ($Na_2SO_4.10H_2O$) in the pre-concentration ponds, which is the stable phase at low temperatures.

A purification system for recovering the sodium sulphate from the other salts present (principally halite) will be tested during the pilot plant test work program.

16.5.2 Recovery of Boric Acid

The concentrated brine from the lithium ponds is first subjected to acidification with hydrochloric acid (to a pH of 2), at which level boric acid crystallizes out and can be separated out in conventional liquid-solid separation equipment.

Approximately 70% of the boron in solution is recovered as boric acid at this stage of the process.

16.5.3 Production of Disodium Octoborate Tetrahydrate

The boron-bearing strip solution, combined with the supply of a boron mineral can be used for the production of disodium octoborate tetrahydrate ($Na_2B_8O_{13}.4H_2O$).

This process will be tested during the pilot test work program.

16.5.4 Recovery of Potassium Chloride

The salt harvest from the solar evaporation ponds contains significant amounts of potassium that can be used for the production of fertilizer grade KCl.

In order to obtain potassium-rich salts during the brine concentration process, the solar pond area should be divided into sections to promote the crystallization of salts having a higher concentration of KCl, to be used in a further stage of separation by flotation from other salts.

A mixture of NaCl and KCl salts can be achieved by making use of the cold temperatures at Cauchari (5ºC, annual mean value) and taking into account the low solubility of KCl.

Salts containing potassium chloride would precipitate in two sectors:

- Sector 1: In the last section (about 10%) of the pre-concentration ponds it would crystallize as a physical mixture of NaCl and KCl, known as sylvinite. Although these salts would have a low potassium grade, its separation would be easily facilitated by using a flotation process.
- Sector 2: Along the concentration ponds after the liming process since the addition of lime reduces the sulphate content in the brine giving rise to new precipitation of KCl, but this time, in addition to NaCl, it would be mixed mainly with gypsum and borates, as well as with $Mg(OH)_2$ carried forward from the liming process. This KCl would be of higher grade than that obtained in sector 1, but its separation will be more difficult by means of the flotation process.

Table 16.5 shows a summary of the estimated amounts and chemical composition of the salt harvest coming from both sectors, as well as the potential of potassium chloride to be recovered. The amounts and composition of the salts were estimated through a simulation of the evaporation process in the solar ponds[9]; on the basis of this composition the quantity of 95% purity KCl to be produced was estimated. For this purpose, it was assumed a yield of 75% in the flotation process for the salts coming from the first sector and only 65% for the second one, due to the presence of impurities: gypsum, borates and $Mg(OH)_2$. As a consequence, the potential output of KCl fertilizer grade is 55,700 TPA for the production of 20,000 TPA of Li_2CO_3.

Table 16.5: Estimated amounts and composition of salt harvest containing KCl for 20,000 TPA of Li_2CO_3

	Flow TPA	KCl	NaCl	$CaSO_4$	Borates	KCl production 95% TPA
Pre-Conc.	222,421	15%	84%	-	-	24,997
Conc.	157,592	30%	58%	4%	7%	30,744
TOTAL						**55,741**

The KCl recovery process from the salts aforementioned is shown in the figure below.

The separation of the fine material through a mechanical procedure and the usage of an adequate depressant should be considered. The separation process of borate salts, which are assumed to represent about 7%, will be studied through pilot plant test works by using real salts obtained in the evaporation process in pan tests currently under way at the project site.

[9] A model of the evaporation process under the weather condition at the Salar de Cauchari was utilized. The model was run using gPROMS software, together with a package of thermodynamic properties to make it possible the calculation of the phase equilibrium of salts and brine as this one evaporates.

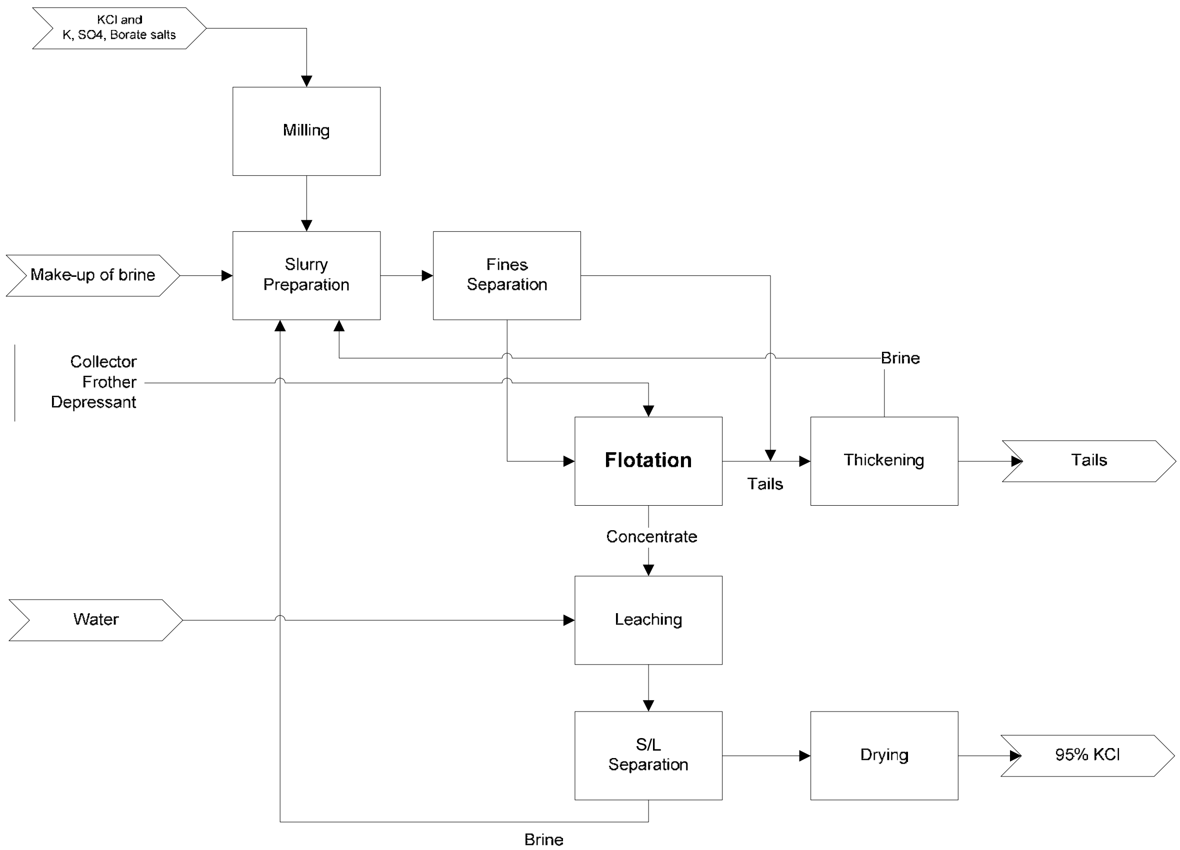


Figure 16.5: Schematic flow diagram of the flotation process for the production of KCl.

17 ADDITIONAL REQUIREMENTS FOR TECHNICAL REPORTS ON DEVELOPMENT PROPERTIES AND PRODUCTION PROPERTIES

17.1 Mining

17.1.1 Well Design

The company is currently drilling a series of production wells for brine extraction at industrial capacity. Figure 17.1 shows the PB4 design that yielded 20 L/s and contains approximately 100 m of screen at 0.5 mm schedule. Each production well is different and is specifically designed to mach the productive brine aquifer in the drilling site.

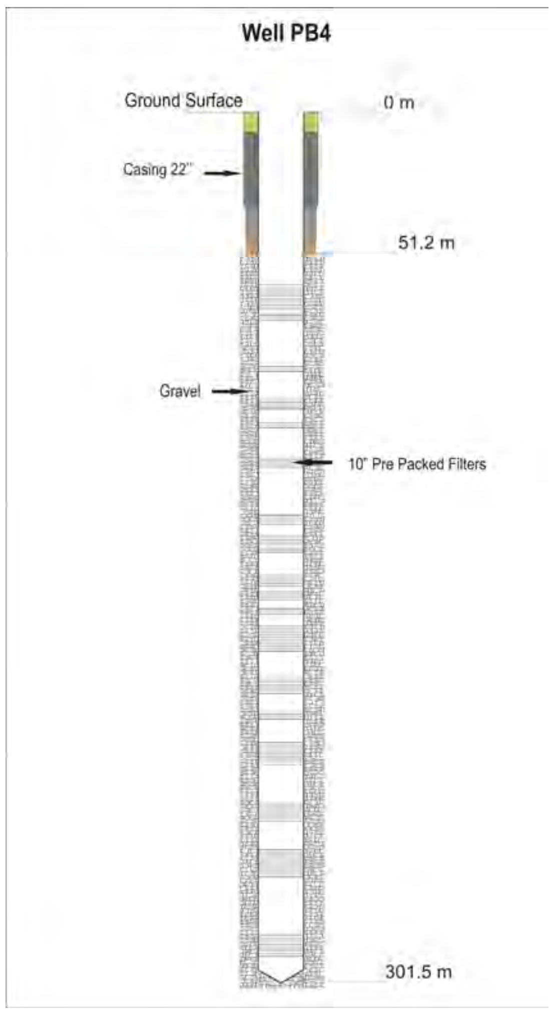


Figure 17.1: PB4 production well design

The company is also starting to drill similar wells for fresh water but at shallow depth (less than 50 m) over the alluvial cone.

17.1.2 Mining Method

The mining method consists of pumping brine from wells drilled in the salar – the depth of the wells is dependent on how deep the aquifers are located. An electrical submersible pump is installed and pumping brings the brine through a pipe network to the evaporation solar ponds.

17.1.3 Mining Infrastructure

The basic mining infrastructure in this type of projects is:

- Consolidated access road for the rig units and well services.
- Consolidated Pad for drill location, suitable for rig units, drilling materials, drilling fluids/drill cuttings and pump pits, parking area, technical supervision and crew cabin, power source, fuel storage capacity, pipe/casing/drilling bars manipulation, etc.
- Production wells
- A network of pipes connecting the wells and the solar ponds
- Solar ponds

17.1.4 Mining Auxiliary Task

Auxiliary tasks for drilling and pumping are as follows:

- Pipe road
- Surveying service
- Fresh water and brine services
- Soil movement services
    - Access and drill location construction
    - Drilling fluids and other purposes pit construction
    - Environmental remediation
- Environmental & Safety support/supervision
- Well services
    - Casing assembly
    - Final production design assembly
    - Screening washing work
    - Geophysical services
- Mine operation staff
    - Miner operation shift
    - Mine operation supervision
    - Pipe & welding shift
    - Electrical maintenance shift
    - Mechanical maintenance staff

17.1.5 Mine, Technical Service Activities:

- The company has currently defined an in-situ resource block model (King, 2010). AquaResource, from Waterloo, Canada is currently reviewing the geological information, the stratigraphic model and the existing in situ resource estimation.
- AquaResource is monitoring the pump tests being carried out in several production wells to estimate the characteristics of the aquifer.
- AquaResource will produce a final hydrogeology model based on the existing data and the pump tests. This model will be used to make reserve estimation and provide a pump field plan.

17.1.6 Mining Dilution and Recovery

In brine mining the concepts of dilution and recovery are different from hard rock mining. Dilution of the brine occurs over time as a result of the influx of fresh water into the salar as the brine is extracted. The exact rate at which this process happens is going to be studied using a dynamic hydrological model currently under construction. Examples from other mines such as Silver Peak are known to have experienced a drop in the grade of over 50% over a period of 50 years of continuous production.

Recovery is also a complex issue in brine resources. The current status of the Cauchari resource estimation is named “in-situ” because the amount of brine that can be effectively extracted from the sediments is still under study. Mining a fluid from a porous media depends on many factors including density, viscosity, interconnectivity of the porous space, etc. The current hydrological model based on the pump tests being completed will allow the input of these parameters into a model in order to establish an extractable reserve.

Once the brine is extracted in a well negligible dilution occurs though the piping system to the ponds.

17.1.7 Mineral Reserves

Mineral Reserves have not been defined in the Project yet; only in situ measured, indicated and inferred resources have been defined to date. Only after long term pump tests at different geological units and different areas of the salar are available can the full hydrological studies be completed and the extractable brine reserves be identified.

17.1.8 Mine Planning

The mining plan designed to identify the number and location of wells needed to feed the plant on a sustainable basis is currently under study and will be completed in subsequent reports after the long term pump tests are completed.

17.1.9 Waste Dump

The evaporation process in the ponds leaves considerable amounts of salts on the bottom of the ponds. These salts must be removed ("harvested") and transported to nearby piles. The quantity of salt to be harvested is approximately 24,500 tonnes/day, necessitating the use of mining type front end loaders and trucks for this purpose. The harvesting and transport operation has been assumed to be performed by an outside contractor. The salt piles normally are up to 20 m high and can be built on the salar surface. It is estimated that approximately 700 ha of piles will be built over a 20 year period and these piles will be built at an estimated distance of 2.3 km from the pond sector.

These discarded salts can be considered as inert waste. The salts are generated from brines already present in the salar and do not introduce foreign compounds to it. Basically, they are composed of sodium chloride (common salt), sodium and calcium sulphates and boron. It is estimated that sodium chloride and sulphate make up over 90% of this waste.

The accurate design of Waste Dumps is under study and the allocation of these Waste Dumps will be carried on from the load & haul optimization point of view with all the environmental considerations

17.1.10 Production Equipment Selection

For the production wells, submersible electric pumps are considered, located at depths that ensure they will always be submerged in lithium-rich brine. For this reason, a slotted "casing" was designed, to be located in the largest lithium concentrated water tables.

For the brine transfer between production wells and evaporation ponds, self-priming pumps will be used.

Other equipment required are:

- Trucks for HDP's pipe transportation inside the Brine Well Field.
- A Hydro – Crane for many pipe manipulation purposes.
- Two HDP's Welder.
- 8,000 to 14,000 litres. Water trucks.
- Cable reel truck, for electrical network.
- Electrical substations, for proper power distribution.
- A First Aid / Evacuation Ambulance.

17.1.11 Service Equipment

Pond design and operation makes it necessary to remove the salt deposits formed on their bottom. For this purpose, typical earthmoving machinery will be used, such as bulldozers, frontal loaders and dump trucks. This service will be sub-contracted.

17.2 Process Plant Design

17.2.1 Process Design Criteria

17.2.1.1 Climatic data

Table 17.1: Climatic Data

	Max	Min	Average
Annual Mean Temperatures*	15.6°C	-6.6°C	5.1°C
Rainfall (December-March)	---	---	32.4 mm
Rainfall (April-November)	---	---	17.6 mm
Mean Humidity*	33%	4.6%	16.8%
Global Solar Radiation*	707 - 1,499 Watt/m^2	---	292 Watt/m^2
Direct Solar Radiation*	335 - 1,200 Watt/m^2		82.5 Watt/m^2
Wind (max daily)*	39.5 m/s		22.8 m/s
Daily Evaporation Rates			5.4 mm

* Based on the data recorded by the Vaisala automatic weather station between May 19, 2010 and January 31, 2011.

17.2.1.2 Pond dimensions and areas

The total pond area includes an additional 10% for harvesting purposes

- Pre concentration ponds

  Pre-concentration ponds
  Two lines of four ponds in series, each 1,300 m long by 560 m wide
  Effective depth – 3.0 metres
  Total area – 5,824,000 square metres, or 582.4 hectares

  Residence time – 160 to 180 days

- Decanting ponds

  Two lines of one pond, each 700 m long by 280 m wide
  Effective depth – 2.3 metres
  Total area – 392,000 square metres, or 39.2 hectares.
  Residence time – 10 days

- Lithium ponds

  Lithium ponds
  Two lines of three ponds in series, each 700 m long by 280 m wide
  Effective depth – 2.3 metres
  Total area – 1,176,000 square metres or 117.6 hectares
  Residence time – 30 days

17.2.1.3 Plant Operating Criteria

- The plant operates 330 days per year.
- Lithium concentration as LiCl of the brine feed for the boron SX section is 4% by weight.
- Residual magnesium at 50 – 100 ppm is removed through the use of lime (CaO) and sodium carbonate.
- Sodium carbonate is added in excess (20%) of the stoichiometric requirement for lithium carbonate precipitation.
- Temperature at the Carbonation stage is 80 - 83°C.
- Lithium Carbonate plant yield is 85%.
- Lithium carbonate has a purity up to 99.5% by weight
- Lithium carbonate product has a particle size of approximately 10 microns (battery grade).
- Good quality water exists in the area, but it tends to be calcium rich, thus an osmosis plant (or ion exchange resin plant) might be necessary to produce soft water of the purity required for product washing. Soft water requirement for washing is 150 cubic metres per day for the initial production of 20,000 TPA of lithium carbonate.
- Initial plant operating capacity is 20,000 TPA and design capacity is 22,500 TPA.
- Product is packed into 1.2 tonne maxi bags for shipping and dispatching to customers through ports of embarkation.

17.2.2 Lithium Carbonate Plant Description

The high-lithium brine coming from the evaporation and concentration ponds is processed to produce Lithium Carbonate (Li_2CO_3) through the following stages:

- Boron removal by solvent extraction
- Purification stage to remove residual magnesium
- Lithium Carbonate Precipitation
- Drying, Compaction, Grinding and Packaging

Main equipment considered for each 20,000 TPA plant module is as follows:

- 70 Pumps
- 40 Tanks
- 30 Tank mixers and agitators
- 2 Thickeners
- 5 Liquid filters
- 4 Air filters
- 5 Screens

- 5 Screw conveyors
- 4 Conveyor belts
- 3 Bucket conveyors
- 3 Heat exchangers
- 1 Compactor
- 1 Micronizer
- 2 Industrial boilers
- 1 Foam system

As for every processing plant it requires a series of services such as gas, power generation, water storage, liquid waste disposal area, compressed air and heating equipment for some of the processes.

17.2.2.1 Boron Removal Stage

The boron contained in the brine is extracted using a solvent extraction process.

The boron-free brine is transferred to the next processing stage; boron is disposed of as an aqueous solution.

This area of the plant will require a fire-protection system.

17.2.2.2 Wet Area

- Purification stage

  The residual magnesium content in the brine is removed through a lime and sodium carbonate reaction, producing magnesium hydroxide and calcium carbonate which are discarded as waste.
- Lithium Carbonate Precipitation

  Lithium carbonate is obtained by the reaction of the purified brine at 1% lithium with sodium carbonate solution (26%) at temperatures of 80 - 83°C.

The precipitated salt is filtered on a belt filter and washed in stages with soft water to remove entrained impurities. The filter cake is transferred to the Dry Area for finishing the product.

17.2.2.3 Dry Area

- Drying, Compaction, Grinding and Packaging
  Through a sequence of drying, high pressure compaction, grinding and classification processes, it is possible to obtain the final product in accordance with quality standards.

  The product is then packaged and stored in a warehouse, ready to be shipped to the various markets.

17.2.2.4 Services

The Project includes a storage area of 3,500 m^2 for process chemicals and a similar size storage area for the final product. Additionally, there is an area of 1,500 m^2 for offices, laboratory, shops and smaller warehouses.

The plant requires a series of utilities such as gas, power generation, water storage, liquid waste disposal area, compressed air, heating equipment and fire protection.

17.2.3 Process Diagram

The process whereby lithium carbonate is produced from concentrated brine is shown in Figure 17.2 and Figure 17.3.

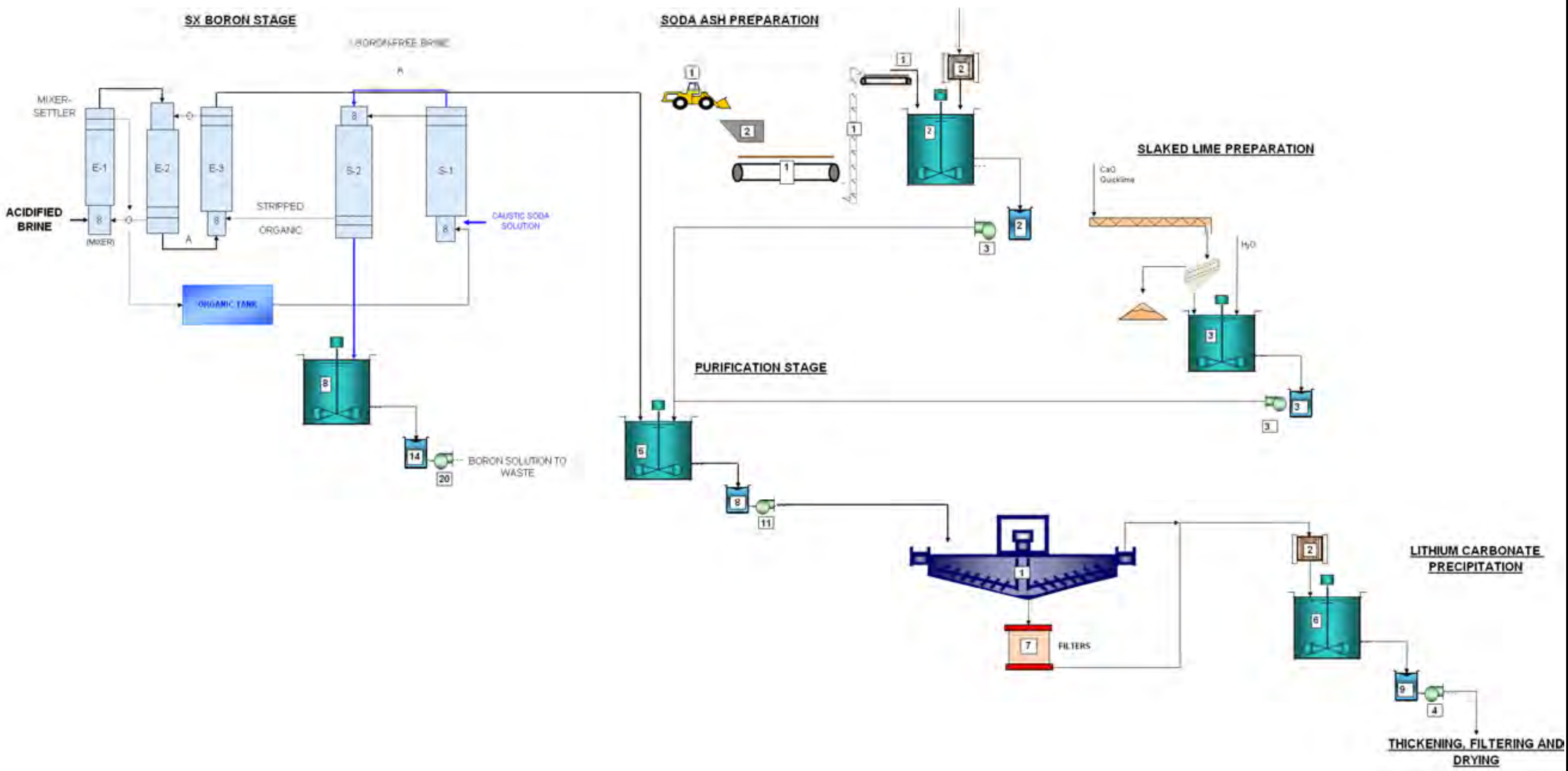


Figure 17.2: Lithium Carbonate Process Diagram 1 / 2

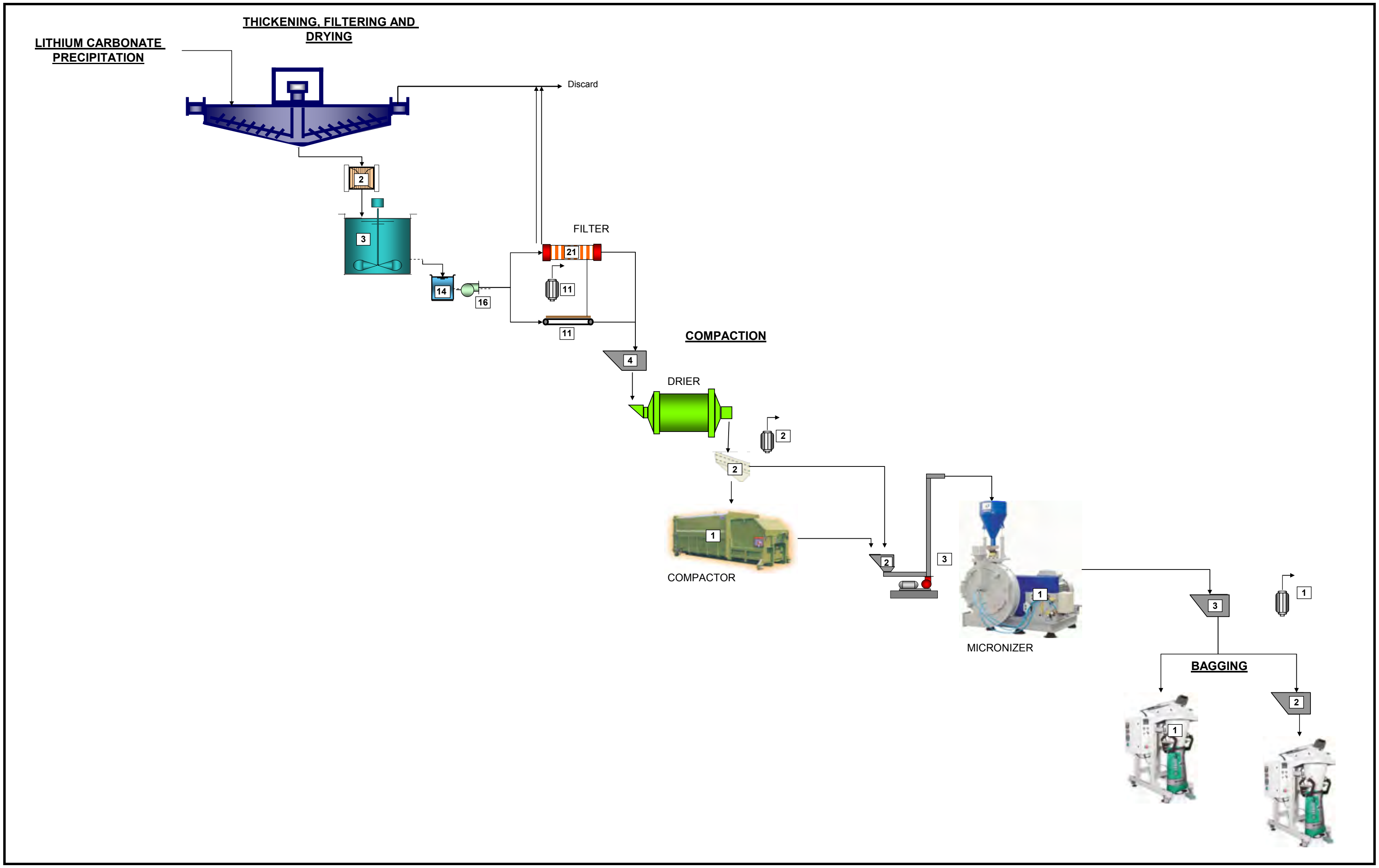


Figure 17.3: Lithium Carbonate Process Diagram 2 / 2

17.3 Site Infrastructure and Support Systems

17.3.1 Processing Buildings

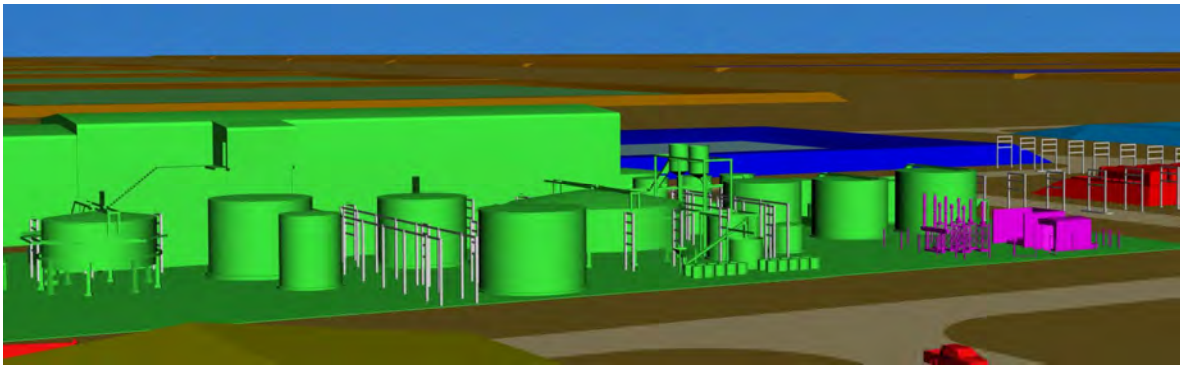


Figure 17.4: Processing Buildings

Taking into account weather conditions at the plant site, closed buildings have been designed for areas with greater permanence of operators, for process areas and buildings, and for electrical and control rooms.

17.3.2 Administration and Warehouse Buildings

The storage building for the soda ash (sodium carbonate) will be steel built and covered with metallic siding.

The final product – lithium carbonate – will be stored in a closed building to protect it from dust contamination due to the strong winds prevailing in this area.

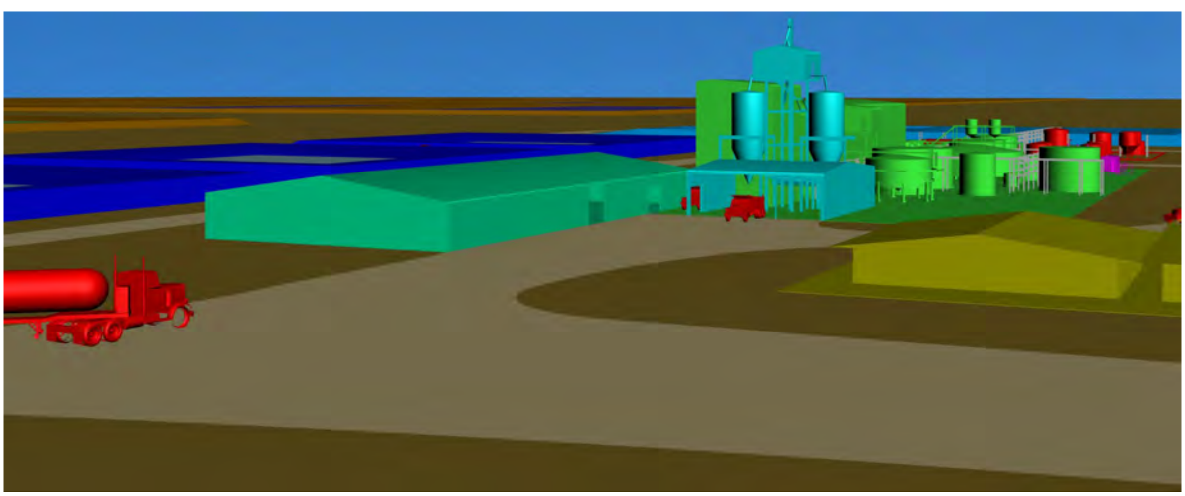


Figure 17.5: Administration and Warehouse Buildings

17.3.3 Security

A metallic perimeter fence will be built surrounding the lithium carbonate plant, warehouses, administrative offices and camp. Given the location of the facilities, it is not necessary to enclose the pond area. Nevertheless, the pond area is to be lighted, to allow night work and improve security.

17.3.4 Access and Site Roads

As indicated in section 4.5 of this report, access to the plant site is via paved National Highways 9 and 52, which connect the site to San Salvador de Jujuy and Salta in Argentina as shown in Figure 4.9. In addition, highway 52 connects to Paso Jama, a national border crossing between Chile and Argentina, providing connection to Chilean route 27 and granting convenient access to Antofagasta and Mejillones, likely embarkation ports for the product. These highways carry significant truck traffic, transporting borate products from various salars in northern Argentina and significant international trade between Chile, Argentina and other countries.

Access to the plant site is possible through a gravel road (Highway 70) which skirts the west side of the salars, this highway is approximately 1 km from the plant site.

17.3.5 Fuel Storage

Need for fuel storage at the plant site is limited, since power generation and plant and camp heat requirements are to be met through natural gas, thus fuel storage needs are only for vehicle operation and emergency power.

17.3.6 Fresh and Potable Water

Industrial water is required to supply the plant with a flow between 60 and 80 L/s continuously and sustainably during 365 days a year for 20 to 40 years.

Vertical Electrical Sounding (chapter 9.6) and drilling (chapter 10) have identified a source of industrial water over the fan of Archibarca, near the future lithium carbonate processing plant. Drilling is currently being carried out to ascertain its hydraulic properties and the company continues to explore in other areas of the Olaroz-Cauchari Salar perimeter.

Water supply wells installed in the Archibarca Fan will be relatively shallow, to ensure that they draw only shallow freshwater. However, even though the wells will be shallow, it is expected that they will produce relatively high yields due to the permeable nature of the fan sands and gravels.

A preliminary estimate of average well yield is similar to that of the salar wells (12 L/s, as discussed in Section 9.9). The estimate is based on the counter-balancing effects of shallower freshwater wells (less yield potential) and more permeable fan materials (more yield potential).

Water will be used for industrial purposes.

The aquifer to be used for such purposes must meet certain hydrochemical parameters such as having low Mg, As, SO_4 and B values.

Geophysical studies and drilling being conducted currently indicate that:

- The Archibarca fan is a sediment accumulation unit formed by gravel and thick sands which become finer sediments in distal areas. In the apex of the fan there is a water-meadow, which is supplying the pilot plant with freshwater. This water source was used to satisfy the needs for construction of embankments for accessing the exploration wells, carried out in the salar.
- It is noted that water enters the permeable fan sediments from direct vertical infiltration and lateral inflow from up-slope areas.
- From a hydrogeological point of view, the fan sediments represent a promising aquifer.
- Exploration well, DDH-06, located at medium distance from the fan, was sampled using a low flow pump; the geochemical and physical profiles clearly show that there is a differentiation in three areas:
    - Fresh water
    - Brine and fresh water mix (brackish water)
    - Brine in the lower part

17.3.6.1 Conclusions

The main conclusions of these studies indicate that:

- The presence of a freshwater layer was determined using geoelectrics, in the studied area of the Archibarca fan, variable thickness, partly confirmed by the chemical analyses of well DDH-06.
- Drilling is currently being carried out to ascertain its hydraulic properties.

Development:

- Drilling will reach a maximum of 50 metres depth but shallower wells are considered, as the base of the aquifer should not be reached in order to avoid mixing with the salt water of the conductive layer.
- An estimate of the existing volumes in the aquifer and recharge will be conducted, in order to plan a sustainable extraction.
- Geophysical explorations continue to be conducted in areas near the Olaroz-Cauchari Salar, with no data to date.

17.3.7 Fire Protection

Installations shall be equipped with a fire protection system. This system, which will be supplied with water from the main fire water tank, will allow fighting fire emergencies throughout the whole plant.

In SX area, where boron removal takes place and whose fire risk is greater, a foam based fire fighting system will be installed. This system includes fire detectors and its activation can be either automatic or manual.

17.3.8 Sanitary Treatment and Waste Disposal

Effluents from the Lithium carbonate plant sanitary installations will be treated in a waste water plant. These will be disposed off in avoiding pollution, in accordance with existing environmental regulations.

17.3.9 Power Supply and Distribution

As indicated later in section 17.8.5.1, a CHP of a 13 MW net power capacity will be installed at the site. These units normally produce electricity at 6.3 kV. Basically, power will be split in two lines that will derive from the power unit. One line, at the production voltage, will feed the pumps at the ponds and wells in the field, through appropriate step down transformers. The other line will feed the plant and camp through two parallel 6.3 kV/380 V transformers.

17.4 Tailings Disposal

17.4.1 Site Selection Study Summary

Several possible sites for the evaporation ponds for the plant's industrial liquid wastes were analyzed. A location close to the plant was chosen and which presents no risks to populated areas. A total of 32 ha are required for this purpose.

17.5 Tailings Dam Construction

The Lithium carbonate plant produces liquid and slurry wastes. These are sent to evaporation ponds, whose volume is greatly reduced using the area's evaporative capacity. These ponds are normally lined with water proof lining materials, to avoid soil contamination. Left over salts are harvested and transported to the waste dumps described in section 17.1.9.

17.6 Environmental Considerations

17.6.1 Introduction

Lithium Americas Corp. has contracted Ausenco Vector to carry on an environmental, social and community relations study so that, once the economic assessment of the project has been completed, it is possible to develop an environmental impact study of the project, thus complying with the environmental permits in force in Jujuy, Argentina, and also with international standards.

17.6.2 Permitting and Authorities

Argentina has a federal system for managing natural resources. Therefore, the province of Jujuy is responsible for granting environmental and social permits. The Provincial Government of Jujuy (Dirección Provincial de Minería y Recursos Energéticos) approved the LAC Environmental Impact Report (the "EIA") for the Cauchari-Olaroz Project exploration work, by Resolution No. 25/09 on August 26th, 2009. Subsequent EIA updates have been presented to accurately reflect the ongoing exploration program; they include an updated 2009 EIA (with topographic and geophysical studies, construction of an embankment, opening of borrow pits, and new exploration wells). Also, the EIA was expanded to install a brine enrichment pilot plant. This expansion is currently under revision following the Provincial Decree 7592 from March 2nd 2011 expanding the analysis of the lithium project for environmental approval for 7 more members. LAC has also obtained a license for extracting groundwater to meet water supply requirements for the exploration program. This license was granted by the provincial water authority (Dirección Provincial de Recursos Hídricos) in Jujuy and is in good standing, with all applicable tariffs paid to date. Decree 7592 mentioned above recognizes lithium as a strategic natural resource acting as a socio economic development generator for Jujuy province.

The third relevant authority is the Tourism and Culture Secretariat, where the permits to operate in areas with potentially archaeological and paleontological interest areas, and salt pan rim, are requested (Provincial Act No. 4133/84, and National Act No. 25743/03).

Last, there is the Environment Secretariat, which is part of the environmental and hazardous waste control authority, and coordinates the Bureau of Protected Areas. The Olaroz-Cauchari salt pan (Act No. 3820/81) is a Multiple Use Protected Area, which allows for mining activities, but has a specifically designed control system, aimed at favouring the vicuña populations.

17.6.3 Environmental Commitments

LAC firmly adhered to the Equator Principles[10] even before exploration operations started. Those principles are a voluntary commitment, which arose from an initiative of the International Finance Corporation (IFC) a branch of the World Bank, to encourage sustainable investments from the private sector in developing countries. Financial entities which adopt them undertake to assess and consider the social and environmental risks of the projects they finance in developing countries and, therefore, to grant loans only to those which evidence a correct management of their social and environmental impacts, such as biodiversity protection, use of renewable resources and waste management, human health protection, and population movements.

[10] Equator Principles: http://www.equator-principles.com

In that framework, LAC established from the very beginning that the Equator Principles are the minimum standards to develop the project, adopting the following measures:

- Making all necessary efforts to understand and respect customs, traditions, life styles, and local needs.
- Committing to accomplish country regulations
- Establishing safety as paramount for its own personnel, consultants, and contractors.
- FPIC (free, prior, informed consultation) will be granted. Thus, rights of neighbouring communities to information will be respected. Open, two way communications will be permanently maintained; before initiating every stage of the project nearby communities will be given information.
- Whenever possible relationships with communities will be formalized through agreements that define roles and responsibilities; they will be used to reduce the risk of misunderstandings in reference to the very presence of LAC in the area, its activities and intentions.
- Rights of indigenous people: as defined in ILO Indigenous and Tribal Peoples Convention 1989 (No. 169) will be acknowledged and respected.
- LAC commits to keep record of all agreements, minutes of meetings with communities, and regular reports related to negotiations with surface owners.
- Community relations team will manage this process following specific programs; LAC's CEO will be informed regularly and directly about them.

17.6.4 Baseline Studies

Environmental baseline studies started in October, 2010. So far, the flora and fauna (summer survey), soil and soil use, sociological study, opinion survey, archaeological-paleontological, hydrology, water quality, air quality and limnology campaigns are over.

Still to come are flora and fauna (autumn and winter) surveys. Also, climate, hydrogeology, glaciers, conservation status, and landscape studies are to be completed.

A brief summary of ongoing studies is presented.

Climate: The Olaroz-Cauchari Project is located in the arid Puna Region. The main climate data were obtained from nearby weather stations. The project is affected by strong, persistent westerly winds, particularly in the warmer months (October to May). Average annual temperature is 5.1°C and annual average minimum and maximum temperatures are -6.6°C to 15.6°C respectively. The average annual rainfall is about 50 mm. An automatic recording weather station has been set up, and has been in operation for almost a year. Particular attention is being paid to on-site evaporation data.

Water Quality: Surface and ground water studies must be completed. In general, water quality is poor and the baseline data are compared to the Water Quality Standards established by the Water Quality Reference Levels under the National Act No. 24585 Annex IV.

Air Quality: The air quality baseline was conducted and the different elements measured (PM10, nitrogen dioxide, sulfur dioxide, carbon monoxide, ozone, photochemical oxidizers, hydrogen sulfide and lead) were all below the established Environmental Air Quality Standards.

Soils: Soils in the Olaroz-Cauchari Salar area generally present severe limitations (climatic conditions, salinity, high risk of water and wind erosion, and shallow depth) which make them generally unsuitable for cultivation and restrict their extensive grazing use, considering animal loading and rotation.

Using satellite images and in-situ surveys (test pits and horizon sampling), 8 soil units were defined: Pailas Series, Lajita Series, Condorhuasi Series, Turu Tari Series, El Carrizal Series, Orosmayo Association, Unquillar Association, and Cauchari Complex. According to the soils taxonomic classification, they belong to the *Entisols* order, and to the *Typic Torrifluvents* and *Typic Torripsamments* sub-groups.

Land use: The soil units were classified according to their use capability in *Class VII* and *Class VIII*, which are marginal soils used for extensive livestock breeding, tourism, and mining activities. In this regard, the salt pan has an exclusive mining use (borates, potassium, lithium), and wild livestock/fauna in the salt pan's boundaries.

Flora: Scattered shrubby and sub-shrubby vegetation covers most of the surface of the Olaroz-Cauchari salt pan rim area. The shrubby steppe and the gramineous shrubby steppe of the rim areas are the most important sectors for livestock, since they present the highest available grazing levels. These units have added value, as they provide shelter to sheep during the calving periods and birds use them as nesting sites.

Fauna: The fauna baseline study is not completed yet. It can be said, though, that the project area is located within the Puna province, characterized by a combination of typical Puna and High Andean elements.

Generally speaking, fauna is scarce, and it is only possible to see reptiles, passerine and scavenger birds, vicuñas, and traces of tunduque rodents.

The Base Line Survey will define the endangered animal species in the Project Area. However according to Narosky and Babarskas (2000) Classification, two species were classified as exposed to some risk in the Puna Area, the Vicuña (*Vicugna vicugna*) and the Gato Andino (*Felis jacobita*).

Landscape: A visual analysis of the landscape units of the Olaroz-Cauchari Project shows that most parts of the territory lack outstanding aesthetic attributes. However, Route 52 goes through the project area and currently, the saline plains have been given more aesthetic relevance, being special attraction points for the tourism of arid zones.

Paleontological study: Based on the surveyed previous information and the results drawn from this study, it can be concluded that the area lacks any paleontological relevance. Most formations observed correspond to intrusive bodies with no fossiliferous potential.

Archeological study: LAC has prepared an inventory of known archeological sites in the Department of Susques. The archeological survey campaigns were conducted and the results of the surveys are being studied.

Social aspect: The project is located in Pastos Chicos community´s territory (188 inhabitants). Another four local indigenous communities are located in the vicinity: Olaroz Chico (334 people), Huancar (375 inhabitants), Catua (600 people) and Puesto Sey (197 inhabitants). LAC has designed and implemented a special community relations program for long-term cooperation with them. All these communities are located in the Susques department of Jujuy province. Its capital is Susques (3,757 inhabitants), located at approximately 60 km by road from Cauchari project.

Population directly linked to the Project is mostly rural, and identified as Atacama indigenous communities. They are generally dedicated to rural activities, and their distribution in space responds to small-scale livestock breeding activities.

All communities share similar features, except for the Susques village, which has a more urban structure and greater job opportunities, mainly in public administration.

The main economic activities in the town of Susques are public service, commerce, livestock breeding and artisanal and small tourism industries. The main activities in the other locations are mainly related to mining and livestock breeding.

A social baseline study conducted in the area has provided information regarding population, education, health and relations in the previously mentioned communities.

17.6.5 Impacts

Once the mining project, its process and its economic feasibility have been defined, the Environmental Impact Study will be completed. Pursuant to a general work plan and to previous environmental studies, the main impacts arising from the project have been identified.

During the project construction and operation stages, there will be moderate impacts on the environment, which can be reverted or mitigated in the short, medium, and long terms. The following major impacts were identified:

- A change in soil use and diversification of land use.
- A groundwater temporary reduction due to the drainage of the underground extraction from brine
- An alteration of the topography and soils due to the construction of permanent salt pans and evaporation ponds.
- An increase in noise levels due to the use of equipment, machinery and vehicles, and the operation of the process plant.
- Decrease in air quality due to the emission of particles and combustion gases resulting from salt pan operations, disposal of salt, construction of dumps, process plant operation, and use of equipment, machinery and vehicles.

- An alteration of the flora processes and population dynamics due to the emission of dust and air contaminating pollutants produced by project operations.
- An alteration of fauna habitats due to partial reductions of vegetation coverage, emission of noises and vibrations and human settlements.

Additionally, there will be other potential impacts due to the geographical location of the project and the types of activities:

- Potential of subsidence of the salar over the area being pumped.
- Quality of underground and surface water due to unexpected spills.
- Impact on potential archaeological resources and/or the cultural heritage due to uncontrolled excavation.
- Reduction of fauna populations caused by the inappropriate operation of equipment or machinery that might displace, burry, or run over some species of fauna.
- Impact on the biological corridor due to the installation of infrastructure in the Salar.

The project development will have socioeconomic impacts on the Susques community, resulting in both negative and positive changes, such as:

- A profile modification of the urban centres due to a higher immigration rate and associated effects, such as temporary housing shortage and the consequent increase in house prices and rental rates, and social problems related to health and safety issues caused by a higher number of people working in the project site and deficiencies in the available infrastructure of schools and health centres.
- An increase in the cost of living resulting from a higher purchasing power of the local population working in the project, which would especially affect the cost of living of people not involved in it. This higher purchasing power of a part of the population would increase the local cost of living of the population depending on its relative relevance in the community.
- Impact on the sense of well-being of the local population due to the availability of vehicles to transport the personnel to and from the project site. Larger vehicle traffic might affect local population or visitors using local roads, as there will be an increase in traffic, dust and noise.

Based on these parameters, the profile modification of the urban centres and the increased costs of living would result in moderately important impacts due to their relevance and duration. The remaining impacts are not considered significant. In contrast, the project development will produce a moderately positive impact on the direct and indirect employment rate, resulting in a more dynamic labour market both locally and provincially. The economic impact will be increasingly positive as the project operations generate higher revenues and benefits. There will be very important rewards in terms of added value, since the project will generate local benefits through the payment of tax and royalties and employees' wages.

The location alternatives for each of the Project components will be analyzed. Once the Project is defined, the project-environment relation matrix will be adjusted, and the environmental monitoring and management plans will be defined, as well as the environmental contingency plans.

17.6.6 Community Relations Plans

LAC has developed a plan that promotes social and economical development in a sustainable framework. LAC started working on a Community Relations Plan in the Susques department in 2009.

This Plan was created in order to integrate local communities by using participatory programs and projects aimed at having a positive impact.

The Susques village is the area's most important business center, where all inputs and necessary services for developing the Project come from. In turn, the Plan is focused in the Catua, Olaroz Chico, Huancar, Pastos Chicos, and Puesto Sey communities. The project is located in Pastos Chicos community´s territory (188 inhabitants).

These communities are made up of Atacama indigenous peoples; they all have legal status and community deeds for their land. Regional economy is based on two productive activities: small-scale camelid raising, and working for mining companies.

The community relations plan was divided in several programs. A communications one, aimed both externally and internally to bring regular information and to show transparency. The consultation program allows LAC to know perceptions of its mining activities. A third program that deals with agreements to be signed and accomplished with communities insures business fairness and builds confidence. Possibly the most important is the one that supports social, cultural, and environmental initiatives. Criteria to choose initiatives are: must benefit the whole population, must also contribute to sustainable development, and must be participative, while at the same time must have its origin in the population itself. It must also be mentioned that LAC has signed formal agreements with all six surrounding communities, the Project surface owners. According to them, inhabitants guarantee LAC the use of their land for different mining activities, and the company ensures them a regular flow of funds, which community members discuss how to use.

17.7 Marketing Study

This section presents a brief summary of the "Lithium Market Report, Outlook 2010-2019 and Long Run Forecasts" produced by Gestión y Economía de Minerales Ltda. of Santiago, Chile (GEM Ltda.), for ARA WorleyParsons in October, 2010, for the purposes of this study.

17.7.1 Introduction

Lithium is a metal with many final uses, and is widely used in the aluminum industry, for glass and ceramic manufacturing, greases and lubricants, continuous casting, air treatment, rubber and thermoplastic manufacturing, pharmaceuticals and batteries. Major consumers of this metal are countries and regions such as: USA, China, Japan, Europe, South Korea, Canada and Russia.

Currently, lithium production is concentrated amongst 4 companies: Talison (Australia), SQM (Chile), Chemetall (USA and Chile) and FMC (Argentina). Their combined market share accounted for 83.5% of world lithium production in year 2009, SQM being generally considered the leading producer, in spite of Talison having a larger market share in 2009. In terms of operations, Talison produces lithium concentrates from mineral pegmatite in Australia, while the other 3 companies produce lithium from brines, mainly in Salar de Atacama (SQM and Chemetall, in Chile), Salar del Hombre Muerto (FMC, in Argentina) and at Silver Peak (Chemetall, in Nevada, USA).

The production of lithium ion (Li-Ion) batteries for electric and hybrid cars is expected to increase lithium demand, for this reason the automobile industry is expected to be the most important driver for lithium demand.

17.7.2 Supply Analysis

Possible sources of lithium are continental brines, geothermal brines and oilfield brines, as well as from mineral sources corresponding to pegmatites and clay mineral hectorite. Among these sources, just a few have the conditions for profitable extraction of lithium. In this manner, we consider in the study those pegmatites having the highest amount of lithium content and continental brines, the latter having a competitive advantage due to lower extraction and processing costs. For this reason, lithium world production is led by ore bodies associated to continental brines. Lithium production from continental brines represented 57.6% of total production for the year 2009, while lithium production from mineral deposits represented the remaining 42.4%, which came mainly from Australia, China, Zimbabwe and Brazil.

In general terms, lithium concentration increases the value of the ore body. Similarly, the presence of other minerals, such as potassium, also increases the value of the deposit. Additionally, the value of the deposit increases with the evaporation rate, as this accelerates the production process. On the contrary, a high Mg/Li ratio reduces the value of the brine deposit, as this makes the production process more costly. Table 17.2 shows the estimated resources from brines and mineral deposits for the year 2008.

Table 17.2: Estimated resources of lithium (metal) by type, country and tonnage 2008).

Type of resource	Country	Tonnes (000)
Continental Brines	Chile	7,120
	Bolivia	5,500
	Argentina	3,035
	China & Tibet	5,000
	USA	1,592
Other Brines	USA	1,066
World Total Brines		**23,313**
Pegmatites	USA	3,365
	D.R Congo	2,300
	China	1,265
	Russia	1,000
	Australia	255
	Other countries	654
Hectorites	USA	2,000
World total (Lithium tonnes)		**34,151**

Source: K. Evans (2008), Yaksic and Tilton (2009) and GEM estimates

It should be noted that Argentina, along with Chile and Bolivia, comprises the "Lithium Triangle", which hosts about 70% of the world's lithium brine deposits.

It is also possible to establish an approximate operating cost range for the different types of deposits. In this way, it is possible to compare the competitive advantages of each one through the different types of deposits and extraction techniques, as shown in Figure 17.6

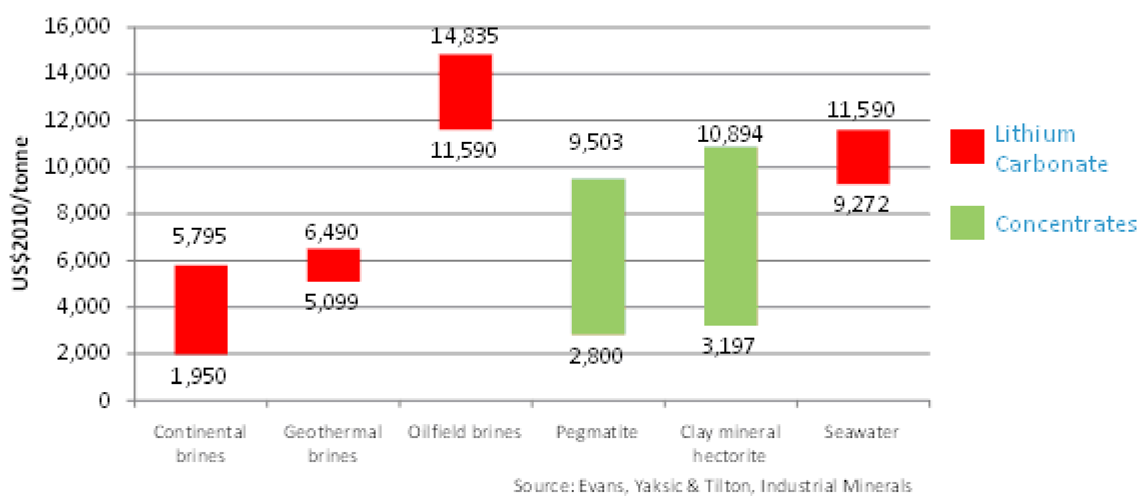


Figure 17.6: Production Cost Estimates, 2010

Regarding end products, the extraction process associated to continental brines produces directly lithium carbonate as a final product. On the other hand, lithium produced from mineral deposits is obtained firstly as lithium concentrates, which need an additional costly process step to turn into lithium carbonate.

17.7.3 Demand Analysis

Lithium consumption has shown a rising trend during the 2000-2009 period, growing at a 6.2% annual compound rate. Excluding the 2009 crisis year, compound annual growth rate in lithium use is 9.6%. Figure 17.7 shows world consumption during this period for LCE.

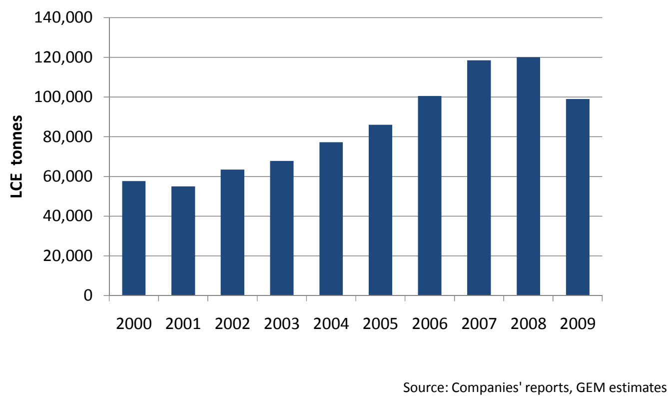


Figure 17.7: World Consumption, 2000-2009. Lithium Carbonate Equivalent (LCE)

17.7.4 Market Forecasts 2010 – 2019

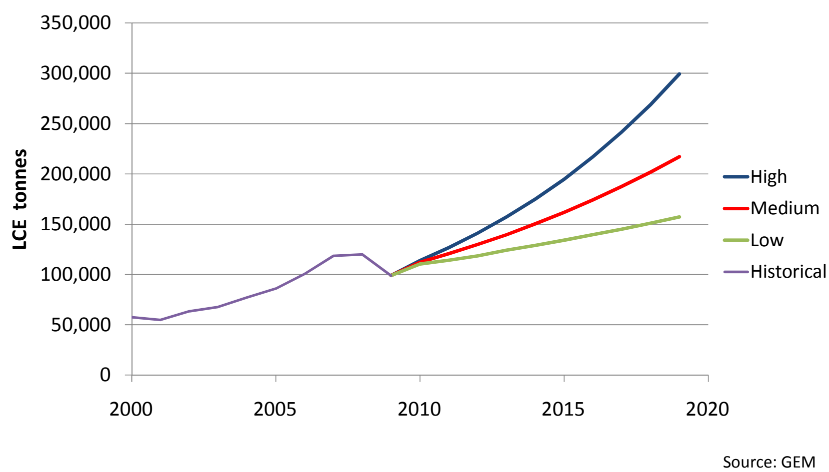


Figure 17.8: Lithium short term consumption forecast, 2010-2019. Summary

On the basis of three different assumptions for the market penetration of lithium battery electrical cars, GEM built the above shown short term lithium consumption forecast.

Long run projection takes into account a stable growth rate demand from year 2021 until year 2034. GEM's estimations consider that the high, medium and low demand scenarios will have long term LCE consumption growth rates of 7%, 5% and 3%, respectively. Figure 17.9, shows the LCE consumption trends for each scenario in the long run (2020-2034).

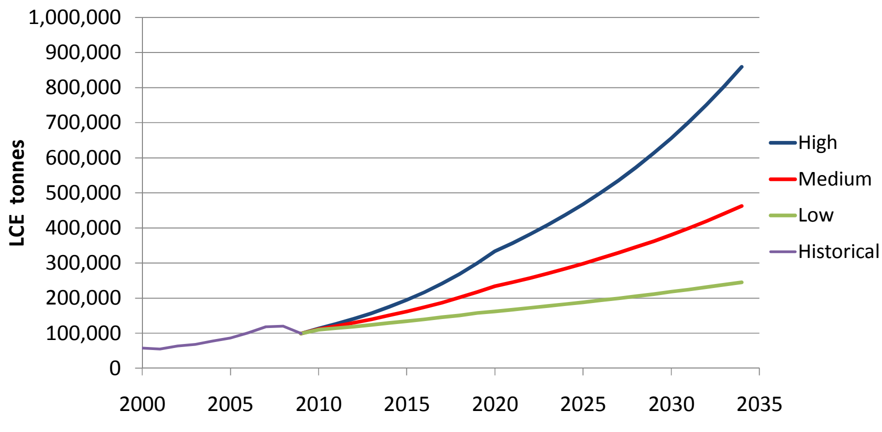


Figure 17.9: LCE long run consumption curve. Summary

17.7.4.1 Industry Capacity

With the objective of determining the short run supply, GEM classified all new lithium projects that have appeared in the media. Using this information, GEM estimates that there are currently 65 projects in different stages of progress. This analysis allows to build a short term supply curve for LCE, according to three different demand scenarios.

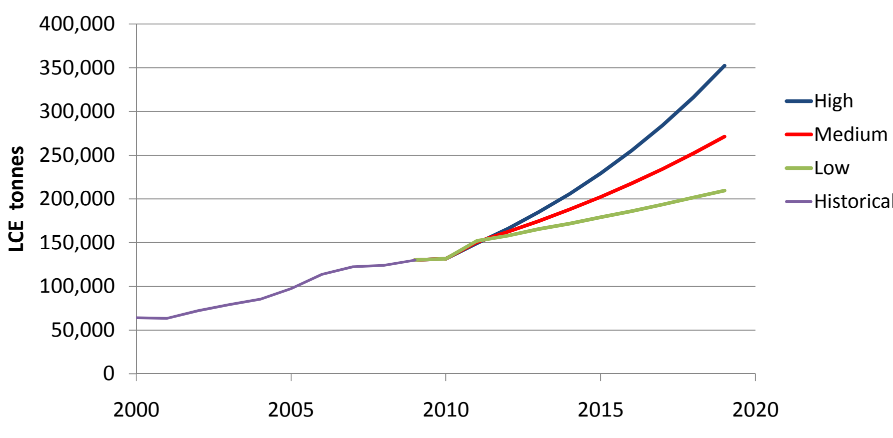


Figure 17.10: Lithium capacity forecast, 2010-2019. Three different scenarios.

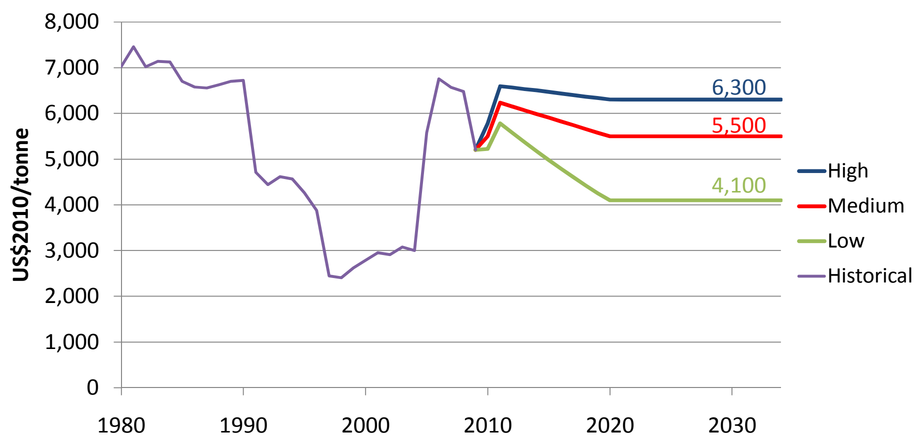
17.7.4.2 Lithium Price

Using these demand and capacity forecasts, an econometric model was developed by GEM that related price with lithium demand and the capacity utilization of industry. The data set used to calibrate the model goes from 1960 to 2009. Table 17.3 shows GEM's price forecast for each demand scenario while Figure 17.11 plots these values.

Table 17.3: Lithium Carbonate Price forecast 2010-2019 (US$2010/tonne).

	Demand Scenario		
	High	**Medium**	**Low**
2010	5,800	5,500	5,200
2011	6,600	6,200	5,800
2012	6,600	6,100	5,600
2013	6,500	6,100	5,400
2014	6,500	6,000	5,200
2015	6,500	5,900	5,000
2016	6,400	5,800	4,800
2017	6,400	5,700	4,600
2018	6,400	5,700	4,400
2019	6,300	5,600	4,300
2020 – 2034	6,300	5,500	4,100

Source: GEM



Source: GEM

Figure 17.11: Lithium carbonate price estimation curve, summary

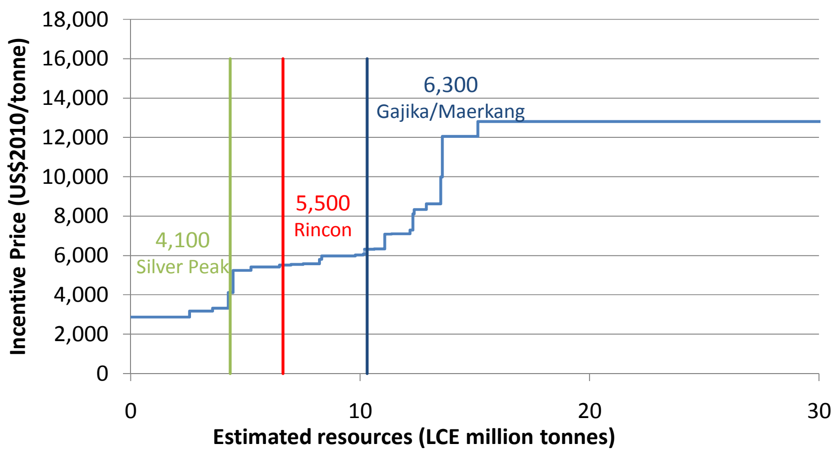
From Figure 17.11 it is possible to see that prices recover in all three scenarios in years 2010 and 2011, due to an increase in lithium demand driven by a recovery in the global economy which is not met with an increase in capacity. However, after these two years, in all three scenarios a price drop is expected, in order to obtain market equilibrium. New projects and current capacity allows supply to meet demand, which causes the short run prices to converge towards the long run price in each scenario starting from 2020. This phenomenon is explained in the following section.

17.7.5 Long Run Forecast

To determine the long run price for the lithium market, the incentive price technique was used. This technique assumes that the long run price will be such that it induces the long run supply to meet demand. The long run supply curve is built by arranging operating deposits and estimated resources according to their incentive price, which include production costs plus overhead costs, royalties and capital costs. Thirty three deposits were considered for this purpose.

Afterwards, to determine the long run price using the incentive price technique, these resources are consumed in order from low to high average costs according to the different future demand forecasts, until the long run accumulative demand is reached.

To determine the long run lithium carbonate price, the long run accumulative demand curve must intersect the long run supply curve. Finally, the intersection of both curves gives the price for each scenario, as seen in Figure 17.12.



Source: GEM

Figure 17.12: Determining long run LCE price, using medium cost long run supply curve

Finally, Table 17.4 shows the LCE long run price. This price is the result derived from the previous analysis of taking the supply and demand curves forecast and intersecting them.

Table 17.4: Long run prices for each demand scenario.

Demand Scenario	Consumption 2010-2034 (Million LCE tonnes)	Long run price (US$2010/tonne)
High	10,311,468	6,300
Medium	6,635,667	5,500
Low	4,338,396	4,100

Source: GEM

17.8 Capital Cost Estimate

Main objectives for determining the capital costs for the lithium carbonate facilities and plant are a) to provide a first estimate of the total project CAPEX for budget purposes, b) to identify and evaluate processes and facilities that provide the best balance between initial and operating costs, c) to provide the necessary data for the initial economic evaluation of the project, and d) to provide guidance for the following engineering phase.

This estimate should be understood as a WorleyParsons Class 2 estimate, meaning that its accuracy is ± 30%. Contingency levels have been estimated separately for major capital items and established accordingly to the quality of the information available for each of them. Contingency values are included in the reported capital costs.

17.8.1 Capital Expenditures - CAPEX

Capital expenditures are based on an operating capacity of 20,000 tonnes of lithium carbonate per year, while design capacity is 22,500 tonnes per year of the same product, for each of the plant's two modules. Capital equipment costs have been taken from in-house data and solicited budget price information.

The estimates are expressed in fourth quarter 2010 US dollars. No provision has been included to offset future cost escalation since expenses, as well as revenue, are expressed in constant dollars.

The capital costs include direct and indirect costs for:

- Brine production wells
- Evaporation and concentration ponds
- Lithium carbonate plant
- Gas pipeline construction
- General Infrastructure, including water supply, Combined Heat and Power Plant, among others.
- Contingencies, salaries, construction equipment mobilization, among others.

The capital investment for the two 20,000 TPA phases of the Cauchari project, including equipment, materials, indirect costs and contingencies during the construction period is estimated to be US$ 399 million. This total excludes interest expense that might be capitalized during the same period. Working capital requirements are estimated to be US$ 7.3 million, in addition, sustaining capital expenditures total US$ 70.5 million over the 20 year evaluation period of the project. Disbursements of these expenditures start in year 5.

Total capital expenditures are summarized in Table 17.5.

Table 17.5: Capital Cost Estimates Summary by Area (US$ 000)

Description	1ST Phase Total Projected Budget US$000	2ND Phase Total Projected Budget US$000	TOTAL Total Projected Budget US$000
Brine Production Wells			
Direct Costs Subtotal	6,794	6,114	12,908
Production Wells Subtotal	**6,794**	**6,114**	**12,908**
Evaporation and Concentration Ponds			
Direct Costs Subtotal	93,391	88,722	182,113
Evaporation And Concentration Ponds Sub Total	**93,391**	**88,722**	**182,113**
Lithium Carbonate Plant			
Direct Costs Subtotal	51,174	39,659	90,834
Indirect Costs Subtotal	15,416	10,000	25,416
Lithium Carbonate Plant Sub Total	**66,590**	**49,659**	**116,250**
General Infrastructure			
Direct Costs Subtotal	16,173	6,788	22,962
Indirect Costs Subtotal	1,710	723	2,433
Infrastructure Sub Total	**17,883**	**7,512**	**25,395**
D.C. + I.C. Sub Total	**184,658**	**152,007**	**336,665**
Contingencies Sub Total (18% & 19%)[11]	**32,495**	**29,424**	**61,919**
General Total Plants, Ponds & Infrastructure	**217,153**	**181,431**	**398,584**

Capital Expenditures for the second phase of the project are lower than those of the first phase due to synergies between the two production modules and assumed higher construction efficiencies.

[11] Contingencies are calculated separately for each major investment category.

17.8.2 Brine Production Wells

The preliminary estimate of average brine well productivity in the Cauchari Salar is expected to be 12 L/s, as discussed in Section 9.9. The estimated number of brine production wells is provided in Table 17.6, based on average well yield and a brine requirement of 345 L/s. As indicated in the table, the preliminary estimate of total brine production wells is 40, including an assumed six reserve wells that would be used to replace units that are unavailable due to maintenance or other reasons.

Table 17.6: Production Well Estimate

Total brine required[12]		m^3/yr	10,885,150
Total brine required		L/s	345
Brine requirement for well number estimate		L/s	400
Estimated Average Well Brine Output ± 30%		L/s	12
Number of wells required		no.	34
Reserve wells	15%	6	6
Total Production Wells required		**no.**	**40**

Per well costs were taken from a quote by ANDINA PERFORACIONES S.R.L., the firm which is currently performing this type of work for LAC.

Capital expenditures for the production wells are summarized in Table 17.7.

Table 17.7: Production Wells Capital Cost Estimate [13]

	Description	Total 1ST Phase US$000	Total 2ND Phase US$000	Total Price US$000
A	**DIRECT COSTS**			
A.4.1	Drilling and Completion of Brine Production Wells	5,790	5,211	11,000
A.4.2	Special Drilling Fluids & Replacement of Tools (10% Wells Value)	579	521	1,100
A.4.3	Pumps	425	383	808
	DIRECT COSTS SUB TOTAL IN US$	**6,794**	**6,114**	**12,908**
	CONTINGENCIES (15%)	**1,019**	**917**	**1,936**
	PROJECT TOTAL IN US$000	**7,813**	**7,031**	**14,844**

[12] Estimate based on ARAWP report of 11/23/2010

[13] It has been assumed that a 10% higher efficiency in construction and procurement can be obtained for this item in the second phase of the project.

17.8.3 Evaporation and Concentration Ponds

The capital cost estimate prepared for the evaporation and concentration pond facilities is based on a production rate of 20,000 TPA of lithium carbonate, per each of the two producing modules. Taking into consideration lithium yield in the evaporation process and plant process efficiency, total pond surface requirements are 1,332 ha for the process, while 148 ha for pond harvesting and maintenance and 34 ha to serve as effluent evaporation ponds.

Table 17.8: Evaporation and Concentration Ponds Surface Estimate

Description	
Production Goal (tonne/yr)	**20,000**
Required Ponds Surface in Production (ha)	666
Required Harvest & Maintenance Ponds Surface (10%) (ha)	74
Effluent Ponds (ha)	17
REQUIRED TOTAL PONDS SURFACE	**757**

Cost of evaporation and concentration ponds is estimated at US$/m^2 12.33. This figure has been obtained from a budget estimate prepared for this effect by Magna Construcciones S.R.L., firm which has already constructed the existing 1 ha test pond in the salar. Unit cost mentioned includes earth movement and construction, lining materials, pumps and piping, and electrical line costs, as well as indirect costs

Capital expenditures for the evaporation and concentration ponds are summarized in Table 17.9.

Table 17.9: Evaporation and Concentration Ponds Capital Cost Estimate[14]

Description		Total 1ST Phase US$000	Total 2ND Phase US$000	Total Price US$000
A	**DIRECT COSTS**			
A.5.1	Construction of evaporation ponds	74,713	70,977	145,690
A.5.2	Construction of concentration ponds	18,678	17,744	36,423
	DIRECT COSTS SUB TOTAL IN US$	**93,391**	**88,722**	**182,113**
	CONTINGENCIES (20%)	**18,678**	**17,744**	**36,423**
	PROJECT TOTAL IN US$000	**112,069**	**106,466**	**218,535**

14 It has been assumed that a 5% higher efficiency in construction and procurement can be obtained for this item in the second phase of the project.

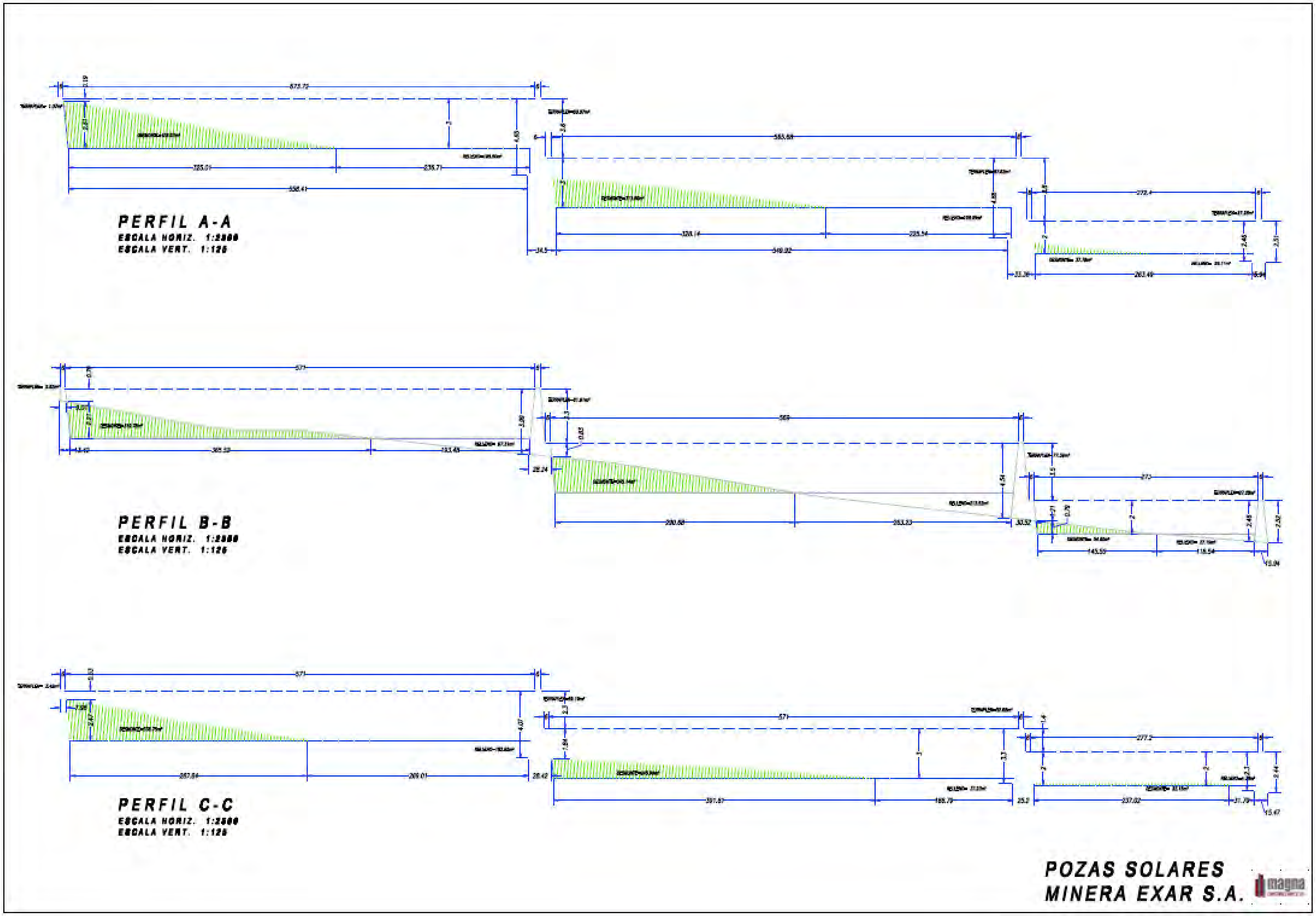


Figure 17.13: Magna's Ponds, Cross Section

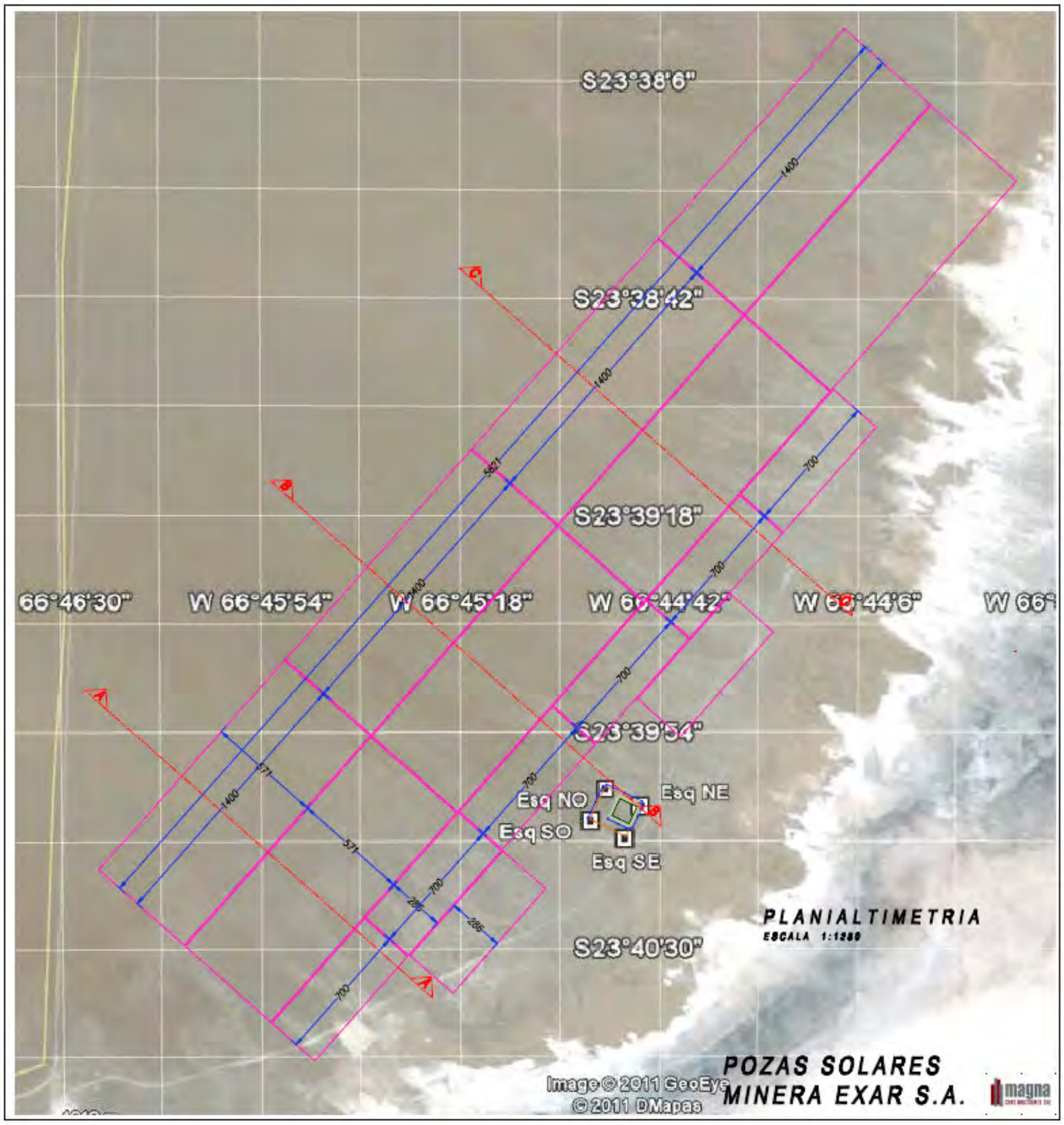


Figure 17.14: Magna's Ponds, Planimetric and Altimetric Mapping

17.8.4 Lithium Carbonate Plant

The capital cost estimate prepared for the lithium carbonate plant considers a production rate of 20.000 TPA of lithium carbonate in each of the project's two plant modules.

The direct cost estimate for the construction and equipment of both lithium carbonate plant is US$ 90.8 million and total cost, including, indirect costs and contingencies, as well as direct costs is US$ 136.7 million. This cost has been determined on the basis of ARAWP experience on this type of plants and includes varying contingency margins.

Capital expenditures for the lithium carbonate plant are presented on Table 17.10.

Table 17.10: Lithium Carbonate Plant Capital Cost Summary

Description		1ST Phase US$000	2ND Phase US$000	TOTAL US$000
		Total Projected Budget $000		
A	**DIRECT COSTS**			
A.1	Lithium Carbonate Plant	47,218	37,060	84,278
A.1.1	Brine Storage and Distribution	302	227	529
A.1.2	SX Boron Plant	4,887	4,887	9,774
A.1.3	First Purification Stage	6,050	6,050	12,099
A.1.4	Second Purification Stage	5,158	5,158	10,317
A.1.5	Slaked Lime	415	208	623
A.1.6	Carbonate Precipitation	1,241	1,241	2,482
A.1.7	Soda Ash	3,760	1,880	5,640
A.1.8	Drying and Filtering	4,299	4,299	8,598
A.1.9	Compacting	4,639	4,639	9,278
A.1.10	Granulation	849	849	1,698
A.1.11	Micronization	1,624	1,624	3,248
A.1.12	Product Packaging	1,171	1,171	2,342
A.1.13	Water Supply, Storage and Distribution	1,192	358	1,549
A.1.14	Electric Supply and Distribution	1,367	683	2,050
A.1.15	Air for Plant Instrumentation	548	274	822
A.1.16	Fuel Supply and Distribution	107	107	214
A.1.17	Thermal Unit	328	246	575
A.1.18	Acid Wash System	134	27	161
A.1.19	Discard Process Management System		2,017	1,008
A.1.20	Fire Protection System (SX)	965	482	1,447
A.1.21	Offices and Laboratory	906	272	1,177
A.1.22	Maintenance Workshop	542	-	542
A.1.23	Products Warehouse	2,203	661	2,864
A.1.24	Weighing Steelyard	150	-	150
A.1.25	General	2,365	709	3,074
A.2	Spare Parts	1,099	1,099	2,199
A.3	Freight and Customs Expenses	2,857	1,500	4,357
	DIRECT COSTS SUBTOTAL	**51,174**	**39,659**	**90,834**
B	**INDIRECT COSTS**			
	INDIRECT COSTS SUBTOTAL IN US$	**15,416**	**10,000**	**25,416**
	TOTAL (D.C. + I.C.) IN US$	**66,590**	**49,659**	**116,250**
	CONTINGENCIES (Var)	**10,477**	**9,932**	**20,409**
	PROJECT TOTAL IN US$	**77,068**	**59,591**	**136,659**

17.8.5 Infrastructure

17.8.5.1 Combined Heat and Power Unit

On the basis of an engineering estimate of energy requirement of 1.2 kWh/kg of lithium carbonate, a 6.1 MW power requirement for the lithium carbonate plants was determined. Additionally, estimates indicate a power requirement of 1.9 MW at the wells, a 1.0 MW requirement at the ponds and a 0.7 MW requirement for lighting, camp, office and shops, for a total project power requirement of 9.7 MW. To supply this electrical load, it was deemed necessary to install at the site a net power capacity of 13 MW, leaving a substantial (34%) safety margin. It was also deemed feasible to supply the heat requirements of the lithium plant with excess heat from the power unit. Cost of US$ 17.4 million for this facility was obtained from a budget quotation received from Magna Construcciones S.R. L., to which ARAWP added the cost of heat recovery boiler that was not included in this budget and subtracted the cost of the pond electrical distribution system, included in the pond's costs in our budget.

Table 17.11: Capital for Lithium Combined Heat and Power Unit

Description	Total 1ST Phase US$000	Total 2ND Phase US$000	Total Price US$000
Revised Magna Construcciones S.R.L. Quote	6,459	5,536	11,995
Civil Works	650	350	1,000
Electric Infrastructure	1,095	650	1,745
Recovery boiler	500	400	900
TOTAL IN US$	**8,704**	**6,936**	**15,640**
CONTINGENCIES (11%)	**983**	**764**	**1,746**
TOTAL CHP UNIT	**9,687**	**7,700**	**17,387**

Cost is based on the use of 13 CUMMINS – C1540 N5C natural gas powered motor generator units of 1.54 MW each, for a total installed power of 20 MW. However, it is to be noted that at the nearly 4,000 m altitude of the project, a substantial derating of the power units applies. Derating at the site has been estimated as 35%, giving a net installed power capacity of 13.0 MW.

It should be mentioned that ARAWP also requested quotes for this facility from an electrical turbine manufacturer and from an electrical engine manufacturer, which respectively quoted prices slightly lower and higher than Magna's quote, but since the latter quote also included a detailed analysis of the power requirements, power output and gas consumption of the facility, this quote was preferred. However, it is recommended that, on subsequent studies a life cycle approach to power unit selection should be used, since gas turbines offer similar initial price to gas engines, but have higher reliability and lower maintenance costs. On the other hand, their fuel efficiency might be lower.

17.8.5.2 Natural Gas Pipeline

Natural gas for the CHP unit will be obtained from the Rosario gas compression station of Gas Atacama pipeline, 52 km away. This pipeline was built to export gas to Chile, but currently it mostly provides small volumes to local customers, exports to Chile being limited, even though natural gas supplies seem ample, especially considering the proximity to Bolivian fields from which Argentina is committed to import increasing gas volumes.

Cost for this 6” dia. pipeline was estimated from ARAWP and industry data. Direct and indirect cost for this work comes out to US$ 7.8 million, plus a US$ 1.1 million (15%) contingency provision. Estimated cost for this pipeline is in line with costs of two similar diameter NG pipelines built recently in the region.

This pipeline is estimated to be capable of supplying natural gas sufficient for both stages of the project.

Table 17.12: Pipeline Estimate for 13 MW of Effective Power Installed

Description	US$/m×d"	d"	m	US$000
Pipeline Estimate for 13 MW of Effective Power Installed				
Materials and equipments cost	20			
Installation Costs	6			
Diameter		6		
Length			50,000	
Total manufacturing				6,000
Total installation				1,800
Sub Total				7,800
CONTINGENCIES (15%)				1,170
TOTAL PIPELINE FOR GAS				**8,970**

MEMO	US$/m×d"
Puna Salta NG Pipeline (4')	25.1
Puna Jujuy NG Pipeline (6')	25.7

17.8.5.3 Fresh Water Provision

It is estimated that fresh water for processing and human consumption will be obtained from 6 wells. This estimate is based on assumed freshwater requirement of 80 L/s, a preliminary estimated per well yield of 12 L/s (see Section 17.3.6) and an allowance for additional wells, to minimize the potential for drawing in deep brine. It is assumed that the wells would be drilled approximately 2 km from the plant (see section 17.3.6). Per well costs of KUS$ 45.6 for these units was taken from a quote by ANDINA PERFORACIONES S.R.L., the firm which is currently performing this work for LAC. Including piping, valves, civil work, other items, and a 15% contingency margin the total for this item comes to US$ 902,703.

Table 17.13: Water Supply and Transport Cost Summary

Description		Total 1ST Phase US$000	Total 2ND Phase US$000	TOTAL US$000
A	**DIRECT COST**			
A.6	**Infrastructure: Water Supply**			
A.6.1	Piping PVC 200 mm CL-10 – 2 km	167	-	167
A.6.2	Wells (6 units)	274	137	410
A.6.3	Civil works and Platform	18	-	18
A.6.4	Valves, Fittings and Accessories	20	-	20
A.6.5	Special Drilling Fluids & Replacement of Tools	27	14	41
A.6.6	Pumps (6 units)	27	13	40
	DIRECT COSTS SUBTOTAL IN US$	**532**	**164**	**696**
B	**INDIRECT COST**			
B.1	Related Engineering	13	7	20
B.2	Permits and Legal Approvals	5	3	8
B.3	Construction Management	27	13	40
B.4	Inspection and Quality Control	5	3	8
B.5	Purchasing Management	1	0.3	1
B.6	Commissioning	8	4	12
	INDIRECT COST SUBTOTAL IN US$	**59**	**30**	**89**
	TOTAL (D.C.+I.C.) IN US$	**591**	**193**	**785**
	CONTINGENCIES (15%)	**89**	**29**	**118**
	TOTAL WATER ADDUCTION IN US $	**680**	**222**	**903**

17.8.5.4 Camp

Table 17.14: Camp Cost Summary

Description	1ST Phase	2ND Phase	TOTAL
Total Area m^2	1,238	600	1,838
Cost US$/m^2	636	636	636
TOTAL COST US$000	**788**	**382**	**1,170**
CONTINGENCIES (10%)	79	38	117
TOTAL CAMP	**866**	**420**	**1,286**

Camp cost has been taken from a quote received for this purpose by LAC from Modurama S.R.L. of Buenos Aires, Argentina.

Camp area includes dorms, sanitary rooms, dining room, as well as recreational facilities.

17.8.5.5 *Infrastructure Summary*

Table 17.15: Infrastructure Capital Cost Summary

Description		Total 1ST Phase US$000	Total 2ND Phase US$000	TOTAL US$000
A	**DIRECT COSTS**			
A.7	CHP	7,834	6,243	14,076
A.8	Gas Pipeline	7,020	-	7,020
A.9	Water Supply	532	164	696
A.10	Mining Camp	788	382	1,169
	DIRECT COSTS SUB TOTAL IN US$	**16,173**	**6,788**	**22,962**
B	**INDIRECT COSTS**			
B.7	CHP	870	694	1,564
B.8	Gas Pipeline	780	-	780
B.9	Water Supply	59	30	89
B.10	Mining Camp	-	-	-
	INDIRECT COSTS SUB TOTAL IN US$	**1,710**	**723**	**2,433**
	TOTAL (D.C. +I.C.) IN US$	**17,883**	**7,512**	**25,395**
	CONTINGENCIES (13%)	**2,320**	**831**	**3,151**
INFRASTRUCTURE TOTAL IN US$000		**20,203**	**8,342**	**28,546**

17.8.6 Exclusions

The following items were not included in this estimate:

- Sunk costs
- Legal costs
- Special incentives and allowances
- Owner's costs, including permitting and insurance
- Escalation
- Interest and financing costs
- Start up costs beyond those specifically included

17.8.7 Currency

All values are expressed in fourth quarter 2010 US dollars; the exchange rate between the Argentinean peso and the US dollar has been assumed as ARS $4/US$; no provision for escalation has been included.

17.9 Operating Costs Estimate

17.9.1 Operating Expenses Summary – OPEX

An operating cost estimate (± 35% accuracy) for a 40,000 TPA facility has been prepared. This estimate is based upon vendor quotations for reagents costs, as well as laboratory work and computer model outputs for reagents consumption rates. Salaries and local expenses estimates have been provided by LAC, while manpower level and energy expenses are based on ARAWP experience. The latter have been adjusted for expected natural gas cost in Argentina.

Table 17.16: Production Costs

Description	US$ / Tonne Li_2CO_3
DIRECT COSTS	
Pond Chemical Reagents	290
Li Plant Chemical Reagents	510
SX Boron Removal Plant Reagents	31
Salt Removal and Transport	143
Energy	142
Manpower	69
Catering & Camp Services	12
Maintenance	145
Transportation to Port	54
DIRECT COSTS SUBTOTAL	**1,396**
INDIRECT COSTS	
General & Administration - LO	38
INDIRECT COSTS SUBTOTAL	**38**
PRODUCTION Li_2CO_3 TOTAL COSTS	**1,434**

17.9.2 Pond and Plant Reagents Costs

As mentioned, pond and plant reagents costs have been obtained from budgetary quotes from vendors, while consumption rates have been obtained from laboratory work and computer model simulations.

As indicated in section 16.2, sulphate brines such as the one present in Cauchari usually requires treatment with both lime and calcium chloride to remove unwanted salts, before proceeding to the lithium carbonate plant. However, as also mentioned in section 16.2, the low temperature prevalent in the area influences the evaporation process, almost eliminating the need to treat the brine with calcium chloride. The above has a strong positive effect on process economics, since treatment with calcium chloride is an expensive step in this process, which step is practically avoided. In addition, it has been assumed that lime is bought from existing producing facilities in Jujuy, located approximately only 150 km from the project site, providing considerable cost savings over other supply alternatives[15].

Lithium carbonate plant consumption of chemicals consists mainly of Na_2CO_3 usage for carbonating the brine (1.86 Tonnes of Na_2CO_3 are required for each tonne of Lithium carbonate produced). Usage of lime at the plant is very limited.

The boron removal plant also needs chemical agents in the form of HCl and NaOH, but the amounts needed are relatively minor.

Pond and plant reagents usage and costs are summarized in Table 17.17. These costs are deemed to be very competitive and constitute one of the major strengths of the project.

Table 17.17: Process Chemical Consumption

Description	Formula	Tonne/yr	US$ / Tonne	US$000 / yr	Tonne/ Tonne Li_2CO_3	US$/Tonne Li_2C0_3
Evaporation Ponds						
Calcium Oxide	CaO	36,317	155	5,631	1.816	282
Calcium Chloride	$CaCl_2$	914	357	326	0.046	16
Lithium Carbonate Plant						
Sodium Carbonate	Na_2CO_3	37,185	278	10,342	1.859	517
Calcium Oxide	CaO	142	155	22	0.007	1
Sulphuric Acid	H_2SO_4	460	225	104	0.023	5
SX Boron Removal Plant						
Hydrochloric Acid	HCl	900	305	275	0.045	14
Sodium Hydroxide	NaOH	400	635	254	0.020	13
Extractant Solvent and other				100		5
CHEMICAL CONSUMPTION		**76,318**		**17,053**	**3,816**	**853**

[15] It has to be mentioned that referred lime production facilities have limited production capacity, thus if they are to supply the project, these facilities need to be considerably expanded and upgraded, creating the opportunity for possible further cost savings through a guaranteed long term supply agreement.

17.9.3 Energy Cost

As mentioned in section 17.8.5.1 of this report, it was initially determined that there is an energy requirement of 1.2 kWh/kg of lithium carbonate (6.1 MW power requirement) at the lithium plants; additionally, it was estimated that 3.6 MW of power capacity was required in the rest of the project.

Gross energy requirement of the lithium carbonate plants is estimated to be 49,200 MWh/year; while well, pond, office and camp energy consumption is estimated to be approximately 28,700 MWh/year, thus total energy requirements are estimated to be approximately 77,900 MWh/year.

This energy can be generated with diesel or gas engines, or gas turbines, but for the purposes of this report, consumption figures were taken from an ad hoc study prepared by electrical engineers in Argentina. Current prices of natural gas for new projects in Argentina are in the range of 4.0 to 4.5 US$/MMBTU, however for the purposes of this study, ARAWP assumed a long term natural gas, net cost of 7 US$/MMBTU at the plant gate including pipeline and other charges. Given a specific natural gas consumption of 285 m^3/MWh, unit cost of energy is US$/MWh 72.85 which results in yearly expenditure of MUS$ 5,675 for this item.

It is to be pointed out that the cost of energy for this project is one of its main advantages when compared to existing neighbouring facilities, which either are subject to much higher energy prices, or face complex logistics for its supply.

Table 17.18: Energy Cost Estimate

Description	Unit	Value 1ST Phase	Value 2ND Phase	TOTAL
Production Requirement	MWh/yr	40,406	37,498	77,904
Specific Consumption	m^3/MWh	285	285	285
Yearly Consumption	m^3/yr	11,518,261	10,689,178	22,207,439
Natural Gas Price	US$/MMBTU	7.0	7.0	7.0
Natural Gas Price*	US$/$m^3$	0.256	0.256	0.256
Electricity Cost	US$/MWh	72.85	72.85	72.85
TOTAL ENERGY COST	**MUS$/yr**	**2,944**	**2,732**	**5,675**

* Assumes natural gas calorific value equivalent to 9,200 kcal/m^3

17.9.4 Maintenance Cost

Maintenance cost has been estimated applying customary percent rates to plant and equipment costs. The same procedure has been applied to estimate pond and well maintenance costs, but percent rates applied are lower, given that a substantial part of their cost corresponds to earth works.

Table 17.19: Maintenance Cost Estimate

Description	Total Direct Cots US$000	Maintenance %	Maintenance US$000
Brine Production Wells	12,908	2.0%	258
Evaporation and Concentration Ponds	182,113	1.0%	1,821
Lithium Carbonate Plant	90,834	3.0%	2,725
Infrastructure	22,962	4.4%	1,010
TOTAL MAINTENANCE COST	**308,816**	**1.9%**	**5,814**

17.9.5 Manpower Cost

Manpower levels were estimated by ARAWP on the basis of its experience, while salary levels to be expected in the area of the plant were provided by LAC. These are presented on following Table 17.20.

Table 17.20: Manpower Estimate

Description AREA - POSITION	Nº of people	Total US$/month
Operations Management	2	14,545
Hydrogeology	7	12,655
Administration	21	41,410
Carbonate Plant	72	108,100
Laboratory	10	21,920
Engineering and Maintenance	15	31,370
MANPOWER ESTIMATE TOTAL COSTS	**127**	**230,000**

17.9.6 Indirect Costs

17.9.6.1 Local Indirect Costs

Main items of local indirect costs are facilities insurance, for which a cost of US$ 1 per year per thousand of asset value has been assumed, giving a cost of KUS$/yr 217; transportation, for which KUS$/yr 259 has been budgeted and which includes cost of pick up trucks and buses for personnel displacement, office rent KUS$/yr 48 and office materials and sundries, estimated as KUS$/yr 60.

17.10 Economic Analysis

17.10.1 Introduction

The purpose of this chapter is to assess the economic viability of the Cauchari salar brine lithium carbonate project. For base case analysis production rate has been set at 40,000 TPA of lithium carbonate.

In order to perform the economic evaluation of the project, a pre tax and after tax cash flow model was generated. This model was fed with the capital and operating costs estimates presented in the previous sections, as well as the assumed production program and pricing estimates derived in the marketing section.

Results obtained from the model include NPV at different rates, IRR and payback period. All of these parameters were calculated for different scenarios. In addition, a sensitivity analysis on the most important revenue/cost variables was carried out.

17.10.2 Evaluation Criteria

- Project life: Engineering, permit and construction time is 2 years for the first construction phase and another 2 years for the second phase, starting on year 3. Operating period is 20 years, but since at the end of this period ample mineral resources are estimated to remain, a project terminal value equal 14 times the average cash flow of the last five years is assumed.
- Pricing has been obtained from the marketing study whose summary is presented in section 17.7.
- Production for the first phase of the project has been estimated as 20,000 TPA of lithium carbonate commencing in year 1, assuming a ramp up rate of 60% for year one and 80% for the second year of production. Production of the second phase of the project is also 20,000 TPA, but in this case ramp up is 80% for the first year of production and full production is attained in the second year.
- Equity basis: For project evaluation purposes, it has been assumed that 100% of capital expenditures, including pre production expenses and working capital are financed with owner's equity.
- Even though the brine composition might allow production of other salts or other chemical compounds such as potassium chloride (KCl), boric acid (H_3BO_3) and others, these options have not been included in this report.
- The economic evaluation has been carried out on a constant money basis, therefore there is no provision for escalation or inflation on costs or revenue.
- The exchange rate assumed is ARS $4/US$.

17.10.3 Tax

The following tax have been applied to the project:

- Federal Tax: On the basis of information provided by LAC's independent tax advisor[16], it has been assumed that the project will be subject to the Argentinean Federal mining law, whose main provisions indicate that capital goods brought into the country are exempt of customs duties, that the income tax rate is 35% and that the Provincial royalty rate is set at a maximum of 3%. Also, the law includes a provision for accelerated depreciation of capital goods, which is set at three years. This provision results in losses for tax purposes in the early operating phase of project, which can be carried forward. The law also allows for direct recovery from the government of VAT paid during the construction period. In accordance with other legal provisions, it has also been assumed that exporters can impute VAT paid during the operating period to other tax payments, thus VAT payments have not been considered in the cash flows.

  Additionally, it has been assumed that all up to date capitalized project expenditures of Minera Exar S.A. (LAC's Argentinean subsidiary) can be used as depreciation once the project starts operations[17]. These expenditures amount today to approximately US$25 million.

  Separately, the Argentinean federal government has imposed a "retention" on exports which varies according to the commodity exported. In the case of lithium carbonate this retention has been set at 5% of the net export value. Additionally, there is a mechanism whereby part of this retention is actually paid back to the exporter, after a time lag. In the case of lithium carbonate, refund rate is 2.5% of the net export value.

  Projected cash flows include both of these mechanisms and allow for the time lag by delaying refunds by one year with respect to retention disbursements[18].

- Provincial royalties. In Jujuy Province, and according with the maximum set in the federal law, these are fixed at 3% of the product value "at the exit of the mine pit", which in this case is understood as the head of the well. In addition, provincial law states that this royalty might be reduced by one third if the company processes the mineral within the province, or if the company carries out an exploration programme within the province. Since LAC will be processing the brine in the province, and in addition, it will probably continue with an exploration programme within the province, there is grounds to believe that this royalty might be reduced to a 2% rate, however the cash flow calculation takes this royalty at the standard 3% rate. To estimate the value of the brine at the well head, in accordance with tax regulations, we have taken the FOB value of the product and deducted from it transportation costs and all pond, brine treatment, plant and administration related costs.

- Other royalties: These correspond to agreements with Grupo Los Boros S.A. and Borax S.A. for the use of their underground mining rights. For the first one, and according to the existing contract, it has been assumed that once the initial US$ 300 K payment associated with production start up takes place, LAC exercises its US$ 7,000 K prepayment option, in lieu of the 3% Net Profit Interest (NPI) to which

[16] Jerez, D., 2010.

[17] Most of these expenditures took place before the project's official registration, thus utilization for depreciation by the project is not straightforward, and may be difficult to carry out.

[18] Legality of the export retention programme is strongly discussed in Argentina. Cases are being heard in the courts, and many exporters are paying the retention, but at the same time they are filing an official complaint.

Los Boros is entitled. Payment to Borax S.A. is a simple KUS$ 200 per year disbursement.

17.10.4 Capital Expenditures

As indicated in section 17.8.1 and on Table 17.5, capital investment for the Cauchari project, including equipment, materials, indirect costs and contingencies during the construction period is estimated to be US$ 398.6 million. As also indicated on the same section, working capital requirements are estimated to be US$ 7.3 million for each stage of the project.

Table 17.21: CAPEX Expenditures Schedule, 1ST Phase

Description	CAPEX Timing US$ 000				CAPEX % Spending		
	2012	2013	2014	Total	2012	2013	2014
Production Wells	-	3,906	3,906	7,813	-	50%	50%
Evap. and Conc. Ponds	28,017	44,828	39,224	112,069	25%	40%	35%
Lithium Carbonate Plant	-	23,120	53,947	77,068	-	30%	70%
Infrastructure	-	4,041	16,162	20,203	-	20%	80%
Total Capex	**28,017**	**75,895**	**113,241**	**217,153**			

Working capital outlays occur 100% during the last year of construction (2013).

Table 17.22: CAPEX Expenditures Schedule, 2ND Phase

Description	CAPEX Timing US$ 000			CAPEX % Spending	
	2016	2017	Total		
Production Wells	3,516	3,516	7,031	50%	50%
Evap. and Conc. Ponds	53,233	53,233	106,466	50%	50%
Lithium Carbonate Plant	17,877	41,714	59,591	30%	70%
Infrastructure	1,668	6,674	8,342	20%	80%
Total Capex	**76,295**	**105,137**	**181,431**		

17.10.5 Lithium Carbonate Production

In accordance with previously mentioned statements, for economic evaluation purposes lithium carbonate production has been set at 20,000 TPA, per project stage. As indicated on Table 17.23 below, this production rate is expected to be obtained during the third year; production rate in the first and second year of the project being assumed as respectively 60% and 80% of the long term production rate[19]. Start up of the second stage of the

[19] Note that since operations start on October 2014, only three months' production, with a 60% ramp up rate, only 3 thousand TPA are produced.

project, is faster, with 80% of the long term production rate obtained in the first year of operations (2018) and full production obtained the following year.

Table 17.23: Production Schedule

Year	2014	2015	2016	2017	2018	2023	2028	2033	Total
	1	2	3	4	5	10	15	20	
Li_2CO_3 1ST Phase	3,000	16,000	20,000	20,000	20,000	20,000	20,000	20,000	**379,000**
Li_2CO_3 2ND Phase	-	-	-	-	16,000	20,000	20,000	20,000	**316,000**

Table 17.24: Production Ramp Up

	% of Full Capacity		
Year	**2014**	**2015**	**2016**
Li_2CO_3 1ST Phase	60%[1]	80%	100%
Year	**2018**	**2019**	**2020**
Li_2CO_3 2ND Phase	80%	100%	100%

1 Potential production capacity of year 2014 is 60%, but real production reaches only 25% of this value, because the production is effective in the fourth quarter of this year.

17.10.6 Operating Costs

As indicated in section 17.9, Table 17.16, direct operating costs per tonne of lithium carbonate are estimated to be US$ 1,396. In the same manner, indirect operating costs are estimated to be US$/tonne 38. Thus, total estimated operating costs are US$/tonne 1,434 (± 35%).

Estimated operating costs for this project compare very favourably with other existing and projected lithium carbonate facilities.

Resulting yearly operating expenses are shown on following Table 17.25.

Table 17.25: Production Costs

Description	Year					Total US$000
	1	5	10	15	20	
Li_2CO_3 tonne Production	3,000	36,000	40,000	40,000	40,000	**-**
Direct Costs						
Pond Chemicals	1,117	10,485	11,617	11,617	11,617	**203,730**
Li Plant Chemicals	1,963	18,422	20,411	20,411	20,411	**357,949**
SX Boron Plant Reagents	118	1,107	1,226	1,226	1,226	**21,504**
Salt Removal and Transport	469	5,188	5,703	5,703	5,703	**99,962**
Energy	552	5,129	5,675	5,675	5,675	**99,643**
Transportation	138	1,940	2,149	2,149	2,149	**37,396**
Maintenance	408	5,304	5,814	5,814	5,814	**102,716**
Manpower	516	2,621	2,760	2,760	2,760	**50,729**
Catering & Camp Services	83	447	477	477	477	**8,668**
Total Direct Costs	**5,363**	**50,643**	**55,833**	**55,833**	**55,833**	**982,297**
Indirect Costs						
G & A Local	338	1,497	1,534	1,534	1,534	**28,899**
Total Indirect Costs	**338**	**1,497**	**1,534**	**1,534**	**1,534**	**28,899**
Total Production Costs	**5,701**	**52,140**	**57,367**	**57,367**	**57,367**	**1,011,197**

17.10.7 Production Revenues

Production revenues have been estimated on the basis of the three price scenarios identified in Table 17.3, and the production schedule shown on Table 17.23. Possible revenue from KCl or other potential by-products has not been considered. Resulting revenue projection is shown on following Table 17.26.

Table 17.26: Revenue, High, Medium, & Low Price Scenarios

Production Revenue Li_2CO_3 – High (US$ in Millions)									
Year	**1**	**2**	**3**	**4**	**5**	**10**	**15**	**20**	**Total**
Li_2CO_3	19.5	104	128	128	230.4	252	252	252	**4,389.9**
Total Revenue	**19.5**	**104**	**128**	**128**	**230.4**	**252**	**252**	**252**	**4,389.9**

Production Revenue Li_2CO_3 – Medium (US$ in Millions)									
Year	**1**	**2**	**3**	**4**	**5**	**10**	**15**	**20**	**Total**
Li_2CO_3	18	94.4	116	114	205	220	220	220	**3,851.6**
Total Revenue	**18**	**94.4**	**116**	**114**	**205**	**220**	**220**	**220**	**3,851.6**

Production Revenue Li_2CO_3 – Low (US$ in Millions)									
Year	**1**	**2**	**3**	**4**	**5**	**10**	**15**	**20**	**Total**
Li_2CO_3	15.6	80	92	92	158.4	164	164	164	**2,910**
Total Revenue	**15.6**	**80**	**92**	**92**	**158.4**	**164**	**164**	**164**	**2,910**

17.10.8 Cash Flow Projection

On the basis of the results and assumptions of the previous sections, pre tax and after tax cash flow schedules were developed for the three price scenarios – High, Medium and Low – obtained in Table 17.3. Results for the Medium scenario, which project a long term lithium carbonate price of US$/tonne 5,500[20], were taken as the base case for sensitivity analysis purposes.

Project NPV is calculated at different discount rates, but 8% is considered the base case. Following Table 17.27 summarizes cash flows for the medium price scenario.

Revenue and expenses are calculated for the first 20 years of the project. Since at that point in time only approximately 23% of the lithium resources will have been consumed, a terminal value of 14 times the net cash flow of the last five years is assumed for the project.

[20] Values expressed in USA dollars of 2010.

Table 17.27: Project Evaluation Medium Price Scenario (000 US$)

Period	-1	0	1	2	3	4	5	10	15	20	Total
Year	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2023**	**2028**	**2033**	
Revenue			**18,000**	**94,400**	**116,000**	**114,000**	**205,200**	**220,000**	**220,000**	**220,000**	**3,851,600**
Lithium carbonate			18,000	94,400	116,000	114,000	205,200	220,000	220,000	220,000	**3,851,600**
Expenses			**-48,124**	**-202,063**	**-81,023**	**-82,675**	**-142,906**	**-70,850**	**-70,850**	**-72,488**	**-1,690,745**
Direct Costs			-5,363	-29,036	-29,882	-29,882	-50,643	-55,833	-55,833	-55,833	**-982,297**
Indirect Costs			-338	-1,352	-1,352	-1,352	-1,497	-1,534	-1,534	-1,534	**-28,899**
Provincial Royalties (3%)			-399	-2,065	-2,706	-2,646	-4,840	-5,148	-5,148	-5,148	**-89,996**
Royalties Los Boros			-300	-7,000	0	0	0	0	0	0	**-7,300**
Royalties Borax			-200	-200	-200	-200	-200	-200	-200	-200	**-4,000**
Export Retention (5%)			-893	-4,676	-5,745	-5,645	-10,163	-10,893	-10,893	-10,893	**-190,710**
Refunds of Export Retention				447	2,338	2,872	2,822	5,446	5,446	5,446	**89,909**
Mining Duties			-45	-45	-45	-45	-45	-45	-45	-45	**-900**
Depreciation			-40,587	-158,135	-43,431	-45,777	-78,341	-2,644	-2,644	-4,282	**-476,551**
Income Before Tax			**-30,124**	**-107,663**	**34,977**	**31,325**	**62,294**	**149,150**	**149,150**	**147,512**	**2,160,855**
Income Tax (35%)			0	0	0	0	0	-52,203	-52,203	-51,629	-756,299
Depreciation			40,587	158,135	43,431	45,777	78,341	2,644	2,644	4,282	476,551
Gross After Tax Cash Flow			**10,463**	**50,472**	**78,407**	**77,102**	**140,635**	**99,592**	**99,592**	**100,165**	**1,881,107**
Other income and expenses											
Total Investment	-28,017	-75,895	-113,240		-76,295	-105,137					**-398,584**
Sustaining Capital							-8,966	-8,966	-14,889	-8,966	**-70,498**
Working Capital			-3,570			-3,570					**-7,141**
Residual Value										1,344,219	**1,344,219**
Full Equity Basis Project Cash Flow	**-28,017**	**-75,895**	**-106,348**	**50,472**	**2,113**	**-31,605**	**131,669**	**90,625**	**84,702**	**1,435,418**	**2,749,103**

17.10.9 Economic Evaluation Results

Economic evaluation results are summarized on following Table 17.28.

Table 17.28: Project Evaluation Results Summary

Scenarios	1A	1B	1C
Price Case	**HIGH**	**MEDIUM**	**LOW**
		USDMM	
CAPEX	399	399	399
		Values, year 20 (US$ in Millions)	
Revenue	252	220	164
OPEX	56	56	56
Adm. Expenses	2	2	2
Ebitda[21]	195	163	107
		Before Tax (US$ in Millions)	
NPV (6%)	1,660	1,331	755
NPV (8%)	1,238	983	536
NPV (10%)	932	730	377
Pay Back Period	5 Y	5 Y, 4 M	6 Y, 6 M
		After Tax (US$ in Millions)	
NPV (6%)	1,233	990	563
NPV (8%)	902	715	387
NPV (10%)	664	518	261
Pay Back Period	5 Y, 2 M	5 Y, 6 M	6 Y, 7 M
		%	
Before Tax IRR	34.3%	30.0%	21.9%
After Tax IRR	29.4%	26.0%	19.1%

17.10.10 Payback Analysis

Simple payback time for the project's base case is 5 years and 4 months, before tax, and 5 years and 6 months, after tax.

[21] Ebitda = Revenue – OPEX – Adm. Expenses

17.10.11 Mine Life

It is important to note that the project, as evaluated, makes limited use of the available lithium resources, as the following tables show:

Table 17.29: Cumulative Production vs. Lithium Resources (20 years at 40,000 TPA)

	Mass Cumulated		Brine Volume ($MM\ m^3$)
	Li (tonne)	Li_2CO_3 (tonne)	
Extracted	232,716	1,238,859	454
Measured	546,300	2,884,000	809
Indicated	458,300	2,420,000	720
Combined (Measured + Indicated)	1,004,600	5,304,000	
Extracted / TOTAL	23%	23%	

Table 17.30: Cumulative Production vs. Lithium Resources (40 years at 40,000 TPA)

	Mass Cumulated		Brine Volume ($MM\ m^3$)
	Li (tonne)	Li_2CO_3 (tonne)	
Extracted	500,590	2,664,884	976
Measured	546,300	2,884,000	809
Indicated	458,300	2,420,000	720
Combined (Measured + Indicated)	1,004,600	5,304,000	
Extracted / TOTAL	50%	50%	

17.10.12 Sensitivity Analysis

In order to investigate the impact on the projects economic results – NPV and IRR – for changes in key variables, a sensitivity analysis was carried out. Variables whose impacts were studied were:

Table 17.31: Driver Variable, Sensitivity Analysis

Driver Variable
Initial Capital Expenditure
Lithium Carbonate Price (Long Term Price)
Lithium Carbonate Production
Total Operating Cost

Results of this analysis are presented on the following tables and figures:

Table 17.32: Project Before Tax NPV 8% Sensitivity Medium Scenario

Driver Variable	Base Case Values		Project NPV (US$ in Millions)				
			75%	90%	100%	110%	125%
Initial Capital Expenditure	MMUS$	399	1,074	1,021	983	942	880
Lithium Carbonate Price (LT Price)	US$/Tonne	5,500	518	797	983	1,168	1,445
Lithium Carbonate Production	Tonne/yr	40,000	638	845	983	1,120	1,327
Total Operating Cost	US$/Tonne	1,434	1,112	1,034	983	931	853

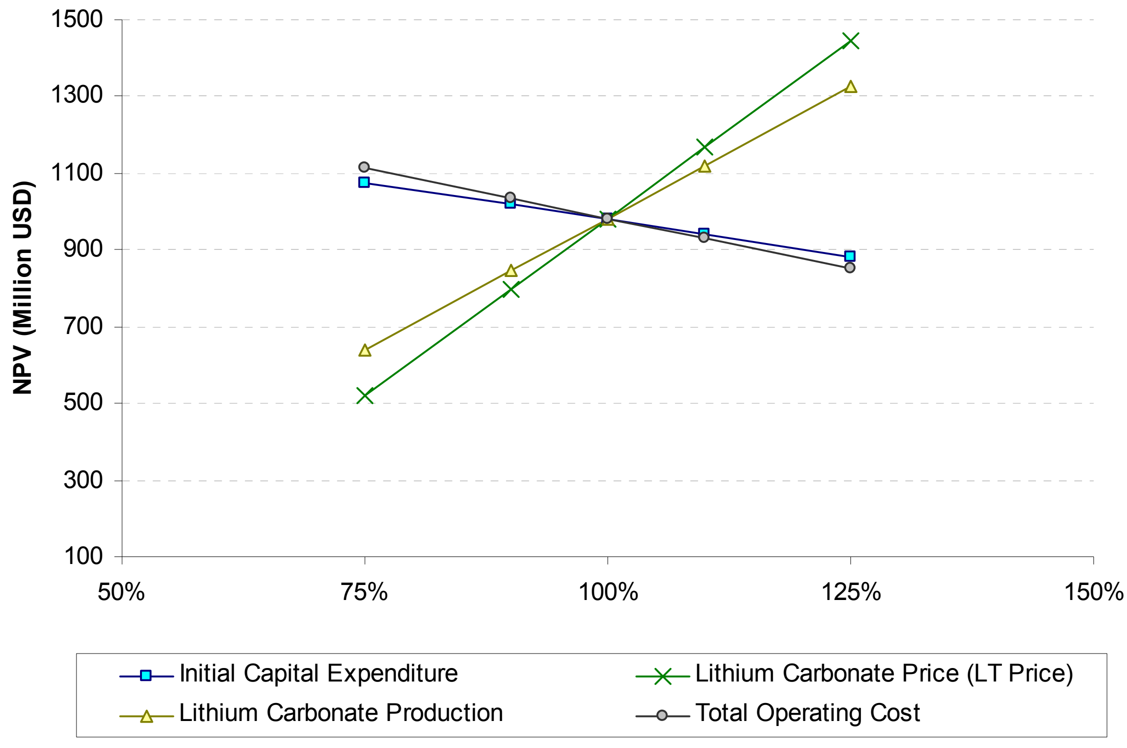


Figure 17.15: Project Before Tax NPV 8% Sensitivity Medium Scenario

Table 17.33: Project Before Tax IRR 8% Sensitivity Medium Scenario

Driver Variable	Base Case Values		Project IRR				
			75%	90%	100%	110%	125%
Initial Capital Expenditure	MMUS$	399	39.9%	33.4%	30.0%	27.2%	23.8%
Lithium Carbonate Price (LT Price)	US$/Tonne	5,500	20.8%	26.5%	30.0%	33.5%	38.4%
Lithium Carbonate Production	Tonne/yr	40,000	23.2%	27.3%	30.0%	32.7%	36.6%
Total Operating Cost	US$/Tonne	1,434	32.5%	31.0%	30.0%	29.0%	27.5%

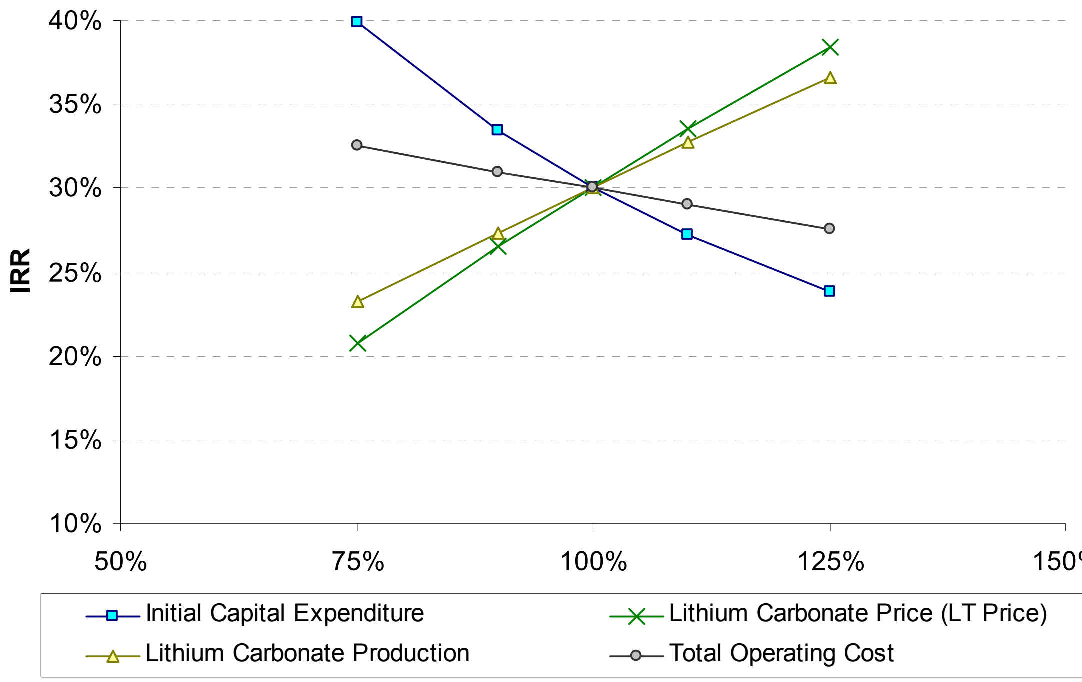


Figure 17.16: Project Before Tax IRR 8% Sensitivity Medium Scenario

Table 17.34: Project After Tax NPV 8% Sensitivity Medium Scenario

Driver Variable	Base Case Values		Project NPV (US$ in Millions)				
			75%	90%	100%	110%	125%
Initial Capital Expenditure	MMUS$	399	784	743	715	685	637
Lithium Carbonate Price (LT Price)	US$/Tonne	5,500	374	579	715	850	1,053
Lithium Carbonate Production	Tonne/yr	40,000	462	614	715	815	965
Total Operating Cost	US$/Tonne	1,434	809	753	715	677	620

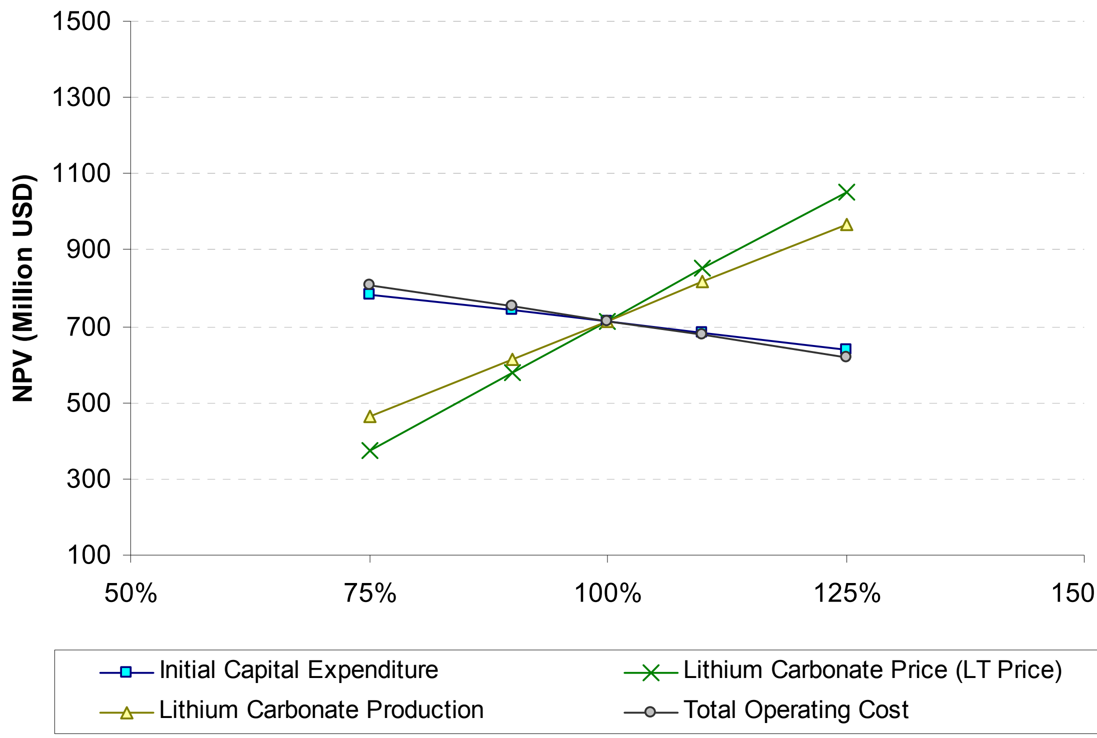


Figure 17.17: Project After Tax NPV 8% Sensitivity Medium Scenario

Table 17.35: Project After Tax IRR 8% Sensitivity Medium Scenario

Driver Variable	Base Case Values		Project IRR				
			75%	90%	100%	110%	125%
Initial Capital Expenditure	MMUS$	399	34.2%	28.7%	26.0%	23.6%	20.8%
Lithium Carbonate Price (LT Price)	US$/Tonne	5,500	18.3%	23.0%	26.0%	28.8%	32.9%
Lithium Carbonate Production	Tonne/yr	40,000	20.2%	23.7%	26.0%	28.1%	31.4%
Total Operating Cost	US$/Tonne	1,434	28.0%	26.8%	26.0%	25.1%	23.8%

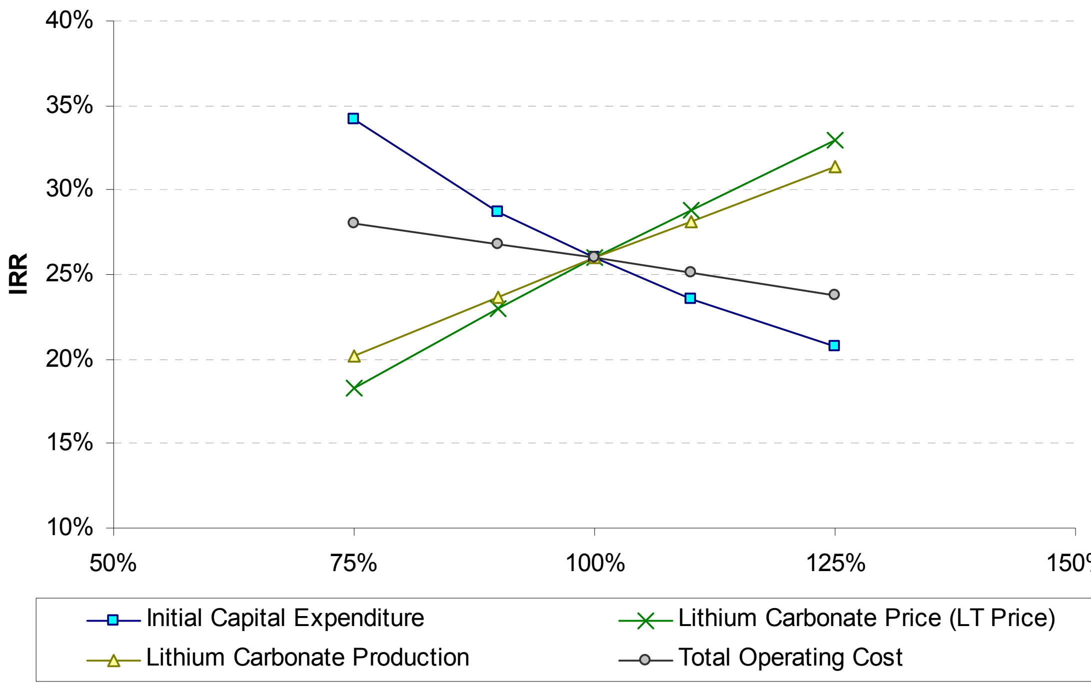


Figure 17.18: Project After Tax IRR 8% Sensitivity Medium Scenario

As is the case with most mining projects, revenue driver variables – Lithium carbonate LT Price and Production – are the ones with the highest impact on project results, regardless of whether these are measured as Before Tax NPV's and IRR or After Tax NPV's and IRR.

Project results are somewhat less sensitive to Capital Expenditures and Total Operating Costs, but in this case some differences appear because when results are measured in terms of NPV, the project appears almost equally sensitive to both variables mentioned, however, when results are measured in terms of IRR, the project is shown to be more sensitive to capital expenditures that total operating cost.

17.10.13 Discussion

17.10.13.1 Economic Analysis

- Project cash flow analysis for the base case and alternative cases indicates that, if assumptions that sustain the different cases materialize, the project appears to be economically viable even if under very unfavourable conditions.
- Project results remain positive, even with important negative variations on the driver variables, indicating project strength and resilience.
- The capital investment for the Cauchari project (± 30% accuracy) including equipment, materials, indirect costs and contingencies during the construction period is estimated to be US$ 399 million. This total excludes interest expense that might be capitalized during the same period. Working capital requirements are estimated to be US$ 7.3 million. In addition, sustaining capital expenditures total US$ 70.5 million over the 20 year life of the project. Disbursements of these expenditures start in year 5.
- Main CAPEX driver is Pond construction, which represents 46% of total project capital expenditures. Pond investment is driven by two variables, namely, evaporation rate, and pond construction unit cost. The latter has been taken from cost studies prepared by Magna Construcciones S.R.L. and which we believe accurately represent current costs for this work in Argentina. The evaporation rate has been determined by initial calculations and preliminary on site measurements, which have given a value of 3.3 mm/day[22].
- An operating cost estimate (± 35% accuracy) for a 40,000 TPA facility, composed of two 20,000 TPA modules was prepared. This estimate indicates that the project's operating costs are US$/tonne 1,434. This figure includes pond and plant chemicals, energy, labour, salt waste removal, maintenance, camp services and transportation.
- Above mentioned cash operating costs of US$/tonne 1,434 appears to be the project's most important positive feature. This results from the indicated extremely low consumption of chemicals – especially $CaCl_2$ – attributable to the prevailing temperature in Cauchari, as well as from the project's low energy cost and consumption.
- Project economic sensitivity analysis shows that revenue driver variables – Lithium Carbonate LT Price and Production – are the ones with the highest impact on project results, regardless of whether these are measured as Before Tax NPVs and IRR or After Tax NPVs and IRR. Project results are somewhat less sensitive to Capital Expenditures and Total Operating Costs.
- It is believed that potash production will further improve project economics, but this is dependent upon process studies currently being developed.

[22] This is the brine evaporation rate, which is different from pure water the evaporation rate which is 5.4 mm/day, as mentioned in section 4.4.7.

17.10.13.2 Cauchari-Olaroz Project Strengths

- **Brine**: The Cauchari-Olaroz project is based on the exploitation of subsurface brines, which as a lithium source are generally substantially more economical to exploit than pegmatites or other solid lithium minerals.
- **Resources Size**: Identified lithium resource (Measured + Indicated) is very substantial, over 1,000,000 tonnes of lithium, with only 23% of these resources consumed after 20 years, at a 40,000 TPA production rate, indicating possibilities for further production expansion.
- **Location – Transportation:** The project site is on a major international highway connecting Argentina and Chile. This route provides economic access to ports in Northern Chile, to bring imported capital goods and raw materials for the project, as well as for exports of product to Asia. In addition, the same route provides connection to Jujuy, Salta and Buenos Aires and allows convenient transportation of local capital goods, raw materials and personnel.
- **Location – Energy Access:** The project site is only 50 km away from a Natural Gas (NG) trunk pipeline; moreover, the ground over which the feeder pipeline is to be built is the edge of the salar (almost flat and featureless) allowing easy and economical construction.
- **Location - Alluvial Cone:** Existence of an alluvial cone separating the Cauchari and Olaroz salares, and LAC's rights over this area allows location of the project's facilities on solid ground, avoiding the salt and clay prevalent in the salar.
- **Energy Costs:** Access to NG supplies through the above mentioned pipeline provides supplies of this fuel at estimated long term costs of approximately 7 US$/MMBTU, providing a substantial cost advantage over existing projects in the same general area.
- **Chemical Costs:** Sulphate brines, such as the one present in Cauchari, usually require treatment with both lime and calcium chloride to remove unwanted salts. However, the low temperature prevalent in the area influences the evaporation process, almost eliminating the need to treat the brine with calcium chloride. This has a strong positive effect on process economics. In addition, it has been assumed that lime is bought from existing producing facilities in Jujuy, located approximately only 150 km from the project site, providing considerable cost savings over other supply alternatives.
- **Pricing Estimate:** Conservative long term base case price scenario of US$ 5,500 per Tonne of Lithium Carbonate adds significant strength to the project's economics.

17.10.13.3 Cauchari-Olaroz Project Weaknesses:

- **Location – Climate:** Project site at nearly 4,000 masl implies the existence of a harsh climate and difficult working conditions.
- **Geology:** The Cauchari and the Olaroz salars are terrigenous salars with complex geology of inter-layered sand, clay, sodium chloride, silt and mixed units. Therefore the extraction of brine is not as straightforward as in sodium chloride salars that have a

simpler geology with a very porous superficial aquifer with high transmissivity near surface (i.e. the Atacama Salar). Cauchari and Olaroz require significant amount of drilling and modelling to be able to estimate extractable reserves and it is expected that the recovery of brine from some of these layers of sediments will be low. It is also expected that a relatively larger number of wells (and deeper wells) will be required to extract the brine compared to sodium chloride salars. The CAPEX of this extra drilling required is relatively a small portion of the overall budget though (less than 5% of the CAPEX, Table 17.7). On the positive side, the reserves are larger than sodium chloride salars on a footprint comparison because unlike sodium chloride salars, terrigenous salars can retain high porosity at depth in some sediment such as sands, and therefore large resources can be identified in a relatively small footprint.

- **Sulphate content**: The relatively high sulphate content of the brine makes necessary a chemical treatment with lime, and eventually small amounts of calcium chloride, to remove this component from the brine.

17.11 Project Schedule

The program started in September 2009 and includes some activities such as the Exploration Program, which are already completed. It finishes on Q4 2017, with the end of the commissioning of the second plant stage.

Major pending activities of the program are:

- Hydrogeology Program
- Process Development Program
- Environmental Studies Program
- Economic and Engineering Studies
- First Stage Construction Program
- Second Stage Construction Program

The program assumes that construction of the project's first phase starts in Q3 2012, date by which all environmental and construction permits must have been obtained. Commissioning the first stage of the project ends in Q3 2014, while construction of the project's second phase starts in Q1 2016 and commissioning of this second phase ends in Q4 2017.

18 INTERPRETATIONS AND CONCLUSIONS

18.1 Geology and Resources

LAC has based the current PEA on the 43-101 Measured, Indicated and Inferred resource estimation released in December 2010 (King 2010a). The main lithological features of the salars have been identified in this report and they play a critical role for the release of the brine. The various lithologies release some brine but the sand is the one that plays the major role hosting about 74% the lithium resource (Table 15.3). Other lithologies such as clay mixtures and halite mixtures contribute much less to the brine resource.

The model developed for the brine resource was based on a variety of programs and parameters, such as results from boreholes (RC and DDH), surface brine and water samples, pumping and air lift testing programs and a seismic geophysical program. The brine chemistry results of all the brine samples taken at various depths from the borehole samples were a key element of the block model.

Another key element incorporated into the block model is the parameter known as RBRC (Relative Brine Release Capacity) measured from the DDH samples – this is an indicator of the rate of release of brine from the host lithology.

The details of these programs and the results therein may be seen in the King (2010). In the following paragraphs we reproduce its final tables and conclusions:

- *"A Measured, Indicated and Inferred Resource estimate for the Project is summarized in Table 17.36 and Table 17.37 for lithium and potassium, respectively; both sets of results are for the ≥500 mg/L lithium grade cut-off:*

Table 17.36: Lithium Resource Summary (≥500 mg/L lithium grade cut-off).

	Average Lithium Concentration (mg/L)	Mass Cumulated		Brine Volume (m^3)
		Li (tonne)	Li_2CO_3 (tonne)	
Measured	656	546,300	2,884,000	8.09×10^8
Indicated	637	458,300	2,420,000	7.20×10^8
Combined (Measured + Indicated)		1,004,600	5,304,000	
Inferred	603	512,800	2,708,000	8.50×10^8

Table 17.37: Potassium Resource Summary (≥500 mg/L lithium grade cut-off).

	Average Potassium Concentration (g/L)	Mass Cumulated		Brine Volume (m^3)
		Li (tonne)	Li_2CO_3 (tonne)	
Measured	5.9	4,912,000	9,382,000	8.09 x 10^8
Indicated	5.7	4,121,000	7,871,000	7.20 x 10^8
Combined (Measured + Indicated)		9,033,000	17,253,000	
Inferred	4.9	4,264,000	8,144,000	8.50 x 10^8

- *The values in Table 17.36 and Table 17.37 are expressed as total contained metals and are based on measurements of RBRC over the aquifer volume of the resource estimate; consequently, they may differ from total extractable quantities."*

18.2 Mining

The location and design of the production wells for brine recovery will be done in the following stages of the project after a detailed hydrological model is completed.

18.3 Process Information and Design

LAC has selected a standard processing plant for treating brines with high concentrations of sulphates, chlorides, sodium, potassium, magnesium, calcium, boron and lithium: pre-concentration ponds for crystalline precipitation of the bulk of the salts in the brine, halite and magnesium sulphate, followed by treatment of the concentrated brine with calcium solutions to remove almost all of the magnesium and sulphates remaining in the brine by chemical precipitation. These chemical precipitates are settled out in a separate pond, where further evaporation occurs while the solids settle out. The final stage of evaporation occurs in another pond (the Lithium pond), after which the brine is treated through a solvent extraction plant to remove boron, followed by treatment with lime and sodium carbonate to remove residual magnesium. The lithium is then recovered from the brine by chemical precipitation with sodium carbonate at moderate temperatures. The precipitated product is then filtered, washed free of entrained impurities (with soft water), dried and prepared for battery-standard lithium carbonate.

The feasibility of the flow sheet was confirmed through a simulation based on well-known principles of the behaviour of the solubility of ions in multi-component aqueous electrolytes.

Ongoing test work is currently underway to validate the process flow sheet at the on-site pilot plant and at other facilities where there is the appropriate expertise. These laboratories are at the Universities of Salta (Argentina), Concepcion and Antofagasta (Chile), and at SGS Mineral Services in Lakefield (Canada).

The on-site pilot plant includes pre-concentration ponds, treatment ponds and the lithium ponds to generate the concentrated brines for further processing in the pilot facilities and at the above-mentioned laboratories.

The test work program also includes testing other processes for the possibility of recovering other valuable industrial minerals such as Glauber´s Salt (Hydrated magnesium sulphate), Boric Acid, Disodium Octoborate Tetrahydrate and Potassium Chloride. Each of these will be evaluated separately.

18.4 Preliminary Economic Assessment Study Results

- Proprietary and public lithium marketing studies indicate that future demand for this metal will continue to increase strongly, driven mainly but not exclusively by demand for batteries for hybrid and electric vehicles. Materialization of this demand should allow commercialization of growing volumes of lithium in a favourable pricing environment.
- The capital investment for the Cauchari project (± 30% accuracy) including equipment, materials, indirect costs and contingencies during the construction period is estimated to be US$ 399 million. This total excludes interest expense that might be capitalized during the same period. Working capital requirements are estimated to be US$ 7.3 million. In addition, sustaining capital expenditures total US$ 70.5 million over the 20 year life of the project. Disbursements of these expenditures start in year 5.
- Given that the second phase investment occurs while the first one is operating and generating revenue, total net capital outflow for the project, excluding interest expense, is approximately US$ 250 million.
- An operating cost estimate (± 35% accuracy) for a 40,000 TPA facility, composed of two 20,000 TPA modules was prepared. This estimate indicates that the project's operating costs are US$/Tonne 1,434. This figure includes pond and plant chemicals, energy, labour, salt waste removal, maintenance, camp services and transportation.
- Project economic analysis indicates that, for the base case, Before Tax (BT) NPV (8%) is MUS$ 982,507 and After Tax (AT) NPV (8%) is MUS$ 714,820. Before Tax IRR is 30.0% and After Tax IRR is 26.0%.
- Project economic sensitivity analysis shows that revenue driver variables – Lithium Carbonate LT Price and Production – are the ones with the highest impact on project results, regardless of whether these are measured as BT NPVs and IRR or AT NPVs and IRR. Project results are somewhat less sensitive to Capital Expenditures and Total Operating Costs.
- Project cash flow analysis for the base case and alternative scenarios indicates that, if assumptions that sustain the case materialize, the project appears to be economically viable. Project results remain positive, even with important negative variations on the driver variables, indicating project strength and resilience.

Readers should note that the preliminary assessment is preliminary in nature, that it includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the preliminary assessment will be realized.

18.5 Project Schedule

The program assumes that construction of the project's first phase starts on Q3 2012, date by which all environmental and construction permits must have been obtained.

Commissioning the first stage of the project ends in Q3 2014, while construction of the project's second phase starts in Q1, 2016 and commissioning of this second phase ends in Q4 2017.

19 RECOMMENDATIONS

19.1 Drilling

19.1.1 Brine

A six well program has been designed from which two wells have been completed to date. These wells will allow the company to have enough hydrological parameters to complete a full hydrological model that will allow AquaResource (independent consultants) to convert in situ resources into extractable reserves.

19.1.2 Industrial Water

A 3 well shallow drilling program on the Archibarca fan has to be completed and pump tests performed to identify the hydrological characteristic of the industrial water aquifer identified by geophysics and exploration drilling.

19.2 Reserve Estimation

The program for Reserve Estimation is ongoing. It is supported by in-progress field activities (particularly pumping tests) and numerical modelling work, as described in Sections 9.6 and 9.9.

19.3 Mining

The definite mine plan including the location of the well field, the extraction rates per area of the salar, the design of the network of pipes and the infrastructure attached to it will be produced once the final hydrological parameters are known and the extractable reserve estimation is defined.

19.4 Base Line Studies

Ausenco Vector is proceeding with the environmental base line study that will be completed by Q2 2011. Other baseline studies under completion are the hydrological balance being completed by AquaResources with the hydrological data collected by the company on a monthly basis, the geophysical program around the salar to establish the boundary conditions and the meteorological baseline that is registered daily in the company weather stations.

19.5 Infrastructure and Engineering

Road and platform construction continues towards the areas where the production wells are being drilled for long term pump tests. A Lithium Carbonate pilot plant is being designed by

SGS Minerals Services, Lakefield, Canada and is expected to be installed on site by Q4 2011. A new laboratory expansion is in progress with an atomic absorption facility to be operational by Q3 2011 to be able to have reliable chemical analysis on site for at least 50 full analyses per day (current facilities allow 4 full chemical analyses per day). Pond Construction is expected to continue to add to the 1 ha pond designed to feed the pilot plant. Four smaller ponds are to be constructed by Q2 2011 of 13 metres by 50 metres. These are settling ponds (for settling out magnesium hydroxide and gypsum) and lithium ponds.

19.6 Process Engineering

The proposed process brine test work program should be actively progressed to advance the process, in line with the next engineering phase, which is to carry out the Full Feasibility Study. The test program is currently underway, with emphasis upon three main areas, as follows:

- Process simulation using the gPROMS software. This will allow the confirmation of design parameters for ponds and plant engineering, before the data from field or laboratory tests being conducted becomes available, since both of these require long periods of time to carry out.
- Bench scale tests, allowing a preliminary confirmation of simulation data. These tests will also allow the determination of the design and scale of the equipment for a Pilot Plant.

  Tests to be conducted in:
  - Field Ponds, Pans and Pilot Plant for brine concentration and liming.
  - Boron solvent extraction (SX) and lithium carbonation tests to be conducted by SGS Minerals Services, Lakefield, Canada and at the University of Concepción, Chile, to determine the extraction and re-extraction stages and subsequently, using the resulting data to design a pilot plan for this process.
  - A representative sample of the salts extracted from the test ponds will be sent to the University of Jujuy, to be subjected to KCl flotation tests, for verifying the economic viability of this process.
- Using the information obtained from the SGS bench scale tests, a lithium carbonate pilot plant scale production facility will be ordered which will be supplied with concentrated brine being generated at the tests ponds. This Pilot Plant will allow, firstly the confirmation of the design information that will be generated by the Simulation Model (gPROMS), and secondly it will allow confirmation of the input engineering data for a Full Feasibility Study.

  Separately, this facility will produce a small amount of Li_2CO_3, which will be sent to the battery manufacturers as a test sample for evaluation purposes.

19.7 Full Feasibility Study

It is recommended to proceed with a full feasibility study to be completed in a period of approximately 1 year.

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21 DATE, SIGNATURE AND CERTIFICATE

Roger J. Kelley
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I, Roger Kelley, B. Sc. Chem. Eng., am an independent consultant for ARA WorleyParsons in Santiago, Chile located at Av, José Pedro Alessandri 1495, Ñuñoa, Santiago, Chile and have been so since March 2011.

I graduated from the University of Cape Town with a Bachelor of Science degree in Chemical Engineering in 1966. I am a fellow of the South African Institute of Mining and Metallurgy.

Since 1966 I have continually been involved in metallurgical plant projects in Zambia, South Africa, the Democratic Republic of the Congo, Chile, Perú, Brazil and Argentina.

I have read the definition of “qualified person” set out in National Instrument 43-101 (“NI 43-101”) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.

I visited the Cauchari-Olaroz Property in Jujuy Province, Argentina on the 9th and 10th of March 2011. I am responsible for supervising the preparation of the Preliminary Economic Assessment, titled “Preliminary Assessment and Economic Evaluation of the Cauchari-Olaroz Lithium Project, Jujuy Province, Argentina”, with an effective date of May XXX, 2011, relating to the Cauchari-Olaroz Property.

As of the date of this certificate, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

I am independent of Lithium Americas Corporation in accordance with the application of Section 1.4 of National Instrument 43-101. I have no prior involvement with the Property that is the subject of this Report I have read National Instrument 43-101 and Form 43-101FI, and this report has been prepared in compliance with that instrument and form.

Dated at Santiago, Chile, this 30th Day of April 2011

“signed and sealed”
Roger Kelley

22 APPENDIX

22.1 Title Opinion

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Buenos Aires, March 22, 2011

TITLE OPINION

Dear Sirs:

Re: Lithium Americas Corp., "Salares" Project, Salta & Jujuy, Argentina

We have been retained by Lithium Americas Corp. ("Lithium"), to provide an opinion pertaining to the title of certain mineral claims and concessions located in the Cauchari Salar in District of Jujuy Province in the Puna, northern Argentina and others in Salta Province, as more particularly described in the exhibits to this opinion (the "Properties").

In reviewing Lithium's interest in the Properties, we have performed a search, in March 2011 – of records at the Mining Authority of Jujuy Province and Salta Province having jurisdiction over the claims and concessions included in the Properties, as attached in the exhibits hereto and the agreements referred to herein.

In addition, we have examined the following:

1. A Purchase and Sale Agreement (the "Purchase Agreement") dated June 11, 2009 between Lithium, Minera Exar S.A. ("Exar"), a wholly owned subsidiary of Lithium, and Latin American Minerals Argentina S.A. ("LAT").

2. An assignment agreement (the "Assignment Agreement") dated June 2, 2009 between LAT and Exar which forms Schedule D of the Purchase Agreement.

3. Originals or photostatic or certified copies of such corporate records, contracts and instruments of Lithium, Exar, LAT and/or other corporations, certificates, permits, licenses or orders of public officials, commissions, boards and governmental bodies and authorities, certificates of officers or representatives of Lithium, Exar, LAT or other corporations and such other records, contracts and instruments, and we have made such investigations and searches, all as we believe necessary and relevant as the basis for the opinion set forth herein.

4. An option agreement dated January 29, 2009, (the "Rojo Option Agreement") between LAT and Silvia Monica Rojo, whereby the optionor granted to LAT an option to acquire a 100% interest in the La Yavena, Sulfa 6, Sulfa 7, Sulfa 8, Sulfa 9 and Cauchari Norte mineral concessions that make up part of the Properties as set forth in the attached Exhibit "A".It is currently holding a supplementary deed of the heirs of Mario Rojo confirming the signing of the contract.

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5. An option agreement dated March 20, 2009, (the "Minera La Puna S.A Option Agreement") between LAT, Luis Agustin Cekada and Camilo Alberto Morales, whereby the optionors granted to LAT an option to acquire a 100% interest in the Verano 1 mineral concession that makes up the part of the Properties as set forth in the attached Exhibit "A".

6. An option agreement dated April 7, 2009, (the "Losi Option Agreement") between LAT and Luis Losi S.A., whereby the optionor granted to LAT an option to acquire a 100% interest in the Jorge mineral concession that makes up part of the Properties as set forth in the attached Exhibit "A

7. An option agreement dated May 11, 2009, (the "Santa Rita Option Agreement") between LAT and Minera Santa Rita S.R.L., whereby the optionor granted to LAT an option to acquire a 100% interest in the San Antonio and Tito mineral concessions that make up part of the Properties as set forth in the attached Exhibit "A.

8. An option agreement dated June 1, 2009, (the "Los Boros Option Agreement") between Exar and Grupo Minero Los Boros S.A. ("Los Boros") whereby Los Boros granted to Exar an option to acquire usufruct rights in the Luisa, Arturo and Angelina concessions, that make up part of the Properties as set forth in the attached Exhibit "A".

9. An intention letter dated June 12, 2009 (the "Santa Rita Letter") between LAT and Minera Santa Rita SRL, regarding an option agreement for the Maria Victoria concession that makes up part of the Properties as set forth in the attached Exhibit "A".

10. An option agreement dated July 15, 2009 (the "Minerva Option Agreement") between Exar and Silvia Valente whereby the optionor granted to Exar an option to acquire a 100% interest in the Minerva concession that makes up part of the Properties as set forth in the attached Exhibit "A".

11. An option agreement dated August 25, 2009 (the "Triboro Option Agreement") between Exar and Triboro S.A. whereby the optionor granted to Exar an option to acquire a 100% interest in the Irene concession that makes up part of the Properties as set forth in the attached Exhibit "A".

12. An option agreement dated January 22, 2010 (the "Chinchinchuli Option Agreement") between Exar, Leon Romarosky, Vicente Victor Costa Ibanez and Vicente Juan Antonio Costa whereby the optionors granted to Exar an option to acquire a 100% interest in the Chinchinchuli II concession that makes up part of the Properties as set forth in the attached Exhibit "A".

13. An option agreement dated September 9, 2009 (the "Borax Option Agreement") between Exar and Borax S.A whereby the optionor granted to Exar an option to acquire usufruct rights in the Zoila, Mascota, Union, Julia, Saenz Pena, Demasia Saenz Pena, Montes de Oca, Julio A. Roca, Elenam, Emma, Uruguay, Uno, Dos, Tres, Cuatro, Cinco, Avellaneda, Buenos Aires, Moreno, Sarmiento, Porvenir, Sahara, Alicia, Serbia, Clarisa, Demasia Clarisa, Paulina, Ines, Maria Esther, Maria Central, Delia, Graziella, Linda, Maria Teresa, Juancito, Archibald and San Nicolas concessions that make up part of the Properties as set forth in the attached Exhibit "A".

14. An option agreement dated April 30, 2010 (the "Chico 3 Option Agreement") between Exar and Mario Moncholi whereby the optionor granted to Exar an option to acquire a 100% interest in the

Chico 3 concession that makes up part of the Properties as set forth in the attached Exhibit "A".

15. An option agreement dated October 21, 2009 (the "Miguel Option Agreement") between Exar and Mario Moncholi whereby the optionor granted to Exar an option to acquire a 100% interest in Miguel concession that makes up part of the Properties as set forth in the attached Exhibit "A".

16. An option agreement dated October 21, 2009 (the "Grupo Minero Osiris Option Agreement") between Exar and Silvia Irene Shapiro whereby the optionor granted to Exar an option to acquire a 100% interest in the Beccero de Oro, Osiris and Alsina concessions that make up part of the Properties as set forth in the attached Exhibit "A".

17. An option agreement dated April 30, 2010 (the "Chico Option Agreement") between Exar and Mario Moncholi. whereby the optionor granted to Exar an option to acquire a 100% interest in the Chico concession that makes up part of the Properties as set forth in the attached Exhibit "A".

18. An option agreement dated November 20, 2009 (the "Electroquimica del Carmen Option Agreement") between Exar and Electroquimica del Carmen S.A., whereby the optionor granted to Exar an option to acquire usufruct rights in the Eduardo, Nelida, Maria Angela, Hekaton and Victoria concessions that make up part of the Properties as set forth in the attached Exhibit "A".

19. An option agreement dated November 26, 2009 (the "Garcia Option Agreement") between Exar and Gabriel Garcia whereby the optionor granted to Exar an option to acquire a 100% interest in Eduardo Daniel concession that makes up part of the Properties as set forth in the attached Exhibit "A".

20. An option agreement dated December 16, 2009 (the "Procesadora de Boratos Agreement") between Exar and Procesadora de Boratos S.A. whereby the optionor granted to Exar an option to acquire a 100% interest in the Grupo Minero La Inundada concessions that make up part of the Properties as set forth in the attached Exhibit "A".

21. An option agreement dated April 30, 2010 (the "Chico IV Option Agreement") between Exar and Mario Moncholi whereby the optionor granted to Exar an option to acquire a 100% interest in the Chico IV concession that makes up part of the Properties as set forth in the attached Exhibit "A".

22. An intention letter dated April 20, 2010 (the "Clotilde Option Agreement") between Exar and Mario Moncholi regarding an option agreement for the Clotilde concession that makes up part of the Properties as set forth in the attached Exhibit "A".

23. An agreement dated June 18, 2009 with the aboriginal community of Olaroz Chico whereby that community granted LAT the exclusive right to occupy and use the land of the community for mining prospecting activities thereon.

24. An agreement dated July 14, 2009 with the aboriginal community of Manantiales-Pastos Chicos whereby that community granted LAT the exclusive right to occupy and use the land of the community for mining prospecting activities thereon.

25. An agreement dated July 14, 2009 with the aboriginal community of Puesto Sey whereby that community granted LAT the exclusive right to occupy and use the land of the community for mining

prospecting activities thereon.

26. An agreement dated August 20, 2009 with the aboriginal community of Huancar whereby that community granted LAT the exclusive right to occupy and use the land of the community for mining prospecting activities thereon.

27. An agreement dated October 18, 2009 with the aboriginal community of Catua whereby that community granted Exar the exclusive right to occupy and use the land of the community for mining prospecting activities thereon.

28. An agreement dated December 9, 2009 with the aboriginal community of Pórtico de los Andes – Susques – Pueblo Atacama whereby that community granted Exar the exclusive right to occupy and use the land of the community for mining prospecting activities thereon.

29. An agreement dated March 14, 2010 with the aboriginal community of Pastos Chicos whereby that community granted Exar the surface rights to build the pilot plant.

30. The "Alegria 1", "Alegria 2", "Alegria 3", "Alegria 4", "Alegria 5", "Alegria 7", "Cauchari Oeste", "Cauchari Este" and "Cauchari Sur" concessions listed in the attached Exhibit "A" and the claims located in the Salta Province listed in the attached Exhibit "B".

31. On February 2, 2011, an exploration contract with option to purchase for the Payo Mines was signed with Mr. Mario Moncholi. See Exhibit A. (In process of registration).

32. General Property Location Map attached as Exhibit "C".

Minera La Puna S.A Option Agreement, Losi Option Agreement, Rojo Option Agreement, Santa Rita Option Agreement, Santa Rita Letter, Minerva Option Agreement, Electroquimica del Carmen Option Agreement, Triboro Option Agreement, Chinchinchuli Option Agreement, Borax Option Agreement, Miguel Option Agreement, Grupo Minero Osiris Option Agreement, Chico 3 Option Agreement, Chico IV Option Agreement, Chico Option Agreement, Clotilde Option Agreement, Minas Payo Agreement, Garcia Option Agreement and Procesadora de Boratos Agreement are collectively referred to herein as the "Option Agreements".

The agreement listed in paragraphs 23-29 above are collectively referred to herein as the "Surface Access Agreements".

Due to the fact that the mining properties are located in the Provinces of Salta and Jujuy the following highlights should be considered in the review study:

A- Permits

Lithium holds all permits associated to the relationship between the Properties and the aboriginal communities - mainly those permits related to the surface land and to the area where Lithium holds mining rights.

The mutual agreements and authorizations include the right Lithium holds regarding access and transportation issues, road construction and use of land for Lithium's mining works.

In addition to the aforesaid agreements, Lithium is also requesting and registering the Right of Way under the competent authority of the Province.

The above mentioned is legislated in the Mining Procedural Code, articles 146 and subarticles.

B- Water Rights

The Water Rights are legislated under the Water Management National Law 25688 and under the Water Code of the Province of Jujuy (Law 161 and amendments).

The use of common or private waters is under the control of the Provincial Body for Hydraulic Resources. Lithium has submitted and obtained approval for the water use for drilling and has paid the royalty.

C- Protected Areas

In the Puna region, there are flora and fauna protected areas as stipulated by Law 23582/88, Law 3820/81 regarding the creation of the Reserve of Olaroz–Cauchari and the agreement to La Vicuña National Law supported by Province of Jujuy.

Olaroz–Cauchari which covers a surface of 460 000 hectares and currently protects approximately 6,500 listed *vicuñas* (Vicugna).

The main concern is to stop hunting and/or avoid altering the environment. The enforcement authority has reviewed Lithium's environmental impact report and approved the work planned by Lithium.

D- Refunds

The Mining Secretary of the Argentine Nation Resolution # 130/93 currently in force considers special refunds for mineral products or by-products produced in la Puna Region in favor of exports to other countries.

E- Royalties

According to the National Law for the reordering on the Mining sector, the law applies for coordinating and organizing the payment of royalties to the Provincial Tax Collectors.

F- Surface Rights , Environmental Impact Approval

Lithium has entered into seven agreements for surface access with the aboriginal communities located on the Cauchari-Olaroz Properties. Should any of the aboriginal communities decide not to renew such agreements, Lithium would be required to enforce its statutory access rights under the provisions of the Argentinean National Mining Code, as amended, however this would be a disruptive and potentially costly process. In addition, a lack of surface access agreements with the local communities could affect the renewal of Lithium's environmental impact report.)

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Lithium has entered into seven agreements for surface access with the aboriginal communities located on the Cauchari-Olaroz Properties. Should any of the aboriginal communities decide not to renew such agreements, Lithium would be required to enforce its statutory access rights under the provisions of the Argentinean National Mining Code, as amended, however this would be a disruptive and potentially costly process. In addition, a lack of surface access agreements with the local communities could affect the renewal of Lithium's environmental impact report.)

Minera Exar SA, has received approval of environmental impact assessment for the exploration stage according to Resolution 25/09 passed on August 26, 2009, in reference to proceeding on Cauchari Project Number 1072.L-08. Currently, the presentation of extensions continues according to the planned and newly added activities.

G. Strategic Metal Declaration.

On March 2, 2011, the governor of Jujuy Province under Emergency Decree Number 7592/11 declared **lithium a strategic mineral and natural resource** in the province. A special expert commission is assigned to carry on the corresponding environmental impact assessment.

H. Glaciers.

Decree 207/2011 regulated by Law 26,639 specifies the Minimum Standards for the Protection of Glaciers and of the Peri-glacial Environment. The Law establishes the implementation of an Inventory and the time involved in the process of completion.

We are solicitors qualified to carry on the practice of law in Argentina only and, except to the extent that this opinion is rendered in reliance on opinions of counsel in other jurisdictions, we express no opinion as to any laws, or matters governed by any laws, other than the laws of Argentina.

The opinions in this letter relating to the Properties are subject to the following assumptions, qualifications and restrictions:

1. We have made a detailed study of all files referred to in the attached Exhibits.
2. We have assumed that the documents that we have examined are the only documents pertaining to title to the subject mineral properties, and the original claim expedients.
3. We have assumed that persons purporting to execute the documents examined in the course of title examinations are, in fact, the same persons named therein and, when executed by a corporation, the authorized persons to follow up the procedures at the Mining Authority.
4. We have also assumed that copies of documents examined are, in fact, true copies of documents in existence and that the original of such documents were properly executed.
5. We have not conducted any searches or other investigations with respect to tax assessed by applicable government authorities.

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Whenever an opinion or other statement in this letter is qualified by the phrase "we are not aware" or "so far as we are aware", with respect to the existence of non-existence of facts, we mean that:

A. during the course of our representation of LAT, Exar or Lithium no information has come to our attention which would give us actual knowledge of the existence or absence of such facts; and

B. except as expressly set out in this letter, we have not undertaken any specific investigation or conducted any search to determine the existence or absence of such facts and any limited inquiry undertaken by us during the preparation of this opinion should not be regarded as such an investigation, and no inference as to our having constructive knowledge of the existence or absence of such facts should be drawn merely from the fact of our representation of LAT, Exar or Lithium.

As a result of the searches and examinations as described above and based on and subject to the assumptions, qualification and restrictions herein described and the accuracy of the records at The Mining Province of Jujuy authority, we are of the opinion as of March, 2011 (the "Search Date") that:

1. The execution and delivery of the Los Boros Option Agreement by Los Boros and the execution of the Option Agreements by the parties thereto other than LAT, Exar and Lithium and the consummation of the transactions contemplated thereby do not contravene, conflict with, result in a breach of or constitute a default under any corporate or mining laws of the Province of Jujuy or the federal laws of Argentina applicable in that province.

2. The Los Boros Option Agreement constitutes a legal, valid and binding obligation of Los Boros, enforceable against it in accordance with its terms.

3. Los Boros is the recorded holder of the Luisa, Arturo and Angelina concessions located in Susques, northern Jujuy, Argentina, detailed in the attached Exhibit "A".

4. Pursuant to and subject to the terms of the Los Boros Option Agreement, Exar may earn a usufruct right for the exploration of the BRINES within the Luisa, Arturo and Angelina concessions listed and described in Exhibit "A" hereto.

5. The execution and delivery of each of the Los Boros Option Agreement, the Option Agreements, the Assignment Agreement and Purchase Agreement by each of LAT, Lithium and Exar, as applicable, and the performance of its respective obligations there under have been duly authorized by all necessary corporate action on the part of LAT, Lithium and Exar, respectively.

6. The execution and delivery of the Los Boros Option Agreement, the Option Agreements, the Assignment Agreement and Purchase Agreement by each of LAT, Exar and Lithium, as applicable, and the consummation of the transactions contemplated thereby do not contravene, conflict with, result in a breach of or constitute a default under: (i) the articles or by-laws of LAT or Exar or Lithium; (ii) any resolution of the directors (or any committee of directors) or shareholders of LAT or Exar or Lithium; (iii) any of the Option Agreements; or (iv) any corporate or mining laws of the Province of Jujuy or Salta or the federal laws of Argentina applicable in those provinces.

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7. Each of the Option Agreements, Assignment Agreement and Purchase Agreement constitutes a legal, valid and binding obligation of each of LAT, Lithium and Exar, as applicable, enforceable against it in accordance with its terms.

8. Exar is the recorded holder of the Option Agreements covering the Properties located in the Jujuy Province, Argentina, detailed in the attached Exhibit "A" (the "Cauchari Claims").

9. Exar owns the "Cauchari Este" and "Cauchari Sur" concessions located in the Jujuy Province in the same "Cauchari Salar" as the part of the Properties covered by the Option Agreements and listed in Exhibit "A".

10. Exar owns the Properties located in the Salta Province listed in Exhibit "B" (the "Salares Properties")

11. Pursuant to and subject to the terms of the Option Agreements and the Assignment Agreement, Exar may earn either usufruct rights to or a 100% undivided interest in and to the corresponding Cauchari Claims listed and described in Exhibit "A" hereto.

12. The Cauchari Claims are concessions in good standing under Argentine Law and granted by the Mining Authority of the Jujuy Province and with the environmental impact study (IA) approved. And there is two new agreements "Chico, Clotilde and Alegrias MP" (New mines requested) with the environmental impact study in process.

13. The Salares Properties are concessions in good standing under Argentine Law and granted by the Mining Authority of the Province of Salta. See Location Map attached EXHIBIT "D".

14. Other than as described in paragraph 21 below, so far as we are aware, there are no suits, proceedings, or investigations which are pending or threatened against affecting the Properties, Los Boros Option Agreement, Option Agreements, Purchase Agreement or Assignment Agreement, at law or in equity, or before or by any governmental or administrative agency or instrumentality, which if adversely determined, would materially and adversely affect the rights under the Los Boros Option Agreement, Option Agreements, Assignment Agreement or Purchase Agreement or title to the Properties.

15. Pursuant to viewing of the records at the Mining Authority of the Jujuy and Salta Provinces, the claims are registered and pending of registration the MD (Mine requested) POCITOS BL, ARIZARO IV, ARIZARO V and ARIZARO VII. , and ARIZARO VII BIS . There are all in process of registration at the Mining Authorities of the Province of Salta, see EXHIBIT "B".

16. All the Properties that require canon duties, have them paid until the end of june 2011.

17. The Surface Access Agreements listed in paragraphs 23-26 above, previously held by LAT, have been validly assigned to Exar.

18. Each of the Surface Access Agreements constitutes a legal, valid and binding obligation of the parties enforceable in accordance with its terms.

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19. Exar has surface rights required to exploit the Cauchari Claims and the Salares Properties.

20. The surface owners have been notified of measurements procedures in accordance with the Mining Code and have expressed no opposition.

21. The Santa Rita Letter was executed before a notary public and an initial payment was made by LAT to Santa Rita, which was accepted. Prior to signing a definitive agreement, Santa Rita attempted to terminate the Santa Rita Letter due to another offer being presented by a third party to purchase the Maria Victoria concession. Legal proceedings have been initiated by LAT in Argentina in an attempt to force Santa Rita to complete the sale to LAT. If successful, LAT will then assign the Maria Victoria concession to Exar. In February 2011, after the judicial activity recess, the setting of the case for trial was requested.

This opinion is for the sole benefit of the addressee and may not be used, circulated, quoted from, relied upon or otherwise referred to by any other persons without our prior written consent.

Yours truly,

Belén Ribera

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