

EXECUTIVE SUMMARY

HILARIC LLAMARA SALT FLAT

TARAPACA REGION

POZO ALMONTE COMMUNE, CHILE



Santiago de Chile, 2022

1.-LOCATION AND ACCESS

The Salar de Llamara is located in the intermediate depression 180 km south of Iquique, close to the southern limit of the Tarapacá Region and located at the southern end of the Pampa del Tamarugal.

The Salar de Llamara is part of the so-called Northern Region of Chile (Tarapacá Region), 37 km north of Quillagua and 750 m above sea level. It is located in a depressed area with a general north-south orientation, called the Central Depression, which has a gentle slope to the west and is limited by two mountain ranges: the Coastal Range to the west, and the Andean Precordillera to the east.

Location Map and Access to the Area of Interest.



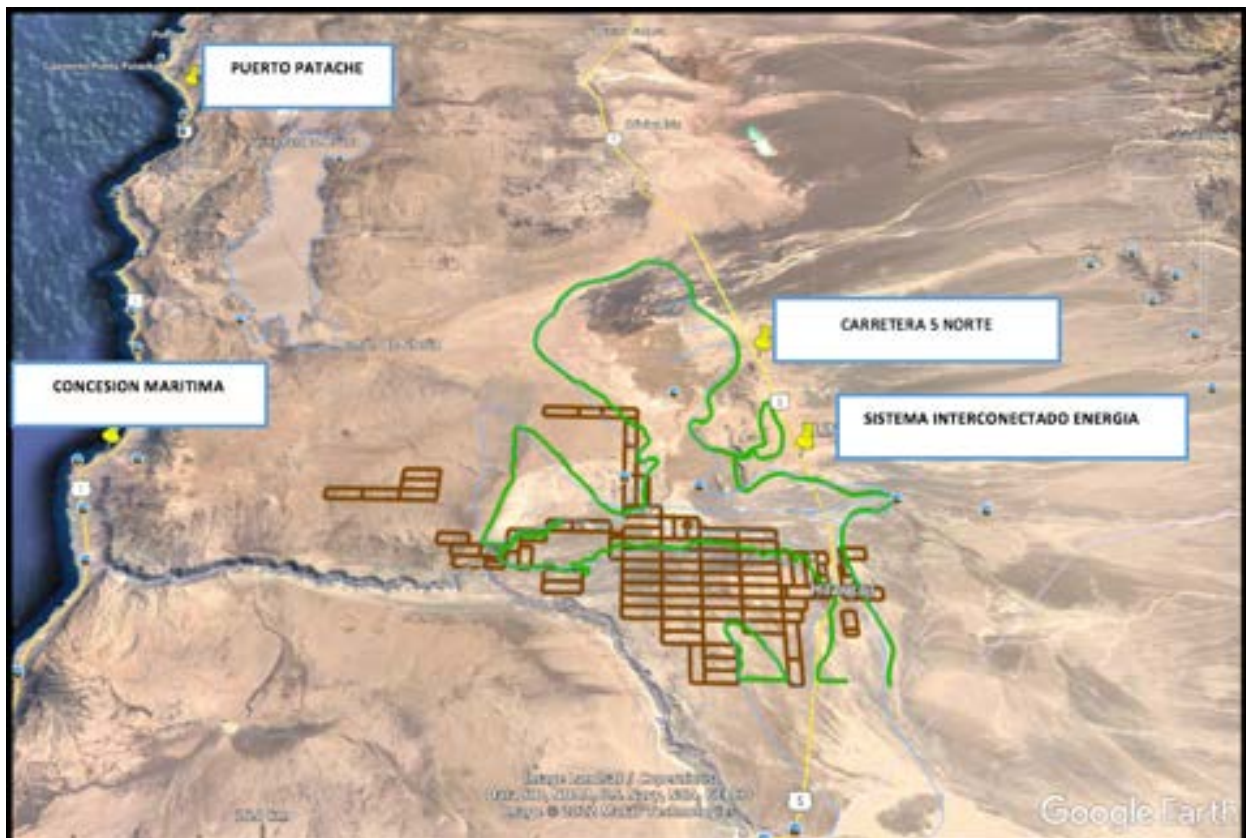
1.1.- Feasibility of International Highway, Port, Industrial Water and Energy:

- **Pan-American Highway 5 North:** One of the main advantages derived from the location of the Hilaricos group of mining concessions for the development of a project lies in its proximity to the Pan-American Highway 5, which runs through Chile from north to south, passing through the vicinity of the project area, which allows for optimal accessibility for the development of the infrastructure necessary for the construction of the facilities, as well as for the development of the transportation of minerals to the shipping ports.

-Northern Interconnected Energy System (SING):Due to its location, Hilaricos has alternatives for obtaining energy from the Northern Interconnected System, whose electrical transmission line is built a few kilometers away, allowing a connection through an electrical substation, which allows it to have energy for the development of the project, including low-cost renewable energy alternatives after the investment.

- Industrial port:In addition to having a network of internal roads that facilitate the development of mining operations, it has a special road directly to the port of Patillos, where salts are currently exported, approximately 80 kilometers away.

- Seawater for industrial use: It has been considered relevant to highlight the use of seawater for industrial processes of the project to be developed, currently holding a maritime concession in process in favor of the project, located 60 kilometers in a straight line, which will allow the extraction of an approximate flow of 250 liters per second.



2.GEOLOGY AND RESOURCES

The current geology in the Hilaricos Mining Properties corresponds to a "PaleoMeso-Cenozoic Basement on which the Salar Llamara basin lies, and the recent aeolian deposits, and the Salar de Llamara aquifer for the area studied Figure 1. Various geological units have been identified.

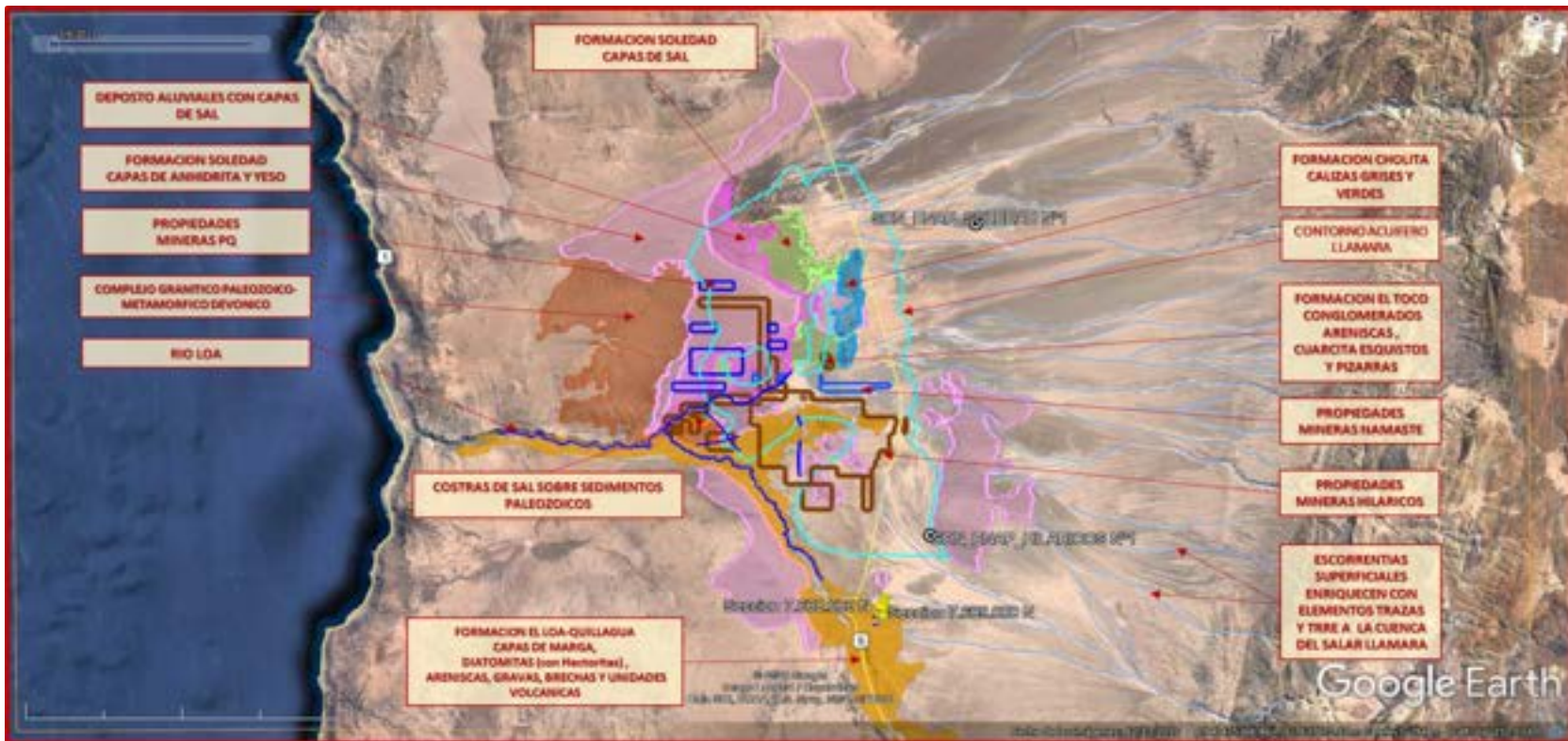


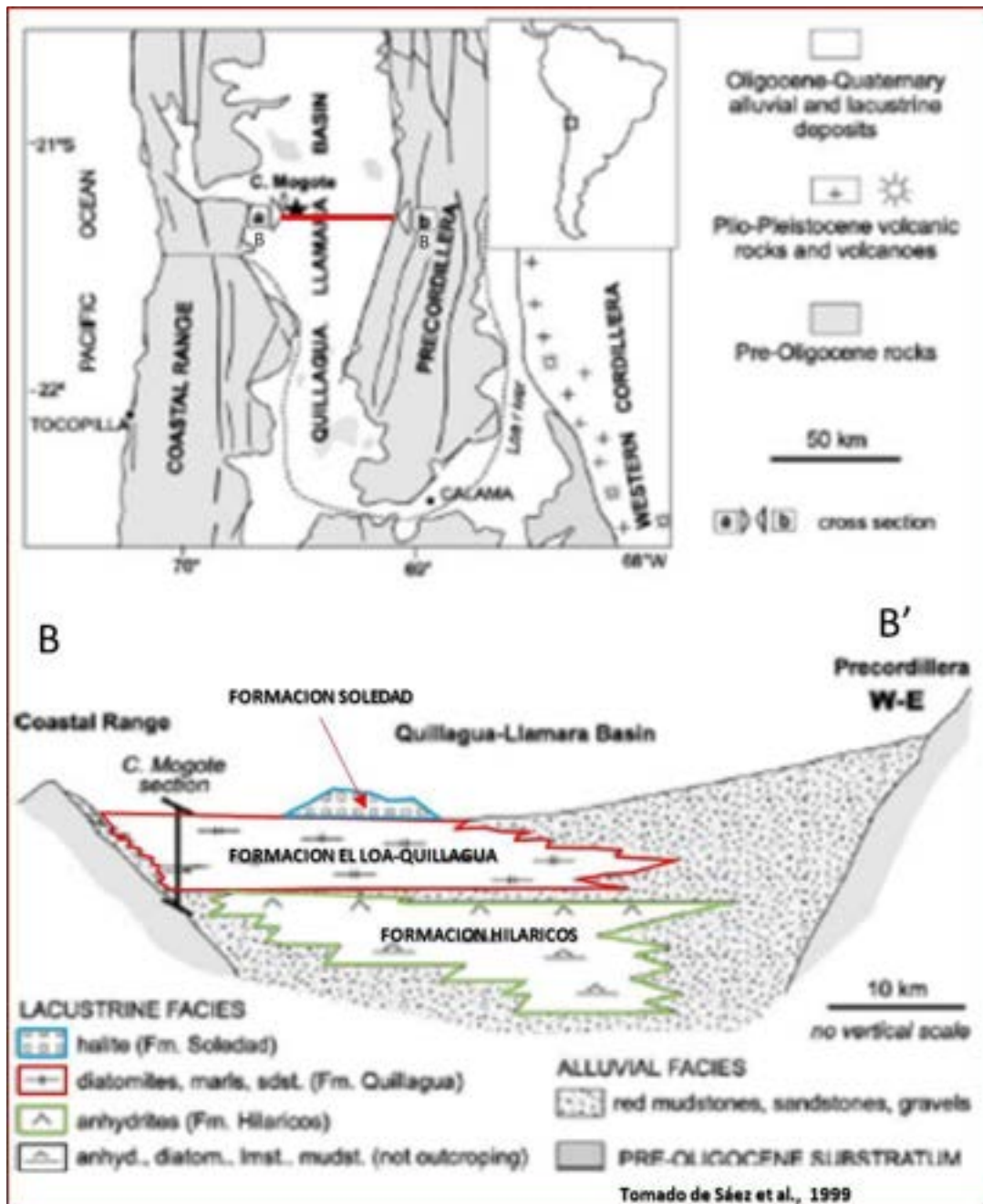
Figure 1. Geological-Geomorphological-Aquifer map established on Google Earth map with the Hilaricos mining properties, location of two ENAP drill holes, outline of the Llamara aquifer, and distribution of the lithologies of the El Toco Formation, El Loa-Quillagua, and Soledad Formation, and layout of the Salar de Llamara.

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Figure 2. Geomorphological and geological map according to Google Earth with the layout of a N35°W Cross Section, showing the geological units, Salar Llamara basin, El Toco Formation (metamorphic sediments), Soledad Formation, El Loa-Quillagua Formation, Paleo-Meso-Cenozoic Basement and Hilaricos mining property. Concentric surface runoff flows to the Llamara salt flat.

Figure 3 presents a map of the region showing the geomorphology of two important facies, the lacustrine and alluvial facies, where three lithological units of economic interest were delimited, such as the Soledad Formation, the Loa-Quillagua, and the Hilaricos Formation as lacustrine facies, which are underlying the endorheic basin of the Salar Llamara. While the alluvial fan systems are distributed as a lateral gear and around the endorheic basin.

Figure 3. Regional Geomorphological Map and vertical section sketch with the Quillagua-Llamara basin and lacustrine-alluvial lithofacies.



3.- STUDIES CARRIED OUT IN THE HILARICOS PROJECT AREA

Information from the following studies has been considered in this presentation:

3.1.-Review of ENAP's oil explorations in the northern zone from 1956 to 1962. Eng. Carlos Mardojovich K. Santiago de Chile, 1965. (annex 1).

The National Petroleum Company of Chile (ENAP) during the years 1961 and 1962 (according to Mordojevick (1965), shows the correlation or lateral overlap between the information of drillings with the stratigraphy of the El Loa-Quillagua formation. ENAP carried out oil explorations by drilling two vertical holes, corresponding to the drillings **Hilarico No. 1** (1,153.3 m) and Soledad **No. 1** (2,295.5 m), on the eastern slope of the Salar Llamara-Rio Loa (Figure 1 and 2).

Table 1 presents the details with the description of both drill holes, showing the correlation between the lithologies of the drill holes and the present analysis equivalent to the El Loa Formation. It is highlighted that the El Loa Formation reached depths of up to 238 m (Hilaricos drill hole No. 1) and 574 m (Soledad drill hole No. 1). According to the information provided by both drill holes, it has been interpreted that there is a lateral extension or overlap of the El Loa Formation towards the eastern side of the El Loa Formation paleobasin, an area where the mining concessions of the Hilaricos project are located.



Hilarisco Sounding No. 1 Lat. 21°32', Long 69°28'		
From- to (m)	Description	Observation
0-19	Poorly cemented gravel and sand	
29-44	Rolled with intercalations of and ~~and~~ and ashes of tuffs	correlatable with the El Loa Formation
44-122	Gypsum with a high degree of purity	
122-174	Reddish-brown red clays with ~~and~~ ~~ba~~ regions	
174-238	gypsum alternating with red clays	
238-482	Partly sandy red clays ac onglomeradic	
482-930	Coarse conglomerates with roda dgranites, lavas and metasediments, with clayey cement	
930-1153.3	Rhyodacitic igneous rocks	
Soledad Probe N°1 Lat. 21° 12', Long 69° 25'		
From-to (m)	Description	Observation
0-109	Poorly welded gravel and sand	
109-188	Red clays, bank guides Rena and Ravas	
188-315	Grey tuffs with intercalations of reddish and brown clays, conglomerate banks and horizons with gypsum, strata	correlatable with the El Loa Formation
315-474	brown clays with intercalations of pure of partly calcareous tuffs and impure gypsum	
474-574	gypsum with intercalations of t ~~el~~ bas and brown clays	
574-603	Basal conglomerate with boulders Gypsum (18m thick), brecciated clasts of igneous rocks	
603-693	Dark grey andesite lavas	Predominance of pyroclastic material correlatable with the Empexa Formation, according to Mordojovick 1965
593-1221	Siliceous tuffs and lava flows Cgoing to intermediate.	
1221-1745	Andesite conglomerates and breccias Yoth intercalations of green tuffaceous sandstones and lutites	
1717-1745	Greenish-grey arkosic sandstones s somewhat calcareous with abundant pyrite	
1745-	Lutites and limestones of marine origin (Ox Fordian?)	
1850-	Evaporites and limestones with little int ~~and~~ black shale and quartzite deposits	
2100-	Hornfels (granate hornfels) and)	
2200-2225	Dioritic dike	
2225-2295.5	No background indicated	Presumably similar to horny rocks?

Table 1. Vertical boreholes carried out by ENAP, drilled for oil exploration, during the years 1961-1962, on the eastern side of the Salar de Llamara, correlatable with the El Loa Formation (according to Mordojovick (1965)).

3.2.-Exploration Potential and Mineral Resources Estimate for Potash Dragon Inc. Llamara Project, Salar de Llamara, Northern Chile NI 43-101. Dr. C Mortimer, 2013. (annex 2).

In the report made by Mortimer (2013) shows how the mining company Potash Dragon Spa (Chile) or Potash Dragon Inc (Barbados-Canada) carried out an extensive study on the brines and waters of the Salar de Llamara with emphasis on potassium, and related to the northeast sector of the mining properties of this study Aquifers and Geological Resources of the Surface Brines.

Figure 4 shows the external limit of the Llamara water body or aquifer on the substrate of the Llamara Salar and basement, whose external limit was taken from the envelope generated in the Mortimer 2013 map. A cross section is added showing the extension of the Llamara Salar, the substrate composed of the El Loa-Quillagua and Soledad Formations, and the Paleozoic-Mesozoic-Cenozoic basement that contains the El Loa paleobasin and the current Salar de Llamara basin. The saline solutions or brines were contributed mainly by the Soledad Formation and its surroundings. The Llamara aquifer has been widely studied and summarized by Mortimer 2013, in a map that shows the various charge and discharge points in the Llamara Aquifer, as shown in Figure 4.

The author provides results of the brine resource estimation, as well as the geology, hydrogeology and probable genesis of the Salar de Llamara. Additionally, geochemical studies and dissolved solids measurements (TDS, 3800 mg/L and 4200 mg/L) were carried out. On the other hand, background information on extractability, geophysical studies (transient electromagnetic surveys = TEM) and hydrology of the aquifer that flows under the Salar de Llamara was provided, considering a low salinity in the upper part correlatable with the Soledad Formation (approx. 100 m thick, 20-200 Ohm-m), and high salinity in the lower part of the Salar de Llamara, where the El Loa Formation is located (100-150 thick, 5-10 Ohm-m). The EL Loa Formation serves as a reservoir for the densest brines, mentioning a high concentration of Na, Cl, Ca, K, Mg, SO₄ in the lower part of the saline aquifer.

Inferred resources associated with brines from the high conductivity unit (UCU, upper conductor unit) were estimated for the central Salar de Llamara sector, in an area covering 10,594 ha. The effective porosity was calculated with a result equivalent to 12.5 %, which is used in this study to calculate the geological resource. The estimated cut-off grade for the volume of brines corresponds to 362 mg/L for K. The calculated mineral brine corresponds to the quantity of 1.57 Mt of K₂SO₄ with 5,112 mg/L. Table 2 presents the calculation for various “cut offs” of the mineral brine.

Figure 4. Salar de Llamara aquifer with its tributary loads and discharges and vertical section of the Soledad Formation (according to Mortimer 2013).

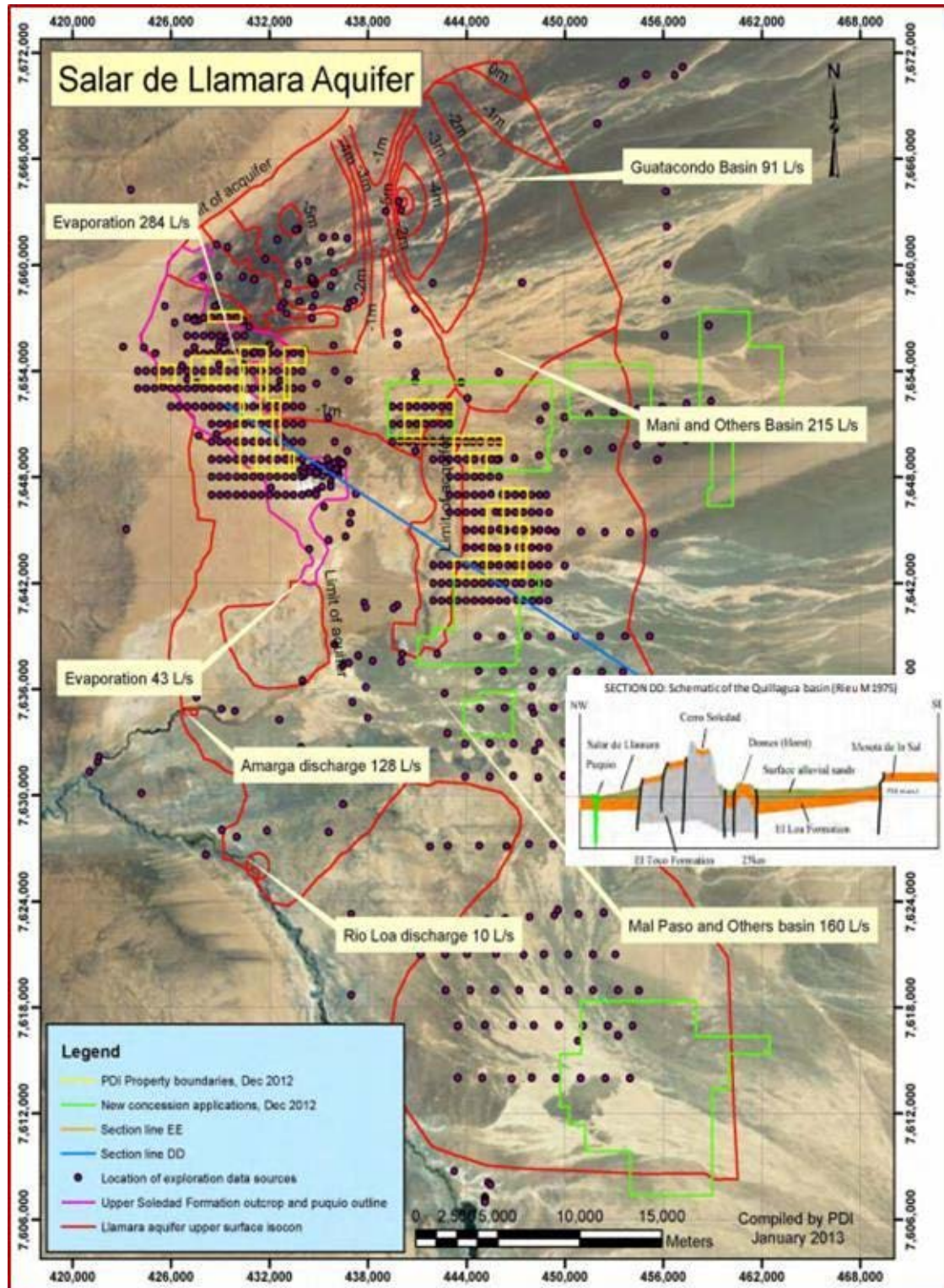


Table 2. Cut-off grade for the concentration of mineral brines contained for UCU of the properties of the Salar de Llamara Central, according to Mortimer (2013).

K Cut Off		6-Ion	K	Mg	SO ₄	Ca	Cl	Na
mg/L	% of Brine	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
1	100%	71,834	1,645	994	15,867	470	29,993	25,350
150	87%	81,408	1,879	1,135	17,770	478	34,066	28,589
362	69%	97,933	2,294	1,383	20,997	476	41,190	34,229
680	49%	127,195	3,055	1,828	26,634	463	53,910	44,316
1,000	35%	158,789	3,949	2,336	32,557	434	67,705	55,127
2,000	22%	204,267	5,445	3,213	41,174	407	86,205	70,246

Tables 3 and 4 present the inferred resource of saline solutions and their tonnage, respectively, calculated and analyzed in the aquifer of the central sector of the Salar de Llamara.

Table 3. Inferred resources of UCU saline solutions from the central part of Salar de Llamara.

	K	K ₂ O	KCl	K ₂ SO ₄	Mg	MgO	SO ₄
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Inferred Resource	2,294	2,763	4,374	5,112	1,383	2,294	20,997

Table 4. Inferred resources in millions of tonnes (Mt) for the central sector of the Salar de Llamara.

	Brine	K	K ₂ O	KCl	K ₂ SO ₄	Mg	MgO	SO ₄
	Mm ³	Mt	Mt	Mt	Mt	Mt	Mt	Mt
Inferred Resource	308	0.71	0.85	1.35	1.57	0.43	0.71	6.47

3.3.-Lefroy Resources Limited, Quarterly Activity Report, for the period ended March 31, 2009, Tom Kelly 2009. (annex 3).

In 2009, Arauco Minerals conducted a campaign of 67 reverse air drillings totaling 1,820 m, reaching depths of less than 40 m and vertically. During the study, the discovery of concentrated Li in the El Loa Formation in the Miami 1-8 and Lllamaras 1-17 mining properties located around Quillagua was reported. It was indicated that lithium mineralization is available in diatomites and calcareous mudstones of the El Loa Formation with concentrations from 300 ppm to 1,800 ppm of Li. These Li concentrations and their lithology were drawn in vertical sections North-South and West-East, with only the North-South section (445.250 E) shown in the report.

At least 7 North-South sections (N7.609.000 Figure 10), N7.608.700, N7.608.600, N7.608.150, N7.608.000 (Figure 11), and N7.607.080 Figure 12 and 6 West-East sections (E444.050, E444.100, E444.300, E444.550, E445.150, and E445.400) were performed, in both sections drillings, lithology of the El Loa Formation and geochemical information of U and Li, concentrated in the layers of diatomites of the hectorite type were arranged.

In the present analysis, two West-East and one North-South longitudinal sections were taken, as an example Figure 5, 6 and 7. The sections are located south of the Hilaricos mining properties and north of the town of Quillagua. The East-West and North-South sections show a regular distribution of the Li concentration in the vertical of the drill holes. It is assumed that the Li comes from the hectorites of the sector and corroborated with other additional studies shown here. The high-grade Li body (**hectorite**) is forming a subhorizontal mantle-type body with concentrations of Li between 300 ppm and 900 to 1200 ppm inland. The lithium body extends to the north and to the eastern and western sectors, and has decametric thicknesses, that is, between 30 and 50 m, leaving open the opportunity for exploration in its near and distant surroundings.

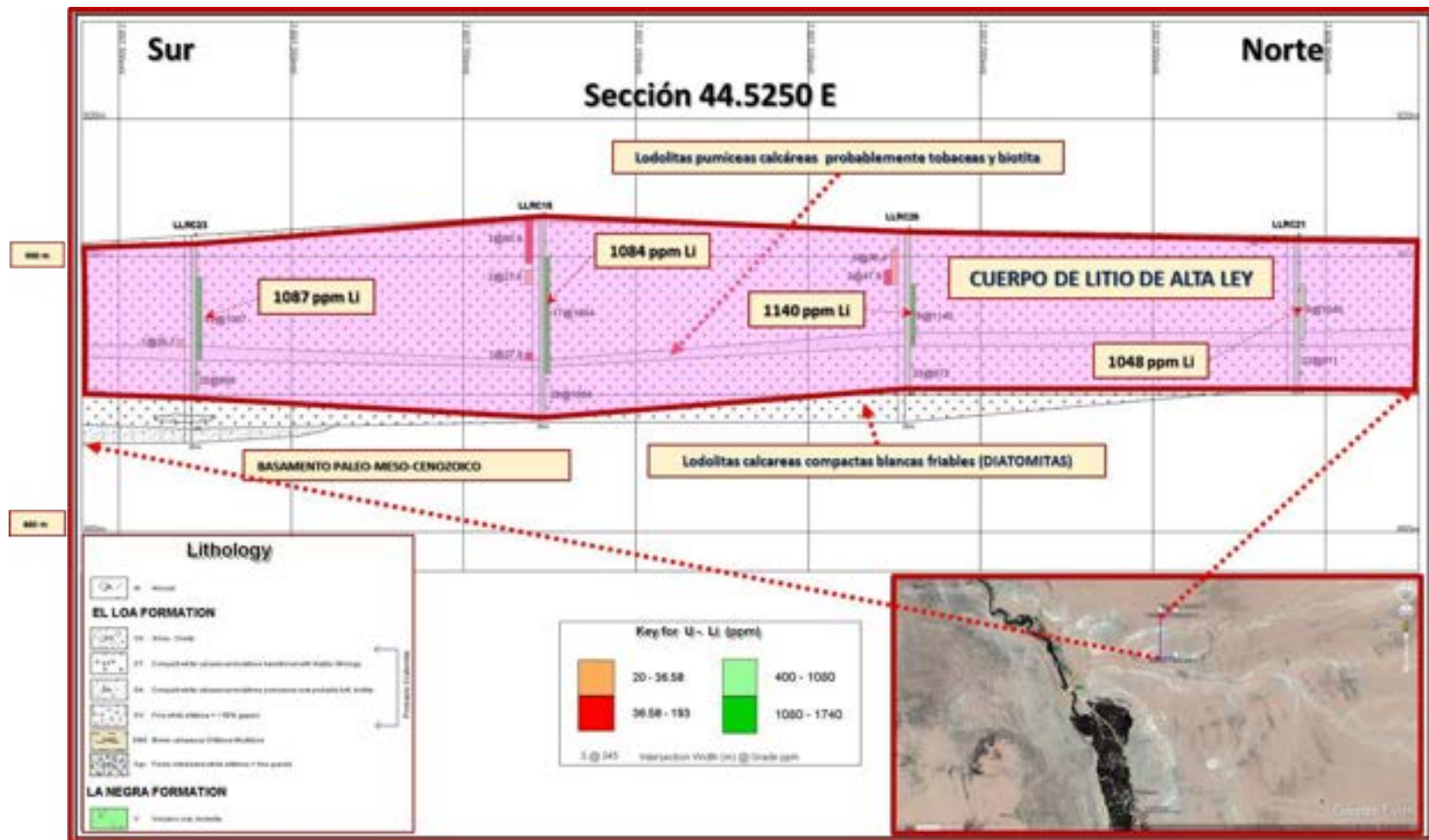


Figure 7. Section 445.250 E (Longitudinal), showing the Loa-Quillagua formation strata and their variation in ppmLi, green color.

This report presents a table of chemical analyses of U and Li in a database of drill holes for various projects such as Llamara, Cerro Soledad and Pampa.

In the sector that concerns the Llamara project located immediately north of Quillagua, there is a database with U and Li laws, which can be seen associated with the drillings shown in sections 7,609,000 N, 7,608,000 N and 445,250 E indicated above (Figure 5, 6 and 7 and Table 5).

Hole	Uranium				Lithium			
	From	To	Metres	Grade ppm	From	To	Metres	Grade ppm
LLRC01	13	18	5	28	12	38	26	523
LLRC02	7	14	7	21	7	38	31	734
LLRC03	0	12	12	22	0	21	21	889
LLRC04				**NSA	10	15	5	454
LLRC05	0	13	13	32	0	20	20	986
LLRC06	0	7	7	47	5	17	12	1099
LLRC06	1	8	7	42	1	21	20	964
LLRC07				NSA	6	28	22	1054
LLRC07				NSA	0	24	24	1002
LLRC08				NSA	7	23	16	1133
LLRC08				NSA	0	23	23	980
LLRC09	0	3	3	84	6	22	16	1083
LLRC09				NSA	0	18	18	1004
LLRC10				NSA	2	15	13	1076
LLRC10				NSA	3	30	27	782
LLRC11	1	3	2	27	28	38	10	1061
LLRC12	0	5	5	28	0	21	21	824
LLRC13				NSA	3	17	14	944
LLRC13				NSA	7	38	31	753
LLRC14				NSA	9	21	12	1018
LLRC15				NSA	0	13	13	945
LLRC15				NSA	0	38	38	853
LLRC16				NSA	7	23	16	1133
LLRC16				NSA	0	28	28	887
LLRC17				NSA	11	22	11	1101
LLRC17				NSA	0	14	14	1135

Hole	Uranium				Lithium			
	From	To	Metres	Grade ppm	From	To	Metres	Grade ppm
LLRC18	1	6	5	104	0	29	29	1044
LLRC18	3	5	2	170	7	23	16	1143
LLRC19	0	17	17	25	8	38	30	980
LLRC20	3	4	1	34	17	27	10	1116
LLRC21	0	1	1	33	0	23	23	972
LLRC22				NSA	7	15	8	1161
LLRC23	15	16	1	36	5	26	21	976
LLRC24	0	10	10	27	1	23	22	989
LLRC24				NSA	6	18	12	1087
LLRC25				NSA	0	16	16	879
LLRC25				NSA	3	15	12	1057
LLRC26				NSA	0	17	17	956
LLRC27	1	8	7	42	0	9	9	1046
LLRC28	2	11	9	26	0	19	19	100
LLRC29				NSA	2	22	20	910
LLRC30	4	6	2	26	5	19	14	1071
LLRC31	2	18	16	37	0	14	14	950
LLRC32	0	5	5	23	1	30	29	964
LLRC33	0	3	3	40	2	28	26	1080
LLRC34				NSA	0	12	12	1131
LLRC35	2	3	1	62	0	21	21	946
LLRC36	5	7	2	68	6	20	14	1060
LLRC37	5	10	5	34	0	4	4	960
LLRC37				NSA	2	27	25	882
LLRC38	14	16	2	36	12	26	14	950
LLRC39				NSA	21	30	9	934
LLRC40	2	3	1	62	1	29	28	928
LLRC41	6	7	1	68	8	22	14	1060

Tabla 5. Resumen Base datos sondajes realizados para el proyecto Llamara, inmediatamente al Norte de Quillagua y al Sur del Proyecto Hilaricos. Se muestra las concentraciones de U y Li composadas en ppm.

Table 5 shows a well with better expectations exhibiting a high concentration of U, corresponding to well LLRC18 which has between 1 and 6 m a 5 m composite of 104 ppm U, another section between 3 and 5 m with a 2 m composite of better grade equivalent to 170 ppm U. Field observations showed that the U was concentrated in organic material forming mineral bodies of U linked to strata.

On the other hand, lithium analyses are more auspicious since concentrations of Li between 900-1143 ppm are presented, whose concentrations would be expressed in Diatomites with the mineral hectorite.

The author also carried out a drilling campaign without positive results in the Salar Grande, due to the difficult penetration of the colluvial cover.

The wide distribution of drillings in different places around the Salar Llamara demonstrates the existence of a Li and U body linked to a stratum of large dimensions and economic importance, given that the EL Loa formation, as demonstrated by ENAP studies and drillings, crosses Hilaricos in its entire extension.

**3.4.- López, Pedro L., Auqué, Luis F., Garcés, Ingrid, & Chong, Guillermo. (1999). Geochemical characteristics and evolution patterns of surface brines from the Salar de Llamara, Chile. *Geological Journal of Chile* , 26 (1), 89-108. (annex 4).
<https://dx.doi.org/10.4067/S0716-02081999000100005> http://www.scielo.cl/scielo.php?script=sci_arttext&pid=S0716-02081999000100005**

In the present study of the Salar de Llamara, the author concludes that the existence of a unique evolutionary pattern has been demonstrated for the brines that accumulate in the depressions there, despite the irregularity of the water supply to the salar. The solutions are constantly in equilibrium with respect to calcite and gypsum, and the process of concentration by evaporation causes them to reach ionic strength values greater than 6 molal.

Under these physicochemical conditions, continuous precipitation of gypsum takes place, which appears covering the bottom of the lagoons as an aggregate of sub-millimeter crystals, from which crystals of the same composition but centimeter in size grow.

The evolution outlined by the solutions collected in the salt flat has been perfectly corroborated by the theoretical calculation carried out using the PHROPITZ geochemical modelling code, a simulation that has been carried out adopting closed system conditions. The pattern of the system thus calculated has also allowed the observation range of its evolution to be extended to the point where the solutions reach equilibrium with halite.

In this way, it has been possible to demonstrate the existence, in the stages of greater brine concentration, of a glauberite precipitation process associated with the dissolution of pre-existing gypsum in the system. This process has been studied in other similar saline systems, but always from the point of view of the precipitated solids, this being the first time that this process has been identified from the thermodynamic analysis of the evolution of the brines. The simulation has corroborated the thermodynamic viability of the aforementioned process, and the analysis of solid samples collected in the salt flat has also confirmed the effective precipitation of glauberite at the bottom of the lagoons. It has also been proven that the dissolution of gypsum only affects the smaller crystals, given their greater solubility compared to those in the centimetre range.

The surface of the salt flat not occupied by free brine is covered by a thin white layer of saline efflorescence, precipitated as a result of an evaporite pumping process of subsurface solutions and which are redissolved every year during the period of recharging of the salt flat. Its mineralogical analysis shows the presence of saline phases with much higher solubility than those formed at the bottom of the lagoons, which allows the genesis of both types of deposit to be easily differentiated.

This work carried out by Chong in 1996, called “Geochemical Characteristics of the Saline System of the Salar de Llamara”, was able to conclude that the composition of the brines was determined by the precipitation of calcite and gypsum. The saturation calculations carried out using the PHRQPITZ code indicate that all the brines analysed were in equilibrium with calcite and gypsum, with the other saline minerals identified in the deposits of the salar being undersaturated.

Samples taken in sectors within the mining concessions of the Hilaricos project indicate not only significant concentrations of Li, but also high levels of Boron, -HCO₃ (TRONA-SODA ASH) and Potassium in brines.

Table No. 2.- Compositional data of surface brines in sectors adjacent to the Project (Chong et al, 1996).

Muestra	T.° (° C)	Dens.	pH	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	Cl ⁻	HCO ₃ ⁻	SO ₄ ²⁻	B	Li ⁺	% EDC
VL1-1	29,2	1,160	7,70	14,60	55,50	3.916,00	65,40	3.110,00	3,99	539,40	6,80	3,27	-1,63
VL1-2	29,4	1,164	7,30	10,40	58,60	4.332,00	75,40	3.343,00	4,06	553,00	—	3,87	+2,13
VL1-5	28,1	1,168	7,60	17,90	62,50	4.193,00	71,50	3.353,00	4,70	572,50	6,07	3,62	-1,65
VL1-6	28,5	1,169	7,71	16,30	62,90	4.291,00	70,60	3.402,00	4,60	592,40	6,70	3,55	-1,49
VL1-8	27,8	1,170	7,68	10,30	63,50	4.519,00	78,00	3.513,00	4,65	596,00	—	3,98	+0,82
VL1-9	26,9	1,096	7,98	16,10	21,20	1.362,00	25,50	1.109,00	3,10	199,10	—	1,17	-3,16
VL1-10	27,1	1,042	8,09	22,70	16,40	843,10	15,80	687,40	2,60	131,90	1,72	0,78	-1,68
VL1-11	26,9	1,032	8,05	16,80	9,68	613,20	10,40	478,30	2,54	90,20	—	0,53	+2,30
VL1-12	26,7	1,026	8,30	18,80	10,00	594,90	10,60	465,40	2,54	102,70	1,41	0,52	-1,45
VL1-13	26,6	1,058	8,04	14,50	20,50	1.272,00	22,00	998,20	3,00	193,00	2,37	1,06	-1,61
VL1-14	27,1	1,162	7,33	20,90	61,00	4.312,00	104,10	3.417,00	4,60	595,40	—	3,56	-0,63
VL1-16	25,9	1,166	7,38	11,60	61,30	4.165,00	69,80	3.303,00	3,93	577,10	6,27	3,62	-1,74
VL1-17	26,9	1,162	7,33	10,90	60,60	4.120,00	69,00	3.294,00	3,78	583,90	6,28	3,55	-3,04
VL2-1	26,0	1,054	7,86	15,70	18,50	1.191,30	18,70	947,48	3,17	176,50	3,22	1,80	-1,81
VL2-2	26,0	1,104	7,80	17,20	35,40	2.570,70	43,80	2.106,60	3,97	318,67	6,75	2,44	-0,94
VL2-3	26,0	1,102	7,87	16,90	41,80	3.087,30	47,50	2.337,90	4,33	378,88	6,62	2,65	+4,87
VL2-4	27,0	1,130	7,86	15,00	47,30	3.215,90	52,30	2.593,60	4,59	401,18	7,72	3,08	-0,14
VL2-5	27,0	1,130	7,86	14,80	47,60	3.297,30	52,30	2.636,70	4,73	444,08	8,76	3,10	-1,48
VL2-6	28,0	1,034	7,95	18,40	12,10	775,00	13,40	623,64	2,50	116,04	2,17	0,88	-0,93
VL2-7	28,0	1,060	7,91	19,20	22,00	1.574,90	25,00	1.252,38	3,17	216,88	4,43	1,50	-0,32
VL2-8	28,0	1,036	8,22	21,90	12,60	816,10	13,00	644,40	3,06	124,85	2,92	0,88	+0,20
VL2-9	29,0	1,020	8,24	20,50	7,29	468,70	7,28	364,60	2,37	82,93	1,59	0,44	+0,03

Finally, the information collected to date allows us to conclude that lithium has been frequently detected in considerable concentrations. It has been detected in brine and clays, reporting economic levels of accumulation that are attractive for a mining extraction process.

The analysis of the results also allows us to infer an approximately homogeneous behavior throughout the entire extension of the salt body of the salar, in terms of the distribution of mineral substances containing Lithium.

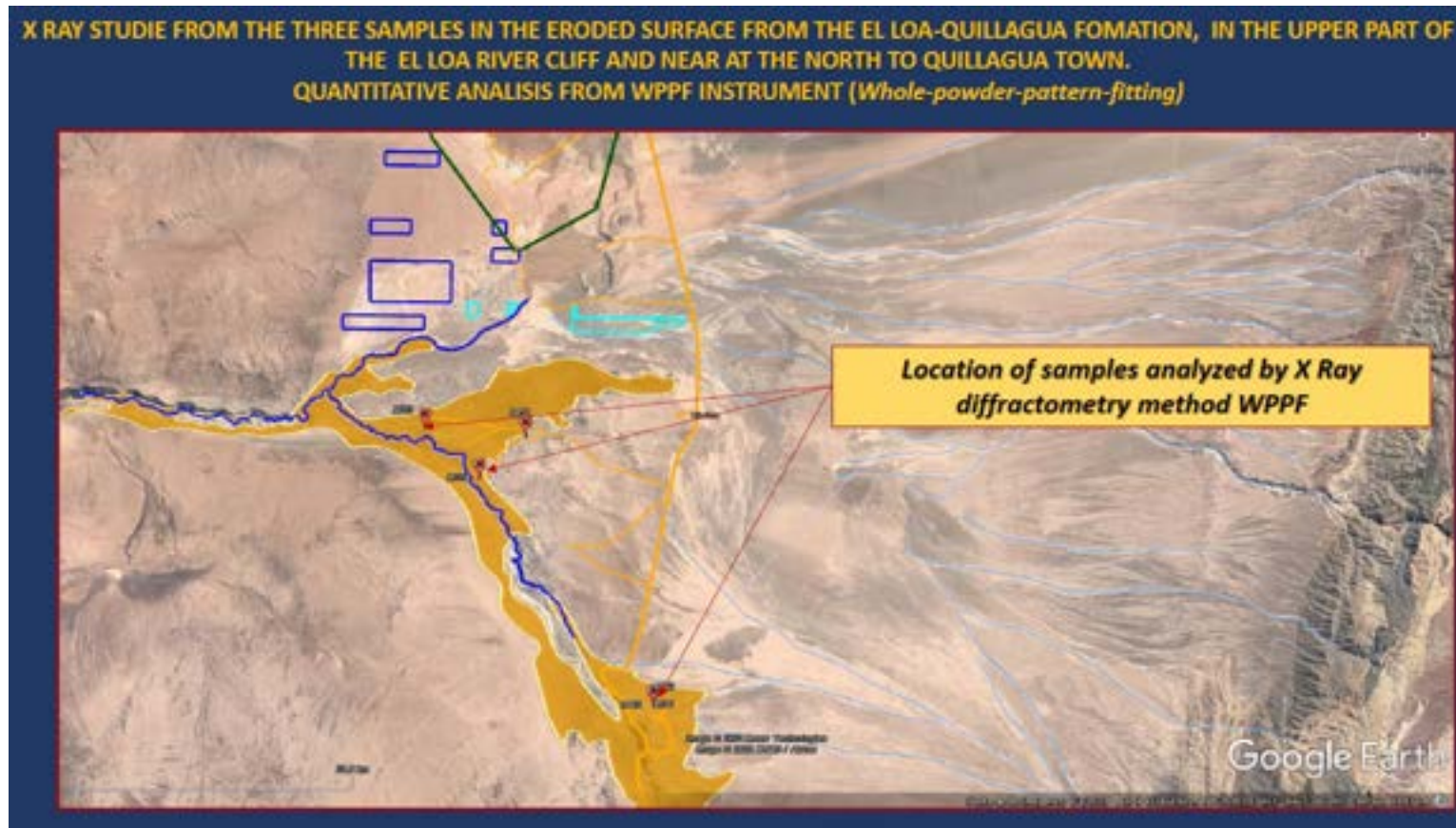
As a result of this work, especially the compositional data of brines taken in samples, we can identify values of Li, Boron, -HCO₃ (TRONA-SODA ASH) and Potassium in brines expressed in units of Molimole/kg, which divided by its density and multiplied by 100, we can convert these values to ppm. Attached is a table with the values in Li, Boron, -HCO₃ (TRONA-SODA ASH) and Potassium, expressed to their equivalent in ppm. The values converted to ppm based on compositional data of surface brines, indicated in table 2 of the Chong 1999 report, can be seen in table 6 indicated below.

Table 6. Li, Boron, -HCO3 (TRONA-SODA ASH) Potassium values, measured in ppm.

Samples	T(°C)	Density	pH	AC2+	Mg2+	Na+	K+	Cl-	HCO ₃	SW ₂	B	Li ⁺	EBC (%)	Li (ppm)	K (ppm)	B (ppm)	HCO3-(ppm)
VL1-1	29.2	1.16	7.7	14.6	55.5	3,916.00	65.4	3,110.00	3.99	539.4	6.8	3.27	-1.63	281.9	5637.9	586.2	344.0
VL1-2	29.4	1.164	7.3	10.4	58.6	4,332.00	75.4	3,343.00	4.06	553	-	3.87	2.13	332.5	6477.7	-	348.8
VL1-5	28.1	1.168	7.6	17.9	62.5	4,193.00	71.5	3,353.00	4.7	572.5	6.07	3.62	-1.65	309.9	6121.6	519.7	402.4
VL1-6	28.5	1.169	7.71	16.3	62.9	4,291.00	70.6	3,402.00	4.6	592.4	6.7	3.55	-1.49	303.7	6039.3	573.1	393.5
VL1-8	27.8	1.17	7.68	10.3	63.5	4,519.00	78	3,513.00	4.65	596	-	0.98	0.82	83.8	6666.7	-	397.4
VL1-9	26.9	1.066	7.98	16.1	21.2	1,362.00	25.5	1,109.00	3.1	199.1	-	1.17	-3.16	109.8	2392.1	-	290.8
VL1-10	27.1	1.042	8.09	22.7	16.4	843.1	15.8	687.4	2.6	131.9	1.72	0.78	-1.68	74.9	1516.3	165.1	249.5
VL1-11	26.9	1.032	8.05	16.6	9.68	613.2	10.4	478.3	2.54	90.2	-	0.53	23	51.4	1007.8	-	246.1
VL1-12	26.7	1.026	8.3	18.8	10	594.9	10.6	465.4	2.54	102.7	1.41	0.52	-1.45	50.7	1033.1	137.4	247.6
VL1-13	26.6	1.058	8.04	14.5	20.5	1,272.00	22	998.2	3	193	2.37	1.06	-1.61	100.2	2079.4	224.0	283.6
VL1-14	27.1	1.162	7.33	20.9	61	4,312.00	104.1	3,417.00	4.6	595.4	-	3.56	-0.63	306.4	8958.7	-	395.9
VL1-16	25.9	1.166	7.38	11.6	61.3	4,165.00	69.8	3,303.00	3.93	577.1	6.27	3.62	-1.74	310.5	5986.3	537.7	337.0
VL1-17	26.9	1.162	7.33	10.9	60.6	4,120.00	69	3,294.00	3.78	585.9	6.28	3.55	-3.04	305.5	5938.0	540.4	325.3
VL2-1	26	1.054	7.86	15.7	18.5	1,191.30	18.7	947.48	3.17	176.5	3.22	1.8	-1.81	170.8	1774.2	305.5	300.8
VL2-2	26	1.104	7.8	17.2	35.4	2,570.70	43.8	2,106.60	3.97	318.67	6.75	2.44	-0.94	221.0	3967.4	611.4	359.6
VL2-3	26	1.102	7.87	16.9	41.8	3,087.30	47.5	2,337.90	4.33	378.88	6.62	2.65	4.87	240.5	4310.3	600.7	392.9
VL2-4	27	1.13	7.86	15	47.3	3,215.90	52.3	2,593.60	4.59	401.18	7.72	3.08	-0.14	272.6	4628.3	683.2	406.2
VL2-5	27	1.13	7.86	14.8	47.6	3,297.30	52.3	2,636.70	4.73	444.08	8.76	3.1	-1.48	274.3	4628.3	775.2	418.6
VL2-6	28	1.034	7.95	18.4	12.1	775	13.4	623.64	2.5	116.04	2.17	0.88	-0.93	85.1	1295.9	209.9	241.8
VL2-7	28	1.06	7.91	19.2	22	1,574.90	25	1,252.38	3.17	216.88	4.43	1.5	-0.32	141.5	2358.5	417.9	299.1
VL2-8	28	1.036	8.22	21.9	12.6	816.1	13	644.4	3.06	124.85	2.92	0.88	0.2	84.9	1254.8	281.9	295.4
VL2-9	29	1.02	8.24	20.5	7.29	469.7	7.28	364.6	2.37	82.93	1.59	0.44	0.03	43.1	713.7	155.9	232.4
IL1-2	21.5	1.183	7.17	8.3	70.85	4,654.00	79.32	3,795.00	3.65	586	9.38	4.76	-1.5	402.4	6705.0	792.9	308.5
IL1-3	20	1.186	7.06	8.26	73.23	4,746.00	82.32	3,955.00	3.54	558.1	8.68	4.93	-1.56	415.7	6941.0	731.9	298.5
IL1-4	21.5	1.182	7.12	8.44	74.4	4,922.00	81.82	4,021.00	3.36	560.7	9.47	4.97	0.55	420.5	6922.2	801.2	284.3
IL1-5	23	1.182	7.11	8.58	69.13	4,936.10	76.1	3,735.00	3.32	603.4	9.38	4.6	4.48	389.2	6438.2	793.6	280.9
IL1-6	19.5	1.068	7.39	11	31.64	1,348.40	23.44	1,055.00	2.16	200	4.32	1.48	0.09	138.6	2194.8	404.5	202.2
IL1-7	20	1.136	7.24	10.5	52.2	3,244.00	55.7	2,620.00	2.55	428	7.31	3.54	-1.44	311.6	4903.2	643.5	224.5
IL1-8	24	1.126	7.52	11.2	48.2	3,046.00	50.89	2,436.00	5.24	413	7.49	2	-1.49	177.6	4519.5	665.2	465.4
IL1-9	28	1.03	7.77	13.9	9.84	650.6	10.58	500	2.94	102.5	2.72	0.44	0.17	42.7	1027.2	264.1	285.4
IL2-1	27	1.023	7.84	20.1	7.73	466.6	8.44	373.5	3.31	77	1.82	0.41	0.04	40.1	825.0	177.9	323.6
IL2-2	25.5	1.058	7.78	20.5	12.1	799.3	14.4	642.7	3.27	116	2.13	0.69	0.18	65.2	1361.1	201.3	309.1
IL2-3	25.5	1.058	7.8	21.9	13.3	910.4	16.9	737.2	3.29	125	2.71	0.77	0.8	72.8	1597.4	256.1	311.0
IL2-4	25	1.052	7.75	21.5	14.2	986.7	18.4	795.7	3.32	138	3	0.83	0.21	78.9	1749.0	285.2	315.6
IL2-5	24	1.068	7.8	20.9	14.7	1,022.30	18.9	825.4	3.28	142	3.24	0.87	0.04	81.5	1769.7	303.4	307.1
IL2-6	29	1.028	7.86	18.9	8.8	534.8	9.86	423.9	3.31	89.7	1.74	0.51	-0.99	49.6	959.1	169.3	322.0
IL2-7	26	1.03	7.88	19.6	10.3	626.9	11.1	496.5	3.32	104	1.87	0.57	-1.34	55.3	1077.7	181.6	322.3
IL2-9	25.5	1.023	7.79	19.4	6.01	333	6.04	265.3	3.28	60.7	1.46	0.33	0.08	32.3	590.4	142.7	320.6
VL3-1	21	1.062	7.74	19.9	19.91	1,414.30	24.28	1,122.30	3.02	194.5	3.14	1.05	0.32	98.9	2286.3	295.7	284.4
VL3-2	20	1.112	7.47	16.2	37.49	2,658.00	45.59	2,088.00	3.61	368.3	6.15	1.73	-0.55	155.6	4099.8	553.1	324.6
VL3-3	20	1.125	7.67	15.8	40.86	2,480.50	45.74	2,242.00	3.36	209	6.29	1.81	-0.83	160.9	4065.8	559.1	298.7
VL3-4	21	1.125	7.67	15.8	41.49	2,514.20	46.72	2,227.90	3.46	241.1	6.12	1.89	-1.34	168.0	4152.9	544.0	307.6
VL3-5	21	1.125	7.66	14.5	38.45	2,446.00	43.3	2,162.20	3.25	232.2	5.42	1.72	-1.26	152.9	3848.9	481.8	288.9
VL3-6	21	1.09	7.51	16.5	29.31	1,952.00	31.55	1,555.70	2.81	270.2	3.45	1.4	-1.07	128.4	2894.5	316.5	257.8
VL3-7	25	1.118	7.52	15.1	40.14	2,729.50	45.48	2,178.10	3.2	369.2	5.17	1.76	-1.11	157.4	4068.0	462.4	286.2
VL3-8	23.5	1.09	7.68	18.2	31.01	2,028.30	31.91	1,593.20	2.96	281.9	3.84	1.45	-0.01	133.0	2927.5	352.3	271.6
VL3-9	26	1.02	7.7	17.9	6.46	381.6	6.44	303.7	2.03	67.3	0.9	0.3	-0.74	29.4	631.4	88.2	199.0
IL3-1	19.8	1.021	8.16	17.6	9.77	658.7	10.1	511.7	3.37	105	1.8	0.59	-0.21	57.8	989.2	176.3	330.1
IL3-2	20.3	1.045	8.34	18.4	12.8	942.3	14	742.7	3.35	140	1.79	0.73	-0.55	69.9	1339.7	171.3	320.6
IL3-3	20.4	1.042	8.24	17.2	22	1,626.50	22.8	1,275.70	3.4	237	3.84	1.23	-1.37	118.0	2188.1	368.5	326.3
IL3-4	19.6	1.031	8.19	18.8	20.7	1,607.50	21.6	1,218.70	3.43	256	3.87	1.08	-1.44	104.8	2095.1	375.4	332.7
IL3-5	20.1	1.033	8.06	21.2	12.8	960.4	13.8	752.2	3.29	142	2.86	0.74	0.31	71.6	1335.9	276.9	318.5
IL3-6	25.2	1.02	8.21	17	7.23	426.3	7.08	328.2	1.82	75.3	1.21	0.44	0.36	43.1	694.1	118.6	178.4
IL3-7	22.4	1.044	8.23	17.6	14	1,108.30	14.1	832.6	3.71	169	3.52	0.74	1	70.9	1350.6	337.2	355.4
IL3-8	23.1	1.023	8.23	17	8.06	478.8	7.39	373.8	2.83	83.1	2.06	0.44	-1.13	43.0	722.4	201.4	276.6
IL3-9	20.5	1.015	8.27	18.2	5.81	325.3	5.67	262.1	2.02	61.4	1.77	0.29		28.6	558.6	174.4	199.0

3.5. Surface sampling campaign carried out on April 8, 9 and 10, 2021, by Geologist Walter Guido Orquera Vargas, QP, Universidad Católica del Norte M.Sc. Economic Geology Colorado School of Mines, USA

The work carried out by the Geologist and his team was aimed at identifying the existence of the Hectorite element and its composition, present in the formation called El Loa, taking various samples in the area of the Hilaricos project.



X RAY STUDIE IN THE SAMPLE N° M561 NORTHWARD FROM QUILLAGUA TOWN

Quantitative Analysis Results (WPPF)

General Information

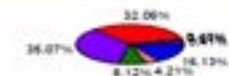
Analysis date	2021/05/19 19:46:13	Measurement date	2021/05/19 17:33:49
Sample name	Quillagua_M561	Operator	administrator
File name	Quillagua_M561.raw		
Comment	Full Chart		

Qualitative analysis results

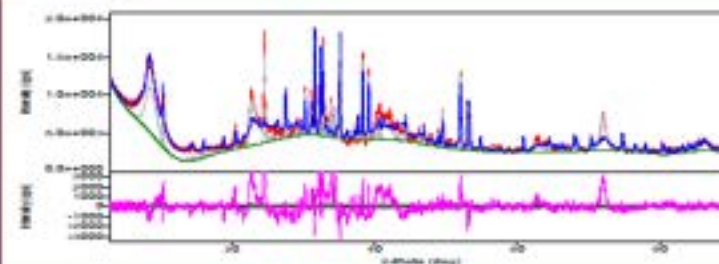
Phase name	Formula	Figure of merit	Phase reg. detail	DB card number
Celestine	$\text{O}_4 \text{S} \text{Sr}$	0.696	User (COD)	9004483
Albite	$\text{Al Na O}_8 \text{Si}_3$	2.149	User (COD)	9000525
Muscovite 2M1	$\text{K Al}_2 (\text{Si}_3 \text{Al O}_{10}) (\text{O H})_2$	1.263	User (COD)	1000042
Montmorillonite	$\text{Al}_0.86 \text{Fe}_0.1 \text{H Li}_0.08 \text{Mg}_0.14 \text{O}_{10} \text{Si}_3.9$	1.029	User (COD)	9010956
Kaolinite 2M	$\text{Al}_2 \text{Si}_2 \text{O}_5 (\text{O H})_4$	3.111	User (COD)	1011045
Phillipsite-Na	$\text{Al}_2.48 \text{H}_2\text{O K}_0.5 \text{Na}_2 \text{O}_{21} \text{Si}_5.52$	0.793	User (COD)	9007470
$\text{Li}_2 \text{Fe} (\text{W O}_4)_2$	$\text{Fe}_1 \text{Li}_2 \text{O}_8 \text{W}_2$	0.849	User (COD)	1527649
iron tungsten nitride	$\text{Fe}_3 \text{N W}_3$	0.256	User (COD)	2006775
$\text{Na}_{20} (\text{Al}_{20} \text{Si}_{76} \text{O}_{192})$	$\text{Al}_{20} \text{Na}_{20} \text{O}_{192} \text{Si}_{76}$	2.170	User (COD)	1527027

Weight ratio

	Phase name	Content(%)
-	Celestine	16.1(11)
-	Albite	4.2(5)
-	Muscovite 2M1	8.1(5)
+	Montmorillonite	35(4)
+	Kaolinite 2M	32(3)
-	Phillipsite-Na	0.4(2)
-	$\text{Li}_2 \text{Fe} (\text{W O}_4)_2$	0.6(7)
-	iron tungsten nitride	3.4(2)
-	$\text{Na}_{20} (\text{Al}_{20} \text{Si}_{76} \text{O}_{192})$	0.09(8)



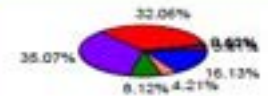
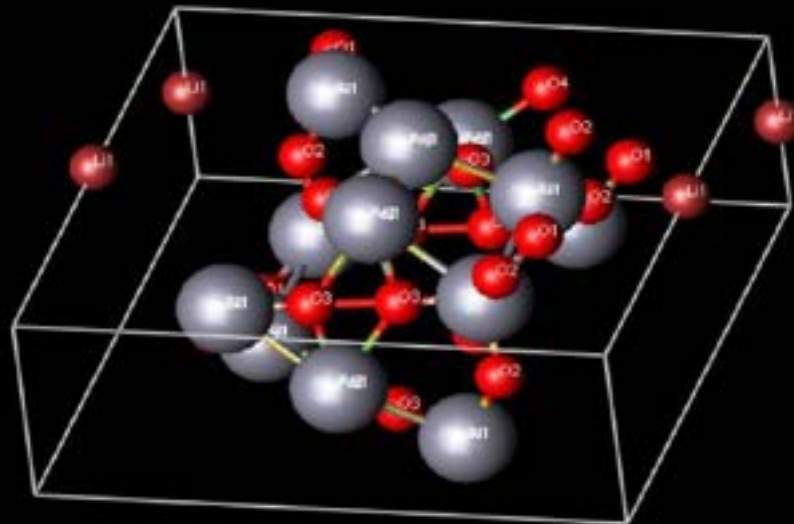
Measurement profile



PANORAMIC VIEW FOR THE SURFACE SAMPLE Nº M561 NORTHWARD QUILLAGUA, FROM THE EL LOA-QUILLAGUA FORMATION



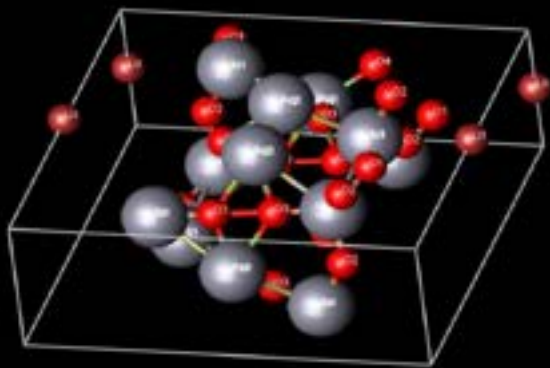
**SURFACE SAMPLE FROM THE EL LOA-QUILLAGUA FORMATION N EL LOA, SAMPLE N° M561 NOTHWARD QUILLAGUA,
DIATOMITAS SENSUS LATUS
HECTORITE ATOMIC STRUCTURE**



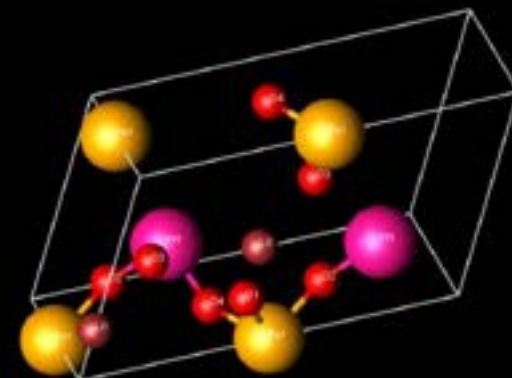
Celestine(%)
Albite(%)
Muscovite 2M1(%)
Mordenite(%)
Kaolinite 2M(%)
Phillipsite(%)
Li2 Fe (Li2O)(%)
Iron(%)
Na2O (Al2O3)(%)

M561 QUILLAGUA, DIATOMITA SENSUS LATUS
LITHIUM STRUCTURE MODELS

MONTMORILLONITE STRUCTURE



$\text{Li}_2\text{Fe}(\text{WO}_4)_2$ STRUCTURE



X RAY STUDIE IN THE SAMPLE Nº M 359 FROM THE ERODED SURFACE FROM THE EL LOA-QUILLAGUA FOMATION IN THE UPPER PART OF THE EL LOA RIVER CLIFF

Quantitative Analysis Results (WPPF)

General information

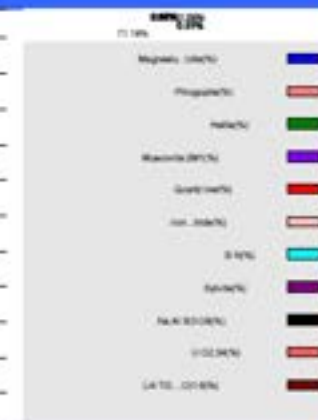
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Sample name	Hilaricoshorte_M359	Operator	administrator
File name	Hilaricoshorte_M359.raw		
Comment	Full Chart		

Qualitative analysis results

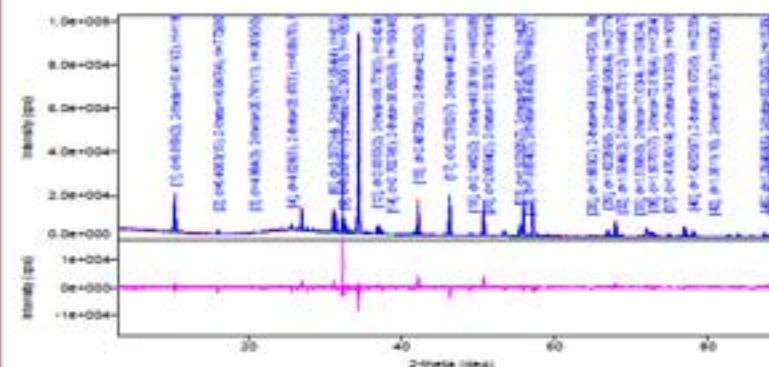
Phase name	Formula	Figure of merit	Phase reg. detail	DB card number
Magnesium calcite	(Mg0.06 Ca0.94) (C O3)	0.386	User (COD)	7214217
Phlogopite	Fe1.1 H0.24 K Mg1.9 O12 Si4	1.316	User (COD)	9016344
Halite	Cl Na	1.028	User (COD)	9006374
Muscovite 2M1	K Al2 (Si3 Al O10) (O H2	3.011	User (COD)	1000042
Quartz low	Si O2	3.255	User (COD)	1011097
iron tungsten nitride	Fe3 N W3	0.368	User (COD)	2006775
B N	BN	1.575	User (COD)	9008997
Sylvite	KCl	0.494	User (COD)	9003133
Na Al Si3 O8	Al1 Na1 O8 Si3	0.604	User (COD)	2310574
U O2.34	O2.34 U1	0.780	User (COD)	1541571
Li4 Ti0.8 H2.4 (Li2 O)1.6	Li7.2 H2.4 O1.6 Ti0.8	2.789	User (COD)	1537481

Weight ratio

	Phase name	Content(%)
+	Magnesium calcite	71.2(4)
+	Phlogopite	0.883(15)
+	Halite	1.64(5)
+	Muscovite 2M1	2.1(4)
+	Quartz low	0.27(8)
+	iron tungsten nitride	2.82(7)
+	B N	11.2(2)
+	Sylvite	2.79(7)
+	Na Al Si3 O8	6.7(2)
+	U O2.34	0.013(8)
+	Li4 Ti0.8 H2.4 (Li2 O)1.6	0.41(15)



Measurement profile



PANORAMIC VIEW OF THE SAMPLE Nº M 359 FROM THE ERODED SURFACE FROM THE EL LOA-QUILLAGUA FOMATION IN THE UPPER PART OF THE EL LOA RIVER CLIFF



X RAY STUDIE IN THE SAMPLE N° M258M3 AT THE SLOPE DIATOMITES ERODED FROM THE EL LOA-QUILLAGUA FOMATION, AT THE UPPER PART OF THE EL LOA RIVER CLIFF, AND NEAR TO NORTHWEST OF THE HILARICOS HILLS

Quantitative Analysis Results (WPPF)

General information

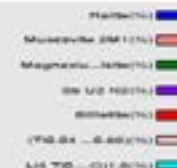
Analysis date	2021/05/20 17:51:24	Measurement date	2021/05/20 09:58:52
Sample name	Hilaricos_M258M3	Operator	administrator
File name	Hilaricos_M258M3.raw		
Comment	Full Chart		

Qualitative analysis results

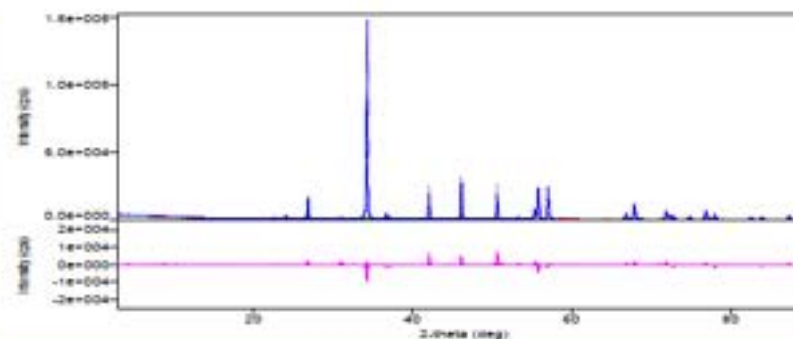
Phase name	Formula	Figure of merit	Phase ref. detail	DB card number
Halite	Cl Na	1.096	User (COD)	9006374
Muscovite 2M1	K Al2 (Si3 Al) O10 (O H)2	1.456	User (COD)	1011049
Magnesium calcite	(Mg0.06 Ca0.94) (C O3)	0.400	User (COD)	7214217
Sb U2 N2	N2 Sb1 U2	2.814	User (COD)	1539546
Bilietite	Ba O23 U6	0.518	User (COD)	9001111
(Ti0.04 U0.96)	Ti0.04 U0.96	2.531	User (COD)	2300523
L4 Ti0.8 N2.4 (U2 O)1.6	Li7.2 N2.4 O1.6 Ti0.8	0.699	User (COD)	1537481

Weight ratio

Phase name	Content(%)
Halite	1.22(3)
Muscovite 2M1	1.46(5)
Magnesium calcite	96.73(10)
Sb U2 N2	0.033(6)
Bilietite	0.047(8)
(Ti0.04 U0.96)	0.077(7)
L4 Ti0.8 N2.4 (U2 O)1.6	0.43(8)



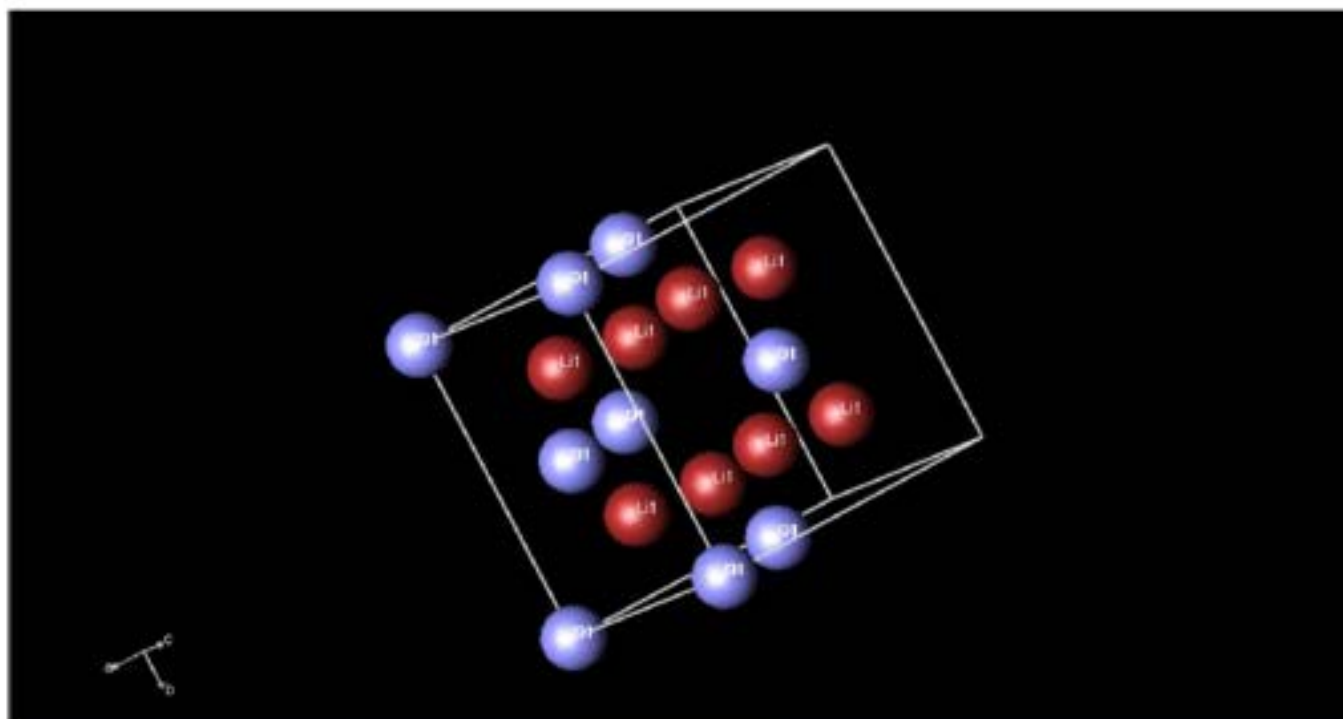
Measurement profile



SAMPLE Nº M258M3 FROM WESTWARD TO THE HILARICOS HILLS, TAKEN FROM DIATOMITES IT BELONG TO THE EL LOA-QUILLAGUA FORMATION

Lithium Structures Model

Li₄ Ti_{0.8} N_{2.4} (Li₂ O)_{1.6} Structure.



**PANORAMIC VIEW FOR THE SAMPLE Nº M258M3 FROM WESTWARD TO THE EL LOA CLIFF, TAKEN FROM DIATOMITES
IT BELONG TO THE EL LOA-QUILLAGUA FORMATION**



- The EL Loa-Quillagua Formation with approximately 50 m thickness and its lateral extension North-South, gearing and wedging towards the Precondillera, and having as a barrier the rocky massif of the Coastal Range, has presented high possibilities for exploration of non-metallic economic resources (mainly Na, Cl, B, Ca, K, Mg, SO₄, Li, and rare earths), finding minerals of economic importance in the stratigraphy that constitutes it and the brines or brines. This is how diatomite, in which smectite-type clay minerals have formed and identified in previous studies as Hectorite, is economically attractive. Diatomites or hectorites lie beneath the Hilaricos Mining properties. Hectorite contains an important element such as Li, which is easily extracted from the ground and as another element in the saline solutions of the sector.
- It is recognized that the lithium body follows the form of a mantle associated with diatomites and that it has thicknesses that would reach 50 m of great lateral extension towards the north, east and west, below the Salar de Llamara basin.
- The aquifer and brine in the Area of Interest, together with the good lithium content, both on the surface and in the subsoil, allow us to conclude that the area being analyzed has the favorable geological and geochemical characteristics for the extraction of lithium in the form of lithium carbonate, as well as the extraction of potassium chloride and nitrate, in addition to iodine; as is currently the case at the SQM mining operations. In addition to the high potential for the exploitation of rare earths, and MM (minor metals) and other elements of high commercial value (U, B, Co), as mentioned in detail in this report.
- As described above, the Area of Interest is involved in a series of geological and geochemical studies that validate the presence of high contents of Lithium, Iodine, Potassium Salts, TT, MM and other elements of high economic value. Regarding the Lithium content, economic concentrations have been identified, above 600 ppm, ranging between 1,000 and 2,400 ppm.



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