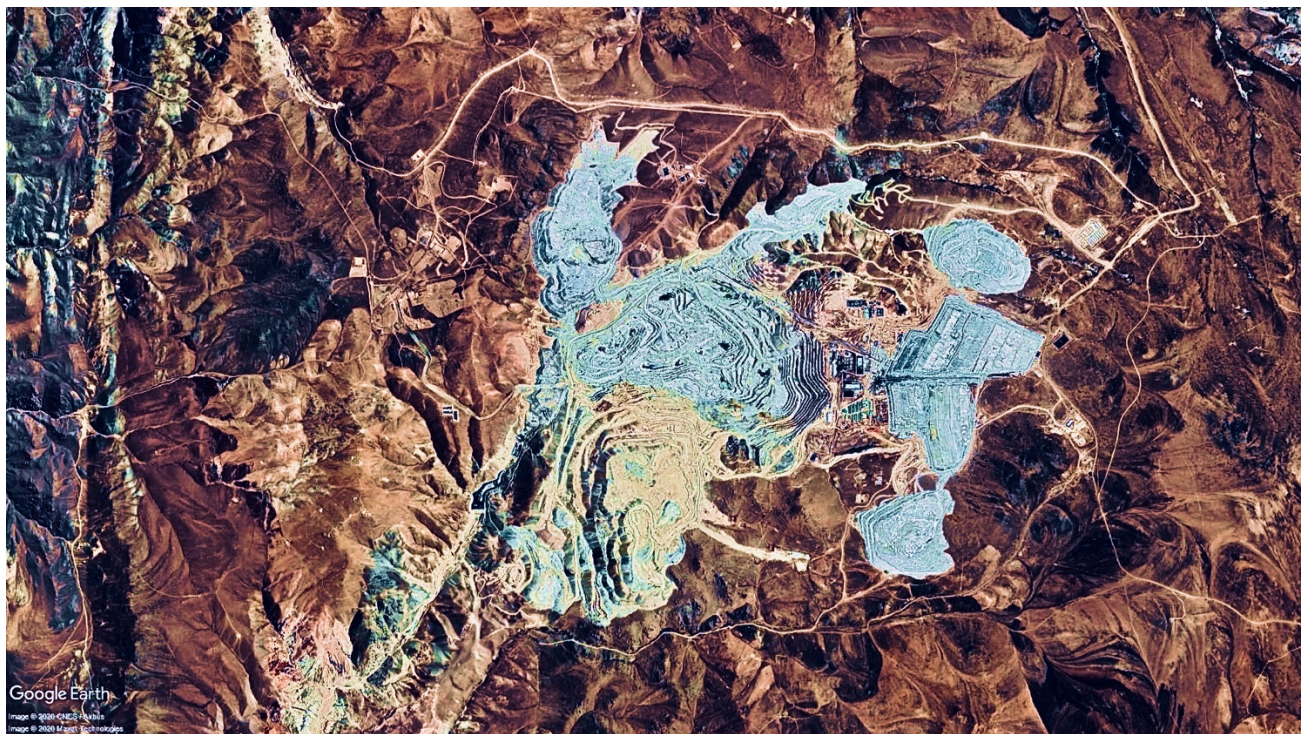


Report:

ANALYSIS OF THE QUEBRADA BLANCA EXPANSION PROJECT PHASE II

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1. Summary of the Quebrada Blanca Expansion Project

The Quebrada Blanca open pit copper-molybdenum mine began operations in 1994 and was acquired by Teck Resources in 2007, as a result of the purchase of Air Resources by Teck Cominco. The mine is located in the Tarapacá region of Chile, at 4400 meters above sea level. In 2012, Teck completed the feasibility study for the Quebrada Blanca Phase 2 (QBF2) expansion project which determined that an expansion was economically viable, but would require significant investment. In 2016, Teck updated the study and established that the expansion would require a development capital investment of US\$4.7 billion¹.

The QBF2 project contemplates 25 years of operation, with a production capacity of 140 ktpd. The current mining operations use conventional open pit mining methods, and the expansion project is basically an extension of the current activities. However, it represents an increase in the depth and width of the pit, and an intensification of the extraction rate², i.e. the impact of the QBF2 mining project is much greater than the current operations. Despite the perceived scale of this expansion, the company does not rule out a third phase. However, this third expansion is not included in the Environmental Impact Study (EIA, for its acronym in Spanish) submitted to the Chilean authorities, nor is it contemplated at this stage of the financing.

¹ Teck Resources (2016). NI 43-101 Technical Report on Quebrada Blanca Phase 2 Feasibility Study 2016, Región de Tarapacá, Chile

² Ibid, p.1-15.



2. Financing Summary

The expansion project is costly and requires large amounts of capital to build the infrastructure needed to support the expansion in production. Teck itself does not have sufficient capital to undertake the expansion alone. Therefore, in 2018 the company announced that it was looking for an investor³ and in December of that year Teck published that an investment agreement had been reached with two Japanese mining companies Sumitomo Metal Mining Co. and Sumitomo Corporation. These companies acquired 30% of Quebrada Blanca S.A.'s shares in exchange of an investment of US\$1.3 billion upon closing the transaction and an investment of US\$444 million in 2019⁴.

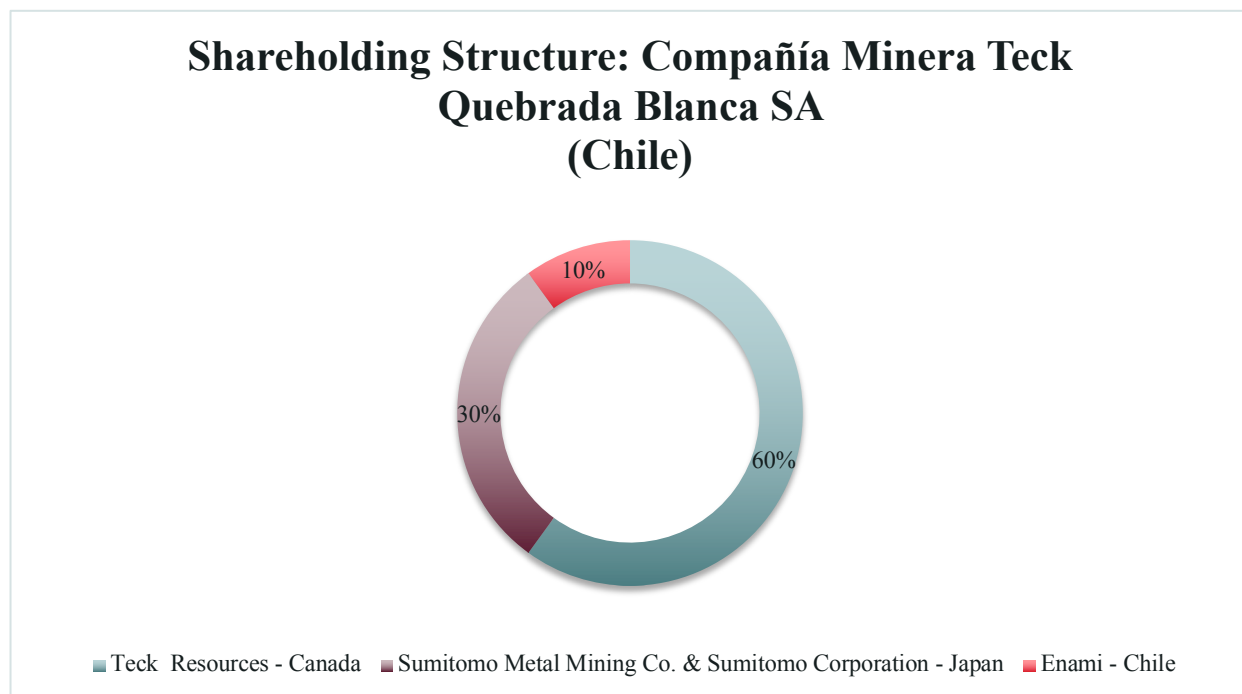


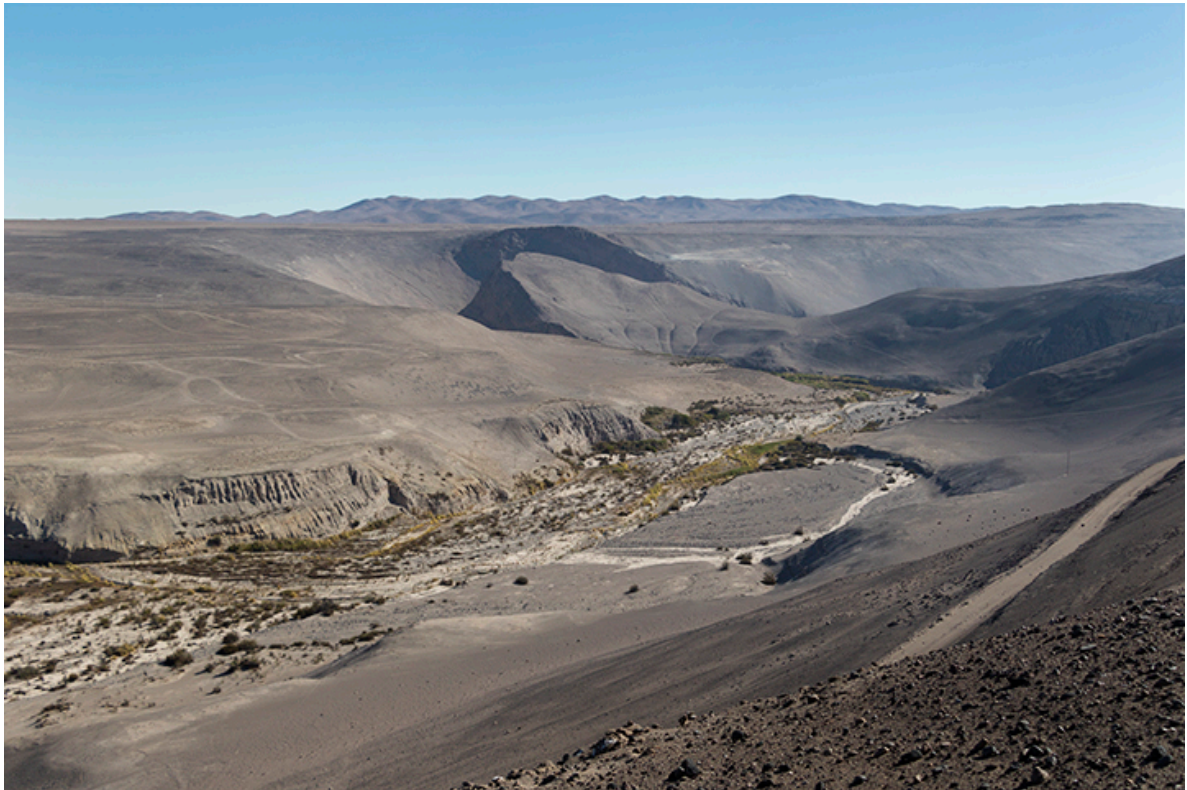
Figure 1: Shareholder Structure of operating subsidiary of Quebrada Blanca, Compañía Minera Teck Quebrada Blanca SA

³ Jamasmie, Cecilia. (August 29, 2018). "Teck seeking partner for \$4.8bn Quebrada Blanca mine expansion", *mining.com*, <http://www.mining.com/teck-seeking-partner-4-8bn-quebrada-blanca-mine-expansion/>

⁴Teck Resources (2020). Annual Information Form, p.34.



In addition to the direct investment in the project by Sumitomo Corporation and Sumitomo Mining & Metals, the company turned to external financing to complete the capital required for the investment. In May 2019, the company announced that it had received US\$2.5 billion in financing from various institutions: Japan Bank for International Cooperation, Export Development Canada (EDC), Export-Import Bank of Korea, German Government for the Untied Loan Guarantee Program ("UFG"), KfW IPEX-Bank GMBH, Bank of Montreal, BNP Paribas S.A., ING Bank N.V., Mizuho Bank, Ltd., MUFG Bank, Ltd., and Sumitomo Mitsui Banking Corporation. It is worth noting the presence of several Japanese banks likely attracted to the project due to the involvement of Sumitomo Corp., as well as the presence of the Canadian development finance agency "Export Development Canada".



(Tarapacá Ravine. Source: Miguel Hechenleitner)



3. Summary on the operator: Some facts about Teck Resources

Teck Resources Ltd. is a Canadian mining company headquartered in Vancouver, Canada. The company is primarily engaged in the mining of copper, coal and zinc, in addition to steel production. In Canada, Teck has 8 mining operations and several exploration projects. In 2014, an expert report⁵ alleged that, for several decades, the company's coal operations in the Elk Valley (British Columbia province, Canada) had been contaminating two rivers downstream of the operations area with selenium, an element that is toxic for human consumption in high quantities. These operations are causing irreparable damage to the fish population in these rivers. Its "Frontier" project, an open-pit tar sands mine, was abandoned this year by the company after protests from Indigenous communities whose territories were to be affected⁶ erupted against what would become the largest tar sands mine in the country. The company also has one joint venture operation in Peru (Antamina), three copper mines in Chile (Quebrada Blanca, Nueva Unión and Carmen de Andacollo) and one mine in the United States.

Residents of the community of Andacollo (in the province of Elqui, region of Coquimbo, northern Chile) have expressed their concern about the constant pollution caused by the detonations and polluting dust in the air that engulfs the town. The World Health Organization has classified Andacollo among the 20 most polluted cities in Latin America because of the high concentrations of particles in the environment⁷, which according to the WHO, can produce a higher risk of heart attacks, respiratory diseases and cancer. In the opinion of the residents, Teck is not complying with

⁵ Lemly, Dennis (2014). Expert Report: "Review of Environment Canada's Teck Coal Environmental Assessment and Evaluation of Selenium Toxicology Tests Westslope Cutthroat Trout in the Elk and Fording Rivers in Southeast British Columbia." https://www.teck.com/media/2014-Water-review_environment_canada-T3.2.3.2.1.pdf

⁶ Nikifouruk, Andrew (February 19, 2020). "What the Teck mine will destroy", *The Tyee*, <https://thetyee.ca/News/2020/02/19/Teck-Mine-Will-Destroy/>

⁷ El Observatodo (3 de Mayo, 2018). "Andacollo es una de las ciudades más contaminadas de América", *El Observatodo*, <https://www.elobservatodo.cl/noticia/sociedad/andacollo-es-una-de-las-ciudades-mas-contaminadas-de-america>



its obligations and is not interested in making remediation and health investments that could help repair the damage already done by its mining operations.

Background information regarding the Quebrada Blanca mine will be explored in more detail below.



(Flamingos in the Huasco Salt Flat, close to Quebrada Blanca. Source: Miguel Hechenleitner)



4. The Quebrada Blanca Expansion Project's Footprint

a) Background

As already mentioned, the Quebrada Blanca mine has been in operation for several decades. In 1989, a bidding process resulted in the founding of the Compañía Minera Quebrada Blanca S.A. by Cominco Ltd. of Canada, with 38.25%; Teck Resources International Ltd., owner of a part of Cominco, with 29.25%; Cominco International Ltd., 9%; Empresa Nacional de Minería, 10% and Sociedad Minera Pudahuel, 13.5% (Boletín Minero, 1994). Inaugurated in 1994, Quebrada Blanca became the first high altitude bacterial leaching operation worldwide⁸.

In 2000 Teck and Cominco sold their assets to Aur Resources, leaving Aur with 76.5% of the mining company^{9,10}. In 2001 Teck acquires 100% of Cominco, and in 2007 it buys Aur Resources¹¹ and renames it Teck Resources Limited in 2008, thus regaining ownership of the Quebrada Blanca mine. According to the company, from 2006 to 2018, a total of 75 million tons of copper were exploited. Additionally, the exploitation of the 144 million tons of tailing contributed to the total production of 777 thousand tons of copper cathode (FS 6-1).

More than 12 projects related to the Quebrada Blanca mine have entered the Environmental Impact Assessment System (SEIA, for its acronym in Spanish) and received its approval, among them, "Botadero Sur de Ripios de Lixiviación" (Botadero Sur Leaching Dump), presented in 1998 through an Environmental Impact Study (EIA, for its acronym in Spanish); "Transporte de Ácido Sulfúrico Ruta Punta Patache - Quebrada Blanca" (Sulfuric Acid Transportation, Punta Patache - Quebrada Blanca Route), in 2001, and "Transporte de Ácido Sulfúrico Punta Patache - Quebrada Blanca", in 2004, both were submitted through an Environmental Impact Statement (DIA, for its acronym in Spanish); "Estudio de Impacto Ambiental Actualización Proyecto Minero Quebrada Blanca" (Quebrada Blanca Mining Project Update, Environmental Impact Study), in 2014, and

⁸ Boletín Minero (1994). Quebrada Blanca: El Nuevo Gran Proyecto de la Minería Privada. N°1.066. pp. 22 – 25. http://www.bibliotecanacionaldigital.gob.cl/colecciones/BND/00/RE/RE0000545_0092.pdf

⁹ Teck Cominco, Annual Report (2001). https://www.teck.com/media/Investors-2001_Annual_Report_T5.1.1.pdf

¹⁰ Bnamericas. (8 de Octubre, 2001). "Enami Contrata Bancos para Venta de QB", *bnamericas*, https://www.bnamericas.com/es/noticias/Enami_Contrata_Bancos_para_Venta_de_QB

¹¹ Teck Sources <https://www.teck.com/acerca-de-es/nuestra-historia-es/>



"Proyecto Minero Quebrada Blanca Fase 2", in 2016, both were submitted as the Environmental Impact Study (EIA)¹².

In 2004, a sanctioning process was initiated against the project "Transporte de Ácido Sulfúrico Ruta Punta Patache - Quebrada Blanca", for using a different route than the one outlined in the Environmental Impact Statement, a process that ended with a fine to Compañía Minera Quebrada Blanca S.A.¹³.

In 2013, an oil spill occurred just a few kilometers away from the town of Huatacondo¹⁴, in the commune of Pozo Almonte (province of Elqui, Coquimbo region, northern Chile), and the responsibility was assigned to the Teck-Quebrada Blanca Mining Company. The Superintendency of the Environment initiated a sanctioning process against the mining company, but it was suspended after the approval of the compliance program presented by the company¹⁵, notwithstanding the serious damage caused to the area's ecosystem, affecting the flora and fauna of the coastline and the community of Huatacondo.

During 2016, the Indigenous organization, "Asociación Indígena Aymara Ganadera y Cultural Quebrada de Yabricoyita y Caya" presented an administrative appeal against the project "Estudio de Impacto Ambiental Actualización Proyecto Minero Quebrada Blanca", because it was not

¹² According to the information found at the Sistema de Evaluación de Impacto Ambiental. Servicio de Evaluación Ambiental. Gobierno de Chile.

¹³ Sistema de Evaluación de Impacto Ambiental. Ficha del Proyecto: "Transporte de Acido Sulfúrico Ruta Punta Patache - Quebrada Blanca". Procesos de sanción. Servicio de Evaluación Ambiental. Gobierno de Chile. https://seia.sea.gob.cl/externos/sanciones/archivos/SAN_idExp3881_idSan1148.pdf

¹⁴ Comité de Defensa de la Madre Tierra, Tarapacá (17 de febrero, 2013). "Dos graves derrames de petróleo... ¿y cuántos más deberemos sufrir?", *OLCA*, <http://olca.cl/articulo/nota.php?id=102903>

¹⁵ Calderón, María José (3 de abril, 2013). "Suspenden sanción contra minera Teck Quebrada Blanca por derrame de petróleo", *Biobio Chile*,

<https://www.biobiochile.cl/noticias/2013/04/03/suspenden-sancion-contra-minera-teck-quebrada-blanca-por-derrame-de-petroleo.shtml>



debated within the indigenous peoples' consultation process. The Environmental Evaluation Service rejected this appeal.¹⁶

On the other hand, in the almost three decades of operation of the Quebrada Blanca mine, workers have denounced on multiple occasions anti-union practices by the company and the need for improvements in working conditions. In 2012 a worker was injured by the explosion of a dynamite charge - accidentally left behind - while driving a backhoe excavator at the worksite¹⁷. That same year the Labor Department condemned Teck Quebrada Blanca for anti-union practices. Furthermore, in 2017, a total of 120 workers were fired¹⁸. That same year, in the middle of collective bargaining negotiations, the union accused the company of anti-union practices¹⁹.

The health risks of working at high altitude have been visible for years. The working sites of the Quebrada Blanca mine are located at 4,400 meters above sea level, an altitude considered extremely hostile to human beings. One of the consequences of working at high altitude is hypoxia or hypoxemia, which affects concentration, memory, coordination and can even cause organic brain damage and other problems such as high blood pressure and pulmonary or cerebral edema²⁰. Moreover, the low temperatures at this altitude can cause drowsiness, lung problems, otitis, among other health problems²¹, not to mention the psychosocial affectations due to the conditions of isolation. However, despite the knowledge that now exists about the negative health effects of working at high altitudes, and also despite certain advances that have been made on the subject,

¹⁶ Sistema de Evaluación de Impacto Ambiental. Ficha del Proyecto: “Estudio de Impacto Ambiental Actualización Proyecto Minero Quebrada Blanca”. Recursos administrativos. Servicio de Evaluación Ambiental. Gobierno de Chile, https://seia.sea.gob.cl/archivos/2017/11/16/Res._N_1022.PDF

¹⁷ Minería Chilena (23 de febrero, 2012). “Investigan explosion de tiro de dinamita olvidado en minera”, *Minería Chilena*. Fuente: La estrella de Iquique.

<https://www.mch.cl/2012/02/23/investigan-explosion-de-tiro-de-dinamita-olvidado-en-minera/>

¹⁸ La Izquierda Diario (17 de febrero, 2017). “120 despidos realizados en Minera Quebrada Blanca de Tarapacá”. *La Izquierda Diario*, <http://www.laizquierdadiario.cl/120-despidos-realizados-en-Minera-Quebrada-Blanca-de-Tarapaca>

¹⁹ Federación Minera (28 de noviembre, 2017). “Sindicato Quebrada Blanca vota la huelga en medio de malas prácticas laborales por parte de la empresa”. *Federación Minera de Chile*, <http://www.federacionminera.cl/sindicato-quebrada-blanca-vota-la-huelga-en-medio-de-malas-practicas-laborales-por-parte-de-la-empresa/>

²⁰ Federación Minera de Chile (2016) Altura y los trabajadores. <http://www.comisiondeproductividad.cl/wp-content/uploads/2016/12/Federacion-Minera-FACTORES-QUE-ATENTAN-EN-CONTRA-DE-LA-SALUD-DE-LOS-MINEROS-DE-CHILE.pdf>

²¹ SIGWEB. Sistemas integrados de Gestión (2012). Riesgos en la minería de altura geográfica. Manuales técnicos. <http://www.sigweb.cl/wp-content/uploads/biblioteca/MineriaAlturaGeografica.pdf>



there are still no strict regulations on this matter, no measures taken by mining companies to mitigate the damage, and no control of the situation by the government²².

Currently, the recently approved "Quebrada Blanca Phase 2 Mining Project" has been widely resisted by the indigenous communities in the area, particularly by the Aymara and Quechua people. Such is the case with the town of Huatacondo, where the residents were not considered to be within the area of influence of this new phase of the Quebrada Blanca project and therefore did not participate in the Indigenous Peoples' Consultation Process, despite multiple requests from different communities to be included in the process.

In 2018, the Quechua community of Ollagüe presented a subsidiary administrative appeal for reinstatement because they were not considered in the Indigenous Peoples' Consultation Process (PCPI), despite the fact that since 2017 the community has repeatedly requested to be included in the process. They appealed to ILO Convention 169, which establishes the obligation to consult the people that could be directly affected. However, this appeal was rejected by the Environmental Evaluation Service²³. For their part, some associations of the Aymara people presented in 2019 an administrative appeal to invalidate the Resolution of Environmental Qualification (RCA, for its acronym in Spanish) of the project, but this was also rejected by the Environmental Evaluation Service. To date, nine administrative appeals have been filed, of which only one has been partially admitted²⁴.

²² Confederación Minera de Chile (2018). Video "Minería en altura, una riqueza peligrosa"

https://www.youtube.com/watch?v=n_8H6ZOuvYE

²³ Sistema de Evaluación de Impacto Ambiental. Ficha del Proyecto: "Proyecto Minero Quebrada Blanca Fase 2". Recursos administrativos. Servicio de Evaluación Ambiental. Gobierno de Chile.

https://seia.sea.gob.cl/archivos/2018/10/03/1.MEMO_N_57-2018.PDF

²⁴ Sistema de Evaluación de Impacto Ambiental. Ficha del Proyecto: "Proyecto Minero Quebrada Blanca Fase 2". Recursos administrativos. Servicio de Evaluación Ambiental. Gobierno de Chile.

https://seia.sea.gob.cl/expediente/expedientesRecursos.php?modo=ficha&id_expediente=2131794104



Additionally, in 2019 the Superintendence of the Environment sanctioned Compañía Minera Teck Quebrada Blanca with three fines for inadequate control and maintenance of groundwater protection measures²⁵.

In this context, the construction of the "Quebrada Blanca Phase 2 Mining Project" has commenced following years of environmental damage, of accusations by the communities against the mining company for pollution, related health issues, the destruction of ecological heritage, and the drying up of bofedales (High Andean wetlands), among other impacts. Additionally, the communities denounced various irregularities in the process of formulating the Environmental Impact Study. They indicated that many communities were excluded from the process, including the people of Huatacondo, who also accused the company of failing to comply with previous agreements related to the preservation of the cultural and ecological heritage of the area²⁶.

b) Production²⁷

The QBF2 project contemplates 25 years of operation, with a production capacity of 140 ktpd. The QBF2 Feasibility Study estimated 1.4 billion tons of proven and probable reserves, with an estimated 6.7 million tons of copper in addition to 258 thousand tons of molybdenum and 59 million ounces of silver²⁸. The current mining operations are conventional for open pit mining, and the expansion project is basically an extension of the current activities. However, the project represents an increase in the depth and width of the pit and an intensification of the extraction rate²⁹. All this means that the impact of the QBF2 mining project will be much bigger than the impact of current operations in terms of the amount of rock to be extracted from the area, as well as the tailings and waste that it will generate.

²⁵ Minería Chilena (22 de agosto, 2019). "SMA aplica multa por más de \$872 millones a Teck Quebrada Blanca". *Minería Chilena*: <https://www.mch.cl/2019/08/22/sma-aplica-multa-por-mas-de-872-millones-a-teck-quebrada-blanca/>

²⁶ OCMAL. Conflicto Minero: Comunidad Quechua de Huatacondo Denuncia a Minera TEK. Mapa de Conflictos Mineros. https://mapa.conflictosmineros.net/ocmal_db-v2/conflicto/view/946

²⁷ See Figure 1 for infrastructure modelling.

²⁸ Teck Resources (2016). NI 43-101 Technical Report on Quebrada Blanca Phase 2 Feasibility Study 2016, Región de Tarapacá, Chile, p. 15-2

²⁹ Ibid, p. 1-15.



c) Tailings and Waste

The project anticipates the extraction of 1.9 billion tons of rock during the 28 years of operations. Of that total, 1.4 billion tons will be sent to the processing plant. It also anticipates that 0.56 billion tons of waste rock will be generated from the process. The company will build two waste rock facilities.

In addition to waste rock generation, the operation would generate tailings from the processing plant. The expansion project includes the construction of a new tailings dam, which would cost US\$285 million. The plant would generate 1.37 billion tons of tailings, which would be sent to the tailings dam. The dam will be located in the Quebrada Blanca valley, at approximately 7 kilometers away from the processing plant, it would have a finite storage capacity of 1.4 billion tons and would occupy 800 hectares of land³⁰. The company notes that the capacity of the dam will be reached, given the production projections in QBF2, and therefore admits that any scenario that exceeds the estimates will require provisions for another site, in order to build an additional dam. The company admits to having identified and secured another possible site that would have capacity for 2 billion tons, if they move to another expansion stage³¹.

³⁰ Ibid, p.15-4 & 18-5; Sistema de Evaluación de Impacto Ambiental. Ficha del Proyecto: “Proyecto Minero Quebrada Blanca Fase 2”. Recursos administrativos. Servicio de Evaluación Ambiental. Gobierno de Chile, p. 1-90
https://seia.sea.gob.cl/archivos/2018/10/03/1.MEMO_N_57-2018.PDF

³¹ Teck Resources (2016). NI 43-101 Technical Report on Quebrada Blanca Phase 2 Feasibility Study 2016, Región de Tarapacá, Chile, p. 1-14 .



Figure 2: Quebrada Blanca Phase 2 – Infrastructure Model





d) Water

Another significant change from previous operations is water use. Currently the Quebrada Blanca mine depends on the private use of water from the Salar de Michincha (315.9 L/s) and the Salar de Alconcha (120.3 L/s)³².

In the Tarapacá region, the mining industry has ownership rights over 68% of the total flow of water in this region (5261 l/s). Among the mining companies that stand out for their usage is the Compañía Minera Quebrada Blanca, with a total of 708.1 l/s³³. This has caused "enormous pressure on water resources located in territories where Aymara, Quechua and Atacama communities live"³⁴. It is also important to consider that the Andean basins of northern Chile are the areas which face the biggest water crisis in the country, due to water scarcity, pollution and overexploitation³⁵.

Given the lack of sufficient water resources in the area to supply the expansion project, the QBF2 project requires the construction of a seawater desalination plant, in addition to the construction of a long pipeline to transport water already desalinated from the port in the Bayo de Patache to the mine. The pipeline would extend for 159 km and rise 4400 m from sea level to the mine. The construction costs would be US\$470 million for the desalination plant and US\$848 million for the pipeline. We can deduce that the company has already exhausted the water resources of the area and is now forced to invest more than US\$1.5 billion to ensure sufficient water for its mining operations.

³²Ibid, p.1-4.

³³ Romero-Toledo, H. (2019). "Extractivismo en Chile: la producción del territorio minero y las luchas del pueblo aimara en el Norte Grande". Colombia Internacional (98): 3-30.

³⁴ Romero-Toledo, H. (2018). "Etnicidades, etno-territorios y conflictos mineros: aportes para una geografía humana de los aymaras en Chile". Revista de Geografía Norte Grande, (71): 211-234
<https://scielo.conicyt.cl/pdf/rgeong/n71/0718-3402-rgeong-71-00211.pdf>

³⁵ Banco Mundial (2011) quoted by Díaz, K., 2019. In: Crisis del Agua en el Norte de Chile. Derecho y Cultura en Los Andes. Sobre los Efectos Irracionales del Derecho. <https://scielo.conicyt.cl/pdf/rda/n61/0719-2681-rda-61-67.pdf>



In addition to water consumption for its mining operations, the project also requires the drilling of more than 37 deep mine dewatering wells.



(Loa River, Tarapacá Region. Source: Miguel Hechenleitner)

e) Electric Power

The energy consumption of the mine is also very significant, given the long trajectories required to pump and transport water from the port, in addition to the electricity required for the operations and the concentration plant. Most of the consumption (half) corresponds to the concentration plant, and a quarter goes to the operation of the pipelines. The energy required for the operation of the mine will be obtained from the Norte Grande Interconnected System (SING). In all, annual



consumption is estimated at 2,020 GWh/year³⁶. It should be noted that in the Tarapacá region, electricity consumption from copper mining is 2.1 TWh and is forecasted to reach 4.5 TWh by 2030. This increase is closely linked to the Quebrada Blanca Phase 2 mining project³⁷.

f) Populations

The town of Huatacondo is the closest town to the current infrastructure of the mining project. Huatacondo is located within the commune of Pozo Almonte, in the mountain range (the Andes). Since the expansion project contemplates an extensive territorial expansion, any impact that may be caused by the operation would have a much greater scope on many more people and populations. There are several towns that are in close proximity to the areas planned for the new tailings dam, concentration plant, and aqueducts. These are: Tamentica, Quebrada Casillas (Choja Alto), Chiclla and Copaquiri. The populations of Caramucho, Chanavayita and Hemp are close to the port infrastructure (see Figure 3).

³⁶ Teck Resources (2016). NI 43-101 Technical Report on Quebrada Blanca Phase 2 Feasibility Study 2016, Región de Tarapacá, Chile, p. 18-17.

³⁷ Cochilco (2019). “Proyección del consumo de energía eléctrica en la minería del cobre 2019-2030”. Cochilco, Ministerio de Minería, Gobierno de Chile.
<https://www.cochilco.cl/Mercado%20de%20Metales/Proyecci%C3%B3n%20Consumo%20EE%202019-2030.pdf>

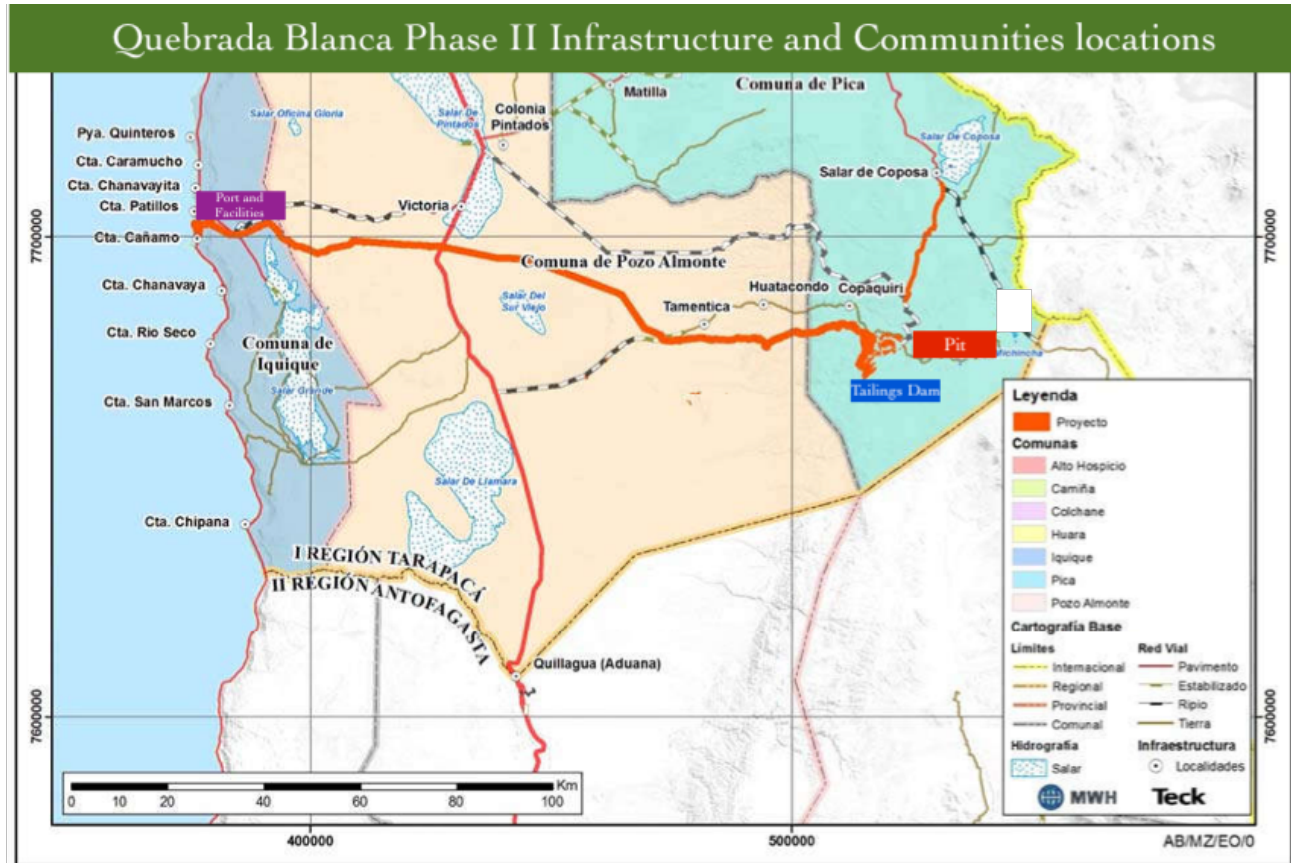


Figure 3: Quebrada Blanca Phase II Map of Communities and Infrastructure. Adapted from: EIA, Quebrada Blanca Fase II, p. 1-29.



5. Impacts

As already mentioned, the QBF2 expansion project, with an estimated annual production of 316,000 tons, aims to be one of the largest mining projects in Chile and to position the company among the 20 largest copper producers in the world³⁸. Similarly, the investment required to carry out the expansion is also very significant. There have been no independent studies analyzing the possible impacts of mining at this scale in this area that have not been carried out by the company, and/or actors who will benefit from the project. However, we believe it is very important to explicitly outline the impacts that the mine will generate, as foreseen by the company itself, in order to understand what the mining operation will be like and what impact will it have in the area.

a) Summary of EDC's findings

It is worth noting that in 2019 the QBF2 expansion project was classified by the Canadian state financial agency "Export Development Canada" as Category A. According to EDC, financing projects that require a review stage, classified as Category A³⁹, are "projects with significant potential to produce social and/or environmental impacts that are sensitive, diverse or unprecedented". Consequently, EDC was required to prepare a report to examine the potential risks of the project and determine whether the company was taking sufficient steps to mitigate these risks⁴⁰. To produce its report, EDC only describes the company's actions based on information produced by the company itself and does not develop its own primary research methods. Taking this into account, the summary of the report's findings identifies six "key risks" of the QBF2 project:

³⁸ Teck Resources. "Quebrada Blanca Fase 2" <https://www.teck.com/operaciones-es/chile-es/proyectos-es/quebrada-blanca-fase-2/>

³⁹ Export Development Canada, "Transparency and Disclosure", <https://www.edc.ca/en/about-us/corporate/disclosure/reporting-transactions.html>

⁴⁰ MiningWatch Canada solicited the full report produced by EDC but this request was denied. As such we depended on the summary of the highlights of the report's findings.



Loss of wetlands, including wetland habitats, vegetation and soils.

The high Andean wetlands are the main source of recharge for the underground aquifers used to develop different activities in the area⁴¹. One significant impact identified by the project's Environmental Impact Study is the loss of wetlands, mainly due to interventions in the terrain and to the emission of particulate matter, which in turn alters the vegetation. In the project's area of influence (determined by the company) there are 16 wetland vegetation formations that will be negatively and permanently affected by the mining project; nine of them are in the category of "effective loss of wetlands"⁴². The EIA presented by the company excludes the currently impacted wetlands that were identified in the "Quebrada Blanca Mining Project Update" project; therefore, it is a loss of wetlands in addition to the existing ones.

Loss of individual specimens of endangered flora

The impact to vegetation and in particular the loss of threatened flora will occur mainly in the construction phase of the project. Within the area of influence, 18 taxa were identified, eight of which are presently in some category of conservation⁴³. Among them is *Metharme lanata*, a species classified as endangered. It is endemic to the Tarapacá region in Chile and its distribution is restricted to the vicinity of Pica and Pozo Almonte, particularly on the banks of busy roads, a situation which poses the greatest threat to its conservation⁴⁴.

⁴¹Ciren (2013). Caracterización de Humedales Altoandinos para una gestión sustentable de las actividades productivas del sector norte del país. Estudios de Impacto Ambiental: Región de Tarapacá.

⁴² MWH Chile (2016). Estudio de Impacto Ambiental Proyecto Minero Quebrada Blanca Fase 2. Capítulo 4: Predicción y evaluación de impacto ambiental.

⁴³MWH Chile (2016). Estudio de Impacto Ambiental Proyecto Minero Quebrada Blanca Fase 2. Capítulo 4: Predicción y evaluación de impacto ambiental.

⁴⁴Inventario Nacional de especies de Chile. Ministerio del Medio Ambiente, Gobierno de Chile.

http://especies.mma.gob.cl/CNMWeb/Web/WebCiudadana/ficha_independ.aspx?EspecieId=28&Version=1



Loss of endangered wildlife and low-mobility wildlife in addition to their habitats

Affectations and alterations of the land's surface, land modification and noise emissions - mainly from blasting - will negatively impact the fauna of the sector. This will result in the loss of endangered wildlife species, as well as in the alteration and loss of wildlife habitat. The impact on native fauna will be permanent during all stages of the project. In particular, increased noise may cause hearing damage, altered behavior and physiological changes in the fauna⁴⁵.

Impacts on marine species

Although the company purports to "improve" access to fresh water for "others", while increasing its own consumption for the purpose of the expansion, the proposed alternative does not represent a solution devoid of repercussions. As already stated, water consumption for the mine expansion will be 1,300 liters per second, which would be extracted from the sea and processed. Then, the highly saline brine is discharged in the sea. Several studies that have analyzed the impacts produced by desalination plants in countries where this has been a common practice identify the high risk the process poses to aquatic life given the discharge of "hypersaline" brine, the emission of carbon due to the industrialization of the process, and the high energy consumption. Occasionally, in areas where these plants already operate, some serious disruption of marine ecosystems has been reported⁴⁶.

Moreover, during the construction phase of the project, the sea bed will be cleared, which can cause serious alterations in its physical and chemical properties, altering the habitat of various marine species⁴⁷.

⁴⁵ MWH Chile (2016). Estudio de Impacto Ambiental Proyecto Minero Quebrada Blanca Fase 2. Capítulo 4: Predicción y evaluación de impacto ambiental.

⁴⁶ Bartlett, "The Salt They Pump Back in Kills Everything."

⁴⁷ MWH Chile (2016). Estudio de Impacto Ambiental Proyecto Minero Quebrada Blanca Fase 2. Capítulo 4: Predicción y evaluación de impacto ambiental.



Loss of cultural heritage

The project is located in an area of great heritage value, mainly due to the presence of numerous archaeological and ceremonial sites of Aymara and Quechua communities. The intervention of the project on the land will produce a loss of archaeological and paleontological sites, the latter mainly concentrated within the port area, where the desalination plant will be built.⁴⁸

As a precedent, in August 2020, while work was being carried out for the construction of the Quebrada Blanca Phase 2 project, the company reported findings of archaeological remains, in particular four mortuary trenches dating between 1100 and 400 BC.⁴⁹

Impacts on traditional land uses by indigenous peoples, especially with regard to grazing and access to natural resources.

This project will alter the ways of life of the Indigenous communities, mainly Aymara and Quechua. Among the impacts identified in the Environmental Impact Study are the loss of grazing lands, the limitation of the transit pathways of animals to grazing lands, the limitation of the traditional use of the Salar del Huasco and Salar de Coposa, as well as the transit to and through these two places.

It is worth mentioning that not all the local communities were considered within the area of influence of the project, as is the case of the Quecha community of Ollagüe, whose members believe that their ancestral rights as indigenous peoples were violated, depriving them of land, water, roads and medicinal herbs, therefore making it impossible for them to follow their traditional ways of life⁵⁰.

⁴⁸MWH Chile (2016). Estudio de Impacto Ambiental Proyecto Minero Quebrada Blanca Fase 2. Capítulo 4: Predicción y evaluación de impacto ambiental.

⁴⁹ Infogate (2020). Minera Teck informa hallazgo de restos arqueológico precolombinos en Quebrada Blanca: <https://www.infogate.cl/2020/08/22/minera-teck-informa-hallazgo-de-restos-arqueologico-precolombinos-en-quebrada-blanca/>

⁵⁰ Sistema de Evaluación de Impacto Ambiental. Ficha del Proyecto: “Proyecto Minero Quebrada Blanca Fase 2”. Recursos administrativos. Servicio de Evaluación Ambiental. Gobierno de Chile. https://seia.sea.gob.cl/archivos/2018/10/03/1.MEMO_N_57-2018.PDF



(Cattle in pasture, Tarapacá. Source: Miguel Hechenleitner)

b) Other possible impacts and/or concerns

Impacts to the hydrological system

The Chilean mining industry is extremely intensive in terms of water consumption and that consumption is expected to increase in intensity by 56% over the next decade due to projected



growth in copper mines, including Quebrada Blanca⁵¹. Researchers Cecilia Campero and Leila Harris from the University of British Columbia, Canada, argue that the mining industry depends on unsustainable water consumption, especially in the northern zone (Atacama and Antofagasta)⁵² where most of the mining operations that consume the most water occur in extremely arid areas and which suffer from a constant water crisis, both caused and exacerbated by the industry. Quebrada Blanca, in the first phase of production, certainly is not an exception to this trend. In fact, it is already part of the problem due to its high-water consumption (as seen above). According to Teck Resources, the transition to desalinated water consumption is necessary to "ensure that others have access to water,"⁵³ but the company fails to recognize that its operation is part of the cause of the depletion of water resources in the area. Teck also fails to consider the impacts derived from the desalination process, the capital- and energy-intensive alternative.

Impacts on workers' health

As mentioned above, working at high altitudes has serious consequences for people's health. Specifically, workers are exposed to acute and chronic mountain sickness. Among the effects described on the cardiovascular system are increased blood pressure and increased risk of myocardial ischemia in workers with a history of coronary disease. At the pulmonary level, acute pulmonary edema and pulmonary hypertension may occur, and it has been reported that working at high altitude accelerates the progression of some types of pneumoconiosis such as silicosis. In the neurological field, alterations of the sleep-wake cycle and decrease of cognitive functions are frequent. Additionally, a possible increase of risk of carbon monoxide poisoning is also mentioned, associated to the phenomenon of incomplete combustion, which increases with the lack of oxygen at high altitude⁵⁴. The expansion of the productive capacity of the Quebrada Blanca mine also implies an increase in the number of workers carrying out their tasks at high altitude. During the almost 30 years of mining operations at more than 4,000 meters above sea level, workers have

⁵¹ Cochilco, "Proyección de Consumo de Agua En La Minería Del Cobre 2018-2029," 2.

⁵² Campero and Harris, "The Legal Geographies of Water Claims," 7.

⁵³ Teck Resources, "Creating Fresh Water in the Atacama Desert of Chile."

⁵⁴ Vearrier D, Greenberg MI. Occupational health of miners at altitude: adverse health effects, toxic exposures, pre-placement screening, acclimatization, and worker surveillance. Clin Toxicol (Phila). 2011 Aug;49(7):629-40. doi: 10.3109/15563650.2011.607169. Epub 2011 Aug 23. PMID: 21861588.



repeatedly expressed their concern and distress for the lack of protection on the part of the company and the State. Nonetheless, in this new phase, Teck has opted to maintain a camp for workers at more than 4000 meters above sea level, in spite of being able to move these facilities to under 3000 meters above sea level, as recommended by health authorities. Today, the Quebrada Blanca Phase 2 project is the largest mining project under construction in Chile, and they have built camps to house up to 8,000 workers⁵⁵.

Impacts on gender relations

Parallel to the increase in the number of workers, the gender asymmetry will deepen in the territory, since mining activity is a highly masculinized work, where women can only access a small number of deeply precarious jobs. Additionally, mega-mining precludes and marginalizes other forms of land use linked to traditional practices where women have historically played a leading role⁵⁶.

⁵⁵ La Tercera (2020). <https://www.latercera.com/pulso/noticia/quebrada-blanca-2-entra-en-su-peak-y-demandara-8000-trabajadores-en-octubre/6FU2WZ5LZ5CZFHEZ5J2KVNOFEY/>

⁵⁶OLCA (2020). Derechos Humanos, Extractivismo Canadiense y Agua. Informe entregado a la Misión Canadiense de Observación y Solidaridad con Chile sobre la Situación de los Derechos Humanos en el Contexto de Transición Sociopolítica.



6. Conclusion

It is worth noting that the Quebrada Blanca Phase II expansion project is superimposed on an extremely delicate situation in environmental and social terms due to the legacy being left by the current exploitation, such as the depletion of the region's water resources and the tensions between the communities living within the area of influence of the mine.

But the Quebrada Blanca Phase II also highlights the irrational nature of these copper mega mining projects with respect to the capital investment required for the expansion and the impacts that these projects will cause, in this specific case, on the health and well-being of workers, indigenous peoples, and local communities. It is also necessary to highlight the risks that this project presents to the flora and fauna of the region and to the high altitude and oceanic-coastal ecosystems, on which many people depend for their economic and cultural activities. Despite Teck Resources insistence that it is developing its operations while conscious of their impacts on climate change, the relationship between the worsening ecological crisis and the depredatory nature of the industrial mining model, is especially evident in these kinds of projects. The Quebrada Blanca Phase II expansion project represents a threat that could provoke the activation of a latent socio-political environmental conflict in the area and that, due to its scale and size, could even produce catastrophic impacts for many downstream populations.



**(Birds in flight in
the Huasco Salt
Flat. Source:
Miguel
Hechenleitner)**