OROCOBRE

MANAGEMENT
APPROACH
DISCLOSURE

WASTE

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Waste

Related GRI Contents	103-1; 103-2; 103-3
Related Sustainable Development Goals	SDG 12
Related Performance Data	Environment
Related Management Approach Disclosures	Community
Related Case Studies	Raising recycled walls
Other related documents	Environmental Policy; Sustainable Development Policy; Orocobre Waste Storage and Evaporation Facilities Discussion Paper
Future Commitments	+ Continue implementing metrics and indicators to define efficiency goals across our operations. + Reduce the amount of solid waste generated per person at Olaroz Lithium Facility and Borax Argentina. + Implement effective sorting at source and recycling program in Olaroz Lithium Facility and Borax Argentina. + Continue to research and develop opportunities for reuse of mineral process waste from Olaroz Lithium Facility and Borax Argentina.
Related Material topics	+ Environmental Management (including storage facilities)

Strategic significance

The remote environment in which the Olaroz Lithium Facility and Borax Argentina operate presents challenges for waste treatment and disposal, including transport costs and associated emissions. Due to this, it is important to identify and implement innovative opportunities to reduce, recover, reuse, or recycle waste produced at our operations, including domestic and mineral waste, in order to minimize environmental and economic costs.

The Global Industry Standard on Tailings Management (the Standard or GISTM) was launched in August 2020. The Standard was developed through an independent process – the Global Tailings Review (GTR) which was co-convened in March 2019 by the United Nations Environment Programme (UNEP), Principles for Responsible Investment (PRI) and International Council on Mining and Metals (ICMM).

We have reviewed the standard and assessed its relevance and applicability to our operations.

Impact boundary

This management approach refers to the activities of both Sales de Jujuy S.A. (Olaroz Lithium Facility or SDJ) and Borax Argentina S.A (Borax Argentina or BRX).

Orocobre manages and measures waste generated by both employees and contractors at its facilities.

For Olaroz Lithium Facility, and Borax Argentina, we report:

- Hazardous waste
- Non-hazardous waste (including non-recyclable and organic waste and recyclable materials)

Where possible, waste associated with construction activities from the Olaroz Phase 2 Expansion Project is reported separately to operational waste.

Mineral and Processing Waste

Waste in the form of precipitated salts from the evaporation ponds process, drill cuttings from exploration, well construction and boring activities at the Olaroz Lithium Facility are included within this scope.

For Borax Argentina, mineral waste in the form of mine site overburden (waste rock) from Tincalayu and Sijes mines and processing from certain chemicals facilities are also within scope.

Management approach

As part of Orocobre's commitment to advancing the UN Sustainable Development Goals, and in line with SDG 12: Responsible Consumption and Production the Company is constantly seeking ways to substantially reduce waste generation through prevention, reduction, recycling and reuse.

Policies that demonstrate the Company's commitment on waste management include:

- Environmental Policy
- Sustainable Development Policy

Management Systems

Orocobre's operations have an ISO certified Environmental Management System (ISO14001) which sets out our approach to management of waste, which is classified and treated according to its type and associated handling risks.

- **Hazardous Waste:**

Both Olaroz Lithium Facility and Borax Argentina are registered as companies generating hazardous waste and all hazardous waste is managed, transported and disposed of in accordance with the mandatory provisions set forth in National Law No. 24.051, and regulations issued by the relevant provincial authorities. Hazardous waste from Olaroz Lithium Facility is transported to disposal at the ECOAXION S.A. plant near San Salvador de Jujuy. Hazardous waste from Borax Argentina is externally managed by Habitat Ecológico S.A. and Salta Petrol S.R.L.

- **Non-hazardous, Organic and Non-recyclable Waste:**

Non-hazardous waste from the Olaroz Lithium Facility is transported to the Jujuy waste treatment plant in Palpalá, located 300 km from the site.

At Borax Argentina, domestic (organic and non-recyclable) waste generated at the Tincalayu and Sijes fields is disposed of in sealed landfills with a GEO HDPE1000 membrane, which controls waste leaching. Domestic waste generated in Campo Quijano is collected by the Municipality and disposed of at San Javier landfill, in the capital city of Salta.

- **Non-hazardous Recyclable materials:**

At Olaroz Lithium Facility recyclable materials are either stored on site for reuse or sent to specific recycling facilities. The Company continues to investigate treatment or reuse opportunities that minimise the amount of waste being sent to landfill. During the construction phase of the Olaroz Stage 2 Expansion Project, non-contaminated scrap metals and building materials are donated to organisations that can reuse them. Additional uses have also been found for recyclable materials in Community Shared Value initiatives.

At Borax Argentina's sites, following waste classification and sorting, all recyclable materials are sent to recycling companies located in Salta.

- **Mineral and Processing Waste**

Olaroz Lithium Facility - Drill Cuttings

Exploration, well construction and boring activities at the Olaroz Lithium Facility generate drill cuttings made up of extracted brine and additives which are managed responsibly and returned to the salt flat with minimal impact on the environment. The additives used at different stages are stabilisers, gelling agents, and flocculants. The compounds used are polymeric, easily biodegradable and do not alter the chemical properties of the environment in the salt flat. Olaroz Lithium Facility analyses the chemical composition of muds, including the presence of Lithium, Calcium, Potassium, Sodium, Boron, Sulfates, pH and other analytes. We also use satellite imagery, to monitor the natural incorporation processes of mud in the salt flat.

Olaroz Lithium Facility - Salts from Evaporation Pond Process

The processing method uses evaporation ponds to concentrate the brine with increasing lithium. The ponds are operated as a sequential/linear system which sees brine move through every pond with increasing lithium concentration.

During the concentration process, salts (mainly NaCl) precipitate in the bottom of the ponds and magnesium hydroxide (Mg(OH)2) is precipitated at the beginning of the pond system where lime is added.

Salt accumulation is managed differently for differently designed ponds. Early-stage ponds are operated as "non-harvestable" and the final stage ponds with high lithium concentrations in the entrained brine are "harvestable".

The harvestable ponds are periodically drained and the precipitated salts are removed to stacked storage locations. When the process is complete, the emptied ponds are refilled with brine and brought back in the pond system.

The stockpiles of harvested salt do not exceed six meters in height to minimise airflow disturbance. The current area for storing harvested salt is approximately 12 hectares.

A feasibility study has been conducted to determine future uses for the salts harvested from our evaporation ponds. Potential uses include mixing with earth for

compacting roads and building additional ponds. We continue to work with local authorities to manage approval processes for potential uses of these materials. In the future, salts not used for other purposes will be reincorporated into the salt flat as filling material at the completion of operations.

As they precipitate, the salts in the non-harvestable ponds settle, compact and cement together at the bottom of the ponds and remain there permanently.

Borax Argentina – Mine waste rock

Mineral waste generated at Borax Argentina sites includes overburden from mines at Tincalayu and Sijes. These materials are deposited in conventional waste rock piles on site. The dumps are designed for long term stability.

Borax Argentina – Process waste

The Borax operations include two open pit mines, concentrators, refining capacity and significant land holdings. The mining operations are located in Tincalayu and Sijes with neither operation requiring a Tailing Storage Facility. A boric acid plant is operated at Campo Quijano, Salta and utilises four evaporation ponds and three waste dumps for storage of excess process water and solid waste.

Sijes plant

The Sijes plant does not use water for production. The plant produces no process waste as what was previously considered a waste stream (the lower grade rejects from the concentrator), has been used since 2016 as an ore feed for the boric acid plant at Campo Quijano. This example of circular economy was implemented when we were able to develop a process using the waste hydroboracite from Sijes instead of using ulexite mined at Porvenir (now closed). Due to this, there are no long-term process waste storage facilities required at Sijes and previous stockpiles of the low grade material have been used up at Campo Quijano or sold as low grade fertiliser.

Tincalayu plant

A process waste "mud" is generated in the Tincalayu chemicals plant and is disposed of in a waste stockpile. The process mud is loaded by loader and transported as a solid material in trucks and dumped in piles on the dumps where it subsequently further solidifies and cements as the remaining moisture evaporates to form a solid material. The waste stockpiles accumulate as per a typical low profile mine waste stockpile.

As this is waste generated in the processing of minerals, it is defined as Tailings in the Global Industry Standard on Tailings Management (GISTM), issued in August 2020. Due to the low moisture content of the mud and the resulting solid consistency, these waste stockpiles are self-supporting and as such, are not require a containment structure. As there is no containing structure around the waste stockpile, it is concluded that there is no Tailings Facility, as per the definition of the GISTM.

The following disposal sites are located at Tincalayu:

Tincalayu site 1: Approximately 31.3 hectares – no longer in use. Approximately 551,600m3 of process waste material has been deposited at this site.

Tincalayu site 2: Approximately 4.6 hectares – currently in use. This site has been active since 2014, and approximately 508,000m3 of process waste material has been deposited at this site.

Campo Quijano plant

A process waste "mud" is generated from the production of boric acid, and is disposed of in waste stockpiles. The process mud is loaded by loader and transported as a solid material in trucks and dumped in piles on the dumps where it subsequently further solidifies and cements as the remaining moisture evaporates to form a solid material. The waste stockpiles accumulate as per a typical low profile mine waste stockpile.

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These waste stockpiles are:

Campo Quijano Site 1: Approximately 16 hectares - no longer in use. Approximately 411,000 m3 of process waste was deposited on this site. Revegetation activities are currently being carried out at this location, which will improve the physical characteristics of the pile substrate and increase the retention of rainwater.

Campo Quijano Site 2: Waterproofed site approximately 6.5 hectares - not operational at present. Process waste generated from 2001 to 2015 (approximately 229,800 m3) was deposited at this location. This process waste contains, calcium sulphate, boron and silica, and we continue to investigate potential uses for these materials.

Campo Quijano Site 3: Approximately 5 hectares – currently in use. This site has been in use since 2010. Approximately 74,500 m3 of material has been deposited on this site.

Considering the importance of this waste, a monthly monitoring plan will be implemented during FY 22, to ensure the integrity of the site. Borax Argentina is undertaking high definition monitoring which will be compared with the baseline study from 2019.

- **Evaporation ponds**

Olaroz Lithium Facility - Evaporation ponds

The primary function of evaporation ponds is to contain lithium rich brine and allow natural evaporation to concentrate the lithium in the brine by up to 10x over a period of 9-12 months. The ponds are approximately one metre deep and more like shallow water dams than Tailings Storage Facilities (TSF). The pond walls are constructed using compacted sand and earth with an impermeable liner placed on the interior to contain the brine. The walls are maintained at a constant height to provide shallow water storage to encourage efficient evaporation. The height of these storage facilities is not built up over time as with TSFs.

The Olaroz evaporation ponds are subject to constant monitoring and management including visual inspections, electrical resistivity testing, remote sensing, leak detection and density testing of pond walls.

Borax Argentina - Evaporation ponds

The production process generates liquid process purges and sludge as effluent. The process purges are contained within four lined evaporation ponds.

Pond	Location	Area (Ha)	Volume (m3) (*)	Dam height (m) avg.	Status
1	24º54'51''S 65º38'24''W	1.05	10,000	1.0	Operating since 1998
2	24º54'57''S 65º38'21''W	1.15	26,500	2.6	Operating since 2002
3	24º55'15''S 65º38'04''W	3.73	64,000	1.7	Operating since 2003
4	24º55'22''S 65º37'58''W	3.59	68,000	2	Operating since 2003

(*) Estimated value according to information available.

The evaporation pond walls are constructed with excavated ground from the pond area (a mixture of clay and coarse round gravels); this excavated material was used for constructing the walls in ascending layers. Each layer was compacted ensuring the maximum density for the material after compaction and leads to the maximum shear resistance.

Following compaction of the base and walls, a High-Density Polyethylene liner was installed ensuring that water does not enter the walls and base of the ponds.

The evaporation ponds contain brine and precipitated (and cemented) salts and do not constitute tailings as defined in the GISTM. Stability reviews are undertaken by external consultants on a regular basis.

Monitoring and Reporting

Orocobre evaluates the effectiveness of its management approach for waste, including mineral waste, through regular monitoring and reporting of key data and metrics, tracking progress against predefined objectives and targets. Internal data and reporting processes include daily operational updates, weekly operational performance reviews and monthly reporting on progress against operational targets.

We are continually monitoring the amount of mineral waste produced at our sites. Waste rock piles at Borax Argentina sites are designed by the Exploration and Mining Superintendent. Mineral waste and process waste have always been actively minimised through the mine planning process at Sijes and Tincalayu. Mine design aims to minimise the overburden to ore ratio (strip ratio) so that the least amount of mineral waste is produced per tonne of ore. Similarly, mine design will also target the highest grade ore production which means that it minimises the amount of process waste per tonne of end product. Consequently, we continually target the lowest production possible of mineral process waste.

For Borax Argentina, the goals related to the reduction of waste and the related recycling, reuse, treatment and disposal costs are progressively adjusted at each of the three production sites. The Environment area monitors the measures implemented at each site and manages changes made to procedures or guidelines based on the results obtained. At Olaroz Lithium Facility, the operating area is responsible for setting goals. In both cases, indicators are monitored by managers and executive officers on a monthly and quarterly basis, respectively.

Orocobre reports on waste performance annually in its Sustainability Report and in response to investor surveys such as S&Ps Corporate Sustainability Assessment (formerly DJSI/RobecoSAM). We are working towards also including annual updates of mineral waste information.

Responsibility

The Corporate Risk Management (RM) Manager is responsible for monitoring waste management, including mineral waste, and works closely with the RM Superintendents and Environment areas at Olaroz Lithium Facility and Borax Argentina. In addition, an inter-disciplinary approach is taken to identify and evaluate opportunities for performance improvement.

The Project Director is responsible for construction waste associated with expansion activities at Olaroz Lithium Facility.

Accountability

The Company is integrating KPIs into the performance evaluation process for specific managers and employees at an operational level.

FY20 update

SALES DE JUJUY (Olaroz Lithium Facility)

Hazardous Waste:

The amount of reported hazardous waste (as defined in Provincial Accession Law No. 5011) increased considerably during FY20 from approximately 25 to 162 tonnes. This is due mainly to improved data collection processes implemented this year.

Non-hazardous, Organic, Recyclable and Non-recyclable Waste:

Prior to the COVID-19 pandemic, we had adopted programs at Olaroz Lithium Facility to reduce the number of disposable materials used in the dining hall by employees and contractors. Unfortunately, due to COVID-19 it was necessary to reimplement the use disposable items, resulting in an increase in use of plastic on site during the year.

The Environment team has worked together with the Communication Management team on a communication plan covering different environment-related issues at Olaroz Lithium Facility including waste management. Messages were developed and presented in audio-visual form at the site dining room and in virtual format, for administrative staff off site to educate staff about effective waste management.

Following improvements in reporting of waste during FY20, new targets for future waste reduction are currently being set for Olaroz Lithium Facility.

See the Environment Performance Data for volumes of hazardous, Non-hazardous, Organic, Recyclable and Non-recyclable waste recorded at the Olaroz Lithium Facility during FY20.

Mineral Waste

A chemical characterisation study was carried during FY20 out to obtain further detail about the composition of salts from the ponds harvested at the Olaroz Lithium Facility. The results of the analysis are shown in the following table:

Table 1. Salt piles chemical analysis results

	Ca (ppm)	Mg (ppm)	Na (ppm)	Ni (ppm)	Cu (ppm)	Zn (ppm)	Cr (ppm)	Pb (ppm)	Al (ppm)	Fe (ppm)	B (ppm)	S (ppm)	SO4 (ppm)	% Humidity	Cl (ppm)	K (ppm)	Li (ppm)
sample 1	8308	1072	322700	7	<1	<1	<1	15	18	<1	1536	13823	41470	3,9	562139	17910	111
sample 2	13466	2841	302200	5	<1	<1	<1	10	12	40	2448	24017	72051	7,6	513408	28550	269
sample 3	38888	4018	275500	8	<1	<1	<1	11	77	70	4033	21025	63074	12,8	515086	17750	849
sample 4	23181	3754	301800	5	<1	<1	<1	13	39	32	2064	14701	44102	9,7	548701	12040	251
sample 5	60001	1673	244600	8	<1	<1	<1	6	393	45	2523	14894	44683	11,5	373062	15620	443
sample 6	42697	9774	210600	7	<1	<1	<1	10	55	45	6359	62682	188046	24,5	419541	46910	1343
sample 7	20051	7090	327300	7	<1	<1	<1	18	20	<1	3762	32819	98456	11,5	467036	38980	981
sample 8	9391	5565	297700	7	<1	<1	<1	6	<1	<1	2973	13811	41432	17,1	516548	15450	840
sample 9	6143	1380	294700	8	<1	<1	<1	11	<1	<1	1550	10700	32100	6,4	559136	11521	270
sample 10	8324	2359	271900	7	<1	<1	<1	22	<1	<1	1519	14400	43200	5,3	571996	17081	608
sample 11	9802	1739	272900	6	<1	<1	<1	16	<1	<1	1038	16570	49710	5,8	557670	18217	406
sample 12	6508	2106	291900	8	<1	<1	<1	16	<1	<1	1083	12400	37200	13,2	576028	14325	338
sample 13	7483	2372	262500	6	<1	<1	<1	27	<1	<1	1516	12750	38250	7,8	586361	15448	525
sample 14	11240	4973	221900	8	<1	<1	<1	13	<1	<1	2243	21490	64470	8,7	566468	21382	992
sample 15	8479	2547	229400	6	<1	<1	<1	13	12	2	1648	16570	49710	4,8	569736	18440	983

The analysis showed that no analyte present in the solids is foreign to the characteristics of the salt flat, and that the values are in line with legal environmental requirements.

BORAX ARGENTINA

Hazardous Waste:

During FY20, Borax Argentina obtained a special authorisation to manage hazardous waste which results in shorter pickup and delivery times and in turn, reduces direct (freight) and indirect (loading and unloading personnel) waste management costs.

Non-hazardous, Organic, Recyclable and Non-recyclable Waste:

Changes to domestic waste management at Campo Quijano headquarters were well accepted by the work teams and delivered improved results. Waste and recycling stations were installed in common spaces as well as in the industrial packaging and logistics sections that generate a considerable volume of waste (including bags, cardboard and other recyclable materials).

Borax Argentina and Saltaplas (a recycling company), are working on an agreement to reprocess plastic waste from the three production plants. This reprocessed material will be used for the manufacturing of bags. In exchange for contributing the waste material, Borax Argentina will receive bags made of the recycled material. This circular economy initiative has several positive outcomes including the benefit to the environment and the reduced cost of bags that would otherwise be purchased from a third party.

A group of students from the Baccalaureate Program also collaborated with this program and arranged the collection and sorting of plastic waste during Peregrinación del Milagro (Pilgrimage of the Miracle) celebration. This initiative was embraced by attendees and a large amount of plastic was collected for recycling.

Borax Argentina also provides waste wooden pallets to employees and communities within the local area, who reuse the wood in different initiatives carried out collaboratively with the Environment and Shared Value teams.

See the Environment Performance Data for volumes of hazardous, Non-hazardous, Organic, Recyclable and Non-recyclable waste recorded at the Borax Argentina facilities during FY20. As some of the figures obtained for each type of waste are currently estimates it is intended that new measure will be implemented next financial year to improve the accuracy of this data. When a baseline has been established, reduction targets will be set for Borax Argentina.

Mineral Waste:

Mineral waste extraction works occurred in Tincalayu field during FY20 resulting in 72,182 tonnes of waste rock of and in Sijes, resulting in 35,453 tonnes.

Approximately 81,000 tonnes of dry waste mud from hydraulic filter presses, centrifuges and decanters in Campo Quijano and Tincalayu Plants was produced in FY20.

During FY20, an external consultant, carried out a hydrogeological and geotechnical assessment for the Campo Quijano evaporation ponds, showing the influence of the weather on the stored water balance (rainfall/evaporation). Based on this report, it is concluded that, the ponds remain stable with heavy rain. Based on recommendations, we are also updating the waste handling plan by investing in mechanical evaporators and using low rainfall seasons to reduce the water level in ponds.