

Making Lead and Zinc

Teck Trail Operations

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Jacqueline Dawes, Health and Safety Performance Lead

Teck

Production For More Than a Century

Various smelting and refining efforts have been underway at Trail since 1896. Over the years, the processes and plants have been modified many times with advances in technology.

The Trail smelter was originally built to process materials from mines in nearby Rossland. Today, concentrates are purchased from many parts of the world, though mines in B.C., Quebec, Washington State, Idaho and Alaska remain important to us. The ore from these mines is ground into fine powder so the metal-bearing particles can be separated and concentrated.

Over 700,000 tonnes of these concentrates are processed at Trail every year. The resulting products include zinc, lead, silver, indium, cadmium and other metals, plus copper and sulphur products. Virtually every bit of metal is extracted. The Waneta Dam provides clean and renewable power to the facility.

Producing Zinc - Our Major Product

Refined zinc is Trail's major product. Zinc sulphide concentrate is either burned in the Roasters or pressure leached with acid to remove sulphur. The sulphur dioxide gas from the Roasters goes to the Acid Plants via the Mercury Removal Plant. The roasted zinc oxide material is processed in the Leaching Plants, along with the pressure leach product and zinc oxide fume from the Lead Smelter. Several purification stages follow, which generate by-product metals including cadmium, indium and germanium. The residue from the leaching process still contains metals, and is further processed in the Lead Smelter.

The resulting pure zinc sulphate solution becomes electrolyte in a huge electrolytic process that produces refined zinc.

Large volumes of materials circulate between Lead and Zinc Operations to ensure the recovery of all the metals. The large stockpiles accumulated around the Trail Operations are the result of earlier imbalances between processing rates. These stockpiles are now being consumed to recover their metal content.

The Trail Fertilizer Operations converts the sulphur from Zinc and Lead Operations into useful products. Different grades of ammonium sulphate fertilizer are made from the solution used to clean the sulphur dioxide from the gas exiting the Acid Plants prior to discharge to the atmosphere.

Lead Production Involves KIVCET Process

Lead comes to Trail primarily as lead sulphide concentrate, though significant quantities of automotive battery scrap are also processed. The Lead Smelter employs the Russian-developed KIVCET flash smelting process to produce lead bullion from a two-stage furnace. Dry feed, together with fluxing and fueling agents, are injected at the top of the furnace with oxygen. Through chemical reactions and settling, impure lead bullion and slag are formed and tapped separately from the furnace.

The hot sulphur dioxide gas resulting from this process passes through a waste heat boiler to make steam, and then on to an electrostatic precipitator to remove dust particles before being combined with the gas from the zinc roasters for processing into saleable products, including sulphuric acid and liquid sulphur dioxide.

The molten slag is transferred to a slag fuming furnace to recover zinc in the form of zinc oxide fume. The fume is processed in the Leaching Plants in Zinc Operations to extract the zinc. The remaining black sand-like barren slag, or ferrous granules are sold to cement manufacturers.

The lead bullion is processed through the Drossing Plant adjacent to the KIVCET furnace to remove copper and other impurities. The remaining bullion is purified in the Electrolytic Refinery, and cast into the finished product. By-products of the refining process include silver, gold, arsenic and antimony.



Alistair Berglund, Senior Technician