Talvivaara's projects

The Talvivaara project is located in Sotkamo in Eastern Finland,. The deposit is one of the largest known nickel sulphide deposits in Europe. The mining licenses in this area were originally granted to Outokumpu in 1986 and exploration rights to them were subsequently transferred to Talvivaara in February 2004.

The resources are well suited for open-pit mining, partly due to the thin overburden. On average, the thickness of overburden is estimated at 2 metres. Furthermore, the average waste to ore ratio is only 1.5/1, which enables cost-effective exploitation of the resource.

© Talvivaara 2007

Mineral resources

The Talvivaara deposits comprise two different polymetallic orebodies: Kuusilampi and Kolmisoppi.

The mineral resources have been classified by Australian JORC code with 0.15% Ni Cut-Off at 414 million tonnes , containing 0.26% of nickel, 0.54% of zinc, 0.14% of copper and 0.02% of cobalt. 81% of the mineral resource is in measured and indicated categories.

JORC classification of Talvivaara resources

Grade (@ Nickel Cut-Off 0.15%)

Mineral Resources Class	Mt	Ni%	Cu%	Zn%	Co%
Measured	**199.3**	**0.27**	**0.14**	**0.54**	**0.02**
Kuusilampi	156.6	0.27	0.14	0.54	0.02
Kolmisoppi	42.7	0.28	0.15	0.56	0.02
Indicated	**136.8**	**0.27**	**0.14**	**0.56**	**0.02**
Kuusilampi	91.5	0.27	0.14	0.57	0.02
Kolmisoppi	45.3	0.26	0.14	0.54	0.02
Inferred	**77.7**	**0.24**	**0.14**	**0.49**	**0.02**
Kuusilampi	54.3	0.24	0.14	0.50	0.02
Kolmisoppi	23.4	0.24	0.13	0.48	0.02
Total	**413.8**	**0.26**	**0.14**	**0.54**	**0.02**

The mineral resources have also been classified by Australian JORC code with 0.07%Ni Cut-Off at 569 million tonnes , containing 0.23% of nickel, 0.51% of zinc, 0.13% of copper and 0.02% of cobalt. 80% of the mineral resource is in measured and indicated categories

Grade (@ Nickel Cut-Off 0.07%)

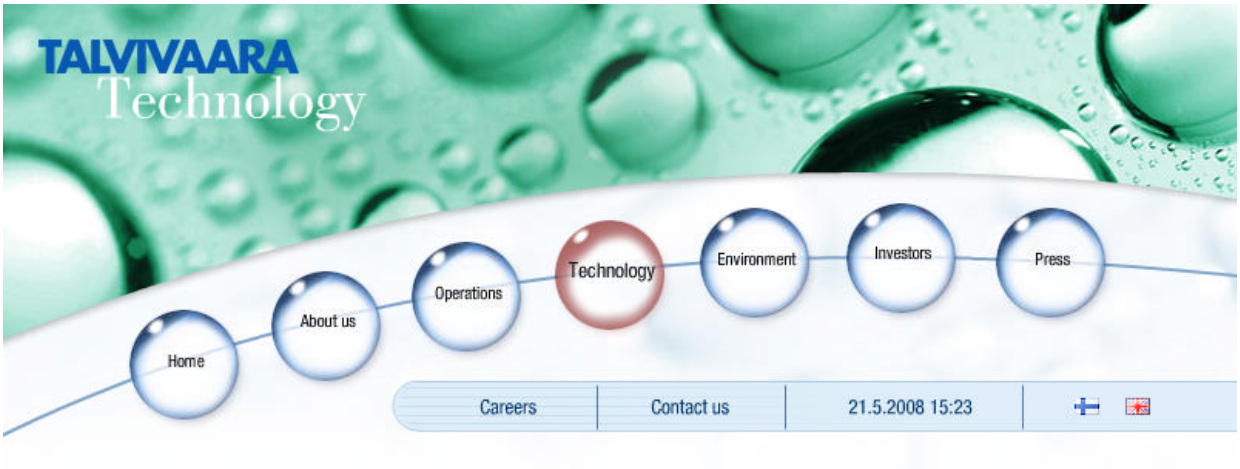
Mineral Resources Class	Mt	Ni%	Cu%	Zn%	Co%
Measured	**263.2**	**0.25**	**0.14**	**0.52**	**0.02**
Kuusilampi	201.3	0.25	0.14	0.52	0.02
Kolmisoppi	61.9	0.25	0.14	0.52	0.02
Indicated	**189.5**	**0.23**	**0.13**	**0.51**	**0.02**
Kuusilampi	114.9	0.23	0.13	0.53	0.02
Kolmisoppi	74.5	0.22	0.13	0.49	0.02
Inferred	**116.6**	**0.20**	**0.12**	**0.52**	**0.02**
Kuusilampi	75.3	0.20	0.13	0.47	0.02
Kolmisoppi	41.3	0.20	0.12	0.47	0.02
Total	**569.4**	**0.23**	**0.13**	**0.51**	**0.02**

The orebodies are well-suited for open-pit excavation due to a thin overburden and favourable resource

geometry. The deposits can be mined with an overall waste to ore ratio of approximately 1.5/l.

Mining, bioheapleaching and metals recovery techniques for the Talvivaara mine have been tested in a 17,000 tonnes on-site demonstration trial during 2005 and 2006. Construction of the mine is anticipated to start during 2007, with commercial production expected to commence in the fourth quarter of 2008.

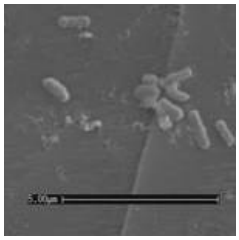
© Talvivaara 2007



Bioheapleaching

Bioleaching is a process, whereby metals are leached from ore as a result of bacterial action. In nature, bioleaching is triggered spontaneously by micro-organisms in the presence of air and water. Commercially applied bioleaching technologies utilize the same phenomenon, but accelerate this natural process. Several physicochemical and microbiological process parameters are modified in order to enhance and speed up the metal recovery process.

Typically, primary and secondary sulphides are associated with pyrite which, when oxidised, has the potential to release sufficient quantities of heat. The biological oxidation of the sulphide components of minerals is an exothermic reaction which releases substantial amounts of energy. This process needs to be carefully managed to maximise effective metal recovery. To reach and maintain the temperatures required for enhanced sulphide mineral leaching, different microbial populations are required to be present over time and the microbial growth rates need to be optimum.



The bacteria used in the Talvivaara bioheapleaching process are naturally growing in the ore. The bacteria are thus endemic to the area and therefore well adjusted to the prevailing environmental conditions.

Talvivaara's application of the bioheapleaching technology has its origins at the Outokumpu Research Centre, where it has been developed using the Talvivaara ore since 1987 under the leadership of Marja Riekkola-Vanhanen who is now employed by Talvivaara. Talvivaara is continuing the development at a laboratory scale with financing from the National Technology Agency of Finland, Tekes.

A pilot scale leaching trial with 110 tonnes of ore has also been carried out as part of the European Union sponsored Bioshale project, which studies the properties of black schist ores. This trial, run in a log column in Outokumpu, Finland, was successfully started in -20°C conditions in March 2005, thereby providing a strong indication of the applicability of the process in sub-arctic environmental conditions.

In summer 2005, a 17 000 tonne demonstration plant was constructed to the mine site. A representative ore sample was mined, crushed to 80 % -8 mm, agglomerated and built to an 8 m high heap. Irrigation of the heap started in August 2005. The pilot heap was inoculated with indigenous bacteria collected from the site. The amount of bacteria in the pregnant leaching solution has been in the range of 106 – 108 cells/ml. The bacteria involved are mesophilic and thermophilic. The start-up of the solution flow resulted soon in elevated temperatures of over 50 0C in the pregnant leach solution. The rise is due to the oxidation of the large quantity of pyrrhotite and pyrite in the ore. The elevated temperatures have also been maintained over the boreal winter conditions. Metal recovery was started in November 2005. In winter 2007 the heap was

reclaimed and the secondary leaching phase begun.

Combined, the trials with the bioheapleaching technology have provided Talvivaara with understanding on the key parameters of the process. One of the most important determinants of leaching rate is the particle size of ore. Other key factors include pH, temperature and rate of aeration.

© Talvivaara 2007

TALVIVAARA

Advantages of bioheapleaching

Bioheapleaching has been chosen as the preferred technology for the Talvivaara project based on its favourable capital and operational cost profile, favourable environmental profile compared to smelting and the good performance data obtained with the technology in several trials with the Talvivaara ore.

Bioheapleaching is a low cost process requiring only air, water and microbes to work. It also has lower capex and opex than traditional smelting and refining processes and it is a cleaner and more environmentally friendly process.

© Talvivaara 2007

TALVIVAARA

Recovery techniques

Talvivaara has recently developed its metals recovery techniques in collaboration with OMG, the nickel operations of which are now owned by Norilsk Nickel. To date, the methodology has successfully been tested in the laboratory and has also been pilot tested to enable the efficient design of production scale equipment. The methodology is based on a process which is currently being used commercially by OMG Kokkola Chemicals in Kokkola, Finland.

The first metal recovery pilot started in March 2006 at OMG, Kokkola, Finland. The product quality is high and recovery yields close to 100%.

Mining, bioheapleaching and metals recovery techniques for the Talvivaara mine have been tested in a 17,000 tonne on-site demonstration trial during 2005 and 2006. Subsequent construction of the mine is anticipated to start in 2007, with commercial production expected to commence in the fourth quarter of 2008.

In metals recovery, nickel, copper, zinc and cobalt are precipitated from the pregnant leach solution and filtered to produce saleable metal products. After the metals are removed, the solution is further purified and returned to irrigate the heaps.

The solution is collected at the bottom of the heaps and either recirculated through the heap or fed to metals recovery. In all, the technology is expected to result in lower capital and operational costs than a substantial proportion of other nickel mines making the Talvivaara project less susceptible to price variations of commodities.

© Talvivaara 2007