Compendium of Commercial Plants Designed and Built by H2GM Principals and Associates

1. **CCR Gold and PGM Refinery, Montreal**
2. **Chambishi COSAC & ISEP Plants, Zambia**
3. **Magnola Magnesium Plant, Danville, Quebec**
4. **Royal Canadian Mint Copper Removal Plant, Ottawa**
5. **Alberta Sulphate Carbonate Removal, Alberta**
6. **Kennecott Dust Leach Plant, Salt Lake City**
7. **Porters Grove Copper Powder, New Jersey, USA**
8. **5N Plus Solar Panel Recycling Plant, Germany**

Glencore (Noranda)

CCR Gold Plant

Montreal

GLENCORE CCR

GOLD AND PRECIOUS METALS PLANT

In the early 1980s, precious metal (Pd, Pt and Rh) inputs to the traditional, classical CCR gold refining process Refinery were increasing so as to make its operation impractical. New processes, entirely hydrometallurgical, were developed for refining gold to ≥99.99% purity, and for recovering silver and the precious metals.

The new refinery was engineered and built entirely in-house, and commissioned in 1985. It continues to operate today, and is capable of processing >1 million ounces of gold annually.


305


Perrin


306
401


406.675
226
401.175
826
999.9

Magnola Metallurgy

Magnesium Metal Plant

Danville, Quebec

MAGNOLA METALLURGY

MAGNESIUM METAL PLANT

Prior to the advent of electric vehicles, magnesium and its alloys were seen as the future way of improving fuel efficiency and reducing carbon emissions in the automotive industry due to its light weight. In the Eastern Townships of Quebec, there are literally mountains of asbestos tailings from the now-defunct asbestos industry. These tailings contain >20%Mg, and a process was developed to recover magnesium metal from them. Noranda (now Glencore) through its subsidiary Magnola (**Mag**nesium, **Nor**anda, **La**valin, the engineer and equity partner) subsequently engineered and built a 50,000 tpa plant at Danville in the Eastern Townships.

The plant operated successfully for three years. However, Chinese dumping of cheap magnesium caused not only Magnola, but also the Dow and Norsk Hydro N. American plants to shut down. The Chinese subsequently bought the plant and shipped it to China.


Magnola Metallurgy, Danville, Quebec

Rio Tinto Kennecott

Smelter Dust Leach Plant

Salt Lake City, UT

RIO TINTO KENNECOTT

SMELTER DUST LEACH PLANT

The Copper Electrorefinery at the Rio Tinto plant in Salt Lake City was experiencing increasing inputs of impurities, especially bismuth, causing off-spec copper to be produced. HG Engineering (HGE) were contracted to solve this issue, and as part of their team, in conjunction with Rio Tinto (UK) metallurgists, a site-specific process was developed to handle the bismuth. The process devised was based on work that had been carried out previously in both Zambia, and for the Noranda (Glencore) Horne Copper smelter.

HGE built the plant which has operated successfully, albeit on an intermittent basis as required.

Alberta Sulphate

Carbonate Removal Plant

Metiskow, Alberta

ALBERTA SULPHATE

CARBONATE REMOVAL PLANT

Alberta Sulphate was a solution mining operation, producing high quality sodium sulphate from the brine lakes in western Alberta. As the operation approached the end of its life, the carbonate levels in the brine began to rise to unacceptable levels. In order to prolong the operation, a process was conceived and developed wherein waste gypsum from a nearby operation was used to treat the brine to remove the carbonate and replace it with sulphate.

The development was successful, and a process plant was built and operated for several years which allowed the main plant to continue in operation until the deposit was mined out.

No publications or patents on this process were ever produced.

Anglo Vaal Mining

COSAC & ISEP Plants

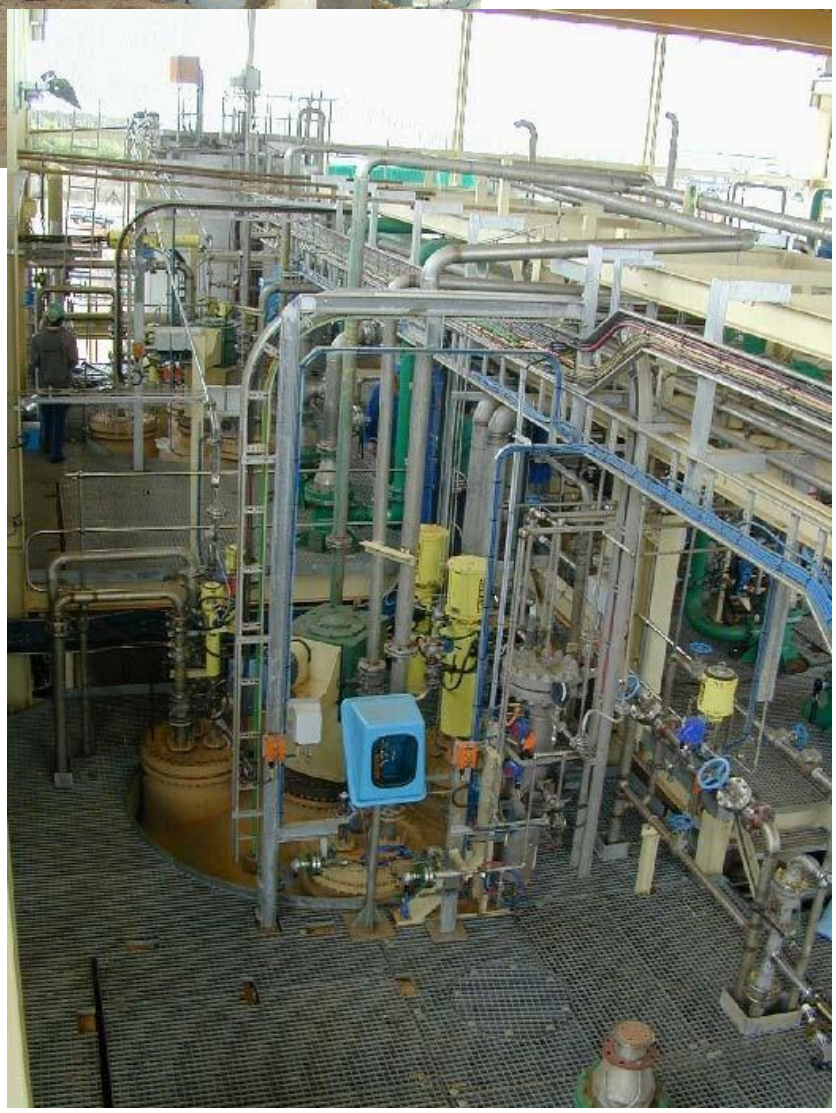
Chambishi, Zambia

ANGLO VAAL MINING

COSAC AND ISEP PLANTS, CHAMBISHI

The Chambishi Cobalt in Zambia was originally built in the mid-1970s. The plant was acquired by Anglo Vaal Mining in the 1990s, at which time its capacity was expanded through treatment of existing slag dumps which were rich in cobalt (COSAC). This was a novel process which had been originally conceived and piloted, but not implemented, for the nearby Nkana Cobalt Plant in the 1970s. Simultaneously, the cobalt tankhouse was expanded, and a novel nickel ion exchange removal process (ISEP) introduced, which had originally been developed at Noranda (now Glencore) in the early 1980s.

Chambishi Metals was acquired by Eurasian Resources in 2010, and remains one of the world's largest cobalt plants, with a nominal capacity of 6800 tpa.

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Porters Grove Metal Recovery Inc.

Copper Powder Plant

Bridgeport, Conn.

PORTERS GROVE METAL RECOVERY

COPPER POWDER PLANT

Copper electroplating operations generate spent electrolyte from which it is desirable to recover the copper. These solutions are generally dilute, which makes efficient recovery difficult. A process was developed wherein copper powder could be effectively and efficiently recovered from these spent solutions. A similar process was also developed at Noranda (Glencore) for the recovery of platinum and palladium powders.

A copper plant was built at Bridgeport in Connecticut, which operated for several years until the company went out of business. The precious metal plants were never built, since Noranda amalgamated with Falconbridge, which already had an operating PGM refinery in Norway.

Royal Canadian Mint

Copper Removal Plant

Ottawa

ROYAL CANADIAN MINT

SILVER REFINERY COPPER REMOVAL PLANT

The Royal Canadian Mint had purchased a new silver refining process from an overseas vendor. The process did not work as advertised, causing a large build-up of copper in the silver nitrate electrolyte, and severely compromising the refining of silver. A new process was developed, based on comparable chloride technology, wherein basic copper nitrate was recovered as an easily-filtered precipitate, with simultaneous recovery of high-strength nitric acid for recycle.

The process operated successfully for several years until the Mint abandoned the complete silver refinery due to other operational problems.

5N Plus

Solar Panel Recycling Plant

Eisenhüttenstadt, Germany

5N PLUS

SOLAR PANEL RECYCLING PLANT

In conjunction with First Solar at the time (2005/2006), 5N Plus was a producer of CdTe Solar Panels. The company wished to recycle spent panels, and commissioned the development of a process for doing so. A novel, highly-efficient process was developed, comprising a sulphuric acid leach, followed by selective ion exchange and electrowinning of cadmium. Tellurium was recovered from the IX barren solution by conventional SO_2 precipitation.

A plant was built, based on the designed process, by the Gütling Division of Veolia at Eisenhüttenstadt in Germany, and commissioned in mid-2007. The plant is still operating.

No publications were ever issued or IP filed.


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