

GORO NICKEL S.A., NEW CALEDONIA

Electrical safety in a modern nickel smelting plant

Goro Nickel is a world-class mining project and a key part of Vale Inco's growth strategy. It is located on the South Pacific island of New Caledonia, an overseas territorial community of France. Goro is among the largest undeveloped laterite orebodies in the world, with excellent average grades,

55 million tonnes of estimated measured and indicated mineral reserves, and a very large resource base. The expected annual capacity of the Goro Nickel project is 60,000 metric tonnes of nickel and 4,300 to 5,000 metric tonnes of cobalt.



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TECHNICAL APPLICATION



►►► **The Goro Nickel project** brings positive socio-economic benefits to the people of New Caledonia. The project has generated approximately 800 jobs directly and many more during the construction phase, a significant number in a territory that has an overall population of about 230,000. It will also provide major long-term opportunities for local businesses and a stronger economic base for New Caledonia.

A hydrometallurgical process is used to extract the nickel and cobalt from the ore. This is the only technology which is suitable for profitably processing laterites with low nickel content. Up until now, such laterites have not been mined from the Goro plateau. Goro Nickel will therefore produce nickel at a low cost and contribute significantly to increasing exploitable resources in New Caledonia.

The project comprises the following:

- An open-cast nickel and cobalt laterite mine
- An ore processing unit
- A processing plant which will use a hydrometallurgical process which has been developed by Inco
- Equipment for processing liquid and solid residues
- A safe system for the storage of neutralised solid residue
- An innovative and safe system for the disposal of effluent at sea, when neutralised
- Accommodation facilities for workers
- A training centre at the pilot plant
- A port on the east coast of Prony Bay
- A coal-fired power station
- A plant nursery responsible for the replanting programme.

From the beginning the Bender representative Ebbco Ltd. has been involved in designing and implementing multiple insulation monitoring and insulation fault location systems. Specifications were vague and not favoured towards a Bender system. Hard work and perseverance prevailed. Finally the Bender insulation fault locator EDS470 was accepted as the preferred option.

The electrical needs of the plant is supplied by a purpose built 65 MW coal-fired power station while it also has its own 2 x 20 MW oil-fed generators. It needs about 65 MW of power of which 45 MW is delivered by the power station whereas the other 20 MW will be generated via co-generation from the washing plant. The oil-fired boiler plant onsite is used for heating up water and sulfuric acid needed for the



Two of three monitors in operation

washing process. After this process the steam is used for co-generation producing about 20 MW of power. The main voltage for running the plant is a 690 V 3 phase unearthed (IT) system. The control system voltage is an earthed 230 V single phase system.

The complete 690 V 3 phase system is powering up more than 1300 motors, about 450 VSDs and the rest as DOL starting motors. A total number of 32 insulation monitoring devices IRDH575B2-435, 122 insulation fault locators EDS470, 1309 core balance CTs with a variety in dimensions are used and spread over 27 individual switchboards. All information from the EDS470 systems is sent via 40 FTC470XMB units to a DSC. A portable EDS3065 unit is also used for pinpointing faulty loads if more than one motor circuit is connected to the outgoing circuit.

The biggest switchboard has 7 interconnected bus sections and is fed from 3 individual 1.5 MW transformers (11 kV/690 V). It is monitored by a total number of 3 IRDH575B2-435, 4 FTC470XMB, 23 EDS470-12 units and 196 connected CTs.

The switchboard can also be configured, during an emergency situation, to feed two other large switchboards with multiple bus configurations to which essentially needed loads are connected to.

Ongoing training has been given to 45 electrical plant operators and maintenance personnel. A training program specially written for this purpose has been implemented both in English as well in French.

By using permanent insulation monitoring and insulation fault location systems the cost of maintaining such a large plant will be considerably reduced, the availability and safety of both plant and personnel increased significantly and conditions for compliance with accident prevention, regulations and guidelines applicable in the location of use have been met – all of which are typical advantages of Bender safety solutions. ■

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Area 350 switchboard room



Inside Area 350 switchboard room



Practical training



Theoretical training