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MINERALS

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CORPORATE BROCHURE



Dry mining in the desert

When the Canadian/Australian minerals company Equinox Minerals Limited ventured into Saudi Arabia, it knew little about the region. Just a few months on it's becoming clear that it made the right decision, though, as Robert Rigo, vice president of project development, told John O'Hanlon

It's not surprising that the kingdom of Saudi Arabia has neglected its mineral resources over the last 20 years: oil and gas have adequately provided for its needs. However geologists have long known that there were deposits of interest under the Saudi desert. All mining activity was controlled until some five years ago by the Saudi Arabian Mining Company (Ma'aden), but in 2005 the government decided to open up mineral leases to private operators.

At that time a local company, Bariq Mining Limited, acquired a number of leases including the Jabal Sayid concession, about 200 miles inland from the port of Yanbu on the Red Sea. In order to develop the project, Bariq entered into a joint venture with Citadel Resources Group, a company listed on the Australian Stock Exchange.

Then, in 2010, Equinox Minerals Limited arrived on the scene. Equinox is an international mining company, dual listed on the Toronto Stock Exchange and the Australian Securities Exchange. After developing it for a decade, Equinox was gaining a healthy cash flow from its Lumwana copper mine in Zambia, one of the largest new copper mines to be developed anywhere in the



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SNC-Lavalin

The Jabal Sayid Copper Project is located some 350 miles north of Jeddah, Saudi Arabia, and is owned by Bariq Mining Limited (subsidiary of Equinox Minerals Limited). SNC-Lavalin successfully delivered the Feasibility Study for this project in 2009, which was converted to full EPCM during 2010.

The underground mine will produce 2.6mtpa of ore to yield 60ktpa of copper in concentrate to be transported for sale internationally. Up to 1,000 people will be on site during project construction. Once operational, the mine will employ around 500 people over its expected 20 year life span.

SNC-Lavalin is engineering the project from its Brisbane and Al-Khobar offices and appreciates the opportunity of working with Equinox Minerals Ltd to successfully deliver the Jabal Sayid Project.



world, which processes about 20 million tonnes of copper bearing ore per year. Equinox was looking to spread its risk, and was keeping its eye open for opportunities in other regions.

Equinox had no previous experience nor indeed any significant knowledge of Saudi Arabia, admits project director Robert Rigo. However, it acquired Citadel and took over Jabal Sayid, along with a number of other Saudi tenements, in a process that was completed in January 2011. The deal was financed using Equinox shares and cash resources, says Rigo. "There was still a fair amount of geological survey work to be done on the other leases but the mine at Jabal Sayid was commercially viable based on our copper price projections. And we felt there were also additional exploration possibilities in and around that mine."

Saudi Arabia has advantages for overseas investors over and above its geology. It has a very attractive tax regime and development costs are lower, thanks to the availability of cheap fuel. This allows diesel-run power stations to be established, so power is relatively cheap. "You do have to import quite a lot of machinery but once it is landed the cost of transportation is reasonable. There is a lot more infrastructure than we had appreciated and very high quality infrastructure too—the roads, ports and telecoms systems are first world quality." It is a lot different, he says, from central Africa in these respects.

With the acquisition of Citadel, Equinox inherited a 70 per cent share in the local JV partner Bariq Mining Limited and expects to have acquired the remaining 30 per cent by the end of March 2011. Bariq is the local operating company, and contracts are in place with the Australian mining specialist Byrnegut for the underground work, and the engineering and construction group SNC-Lavalin for the surface facilities and mill. "These are experienced partners with excellent teams," says Rigo. "Byrnegut has been present on the site since October 2010 and is bringing in equipment and manpower ready to develop the mine and start producing ore from November this year."

The initial feasibility study was collated by the Australian branch of SNC-Lavalin, a Canadian company, and this subsequently migrated, he says, into a fully fledged EPCM contract. "The SNC-Lavalin team is now close to finishing the design of the project from an engineering perspective—they are scheduled to finish that by the end of April 2010, using a mixture of Canadian and Australian personnel, augmented by Saudi engineers." Installation work, he adds, has been carried out exclusively by local subcontractors, reflecting Saudi Arabia's sophisticated engineering environment based on its oil and gas industry. "The plant should be largely constructed by the end of this year with a dry commissioning commencing in January and ore being fed into the plant by the end of Q1 2012."

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“The concentrate is very clean and contains some gold and silver credits, which makes it attractive to the international smelting community”

The mine will produce a standard 25 to 28 per cent concentrate that will be trucked to Yanbu, from where it can easily be shipped into Equinox’s key markets of India, China, Korea and even Japan. “The concentrate is very clean and contains some gold and silver credits, which makes it attractive to the international smelting community,” says Rigo.

The mine operations are fairly standard—with one exception. Water in Saudi Arabia is a sensitive issue and the options used in Australia and even Zambia—damming watercourses or in arid areas sinking boreholes—were not available. At Jabal Sayid, water will be recovered from both the concentrate and the tailings by the filtration process, Rigo explains. “We will crush, grind and then float the copper mineral which is contained in a slurry that’s filtered to produce copper concentrate. The tailings will be



Peaks Construction & Maintenance Co. Ltd. is a specialized contractor for infrastructure and civil work, and is a leading designer and manufacturer of pre-manufactured buildings.

The company has in-house engineering capabilities for designing permanent villages and living communities with various buildings such as houses, clubhouses, kitchens and dining halls, clinics, mosques, site offices and all outdoor recreational facilities such as swimming pools, basketball/football and tennis courts. PEAKS also specializes in all utilities required such as: water, sewer, power, telecommunication, security and access control systems, perimeter and street lighting as well as perimeter fencing.

Support for all the company's projects comes from the following fully integrated internal departments: project management, engineering, procurement, finance and accounting, human resources, and the equipment department.

All pre-manufactured buildings are done in the company's factory located in Rabigh, Jeddah.

Currently in Jabal Sayid, the company is working with Bariq Mining and SNC-Lavalin on 4 packages to kick-start the copper mining development in the area.

The 4 packages include:

- 1 The Bulk Earthworks and Road works
- 2 The Permanent Village that will accommodate more than 700 personnel who will be operating the mine and the copper refinery plant
- 3 The Site Mine Buildings and plant facilities that include (but not limited to): Bariq and Contractor offices, First Aid/Mine Rescue building, Plant warehouse and workshops, crib room, lamp room, change house & laundry building etc...
- 4 The Perimeter Fencing of the complete site.

classified to produce a coarse sand and fine sand product by 'cycloning' (rather than being pumped as a slurry into a tailings dam) and then filtered, with the coarse sand being used in backfilling the mine and the fine sand tailings being dry stacked in the tailings 'dam'. Every ounce of water we can recover is important, because it is such a scarce commodity here," Rigo insists.

As a result, Jabal Sayid will use a third of the water normally required to process copper ore. The plant will still need to use a large quantity of water though—and using the traditional wells of the surrounding communities was never an option. The solution was unusual, perhaps unique. Equinox has a memorandum of understanding with the city of Medina to take a proportion of the 'grey' water discharged from the municipal water works there. Initially this water will be taken the



150 miles to the site by truck; however a feasibility study is underway to see whether a pipeline can be built. "We are very conscious that we need to build our presence here on a sustainable and environmentally responsible basis," says Rigo. What could have brought the plant into conflict with the community has been turned into a positive story.

The same is true of human relations. As far as possible, recruitment is taking place within communities close to the plant. This means taking on people who don't know much about mining, but Equinox is not afraid to commit to training,





Diemme Filtration

Diemme Filtration was engaged to provide one concentrate filter (GHT1500) and two tailings filters (GHT2000) for the Jabil Sayid project. Each filter press employs four (4) hydraulic jacks working in tension to close the plate pack, ensuring reliable operation throughout more than 80 cycles per day. The tailings filters have the highest production capacity of any units currently installed in a similar application. www.diemme-spa.com/filtration

whether that's on the job, in the classroom, or even at Saudi colleges and universities. In addition, apprenticeship-type programmes for electricians and fitters and other trades are being prepared.

There are advantages to taking on people who

have had no chance to learn bad habits, Rigo points out. Already, the directly employed members of staff know that wearing hard hats and protective boots is non-negotiable. It is a little harder to create a culture of safety among subcontractors, though Equinox is working with them and they quickly learn that they won't be allowed onto the site unless they are properly equipped and trained.

Of course, cultural considerations cut both ways, and a number of burly Australian and Canadian engineers and miners have had to come to terms with life unsustained by alcohol. Once they get over the initial shock, they begin to see the benefits in safety and efficiency, says Rigo: "You can have a sensible conversation any time of the day, nobody blows a shift and the overall demeanour of the workforce is more respectful and dependable. I have become an advocate of a dry camp!" <http://www.equinoxminerals.com/>

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