

# **Canada's First Diamond Mine Starts Production**

## **Ekati Mine's Remote Site Challenges Builders**

Canada's first diamond mine started production in October 1998 and is currently ramping up towards full production scheduled for March of 1999. The mine, located near Lac de Gras, 340 kilometers northeast of Yellowknife, was not only a huge construction project but also represents the beginnings of a whole new industry for Canada.

Diamonds are perhaps matched only by gold in their allure and the discovery of diamonds in the Northwest Territories generated intense interest that spread far beyond the mining community. The original discovery in 1991 sparked a "diamond rush" that became the largest mineral staking rush in North American history.

The lure of mineral riches that drew people to the Klondike or the Cariboo earlier in Canada's history, was at work in the Territories diamond rush. Helicopters, snowmobiles, all terrain vehicles and sophisticated geological technology may have replaced the pick and shovel equipped miner of the 1800's, but there is no denying that the discovery of diamonds lent a new level of excitement to the normally businesslike Canadian mining scene.

Diamonds may be romantic but it quickly became apparent that developing the country's first diamond mine would be a massive industrial enterprise. There would be no plucking of multi-carat gems from the surface - what would be required was a nearly billion dollar investment in an open pit mine that would excavate and process thousands of tonnes of rock for every handful of diamonds. That huge investment would be required to marshal the mining, engineering and construction expertise to create a major industrial installation on a treeless, lake-dotted tract of permafrost.

The scale of the development ruled out any players except those from the big leagues of the mining industry. For this discovery, the heavy hitter to step forward was the Australian mining giant, BHP. With 60,000 employees working in more than 50 countries, and a mining heritage dating back to 1885, they were one of the few companies able to take on a project of this magnitude. To turn the discovery into an operating mine, an entity called the NWT Diamonds Project was created. It is a joint venture of BHP (51%), and the Blackwater Group (49%), consisting of Dia Met Minerals Ltd. and Charles Fipke and Stewart Blusson, original discoverers of the deposit.

## **Location, Location, Location**

The development of the mine was one of the largest Canadian construction jobs of the 1990's. For that reason alone, it is interesting, but when one considers the mine's location, it is a truly remarkable project. Canada's has many places that can be called the

middle of nowhere but the location of the diamond discovery surely has one of the best claims to that title. The site is on the barren lands of the Northwest Territories, 100 kilometers north of the treeline. The nearest civilization? - the Dogrib community of Snare, 180 kilometers southwest. Road links? - there aren't any. Vehicle access is possible only during the 2 ½ to 3 month period when a temporary winter road is put in place.

The task facing the mine's developers was to build on this site all the facilities required to mine a projected 508 million tonnes of waste rock to get at and remove the diamonds from approximately 78 million tonnes of kimberlite ore. Those facilities include a processing plant housed in a building the size of two football fields, 17,600 KW of power generation capacity, an airstrip capable of handling 737's and accommodations for a peak workforce of nearly 1,000 people.

The development of the mine would be a challenge even if it was located close to major road and rail links in southern Canada. The remoteness of the site multiplies all the normal problems associated with a construction project.

Graham Nicholls is Manager of External Affairs for BHP Diamonds. When asked what was the most difficult part of the project, he replies without hesitation, "Logistics! The availability of transport was dictated by the winter road and that had a big impact on scheduling."

Scheduling is a critical part of any construction job but for this project, it was everything. Material delivery had to meet the brief window when the winter road was open. Anything that didn't make that window, didn't make it to the site unless it could be flown in on a Hercules transport plane.

With the huge amount of materials the project required, properly coordinating deliveries via the winter road was critical. Over 2,000 truckloads per season came in on the winter road from the staging point in Yellowknife. That included some 150 pieces of mobile equipment headed by the 218 tonne mine haul trucks and that are teamed with a giant Demag excavator. All the materials to build the accommodation complex, process plant, power plant, offices, water supply system, truck shop and ore storage facility had to be procured and delivered according to the availability of that 475 kilometer stretch of winter road to Yellowknife. (Keep in mind that just getting materials to Yellowknife itself is no simple task.)

Just two of the mines key materials requirements, diesel fuel and ammonium nitrate explosives, illustrate the logistical challenge of operating a mine at this site. Annual diesel fuel requirements are estimated at 50 million litres, representing 2,000 tanker truck shipments. Twelve thousand tonnes of product are required to fully stock the mine's ammonium nitrate storage building. Some simple arithmetic reveals that, at 50 tons a load over a road that may be open for less than 90 days, just supplying the mine with explosives is a major transportation effort.

Even with the massive movement of materials over the winter road, air transport was an indispensable part of the NWT Diamonds Project. The project's Koala Camp was a busy air hub throughout construction with up to 300 Herc trips per month. The June 1996 to June 1997 period saw some 15 million pounds of material arrive on site by air. Manning the job meant flying 17,000 passengers into camp in a one year period via regularly scheduled flights from Edmonton and Yellowknife.

## **An Open Shop Project**

With total construction costs at 700 million dollars, the Ekati Mine certainly qualifies as a major construction project. This job was completed as an open site with a variety of non-union and union contractors. For many industrial projects of this size in western Canada, owners have opted to sign union-only project agreements with the Building Trade Unions.

When asked why BHP did not choose that route, Graham Nicholls explains that for BHP the labour relations set-up of their contractors is of little concern. "We simply put the work out to tender, union or non-union is not a critical issue. We just want to get the best possible bid". Construction fell under the responsibility of an engineering consultants (H.A. Simon). They put work out to tender on a package by package basis. On the project there were a half dozen major contractors and more than 20 smaller outfits.

Yellowknife based Nishi-Khon/PCL Constructors were among the first contractors on site, starting work on the ore sampling facility in early 1994. NK/PCL is a joint venture of PCL Constructors Northern and an aboriginal (Dogrib) business entity, Nishi-Khon Constructors Ltd. Work on the bulk sampling was followed by a design-build contract for the accommodation complex and later a drill/blast contract for mine pre-stripping work.

Glen Tetarenko, NK/PCL's Construction Manager says that their first major contract was challenging right from the start, "It was a 24 hour a day, 7 day a week, fast track schedule. Immediate and full mobilization by air took place during the harshest weather experienced during the whole construction period."

BHP's expectations from the contractors were clearly defined explained Tetarenko, "Safety, northern and aboriginal participation along with quality construction were the three major client objectives". Meeting those expectations required some creativity and flexibility on the part NK/PCL as general contractor, such as suggesting to four Yellowknife mechanical companies that they form an alliance in order to have an opportunity to bid on some of the larger sub-contracts. PCL's fifty plus years of experience working in the NWT also helped to ensure that the joint venture was able to exceed BHP's northern and aboriginal participation targets. Tetarenko says that, "The Open Shop process also contributed to maximizing employment within the region. These type of projects don't come along every day and it's important to ensure that local firms and personnel gain first opportunities when they do materialize".

Tetarenko calls NK/PCL involvement with the mine, “Very successful and rewarding”, and says “The group is definitely preparing for the next proposed diamond mine development.”

Edmonton and Yellowknife-based Clark Builders had a major contract, building the truck shop and power plant. Company President Bill Giebelhaus reports, “This was a good job for us. It was a well-run project and the owner was very sensitive to the special conditions that go with a northern job.” Questioned about staffing a big job on a remote site he says, “We worked hard at sourcing people and were very satisfied with the crew we put together”. His company has some 25 years experience with construction in the north and although this was one of their biggest jobs he says, “The northern hire process worked pretty well and we were able to meet the owners goals”.

Ledcor Industrial was responsible for a large portion of the construction work. Their contract included the process building, ore storage building, explosive storage and mixing facilities, a tailings and water pipeline and even a bridge, one of the most northerly in the country. Their staff echo the positive reviews of others involved with the mine. Don Ellis, Ledcor’s construction manager rates it as, “an extremely successful job.”

Before the project started, many in the construction industry expressed concerns about availability of tradespeople. Ellis reports, “Manpower wasn’t nearly the problem everybody had perceived it to be.” Ledcor’s on-site workforce peaked at 400 and they also report a good experience with northern and native hiring.

In choosing contractors, Graham Nicholls says the criteria they use are price, experience, expertise and quality of construction methodology. The contractors also must abide by BHP’s requirements for the site. For this project, that included a commitment that the owner had made to allow maximum participation by northern residents and aboriginal people as well as some very stringent environmental and safety requirements.

When asked to assess the results, Nicholls answers reflect his pride in the project, “On schedule and within budget, this was a good job!”. On safety, he says, “Our safety record stands for itself”. He explains that safety has been a top priority on the project and that they were able to achieve an excellent lost time accident rate, at one time reaching one million man hours without a lost time accident. On northern content he says, “We exceeded our targets in northern procurement and in aboriginal employment.” Overall, he says, “Our approach to contracting is successful”.

Knowing the challenges of this project, few could fail to appreciate why BHP’s people and everyone involved exhibit considerable pride in what they have achieved. This was an undertaking in the mega-project category. It’s northern location brought all the complications that severe climatic conditions impose on the construction process. The extreme remoteness of the site added huge logistical problems to project planning and scheduling issues that are already difficult for a job of this scale, no matter where it is located. Outside of purely construction issues, there were challenges regarding stringent

environmental controls and the need to maximize involvement of the people of the north. Add in some details, like the fact that the kimberlite pipes end in surface depressions that are occupied by lakes that must be drained before mining can take place, and it is easy to appreciate what was accomplished in bringing Canada's first diamond mine to the production phase.

## **Canadian Diamonds Reach the World Market**

The mine is now moving towards full production, a process that involves a substantial training effort and a fairly steep learning curve for the entire staff. The diamonds will go to a facility that BHP is establishing in Yellowknife where the stones will be sorted and valued. The next stop is a sales office in Antwerp, Belgium, which is the center for the world diamond trade. From there, they will be dispersed to diamond buyers all over the world. The appearance of a gem stone on someone's hand in Israel or India or France, may be the ultimate end to this process.

One can't help but wonder if these customers will understand that their glittering bits of carbon came from beneath a tundra lake in Canada, from a place so remote that for thousands of years it was home to nothing but ptarmigan and arctic foxes and wandering caribou, or if they will have any inkling of the massive effort and expense and the work of hundreds of people that are responsible for bringing them these jewels.