



# The Unique Facets of Diavik

Canada's Premier Diamond Mine



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THE UNIQUE FACETS OF DIAVIK  
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Photography: Jiri Hermann  
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Cover: Gem-quality rough Diavik diamonds – the brilliant light of Canada™.  
A 4.17-carat Diavik diamond princess cut by D.D. Manufacturing of Antwerp. Clarity VS2. D colour.

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## VISION STATEMENT

Diavik's vision is to be Canada's premier diamond producer, creating a legacy of responsible safety, environmental and employee development practice and enduring community benefit.

## VALUES AND PRINCIPLES

We treat ourselves and all those with whom we meet and work with dignity, consideration and respect.

We are committed to active partnership with local communities, businesses, governments and non-governmental organizations.

We are dedicated to meeting the needs of our customers and to contributing long-term value to our investors and to the North.

We strive for excellence in all we do.

*For centuries,*

*people of the North have used the resources wisely.*

*...Diavik is continuing this tradition.*

An aerial photograph of a vast, flat tundra landscape in Canada. The terrain is a mix of light-colored soil and patches of dark, low-lying vegetation. A winding road or path cuts through the landscape. In the lower-middle section, there is a small cluster of buildings, including a large, multi-story structure with a flat roof, possibly a government or military installation. The sky is overcast with soft, diffused light.

No one **spirit** can know all the  
**mysteries**  
of the vast and beautiful *Canadian tundra*

# Diavik's Many Facets

The vast Canadian tundra, rugged and beautiful, is a land still largely undiscovered. Hidden beneath these misnamed 'barren lands' for millennia, lies another undiscovered beauty – diamonds. In the early 1990s, news leaked out about a diamond discovery at Lac de Gras, a remote lake northeast of Yellowknife, the capital city of Canada's Northwest Territories. • Early on the scene was a determined Canadian exploration company named Aber. In partnership with Kennecott Canada, a subsidiary of global mining company Rio Tinto, the Diavik team began the difficult process of finding diamond deposits. By 1995, success was at

hand, with four attractive diamond deposits identified under the waters of Lac de Gras. Through subsequent focused community consultations, a comprehensive environmental assessment, and a challenging engineering feasibility study, a new company called Diavik Diamond



Mines Inc. built the foundation for a new mine. A mine that would be different by all counts, from its close relationships to local communities, to its stringent work in protecting the environment, to its world class and innovative engineering ...a premier diamond mine. • In early 2003, construction of the Diavik Diamond Mine was completed, ahead of schedule and under budget. Soon after, Diavik Diamonds™ were being sold to the world. This book celebrates not only the many special facets of Diavik but also the work of thousands who envisioned, constructed, and now operate what Diavik hopes will become Canada's premier diamond mine.

*challenge*

*strength*



*Nature's* gems  
from deep

*within the* **EARTH**



# Born in Fire



Diamonds, nature's hardest gems, were forged by heat and pressure deep within the earth where they would have remained for eternity were it not for another of the earth's powerful forces – volcanization.

A mere fifty-five million years ago, kimberlite magma erupted from the depths collecting its diamond treasure as it moved toward surface. Diamonds which are hauntingly clear, many preserved in their much desired crystal shape, sharply edged, and octahedral – a hallmark of Diavik diamonds.

*magma*

Over eons, nature gently weathered the exposed, hardened rock; titanic ice sheets scattered its minerals. In the final glacial retreat seven thousand years ago, detritus and meltwater covered these ancient volcanoes hiding the diamonds once again.

It would take considerable fortitude, finesse, and technology to find the formations, called kimberlite pipes, which contain Diavik diamonds.

*crystallized*

An aerial photograph of a research station in a high-altitude, mountainous landscape. The terrain is rugged with rocky peaks and sparse green vegetation. Several bright blue lakes are scattered across the landscape, some nestled in valleys and others on higher ground. In the foreground, a cluster of white tents and yellow equipment is visible, indicating a field camp or research station. The overall scene is desolate and remote.

The search  
*continues*

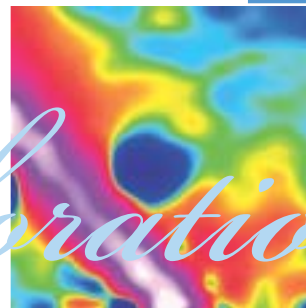
# Finding the Buried Treasure

*tools*

Soon after diamonds were discovered in the Lac de Gras region of Canada's Northwest Territories, Canadian exploration company Aber set out to stake claims in the dominion's remote reaches. Backed by Rio Tinto's Kennecott Canada Exploration, the painstaking search for kimberlite, diamond host rock, intensified. Using a variety of tools, from geological mapping to geochemical sampling, to airborne and ground-based geophysical surveys, the treasure's trail became clearer. Then, a spectacular two-carat rough diamond, found in a core sample, hinted at the trove.

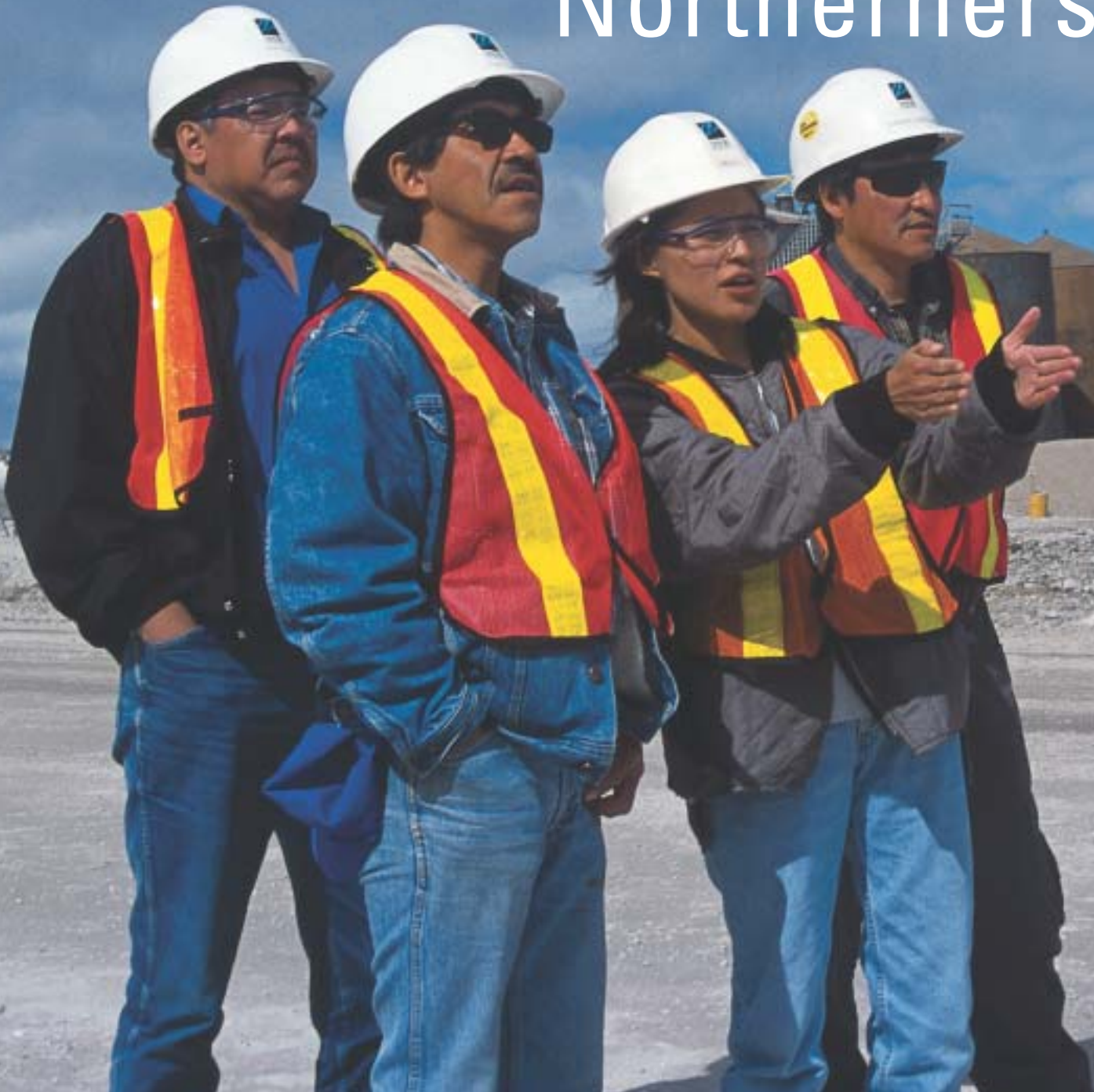
By 1995, the exploration team, facing frostbite in winter and relentless swarms of insects in summer, had discovered four kimberlite pipes meriting more investigation. After significant sampling, including mining a several thousand tonne sample, the Diavik team confirmed them economic.

And like the two-carat stone's hinting, could these four kimberlites also be a sign? Exploration work continues on Diavik's vast claim in hopes of adding to the already rich resource.



*exploration*

*working* with  
Northerners



# Community Participation

Diavik is a guest in a land where Aboriginal people assert a presence dating back several centuries. Key to the way Diavik works is its strong, open, and respectful relationship with local Aboriginal groups.

Agreements with local neighbours – the Dogrib Treaty 11 Council, Yellowknives Dene First Nation, the North Slave Metis Alliance, the Kitikmeot Inuit Association, and the Lutsel K'e Dene Band – address training, employment, and business opportunities. Local community and Aboriginal participation plays a major part in making Diavik a leader in community relations in Canada's resources sector.

Diavik considers local traditional knowledge significant and this knowledge is used wherever possible. Examples include mine footprint and design, and a unique fish study combining traditional and scientific knowledge.

Diavik foresees creating a legacy where local communities reflect on Diavik as a cornerstone of sustainable development – having protected the environment, improved social well-being, and generated economic prosperity.



*respect*

The *A r c t i c*  
fragile and extreme  
care and *a t t e n t i o n*



# Caring for the Environment

The Arctic – fragile and extreme – requires special care. Well in advance of mining, Diavik began its comprehensive baseline studies and environmental assessment. Knowledge gained about the environment, combined with northern needs and concerns, was integrated with mine design.

*protect*

For Diavik, the environmental assessment, begun in 1994, was an opportunity to build trust locally. Communities stressed that the land, water, and caribou be protected. Diavik began by collecting comprehensive baseline data on fish and water, wildlife, vegetation and terrain, air quality, heritage resources, and socio-economics, from scientists, engineers, community residents, and elders.

*water*

Diavik's health, safety, and environmental systems are of the highest standard.

And Diavik will ensure the land is returned as close as possible to its original use, with reclamation taking place progressively, throughout mine life.

*land*

Diavik is proceeding with sustainable development in mind – an approach echoing local Aboriginal wisdom and one reflected in its credo: For centuries people of the North have used the resources wisely. Diavik is continuing this tradition.



*wildlife*



*safety*  
*training*



# Protecting our Workers

The true wealth of Diavik's clean, pure diamonds includes a strong approach to health and safety.

Diavik is among the safest mines in Canada and across Rio Tinto's global mining operations. To maintain this high standard, Diavik analyzes risk, sets stringent safety standards, and measures performance with a goal of zero injuries.

When Diavik reviews its annual performance, safety has pride of place.

Initiatives include: safety management audits, hazardous materials, first-aid and emergency response training, an emergency response team, and a medical aid facility. In addition, Diavik provides an employee and family assistance program and is developing occupational health and wellness programs.

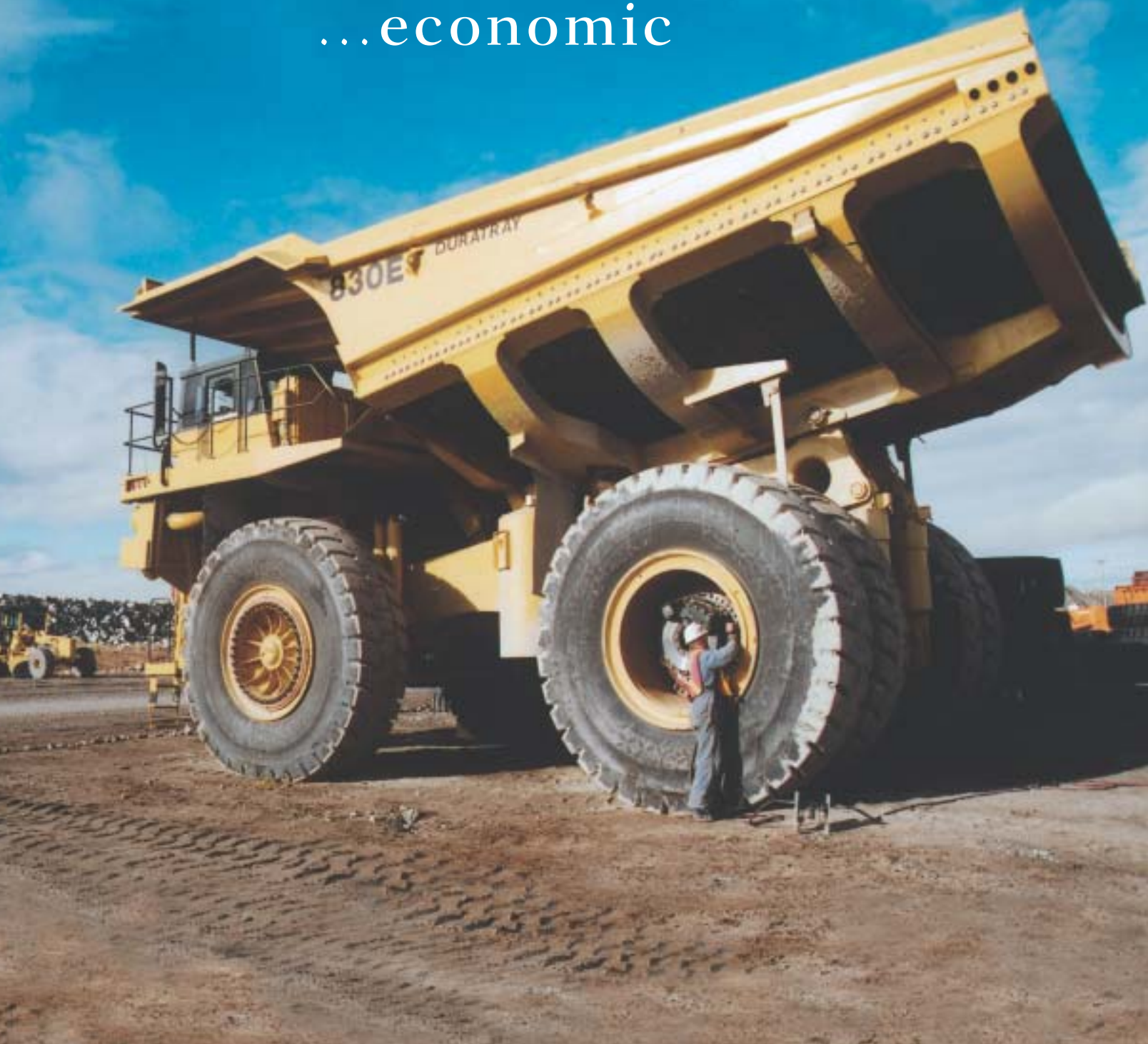
Every member of the Diavik team is empowered and involved to ensure the health and safety of all.

*prepared*

*safety*

*assistance*

...employment...*business*  
...economic



# Providing Significant Benefits

Diavik is a significant contributor to Canada's northern economy.

*surpassing*  
Several hundred people built the Diavik Diamond Mine under budget and ahead of schedule. Employment exceeded forty per cent northern, surpassing Diavik's commitment. Nine hundred million dollars in contracts went to northern firms, doubling Diavik's goal. Two thirds of the northern spending – six hundred million dollars – was with northern Aboriginal joint ventures and northern Aboriginal firms, an achievement never before reached in Canada.

Diavik is continuing to add wealth to the North. In operations, local benefits remain strong. Three quarters of the workforce of nearly seven hundred are northern and Aboriginal. Approximately two thirds of the two hundred million dollars spent annually on goods and services and labour contracts is northern.

In addition to providing significant benefits to the northern economy, Diavik estimates it will contribute approximately four billion dollars to governments, nearly half of the value of the diamonds in the ground.

*commitment*

comprehensive

# training initiatives



# Training for the Future

Each phase of the Diavik Diamond Mine offers training opportunities for the communities of this remote region of Canada.

The environmental assessment phase, presented the project's first training opportunities.

Then, during construction, training evolved to something uniquely northern through partnerships with communities, contractors, colleges, and governments. Twenty courses were conducted, the majority being delivered in northern communities. Results were unprecedented as graduates improved community infrastructure and gained self-confidence.

This initiative alone, in no small part, helped Diavik exceed its northern construction employment commitment.

Now in production, Diavik's training efforts centre on site-specific skills, training workers for safe productive employment using Diavik's equipment and new technologies.

Diavik's training program is strong and multi-faceted. It is a combination of business unit and individual professional development, community-based training, and site trades and technology training, with a unique workforce learning centre and scholarships.

Diavik's training approach is transforming resource value into riches which are often difficult to measure – knowledge. A legacy that will outlive the mine.

An aerial photograph of a coastal region, likely in the Arctic. The foreground features a large, dark island with a complex network of roads and a prominent, winding road that forms a loop. The island is surrounded by a vast expanse of water, with numerous smaller, lighter-colored islands and peninsulas scattered throughout. The sky is filled with soft, white clouds, and the overall color palette is dominated by blues, greys, and whites.

DIAVIK'S  
*island home*

# Ek'adi

Ek'adi, or Fat Island in the Dogrib Dene language, was named for the veins of quartz which criss-cross the land and resemble the fat in caribou meat. Ek'adi is a twenty square kilometre island comprised of bedrock outcroppings, glacial deposits of boulders, till, and eskers. The area is home to arctic hare, ground squirrel, arctic fox, and ptarmigan. Members of the Bathurst caribou herd migrate nearby. Vegetation is abundant but small, and includes dwarf birch, Labrador tea, and bearberry.

Man too has visited Ek'adi. Archaeological evidence, quartz chips known as flakes, suggests the island's early Aboriginal visitors quarried pieces of this most abundant of nature's minerals, fashioning it into tools.

Centuries later, Diavik has followed in the Aboriginal quarryman's footsteps, this time quarrying rock from the island to build a mine at an island called Ek'adi.

*Fat Island*

*Cutting edge* processing  
Comprehensive *water* management  
*Fuel* efficiency





# The Fore of Technology

Diavik's technology makes for a powerful example of a leading edge mine.

Near the Arctic Circle and self-contained, the Diavik Diamond Mine needs a significant amount of diesel fuel for equipment, heating, and power – about fifty million litres annually. To ensure efficiency, a recovery system heats water for ore processing and glycol for buildings. The system doubles power plant efficiency and minimizes emissions.

In the process plant, high angle conveyors reduce the plant's footprint; operators oversee all ore circuits on-screen. And diamonds are freed from waste rock through a gravity-based, non-chemical process where water and magnetic sand, used in the dense medium cyclones, are recycled.

The mine's comprehensive water management system uses twelve on-land engineered dams locked to permafrost and lined with geosynthetic material successfully heat-welded under the coldest temperatures ever attempted. At the system's heart is a state-of-the-art water treatment plant, the only one of its kind in the North.

Not only does Diavik use the best technology, Diavik uses the best technology for the local conditions.

*permafrost*

*state-of-the-art*

*Award* winning  
achievement



# Ring of Rock

For Diavik to successfully mine diamonds from under the waters of Lac de Gras, engineering and construction innovation would be required. Utilizing a combination of technologies never before attempted in the Arctic, Diavik's engineers designed a unique 3.9-kilometre rockfill dike to be built into the lake.

Construction would be a challenge in any location but one magnified significantly when the location is remote, the surrounding lake is pristine, and the construction season short.

*protection*  
In total, six million tonnes of rock were quarried and crushed for the dike and thousands of bags of cement were shipped to the site. Built in only two years, the complex structure hosts a watertight central wall, grouting to anchor the structure to bedrock and to seal bedrock fissures, full instrumentation, and thermosyphons – closed tubes of liquid carbon dioxide – to maintain permafrost integrity.

Placing this volume of rock into a pristine lake created a water protection challenge.

But silty water, disruptive to fish, was managed with a turbidity barrier which redirected the silt to the lakebed. Water protection requirements were met or exceeded.

*watertight*  
So unique, and so successful was the result, that Diavik's dike received Canada's highest award for engineering excellence. Today, the dike holds back the waters of Lac de Gras allowing safe open pit mining of Diavik's rich resource.



*cold* climate  
builds highway of *Ice*



# An Ice Lifeline

Faced with constructing a self-contained diamond mine in Canada's hinterland, the operation would have to be constructed three hundred kilometres from the nearest road; where the only highways are the centuries-old paths woven into the tundra by migrating caribou herds. The largest nearby centre is Yellowknife, capital of Canada's Northwest Territories.

Thousands of tonnes of construction materials would be needed for ore processing, power, and heating plants, maintenance and office buildings, an accommodations complex, and water and sewage treatment facilities. And millions of litres of fuel for mobile equipment, for power, and for heat. Diavik knew accessibility would be a challenge.

The very cold which often presents problems, offered the solution. A brief, seasonal ice highway opened each winter, bridging frozen lakes and ponds, and portages – a transportation window of which early explorers could never have dreamed. Construction begins with crews ploughing snow off the route. As nature builds the ice from the top down, crews assist with flooding. The result is ice up to two metres thick, sufficient to carry the heaviest of loads.

Drivers respect the ice and successfully transport thousands of loads required to construct the mine. During operations, the ice road will continue to be a vital resupply artery. Through this seasonal ice artery, nature provides an elegant, temporary solution for moving supplies deep into the heart of the Barren Lands.

*polished* stones

# World-class Diamonds



world's finest

For centuries, diamonds have stirred feelings of passion and timelessness, our highest

symbol of commitment. Now, romance speaks through Diavik diamonds ... stunning

*timelessness*

gems from the icy north, reflecting a new brilliance, and a provenance that is clean

and pure. A diamond that, in its production, sees care for the land, and community

benefits ... a promise of new

wealth, a legacy for future

generations. For Diavik has



taken this commitment to

heart, to be the measure

of sustainable development,

balancing economic prosperity, social well-being, and environmental stewardship ... meeting

the needs of today's society without compromising the ability of future generations to meet

their own needs. Diavik diamonds ... symbolic of how Canada's rugged beauty can be

transformed, like the artisan turning the rough diamond to the perfect polished gem.

*rugged beauty*

## C A P T I O N S

### Diavik's Many Facets

Left: The Diavik Diamond Mine, constructed on an island, is located three hundred kilometres northeast of Yellowknife, capital of Canada's Northwest Territories.

Right: Production of Diavik's gem-quality rough diamonds began in January 2003.

### Born in Fire

Rough Diavik diamonds. The largest stone, bottom left, weighs approximately eight carats.

### Finding the Buried Treasure

Left: From Diavik's exploration camp, the exploration team continues to explore its large claim block at Lac de Gras.

Right: Various exploration tools are used, including geophysical mapping and diamond drilling.

### Community Participation

Left: Community representatives tour the Diavik site.

Right: Aboriginal elders bless the mine site.

A unique fish study combines traditional knowledge and science.

### Caring for the Environment

Left: Members of the Bathurst caribou herd safely migrate near the mine site in spring and fall.

Right: Water monitoring and management is comprehensive.

### Protecting our Workers

Ongoing training maintains safety readiness for any crisis, no matter how low the risk.

### Providing Significant Benefits

Diavik contracts a significant portion of its workforce, including heavy equipment operation, with northern firms, many Aboriginal owned.

### Training for the Future

Training programs, begun early in Diavik's history, continue to develop northern skills.

### Ek'adi

Blanketed with the season's first snowfall, Diavik's island home is surrounded by the sixty kilometre long Lac de Gras.

### The Fore of Technology

Left: Diavik uses state-of-the-art technology, including high angle conveyors.

Inset: Control room operators oversee all process plant circuits on computer screen.

Heat exchangers double efficiency in the power plant.

### Ring of Rock

Left: People and specialized equipment from several countries built Diavik's innovative dike.

Inset: The dike, measuring nearly four kilometres, allows Diavik to temporarily borrow the lakebed.

Right: The Canadian Council of Professional Engineers' National Award for Engineering Achievement.

### An Ice Lifeline

The ice road made construction, and subsequent annual resupply of the Diavik Diamond Mine, possible.

### World-class Diamonds

Diavik's cut and polished diamonds are amongst the world's finest.



The Diavik Diamond Mine is an unincorporated joint venture between Diavik Diamond Mines Inc. (60%) and Aber Diamond Mines Ltd. (40%). Both companies are headquartered in Yellowknife, Canada. Diavik Diamond Mines Inc. is a wholly owned subsidiary of Rio Tinto plc of London, England ([www.riotinto.com](http://www.riotinto.com)) and Aber Diamond Mines Ltd. is a wholly owned subsidiary of Aber Diamond Corporation of Toronto, Canada. The joint venture partners market their share of rough Diavik Diamonds™ independently.

T O P U R C H A S E D I A V I K D I A M O N D S :

Rough Diavik diamonds are marketed directly by Aber Diamond Corporation of Toronto, Canada and by Diavik Diamond Mines Inc. through its sister company and sales agent, Rio Tinto Diamonds N.V. of Antwerp, Belgium. A variety of factories have chosen to remarket the stones as distinctly Canadian. For a list of retailers of Diavik diamonds, contact Aber and Rio Tinto Diamonds.

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