



*Polaris, Nunavut*

## A Farewell to Polaris

*After 20 years of operation, the Polaris mine closed in August, 2002. Renowned as the world's most northerly base-metal mine, the mine was a unique model for excellence in mining innovation and groundbreaking achievement. Although the obstacles and challenges of the high arctic were many, all were overcome thanks to the commitment and dedication of management and staff.*

**The following tributes on the Polaris mine have been reprinted from articles that appeared in the final edition of *Polar Star*, the operation's employee magazine, with the exception of "A Polaris perspective" by Donna Cragg.**

### The mine closure

The closure of the Polaris Mine is a very special and sad occasion for

Teck Cominco Limited. Polaris has been successful from the start. Its high quality concentrate has always been in great demand from our customers, the European zinc and lead refineries. Polaris is a distinguished member of the northern mines developed and operated by Cominco. The other mines are Pine Point in the Northwest Territories, Black Angel in Greenland and Red Dog in Alaska.

The development of the "most northerly base-metal mine in the world" has always required perseverance and innovation. From the discovery of the orebody



*A barge tows the processing plant from Trois-Rivières, Quebec to its permanent home at Polaris.*

in 1971 to the decision to construct the mill on a barge in Trois-Rivières, Quebec, and to ship it 4,800 km to Little Cornwallis Island required engineering of the highest calibre. Polaris was at the forefront of innovation in its ventilation system, permafrost mining and tailings disposal.

The success of the mine, however, was due to the efforts of the management and employees at Polaris itself. Polaris is the first fly-in fly-out mine in the Cominco Group; in 1984 it was the first mine to introduce Gainshare, and in 1989 the first to offer extended leave.

It is fitting that the Inupiat Eskimos of the Northwest Alaska Native Association (NANA) made their decision to partner with Cominco in the development of the Red Dog deposit after they had toured Polaris and the Black Angel mine in the early 1980s. In that sense, Polaris and Black Angel are the parents of Red Dog!

On behalf of the Board of Directors of Teck Cominco Limited, I would like to thank all of you for the contribution you have made to the success of Polaris and I wish each of you every success in the future.

**David A. Thompson**  
*Deputy Chairman and Chief Executive Officer*



## Mining in the permafrost

At the end of August this year, the last tonne of ore dropped down the main ore pass and made its way through the Kemco crusher and up the conveyors, putting the final note on 21 years of production at the Polaris mine. The final tally is approximately 20 million tonnes of ore mined at 13% zinc and 4% lead, close to the reserves that were believed to be here when the mine was discovered in the early 1970s. Not envisioned, however, were the many changes that would occur along the way.

High-ore grades and excellent metallurgy helped make Polaris one of the lowest cost lead-zinc mines in the world. For underground mining, good fortune was also present, and a big part of

the mine story begins with the deep permafrost horizon. Years before the production decision was made, studies were undertaken to determine if mining here was even possible. Every miner who has worked here has felt the bite of cold air blowing down the ramps and headings, but on a daily basis one might forget what a friend the permafrost has been. Without the permafrost, all the ice-filled cracks in the rock would have melted and drained into the mine, and, being right next to the ocean, probably made so much water that Polaris would not have become a mine. Besides keeping the water out, the permafrost helped ground conditions. As a result, the refrigeration units at the portal were installed early on to preserve the permafrost during the summer

months. To us, it makes sense, but refrigeration units are probably the last thing the average person expects to see at a mine in the high arctic.

The permafrost also provided opportunities in the area of backfill. By adding water to the fill in the primary stopes, the resulting frozen fill made high levels of pillar recovery possible. A major development for the mine later followed with the completion of the cemented rock fill (CRF) plant in 1997. The switch from frozen fill to stronger CRF enabled recovery of the Abutment pillar and added several highly productive years to the mine life.



***“Scaling the back.” Removing loose rock from a tunnel (drift) at the Polaris mine.***

This brings us to the most important part of Polaris, its people. Few are capable of working well in a remote site like Polaris. After getting to know the people here, you begin to learn something of the quality individuals Polaris has been fortunate to have over the years and of the effort and personal sacrifices they’ve made. Without you, Polaris would not have been the success it was. For this, we say thank you and wish you all the best wherever your next road takes you.

**Bill Willoughby**

*Polaris Mine Superintendent*



## At the end of the day

For some people change is harder to accept than for other people. Knowing that the Polaris mine is closing for good after being part of our life in Resolute for so long is definitely hard to accept.

Being from a Cominco town (Trail, BC) where I was born and raised, it was a big surprise when I realized that Cominco was creating the northernmost lead/zinc mine on Little Cornwallis Island just a few miles from where I came to live in 1975.

I like to think we were part of the start-up crew because my husband Bazel and I were asked to look after the crew that was surveying the dock in 1979. My husband looked after the logistics of the camp and I cooked for the small crew of men. There were a lot of foxes around that year, which worked very hard at trying to tunnel into the buildings where the food was stored. It was great to see familiar faces from Trail coming through Resolute to work at Polaris in the earliest days, and they always brought a snippet of news from the Kootenays.

As the mine grew and developed, I had the opportunity to see Polaris become a wonderful “corporate citizen” for the high arctic. The company and the workers at the mine were always willing to help Resolute with its fundraising projects. Our community gymnasium is the biggest example, with donations of every kind to our community as well as the

wonderful opportunities for adults and children to visit the mine and enjoy the hospitality there.

I always admired the company’s



*Twin Otter pilots of the far north were skilled, tenacious and interesting individuals, and were an integral part of the Polaris story.*

willingness to meet with our village Council and residents whenever there was a concern. Private sector, steady employment was new to this area, so an adjustment period was needed, and Cominco did provide many people of the high arctic with job opportunities over the years.

We have benefitted economically and socially from our neighbours at Polaris. Our community will feel the loss on many levels. Thank you, Polaris mine, for being great neighbours!

**Terry Jesudason**  
*Resolute Bay*

*Terry Jesudason and her husband Bazel, were co-owners of the North Pole guide and outfitting service, High Arctic International.*

## A Polaris perspective

*Life at the world’s most northerly base-metal mine*

When the Polaris lead/zinc mine on Little Cornwallis Island in Canada’s high arctic was being planned, commissioned and started up in the late 1970s and early ’80s, I had no idea how important a role the mine would play for me. Now, as operations wind down, I can’t imagine what life would have been like without the opportunity to work and live here in the north.

I often imagine back three decades, when Bechtel was working with Cominco on the design and conceptualization of Polaris. A



barge topped with a building the size of a football field was outfitted with a complete processing plant in Trois-Rivières, Quebec, towed to the mine site north of 76 degrees latitude and anchored to the arctic island shore. Landfilling, an adjacent deep-sea dock and construction of an accommodation complex were completed in the winter of 1980/81, despite demanding deadlines and even

first year of operation. Sam is credited with preventing this costly manpower drain, for he engendered a powerful level of loyalty and dedication well beyond expectation.

People at Polaris were willing to put so much into their work that often the lines between work time and personal time blurred. When the mine winds to a close, many

in-laws' northern Ontario home watching the first Polaris video. The description of polar bears, icy winds, snow and frozen moustaches made it sound like an ominous yet exciting place, and Tom left for Polaris in June.

There was no phone in his shared accommodations, and his calls home became the highlight of my week. I spent endless hours trying to visualize his new environment. Finally, that Christmas, I made my first visit to Polaris.

Mine visitors who lived in eastern Canada were routed first to Montreal for a charter flight north. We made a stop in Frobisher Bay (now Iqaluit), where I was introduced to the bitter arctic wind. After continuing to Resolute, we transferred to a Twin Otter for a 25-minute flight farther north to the mine site on Little Cornwallis Island. This was my introduction to the Bradley Twin Otter pilots of the far north, an amazing crew of skilled, tenacious and interesting individuals who were integral to the history of Polaris.

Flying into darkness isn't the same as having night close in with the passing of time. Physiologically, I responded by feeling totally lethargic. Once we reached the mine site I faced quite a different challenge: finding my way around the accommodations building. The repeated modules, distinguished by colour, with distinct third floors



*Christmas "on top of the world" at Polaris*

harsher elements. This was an astonishing engineering feat for its day, made possible only by human cooperation and resourcefulness.

This adaptability was epitomized by the first mine manager, the late Sam Luciani, who had an indelible effect on all who knew him and many who didn't. One story that illustrates his influence has to do with personnel turnover, initially expected to pass 60 percent in the

individuals will be leaving after 15 to 20 years of service. Their loyalty and wealth of experience have been fundamental to the operation's success.

My family's introduction to Polaris came by way of a phone call in early 1987 from Cominco's human resources department to my husband, Tom: would he be interested in a position at the mine? Within two weeks, we were at my



unconnected to any other module, added to the fun and sense of discovery, and my explorations revealed a pool room, a gym and a library.

As Polaris is a 24/7 operation, only Christmas itself was a day off during that first holiday. But the company, recognizing the value of family, ensured that employees with visitors were scheduled for day shifts so they could spend quality time together. Organized events included a wine and cheese welcome party, ski-dozer rides, a mine tour, gift exchange and more. A Catholic priest was flown in to offer a mass and a non-denominational service. We toasted Santa's arrival on Christmas morning with champagne and orange juice (still one of my most enjoyed traditions). The buffet extravaganza provided by the catering staff, complete with ice sculptures, rivalled the best cruise-ship offerings.

I fondly recall the long, leisurely days of my first visit—swimming, reading, relaxing in the sauna and hot tub. We took a bus tour to search for polar bears (in total darkness!) and went outside to watch an igloo being built but had to retreat inside within minutes because, even though we were bundled up, any exposed skin started to “burn” from the severe cold. I've often repeated something I was told back then: that an unprotected person would die of exposure in seven minutes—an impressive testament to the land and weather that I am thankful has never been put to the test.

On that holiday we were also treated to a visit by children from the isolated community of Resolute. It was fascinating to watch children brought together from coast to coast to coast relating to each other in the universal language of play. The kids from Resolute had earned their much-coveted seats on the Twin Otter through year-long performance in and attendance at school. The bottomless ice-cream pail and the swimming pool at Polaris were two of the main attractions!

That first trip gave me a glimpse of Tom's surroundings and his life at Polaris, but I later discovered that the jovial spirits of high times and holidays are a far cry from the more monotonous everyday routine on Little Cornwallis and the tiring workloads.

Over the next nine years, we adjusted to the Polaris schedule, with Tom working eight weeks on-site and spending four weeks at our home north of Toronto. Then in 1996, just when we were planning to relocate our home base to Fort Lauderdale, Polaris called once again. This time the inquiry was whether I would be available to cover a short-term staff shortage in the finance department. I accepted, with excitement and a little trepidation.

After the requisite medical and X-ray and a trip to buy footwear that would withstand minus 45 degrees



***Summer at Polaris meant 24 hours of daylight. Here's their 1998 Slo-pitch team pictured at 4:30 am (l-r) back row: Mike Nixon, Murray Hanstead, Silvia Pascal, Trevor Feduniak, Donna Cragg, Ron Greenway, Dave Baril; (l-r) front row: Mikee Pahkala, John Morton, Richard Gamache***



Celsius, I travelled north on February 14, 1996, originally for a three-week stint. When a full-time position in finance became available, I took it. Nearly seven years of incredibly diverse life experiences later, I am still here.

My early Polaris life wasn't all roses. Indeed, after several years of a long-distance relationship, Tom and I wondered if we could still live

before shutting a door in order to achieve the quietest possible closing and not disturb our neighbours.

At Polaris, work schedules are based on 12 blocks of eight weeks on and four weeks off. I entered this strange and wonderful world as a Block One, which is where I remain. But we had to do a little shuffling, through a series of



***Polaris's charitable social organization, the High Arctic Club (PHAC), raised funds for local charities. Since its inception, PHAC raised more than \$100,000.***

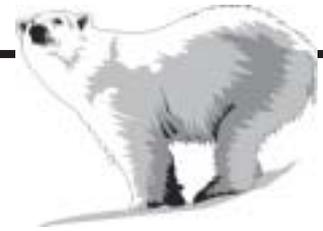
together full time. Would we adapt or drive each other crazy? When I first joined Tom in his single room, he felt like he needed to go out into the hall to change his mind! Eventually we moved to a double room and then a suite, and I'm thrilled to report that we did adapt. I also mastered a few novel requirements — such as remembering to turn the knob

shorter contracts, to match Tom's schedule and mine without overly disrupting work flow. One result was that in my first year I was on-site for almost all of the wonderful annual events that helped define my life at Polaris: the ball and golf tournaments, the winter carnival, the corn roast and lobsterfest, Halloween festivities and a long list of others.

The first baseball tournament that year drove home the effect of 24 hours of light. The final game, played at 4:30 a.m., could have been at a ball field in the south at noon on any summer day, so bright and sunny was the setting. While scorekeeping at another baseball game, I witnessed the resilience of the native people. Despite freezing cold and whipping rain, the Resolute team played intently, oblivious to the elements, and I realized that such weather is part of their reality.

The success of most of the social activities on Little Cornwallis was due primarily to the efforts of the Polaris High Arctic Club (PHAC), a charitable social organization founded by insightful employees in 1983 for the benefit of fellow employees and the local community. Vice-president Dave Swain reports that PHAC has donated more than \$100,000 to local area charities — quite an accomplishment, and one that has contributed greatly to the quality of life for individuals here.

Volunteering for PHAC became a big part of my life at Polaris: helping with decorating parties, tending bar, doing cleanup detail. The guiding principle for PHAC members is the unwavering focus on morale. To judge by the high spirits and upbeat feeling at the final golf tournament and pub night



held July 20, 2002, they were very successful indeed.

Many individuals contributed greatly by organizing other social outlets. Movie Night originated in Marc Richea's effort to share a pastime he enjoyed with a few friends and Tim Sewell's recognition that it held value for all of Polaris. The Coffee Club (originally the Book Club) sprang from my desire to recapture the enjoyment of a casual conversation with friends that had been a part of my southern life. Aerobics grew out of someone's interest in fitness; the opportunity to learn karate stemmed from Brian Powers's passion for the discipline. My list could go on and on, with so many more individuals deserving of mention than can be listed here.

For me, Polaris has offered incredible experiences and opportunities that otherwise would not likely have come my way: listening to classical violin music over cappuccinos while overlooking the Arctic Ocean on a Sunday afternoon; attending an impromptu presentation by a NASA scientist who just happened to drop by; watching a ship dock in the bright midnight sun while enjoying "auction quality" port courtesy of a travel writer from Portugal; thrilling to the combination of Mozart and fireworks on New Year's Eve; sharing stories and photos with visiting contractors and geologists.

For each great experience, it seems there has also been an equal challenge, starting with the effects

on southern family and friends of my decision to work at Polaris – like missing my sister's wedding shower. Sometimes I chafed at the lack of control over my own existence due to elemental forces, some natural and some manmade. I remember the dinners we ate by candlelight after power outages shut the place down, listening to the silence and trying to remain calm as someone calculated how few hours we had to get the power back before the intense cold would force evacuation. There was also the bone-weary tiredness at the end of an eight-week rotation, the difficulty sleeping through extremes of darkness and light and the effect that isolation and lack of privacy had on everyone.

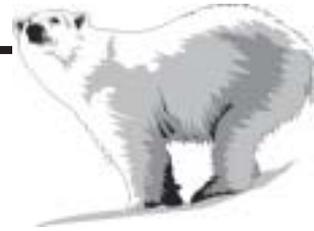
But these things pale against the natural beauty of the north. One of the most wondrous aspects of life here is the vibrant and vivid sunsets. I've driven to the very tip of Florida to view the renowned sunset in Key West, and I can tell you it doesn't hold a candle to what I see out my window on the barge when the sun is setting. I still marvel at the first glimpse of the sun peeking over the horizon in the spring. The subtle tones and pastel hues of the arctic on a bright summer day – the soft blues and pinks of sky and water, the blend of purple saxifrage and yellow

cinquefoil blanketing the tundra – are unlike any other natural palette I've had the fortune to view.

We'll be leaving Polaris with a narwhal tusk and soapstone carvings by Hannah and George Akikuluk, plus a traditional parka now being custom-made for my mother-in-law. Unlike a garment ordered in the south, this one will be about this colour, about this size, with about this type of decorative elements, yet despite all the "abouts" I know with



*The "bottomless" ice-cream pail and the swimming pool at Polaris during Christmas were the two main attractions for children visiting from Resolute.*



unerring certainty that the outcome will be gorgeous. As with so much of northern life, one has to take a chance, jump in, act now – for, like the weather, things here change quickly and irrevocably.

As I reflect back on the past seven years and look toward the future, I realize that the Polaris experience has become a part of who I am, and I go forward as a very different person. And, just as it was people that made Polaris, it is the people who have now been woven into the fabric of my life that will make up the real treasure that I carry away with me.

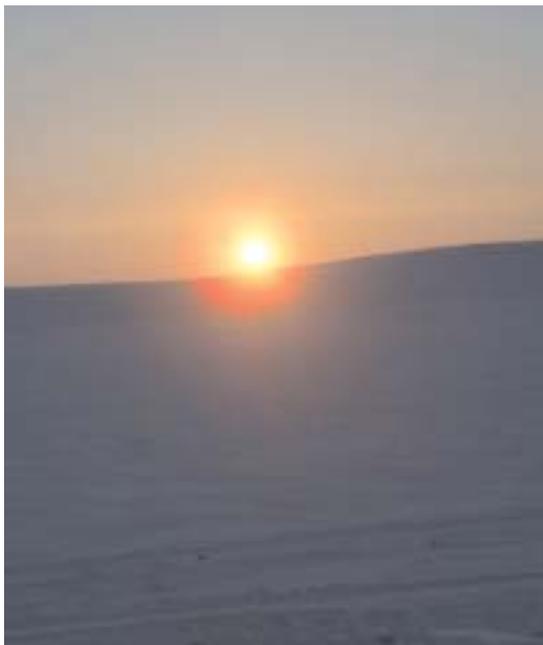
**Donna Cragg**

*Paymaster Accounting Assistant*

## A letter from the Mine Manager

Polaris has been a wonderful mine. For the company, it was a productive, low-cost producer of top-quality lead and zinc concentrates that were sought after throughout the world. For the employees, it was a stable employer that paid well and provided a safe but challenging work environment. Beyond these aspects, however, the harsh, isolated arctic setting, the long work contracts and the unique personalities attracted to Polaris resulted in it truly being a home away from home. For some, it actually was considered home. To my knowledge, there's no other mining camp that can make that claim.

That takes people with resolve, initiative and ingenuity. For whatever the reason, Polaris attracted a large number of people with those characteristics. There were times of friction and dissent, which is to be expected in any large group living and working in a confined area. When the chips were down, though, everyone pulled together. Every setback was met head on and overcome, no matter what problems lay in the way. Polaris produced nearly every single day, for 21 years, in spite of being located in one of the harshest climates of the world and isolated from outside resources.



*Springtime at Polaris, where a glimpse of the sun peeking over the horizon, signals an end to the long, dark season.*

Polaris was found mostly by accident, but it was no accident that it was such a success. There were a number of natural factors that helped ensure that: significant reserves of highgrade, amenable ore, tide-water location, a good supply of fresh water and an ideal tailings disposal facility. The harsh winters and often shrieking winds were tossed in as an added bonus. These factors, however, don't guarantee good safety, high productivity and continually improving operating performance.

I have been at Polaris for seven years, which isn't very long compared to many others. Several have been at Polaris since the days of construction, and nearly a third of the entire workforce has been here more than 15 years. I am proud to have been part of the Polaris success story, and I think that every resident and employee should be proud of their role and contributions as well. On behalf of Teck Cominco, I would like to thank each and every individual for their efforts, and wish them health, success and happiness in their lives after Polaris.

**John Knapp**

*Polaris Mine Manager*



## Polaris history

- 1960 Lead and zinc mineralization discovered by Bankeno Mines.
- 1964 Cominco options property.
- 1964 - 1971 Exploration drilling indicates deposit of 18 million tonnes of 20% combined lead-zinc.
- 1972 - 1979 Feasibility studies, including underground exploration and a 3,200-tonne bulk sample for metallurgical testing.
- 1979 Bechtel Canada chosen as general contractor. Design production rate of 750,000 tonnes ore per year.
- 1981 Mine development reaches bottom of CV-01.
- 1982 Raiseborer completes first raisebore hole. ANFO plant moved underground. Production commenced.
- 1983 Studies for mining Keel Zone and expansion to 1 million tonnes per year of ore.
- 1984 Refrigeration units installed on main portal.
- 1985 Pillar mining begins in Panhandle. First Tamrock Solo drill purchased. Development to 820 level to extend conveyor down from Allis crusher.
- 1987 Eagle crusher installed, replacing Stammler feeder breaker on 820 level. December 6th –D6 Cat takes plunge into backfill in 850-200 st ope.
- 1988 Second Solo drill (#162) purchased. First year of more than 1 million tonnes ore mined.
- 1989 Kemco Crusher installed.
- 1991 New ST8-B Scoops purchased. Mine achieves record ore production of 1.069 million tonnes.
- 1993 Third Solo drill (#163) arrives.
- 1995 - 1996 Construction of CRF plant.
- 1997 Development of North Ore Pass and 790 Truck Chute. First ore mined from Ocean Zone.
- 1998 Mining begins on Abutment pillar.
- 1999 Record production with 319,000 tonnes of concentrate shipped.
- 2000 Development south towards KEX Zone.
- 2001 Mine Crew #4 achieves five years accident-free.
- 2002 August –Polaris reaches 20 million tonnes of ore milled , 5 million tonnes of concentrate produced. Mine closes.