



POPULAR GEOSCIENCE



# POLARIS

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## An Amazing Story

Imagine mining for metals where the ground is frozen solid! Where winters are long and dark and temperatures often drop below  $-40^{\circ}\text{C}$ . Where the only time you can ship your ore to market is during a six to ten week period in the summer. And where everything, from mining equipment to construction materials, workers and food has to be brought in either by ship or plane. Imagine doing this every day for 20 years, 24 hours a day, and making a profit! And then imagine closing the mine, and restoring the landscape so well that years from now it will be hard to tell there was ever anything there.

This is the story of the Polaris lead-zinc mine, the most northerly metal mine in the world.



1992

## A Unique Situation

The Polaris orebody was discovered in 1971 on Little Cornwallis Island, Nunavut, about 35 minutes by plane northwest of Resolute (Qausuittuq). Testing revealed a massive concentration of galena and sphalerite in limestone, 60 to 300 metres below the surface. Studies continued throughout the 1970s, leading to the start of construction in 1979, and first production of ore in late 1981.



2003

Although you might think that permafrost would make mining operations difficult, it actually helped. In more southerly mines, a lot of waste occurs because pillars of rock are left in place to support excavated tunnel roofs and cannot be mined. At Polaris, excavated backfill was saturated with water and left to freeze. This was used instead of pillars, allowing more ore to be mined.

K. Dewing

J. Noble, IMAC



# POLARIS

## A Difficult Job



S. McCracken, NRCCan

The Polaris mine on Little Cornwallis Island was incredibly expensive to build, but the lead and zinc deposits were well worth it. Many of the facilities, including the mill (used to crush and concentrate the ore), were built on a barge in Trois-Rivières, Quebec and towed 4800 km to the mine site. Also needed was a place to store the concentrate until it could be shipped out during the brief summer, so an enormous A-frame building was constructed, capable of holding about 215,000 tonnes! Machine shops, storage sheds, and staff accommodations all needed to be built and maintained during the 20-year life of the mine. Persuading people to work and live in such a remote place was a challenge in itself, but their accommodations included a swimming pool, whirlpool, sauna, gym, running track, and TV and game rooms, which made leisure time more enjoyable. And for many who worked there, the isolation and hard work coupled with the beauty of the land gave them an opportunity to experience something unique.



When the mine closed in 2002, everything had to be taken apart and moved out or buried. Reclamation of Polaris will cost an estimated \$40 million.

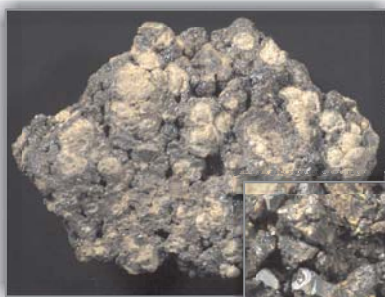
### Did you know?

**Zinc is a major ingredient in many sunscreen products.**

**Nearly 50% of the lead produced in Canada comes from recycled car batteries.**

**Half the zinc produced worldwide is used to galvanize steel.**

**One-third of the zinc we use comes from recycling.**



B. Rutley, NRCCan



B. Rutley, NRCCan

*Sphalerite:  
the source of zinc*

**If you combine zinc with copper, you get brass.**

**There is no lead in a lead pencil; it's graphite and clay, but it still isn't a good idea to chew on pencils.**

**Most lead (75%) is used in batteries; the average car battery contains about 10 kg of lead!**



B. Rutley, NRCCan



B. Rutley, NRCCan

*Galena:  
the source of lead*