



CRYSTAL PEAK
GARNET

001596

082ESW102

Crystal Peak
Property File

INFORMATION CIRCULAR

NOVEMBER 9, 1989

INTRODUCTION

Crystal Peak Garnet Corporation, a wholly owned subsidiary of Polestar Exploration Inc., filed a letter of intent (prospectus) with the Ministry of Mines Energy and Petroleum Resources on October 4, 1989 to develop a small garnet quarry on Mt. Riordan near the Apex Alpine ski area.

This information circular is written to address concerns of local citizens about the impact of the proposed operation. As well, company and ministry officials will at all times be available to provide more information and address additional concerns.

Once a letter of intent has been filed, the Mine Development Steering Committee (consisting of representatives of the Ministries of Mines, Health, Environment, Parks, Forestry, Highways, etc.) evaluate every aspect of the project to ensure compliance with existing regulations and guidelines and to minimize impact. As part of the evaluation process, they invite public input at every stage.

We also invite public input so that the final plan of operations will be acceptable to all concerned. For instance, as a result of discussions with local residents and the manager of the Apex Alpine Ski Area the company has changed the proposed quarry location. As well, other options for the processing plant location are being considered. The deposit is so large and the processing so simple that any reasonable compromises can be easily made.

CORPORATE INFORMATION

Polestar Exploration Inc. is a B.C. public company listed on the Vancouver Stock Exchange (trading symbol PSE). The board of directors consists of three senior geological engineers and an office manager, all B.C. residents.

The company has been involved in mineral exploration since 1983 and presently has interests in a gas well near Fort St. John, a placer gold property near Likely, B.C., a platinum-nickel prospect in the Yukon and two gold-silver prospects in the United States.

GARNET

There are many types of garnet. The most familiar garnet is a bright red semi-precious stone used in jewelry, technically known as pyrope. The garnet found on Mt. Riordan consists mostly of andradite ($\text{Ca}_3\text{Fe}_2\text{Si}_3\text{O}_{12}$) and also includes grossularite ($\text{Ca}_3\text{Al}_2\text{Si}_3\text{O}_{12}$). It occurs in massive or coarsely crystalline form, usually reddish brown or green.

Andradite garnet is very hard (H=7) and heavy (S.G.=3.7). There are approximately 8.7 cubic feet of garnet per ton.

Garnet is a "resistate mineral" that is chemically and physically stable. It does not oxidize or decompose and is essentially inert. These qualities make garnet the ideal mineral for abrasive blast cleaning (sandblasting), water filtration, water jet cutting, specialty aggregates and other abrasive uses such as sandpaper.

The two materials most commonly used for sandblasting painted steel structures (ships, bridges, oil storage tanks, etc.) are silica sands and smelter slags. Silica dust causes silicosis, an often fatal lung disease, and smelter slags are contaminated with numerous heavy metals and other potentially toxic elements.

Silica is already banned in several European countries and California. Slags kill fish, and therefore cannot be used near natural waters. In addition, the disposal of slags presents a problem: currently they are dumped as landfill and their heavy metals can contaminate groundwater.

Even though garnet is recognized as a superior abrasive, its use has been limited due to its high cost. There is no garnet production in Canada. Imported garnet from Idaho sells in Vancouver for \$39 per 100 lb bag. In bulk, this product sells for \$160-240 US per ton at the mine site in Idaho.

The Mt. Riordan deposit is thought to be the largest and purest garnet deposit in the world. Preliminary tonnage estimates are greater than 10 million tons of 85-90% pure garnet.

SCOPE OF OPERATIONS AND ENVIRONMENTAL CONCERNS

The proposed quarry will operate for only one month a year. The processing plant is to operate year-round. After consultation with local residents, June has been tentatively selected for the actual quarrying since recreational use of the area is minimal at that time. Drilling, blasting and hauling to the processing plant will therefore be conducted when the village is almost deserted.

Yearly production will be determined by market conditions. Initial production is planned for 100 tons per day, or approximately 30,000 tons per year. Hopefully, production will increase to 60,000 tons in three years. Even at 100,000 tons per year, daily production will only be 300 tons per day, which is very small by mining standards (see Fig. 1 for a comparison of Crystal Peak's planned production with two other local mines). For illustration, 300 tons of garnet would occupy a volume of less than 14x14x14 feet.

Waste materials generated will consist of quartz, calcite (lime) and fine grained silicates. The volume of waste is expected to be less than 15% of the total volume mined, whereas the waste of other mining operations is often more than 99%.

Major concerns expressed to date are radioactivity, noise from the processing plant, contamination and/or disruption of water supplies, increased traffic, and visual impact.

The company has completed 23 diamond drill holes and taken hundreds of surface samples which were subjected to detailed thin section analysis by Vancouver Petrographic Laboratories. No trace of uranium or any other radioactive mineral was discovered.

The company has engaged Merit Consultants to perform a noise analysis of the processing operation, particularly the crusher. Their study indicates that noise levels will be negligible.

Concerning water supplies, neither of the two village water supplies are drawn from the catchment basin in which the processing plant will be located. Therefore, there will be absolutely no effect on village water supplies. There will be no contamination of groundwater even within the plant's catchment basin since no chemicals are to be used. The company has engaged SRK Consultants (an international consulting firm specializing in environmental impact studies, hydrology, mine planning and waste management) to examine the issues.

Water consumption during processing will be minimal, since it will be mostly recirculated. Garnet is widely used for water filtration, and the quality of water returned to the environment will not be adversely affected.

There will be increased truck traffic through the village. Each truck carries between 40 and 50 tons of finished product. It is expected that the impact of the increased traffic will not be significant since the road already carries traffic to and from the Nickel Plate Mine.

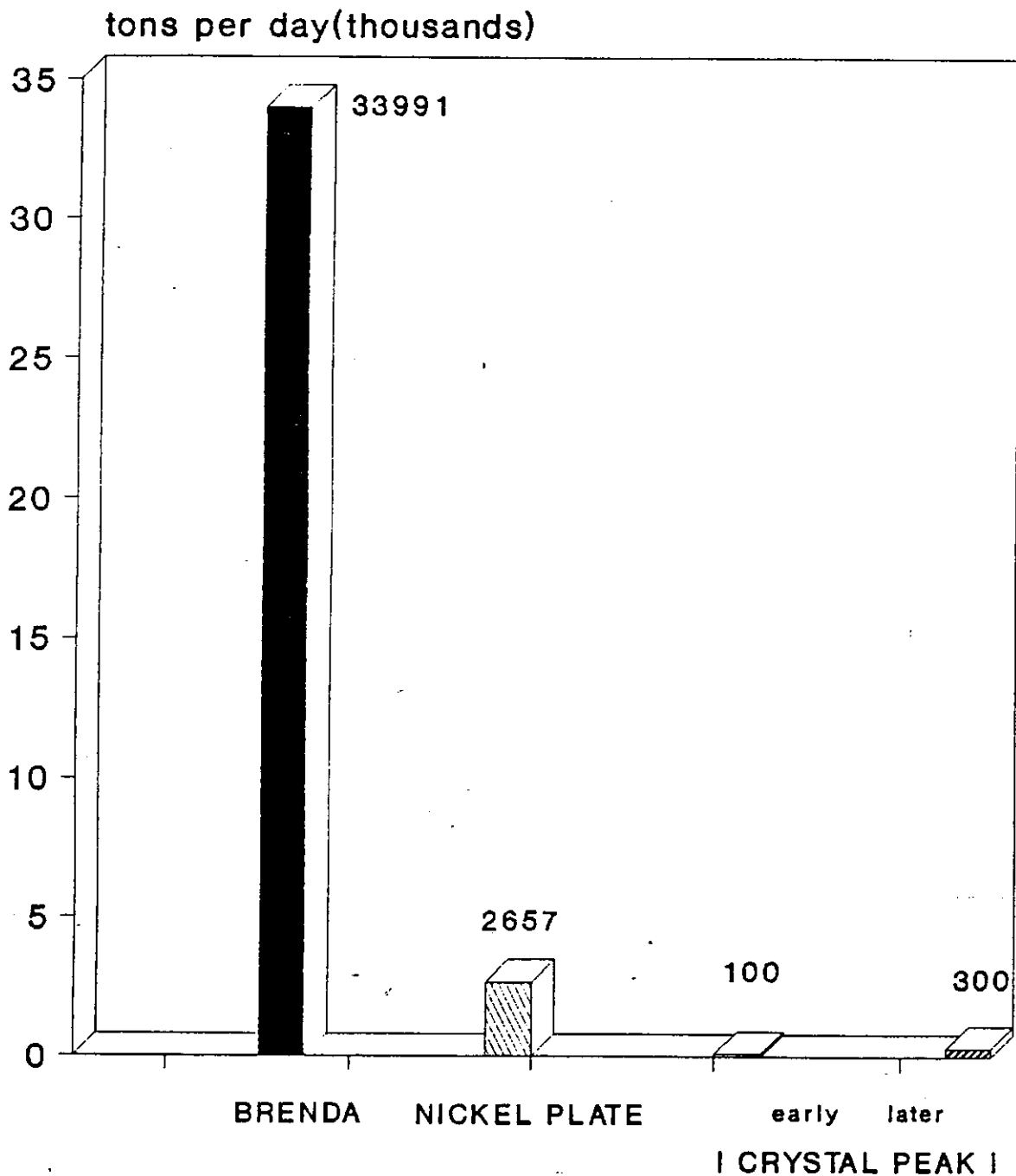
Visual impact will be minimal, since the quarry and processing plant are not visible from the village.

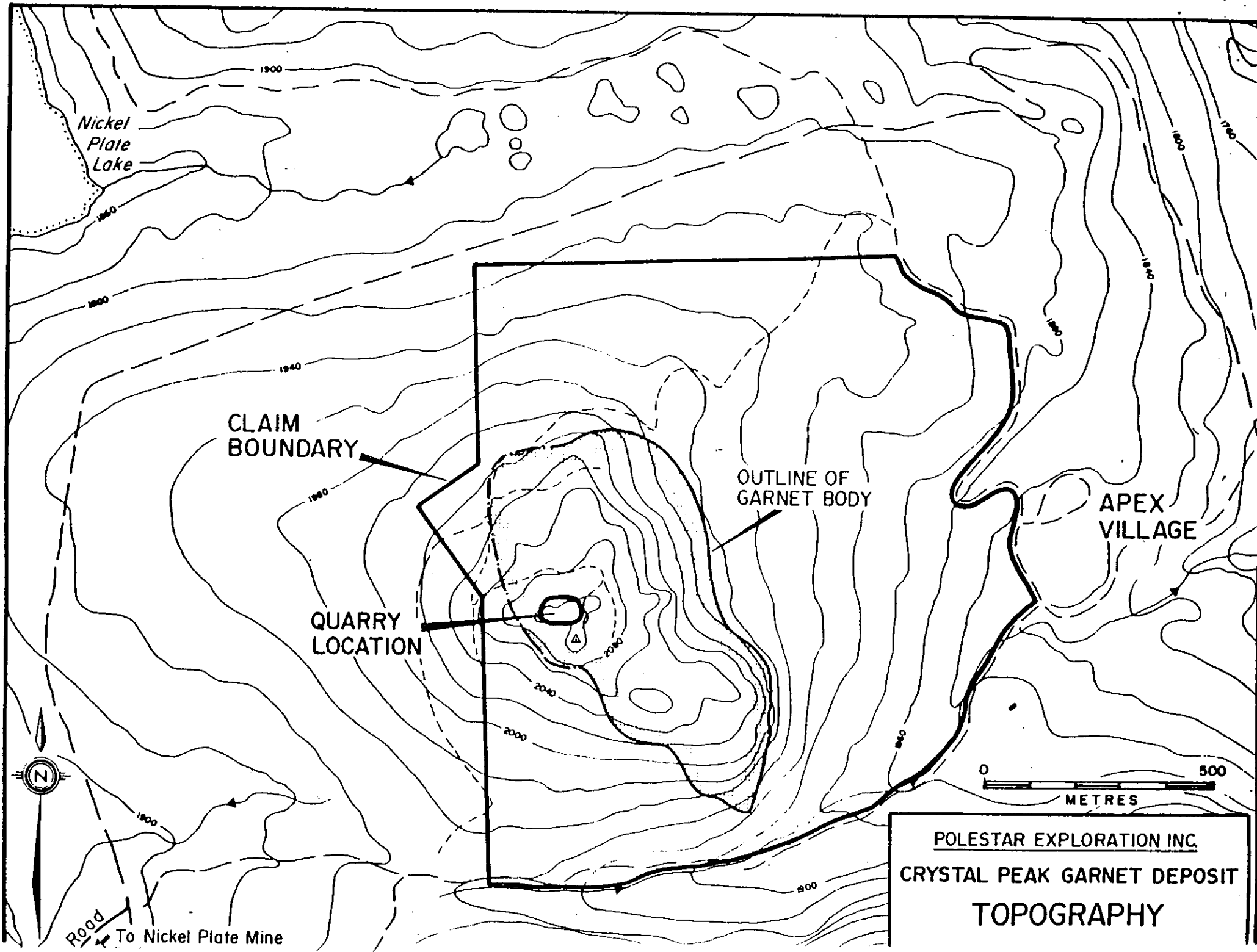
CONCLUSIONS

The proposed garnet quarry on Mt. Riordan will be unique in the world and will hopefully be a source of pride to the local community. It will produce a material needed to minimize deaths due to silicosis and toxic contamination of landfills.

Crystal Peak Garnet Corporation hopes to contribute positively to the area's economy for many years to come. Although the proposed operation is small, it will employ at least six people in the plant, several contractors in quarrying, construction and transportation, and three to four people in technical and administrative positions. Local services will be used wherever possible.

SCOPE OF OPERATIONS COMPARISON WITH LOCAL MINES





POLESTAR EXPLORATION INC.
CRYSTAL PEAK GARNET DEPOSIT
TOPOGRAPHY



MEMORANDUM

TO: R. WOLFE, P. ENG. - POLESTAR EXPLORATION INC. DATE: November 8, 1989
FROM: M. EIVEMARK & D. CHARBONNEAU PROJECT NO: 70501
RE: RESPONSE TO CONCERNS ABOUT QUARRY AND PLANT OPERATION
- MT. RIORDAN

1. QUARRY

A second quarry (option 2) has been located on the west side of Mt. Riordan. Either one of the plant locations, (options 1 or 2), would be suitable for this quarry since the distances are similar. Drilling has indicated that there is good quality garnet mineralization in this area.

The option 2 quarry has 1,234,000 tons of material down to elevation 2075, which is sufficient for 21 years of production. This is only the top 40 metres of the deposit, with one drill hole in the area intersecting mineralization down to 300 meters from the surface. The quarry will not be visible from Apex Village. Equipment noise and blasting will be directed towards the west and should be considerably reduced from the option 1 quarry.

2. VILLAGE WATER SUPPLY

The Village water supply is obtained from surface sources during the summer and from wells during the winter. The closest water well is reported to be located within about 3000 feet from the quarry site and draws water from a depth of several hundred feet in bedrock. It is further reported that the yield of the well is low, and, at certain times the yield is totally depleted. The performance of this well is typical of wells developed in bedrock where the fractures, or water-bearing conduits, are widely spaced.

As discussed below, blasting activities would not worsen the performance of the well.

The quarry is expected to be 3000 feet horizontally and 500 feet vertically away from the well. Based on attenuation of blast energy with distance away from the source, it is estimated that the ground velocity due to blasting would be in the order of 0.5 in/sec in the vicinity of the well. This is shown graphically on Attachment 1. The Attachment also shows that rock breakage begins at 25 in/sec. The ground velocity due to blasting in the quarry would be below the threshold that would cause sufficient shaking to alter rock structure, i.e. open or close existing fractures. Therefore quarry blasting would have no impact on water yield at the well.

The operation of the quarry is scheduled for summer when water for the Village is obtained from streams. The area affected by quarrying comprises less than 6% of the contributing watershed. With relocation of the quarry to the western side of the peak, the affected area of the watershed drops to less than 2%.

No adverse impacts on surface or groundwater quality are anticipated based on the proposed processing procedures, which require no reagents.

