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# Mine Development Assessment Process

## Crystal Peak Garnet Project

**Summary of the Technical Review of  
the Polestar Exploration Inc.,  
March 1991, Stage I Submission and  
Susequent Addendum Material**

September, 1991



Province of British Columbia  
Ministry of Energy, Mines  
and Petroleum Resources

# **MINE DEVELOPMENT ASSESSMENT PROCESS**

## **CRYSTAL PEAK GARNET PROJECT**

### **SUMMARY OF THE TECHNICAL REVIEW OF THE POLESTAR EXPLORATION INC., MARCH 1991, STAGE I SUBMISSION AND SUBSEQUENT ADDENDUM MATERIAL**

#### **INTRODUCTION**

##### **Project Description**

The Crystal Peak Garnet Project is partly located within the Apex Recreation Area, near Penticton, British Columbia. Polestar Exploration Ltd., in joint venture with Hawkeye Developments Ltd., propose to annually quarry approximately 75 000 tonnes of garnet ore over a six week period in the spring at the end of the ski season. The quarry site and main haul road will then remain dormant for the remainder of the year.

The material will be quarried using conventional blasting techniques which are designed to minimize dust, noise and ground fracturing. Following quarrying, the garnet will be loaded and hauled to the processing plant which is located one kilometre west and outside of the recreation area. The plant will operate on a year round basis and will produce 60 000 tonnes of finished product per year.

Processing will consist of crushing, screening and/or hydrosizing and magnetic separation, and will not involve any chemicals. Finished products will then be placed in bags and trucked (six trucks per day) via the Apex road, and Green Mountain road to points south and west. Storage of waste will be in a confined impoundment designed to hold twenty years of tailings.

The Mineral Development Agreement (MDA), a joint federal/provincial fund to stimulate mineral research and geological mapping, awarded Polestar a grant to conduct a mineral market study. The project also received funding from the Western Economic Diversification program under which the federal government provides interest free loans to promising new ventures.

Garnet is used in a number of applications including water filtration, waterjet cutting, bonded and coated abrasive products and wear resistant surfaces. By far the largest potential market for garnet is for use in abrasive blast cleaning.

Historically, the markets for abrasive blast cleaning have been dominated by the use of silica sands and mineral/coal slags. The use of silica, which is linked to the lung disease

silicosis, poses a health concern and thus, has reduced the demand for silica sand. Coal and mineral slags have been linked to environmental problems relating to heavy metal content and arsenic.

Studies conducted by Polestar indicate that garnet has been shown to be an effective blasting abrasive and, given that the mineral is chemically inert, is free from the problems associated with silica and slags. In particular, Crystal Peak garnet was found to be harmless to fish, and the product has been approved for sale as a blasting abrasive in California. Polestar's market research has been carried out among both product distributors and end users in the western United States and in Canada.

It has been a long standing practice for the Geological Survey Branch of the Ministry of Energy, Mines and Petroleum Resources to request an assessment of geological reserve estimates and methods of calculation as part of the Mine Development Assessment Process. The Geological Survey Branch agrees with the company's geological assessment. In particular, the overall drill-indicated garnetite resources in the North Zone amount to 17 955 000 tonnes grading 80 percent garnet to 90 metres depth. Detailed ore reserves studies on this zone have utilized geostatistical methods, in part, to determine a mineable quarry reserve of 1 917 000 tonnes grading 80 percent garnet. At a planned production rate of 75 000 tonnes per year, this represents slightly more than 25 years production. The reserve studies carried out for this project are generally accepted methods which are applied throughout the mining and exploration industry for major metallic minerals projects. As such, they are more than adequate for a small quarry project such as this.

Polestar estimates that the project will create 51 local jobs and another 32 province wide, including those jobs created in spin-off industries.

#### **Mine Development Assessment Process**

Polestar Exploration Inc. submitted a prospectus for the project to the Mine Development Steering Committee in September 1989, thereby entering the province's Mine Development Review Process (MDRP). An addendum report followed in November 1989, outlining changes in the location of the quarry, mill and access road, to minimize impacts on the nearby ski hill and recreational residents.

The purpose of a prospectus or letter of intent is to provide government and the public with an overview of the proposed mine development, and a preliminary identification of potential socioeconomic and environmental impacts and management strategies, in order to determine whether or not further detailed planning and impact assessment is required prior to a decision on project approval-in-principle. Approval is granted when all major technical and policy issues have been identified, and are known to be resolvable at permitting. Once approval-in-principle has been granted, the project proponent is authorized to receive the necessary statutory permits and approvals required prior to mine

construction and operation. In order to minimize any undue delay in permitting, project proponents are encouraged to discuss permit requirements with key agencies early in project planning.

In August 1991, Bill 59, the *Mine Development Assessment Act*, was proclaimed. This formalized the province's MDRP and established the Mine Development Assessment Process (MDAP). Under the *Act*, a mine development certificate replaces the traditional approval-in-principle. Proponents of mine developments will be required to obtain permits and licenses from various agencies, once a mine development certificate has been issued by the Minister of Energy, Mines and Petroleum Resources, with the concurrence of the Minister of Environment.

### **Protocol Agreement - Mineral Exploration in Recreation Areas**

Since 1986, the provincial government has acted to free the parks system of any commercial resource use. At the same time, government has accepted the principle that the mineral potential of any proposed park should be thoroughly evaluated before making long-term park designation decisions. To help accomplish this, the *Mineral Tenure Act*, which allows for time-limited exploration, was passed in 1988. This legislation puts into effect a recommendation of the province's Wilderness Advisory Committee in its report of March 1986, that a time limited period of mineral evaluation be allowed on lands which may be designated as future Class A parks.

Within *Park Act* designated recreation areas, B.C. Parks plays an important role in the review and approval of proposed mineral exploration and development proposals, pursuant to Section 19 of the *Mineral Tenure Act*. B.C. Parks have been involved in the review and approval of all exploration proposals submitted by Polestar, and has participated jointly in the review of the company's Stage I submission.

### **B.C. Parks Master Plan**

In 1990, B.C. Parks initiated the development of an inter-agency Recreation Management Plan for the Apex Mountain/Nickel Plate Lake area that involves the Ministries of Forests, Environment, Energy, Mines and Petroleum Resources, and Crown Lands. The involvement of these agencies reflects the variety of uses and jurisdictions that characterize the area. This plan, once completed, will define the various agency responsibilities for managing, protecting and enhancing the recreation and visual resources of the area.

An important component of this plan is a background report, which was prepared by a independent consultant and partially funded by Polestar. This report included an analysis of the natural and recreation resources of the area, as well as an assessment of the impacts of the proposed garnet project. Polestar provided the results of the background report in its Stage I submission.

B.C. Parks has decided to delay further work on this plan until a decision is reached on the proposed garnet mine. Once this decision has been made the Ministry will be in a better position to make decisions in the plan regarding various agencies responsibilities and obligations.

B.C. Parks is phasing out of its involvement with major destination downhill ski resorts at Silver Star and Apex. These areas are heavily modified by downhill ski development and have a large capital investment in facilities. As a result, they do not fit the Ministry's mandate for conservation and recreation. Additionally, the administrative complexities of these areas are more appropriately handled by Crown Lands under its "Commercial Ski Area Policy". In keeping with this policy, B.C. Parks will be removing the Silver Star Mountain Resort complex and the proposed expansion of downhill ski facilities in the Putnam Creek Basin from Silver Star Provincial Park. The Apex-Nickel Plate recreation plan will apply a similar approach to the commercial ski resort area presently comprising the bulk of the Apex Mountain Recreation Area.

#### **Chronology of Project Review To Date**

The prospectus and Addendum report review was completed by government agencies, native groups, interest groups and the public in May 1990. During the prospectus review Polestar held a public open house in Penticton in November 1990, at which, project plans including infrastructure relocation were on display for public review.

Based on the prospectus review, several areas of outstanding technical concern were identified including issues related to groundwater, water quality, recreation, and noise and dust impacts. The Mine Development Steering Committee required Polestar to address these concerns in a Stage I submission, prior to a government decision on project approval-in-principle.

Polestar submitted its Stage I Report to the Mine Development Steering Committee in March 1991. The report was distributed to provincial review agencies, local government, native groups and the public for review and comment by May 31, 1991. Government agencies were requested to review the submission from their management mandate and perspective, and conclude whether or not the project could proceed to permitting based on current policies, statutory permits, approvals and regulations. Polestar opened and maintained a store-front office at 412 Main Street, Penticton, and the public were invited to drop in to discuss project planning and concerns directly with the project proponent.

Based on a preliminary review of the Stage I report, B.C. Environment identified the need for additional data and information on air emissions, tailings pond location, seepage recovery and tailings water quality to be provided by the company prior to the Ministry completing its Stage I review. This information was provided by the company in a Stage I addendum letter report on July 23, 1991.

Throughout the prospectus and Stage I review period, the Mine Development Steering Committee provided information updates to the public through information letter releases. Information Letter No. 1, distributed in November 1989, provided background information on the province's land use policy and multiple use administration for recreation areas under Section 19 of the *Mineral Tenure Act*. Information Letter No. 2, which summarized Polestar Exploration Inc. exploration proposals and reclamation plans, was distributed at the Ministry of Parks Open House on its draft master plan in Penticton on November 7, and 8, 1990. Information Letter No. 3, which provided an update on the company's 1990 exploration field program, Stage I review process and the results of a fact finding tour of the Emerald Creek Garnet operation near Fernwood Idaho, was released in March, 1991. In this information letter, the provincial government confirmed that a public meeting would be held in Penticton at the end of the technical review of the Stage I report, and prior to a decision on the project by government. Information Letter No. 4, which summarizes the Stage I review and next steps in the process, is being distributed.

## BACKGROUND/LAND USE

### **Apex Mountain Recreation Area**

The Apex Mountain Recreation Area is under the jurisdiction of the *Park Act* and currently contains an area of approximately 575 hectares (2.2 square miles). The land is entirely provincial crown land, which is subject to a variety of agreements, tenures, easements and permits. As well as existing mineral claims, there is an easement and right-of-way for West Kootenay Power Ltd. and B.C. Telephone Co. Ltd. to operate a power line, telephone line and service road between Mount Riordan and Beaconsfield Mountain. *Park Act* Resource Use Permits allow the maintenance of a Boy Scout cabin, and the R.C.M.P. to operate a radio transmitter on the summit of Beaconsfield Mountain.

Apex Mountain Recreation Area originated in May 1961, as a Class "C" Park which was intended to provide a land base for local interests in developing downhill ski facilities. Its original area was 458 hectares, and it did not include Mount Riordan or the present block north of Public Road No. 14, the old Hedley - Penticton road. Its administrative history reflects evolving land use in the area, particularly the expansion of ski operations and resource interests.

In February 1965, the 117 hectare block north of Public Road No. 14, which included Mount Riordan, was added to the Apex Mountain Class "C" Park. The addition was subject, however, to the prior rights of holders of mineral Claim Lots 3122 and 3123.

In March 1980, the previous orders-in-council were rescinded and the area's status was changed from a Class "C" Park to a Recreation Area, to manage the area's high recreation values which also had resource commitments such as mineral tenures. The land status

change shifted management responsibility from a local Park Board to B.C. Parks because of the complexity of managing commercial ski area expansion, grazing and mineral issues.

In April 1989, the portion of Apex Recreation Area north of the power line road was opened to time-limited mineral claim staking in accordance with the aforementioned provisions of the *Mineral Tenure Act*. The remainder of the area remained closed.

Lands inside and outside of the recreation area, as well as the land where present commercial alpine ski facilities are situated and future improvements are proposed, have the designation **Controlled Recreation Area**, under the *Land Act*. Use of this area is controlled by Apex Alpine Recreations (1988) Ltd. until recently, under a 1981 agreement with the Ministry of Crown Lands.

The Ministry of Lands and Parks, in February 1991, entered into a new 50 year Master Ski Development Agreement with Apex Alpine Recreations (1988) Ltd. The agreement provides for the development and operation of recreation improvements, and the sale of crown lands for commercial and residential accommodation in the base area to complement the recreation improvements. The reserve and development agreement are subject to rights issued under the *Mineral Tenure, Petroleum and Natural Gas, and Water Acts*.

### **Mineral Tenure**

The history of mineral exploration and claim staking on Mount Riordan dates back to the early 1900's. Polestar holds a mineral tenure which is officially called KE 8674, and is informally called the Crystal Peak Garnet Project claim. The southern boundary of the claim is Public Road No. 14, the powerline trail. The claim covers that area of Mount Riordan that lies within the recreation area. This claim was issued under Section 19 of the *Mineral Tenure Act*. The company also holds in good standing, the original claim lots 3122 and 3123, within the recreation area, and a number of claims located in the area of the proposed millsite location.

### **Grazing**

Land around and within the recreation area has been made available for cattle grazing. Two grazing leases exist and both licensees hold valid Resource Use permits for grazing within the recreation area. Livestock use, forest harvesting and recreation use are in many ways complementary, and this area is one where the complementary effect has been demonstrated. Examples include road infrastructure for timber harvesting and trails for cattle used by recreationists and range licensees.

## **Forestry**

The forests in the project area are mostly middle-aged stands from 80 to 120 years old. Major timber species are lodgepole pine, englemann spruce, and subalpine fir, with lesser cover by white bark pine. Forest site classes range from medium on well-drained slopes to poor on the summit of Mount Riordan and on seepage areas.

## **Tourism Values**

Apex Alpine area is considered a priority development area in the provincial ski development plan, and it offers significant operating and development potential on a year round basis. Recreational use of the area has steadily increased over the past three years, and now generates an annual gross revenue of \$2.1 million, employs 10 full time and 100 seasonal employees. The overall resort community generates over \$5.0 million in sales, almost \$6.0 million in purchases and \$1.2 million in payroll to the local/regional economy. The province recognizes the present and future importance of the area's recreation and tourism values to the local and regional economy.

# **IMPACT ASSESSMENT**

## **MINESITE AND INFRASTRUCTURE LOCATION**

The prospectus, submitted by Polestar in September 1989 called for the quarry and infrastructure to be located on the North flank of Mount Riordan adjacent to the recreational housing of Apex Village. Early in the prospectus review, comments were received from members of the public and Apex Alpine Recreations (1988) Ltd., the operators of the ski hill, indicating that the location of quarry would have a negative visual impact on the ski hill operations. After reviewing these comments, the company proposed to relocate the quarry and plant site to the west flank of Mt. Riordan. This relocation was designed to minimize visual and noise impacts. The proposed changes were provided in a November 1989 Addendum to the company's September 1989 prospectus, and also provided at the company's November 1989, open house for public review.

## **WATER QUALITY**

The Project is located adjacent to the Apex Alpine village, and as such, Polestar was required to provide a detailed water quality assessment in the Stage I report in order to identify any potential impacts, and to design management programs to ensure that the project would not negatively impact the area's water resources.



### **Surface Water Quality**

In order to assess the background water quality in streams that could be affected by the project, Polestar was asked to collect and assess water samples at locations and using parameters set by B.C. Environment.

Project water management plans include the containment and diversion of spring runoff from the quarry site, waste dump, raw ore stockpile, mill site and haul roads to the tailings pond. This will minimize any potential impact on uncontaminated water in the catchment area upstream from the tailings pond. However, sufficient information regarding the potential impact on downstream water quality, either through direct discharge or seepage from the tailings pond, was not provided in the Stage I report. Polestar conducted further chemical analyses of tailings pond supernatant and sediments, as directed by B.C. Environment, and based on a review of the addendum information, the Ministry concluded that further surface water quality assessment can be provided by Polestar at permitting, in keeping with provisions of the *Waste Management Act*.

### **Groundwater Quality**

Residents of Apex Village, the operators of the ski hill and the Penticton Indian Band have expressed concern regarding the potential effect that the project could have on the quality of groundwater.

The company noted in its addendum to the prospectus that the relocation of the mill site from the north flank to the west flank of Mount Riordan would result in the project drawing groundwater from a different watershed than the one used by the ski hill and local residents.

B.C. Environment's preliminary review of the company's Stage I submission indicated the need for additional groundwater sampling and assessment prior to commenting on project approval-in-principle. In particular, an explanation of anomalous metals levels in several piezometer wells located in the proposed tailings pond area was required. The company subsequently resampled the wells and provided the results to complete the Ministry review. The initial high metals levels reported in the Stage I submission were the result of sampling the piezometer wells shortly after drilling when suspended sediments were still high. Subsequent sampling indicated significantly reduced suspended sediments, arsenic, iron, copper, lead and manganese. The anomalous values were explained to the satisfaction of B.C. Environment, and no further groundwater quality issues have been identified.

### **Waste Water Quality**

B.C. Environment requested that Polestar investigate the chemistry of the process waste water to identify whether nitrate, acid mine drainage or heavy metals might be a concern

for the protection of surface or groundwater quality downstream of the tailings pond. The results were to be provided in the Stage I submission.

Analysis of bench-scale tailings pond water showed no acute toxicity and relatively low metals compared with waste water of other metal mines in the region. A conservative approach to tailings dam placement and design, and seepage recovery facilities will ensure downstream water quality will be protected. This assessment meets B.C. Environment's requirements and any water quality issues still remaining can be addressed at permitting.

#### **Acid Generation Prediction/Prevention**

Garnetite in the area is associated with small concentrations of magnetite, pyrrhotite, pyrite and chalcopyrite, which may have the potential for acid mine drainage. The proponent was thus requested to provide a further assessment of the potential for acid mine drainage in the Stage I report.

Metallic mineral content (particularly sulphides) was also a concern raised in the review of the company's September 1989 prospectus. Information provided in the Stage I report indicates that metallic concentrations are quite low for the bulk of the pit reserves. Although there are known occurrences of copper and tungsten elsewhere on the property, the likelihood of acid-producing waste material from garnet production is remote.

Acid-base accounting tests conducted by Bacon, Donaldson and Associates, on behalf of Polestar, on four samples indicated neither the ore tailings nor the waste rock are likely to be acid generating. Environmental review agencies are satisfied that acid generation will not be a concern during mine operation, or after abandonment.

#### **WATER MANAGEMENT**

Local recreational residents have expressed concern over the quantity of water required for the mining operations, and the impact that it could have on their water supply. As such, B.C. Environment requested Polestar to conduct a detailed hydrology and groundwater assessment to ensure that supplies would not be significantly impacted by the project development.

All streamflows in the area surrounding the project have been fully recorded (allocated), thus no surplus water is available for any new water licences. Water licences have been issued for a variety of agricultural and domestic purposes including requirements of Apex Village, Apex Alpine Ski Resort, and municipal and irrigation purposes in the lower valleys.

The Stage I submission indicated that water for the milling process will be obtained from the tailings pond which will contain captured spring runoff. This water will be recycled and

will meet the milling needs for the project. Potable water for operations is estimated not to exceed 4 000 litres per day, and will be obtained from shallow bedrock wells in the vicinity of the mill.

Results of the Stage I assessment confirmed to the satisfaction of B.C. Environment that the project is located in a separate watershed from that supplying both surface and groundwater to the ski hill and recreational homes. As well, the recycling plan for the mill was determined to minimize impacts on downstream water supplies in the Nickel Plate Lake watershed.

### **TAILINGS POND LOCATION AND DESIGN**

The primary components of the proposed tailings storage facility are a storage dam and spillway, seepage recovery facilities with a pumphouse located downstream of the tailings dam, and diversion ditches for control and management of water on the site.

B.C. Environment's preliminary review of the Stage I submission raised concerns regarding the potential impacts of the tailings pond location in an area of groundwater discharge. The Ministry was concerned that the high groundwater discharge may introduce uncertainty in pond performance, water balance and seepage recovery. Based on revised company plans to begin with a small two year starter dam, and additional data and information provided by the company on seepage recovery facilities, the Ministry is satisfied that any further issues related to initial dam location and water balance can be addressed at permitting.

The performance of the two year pond, which will be closely monitored, will guide the design and construction of the final dam to hold twenty years of annual tailings production. The Ministry of Energy, Mines and Petroleum Resources will ensure that the final design of the dam and its construction will meet *Mines Act Health, Safety and Reclamation Code* approval requirements, to be reviewed and approved by the District Inspector of Mines.

Prior to the approval for the final design, the company will be required to provide an assessment of discharge rates from the initial tailings pond, results of downstream water quality monitoring, and performance of a compacted till liner. A report including the results of the first year of pond operation will be required. This assessment will provide the necessary information on which to base final dam design, seepage recovery requirements, and downstream water quality protection strategies.

### **DUST**

The operators of the Apex Alpine ski area, as well as local residents, expressed concern regarding the creation of dust as a result of the mining operations. Potential sources of dust from the project include blasting, loading, hauling and unloading of raw material, and processing the final product.

Concerns raised include the potential for dust from the mining operations to land on the ski runs that could lead to the snow melting prematurely in the spring. The shorter ski season would thus have negative economic impacts on the ski hill operations. As well, the increased dust level could pose a health risk to employees and patrons of the ski hill.

Blast testing conducted by Polestar to meet Stage I information requirements, indicated that garnet is a coarse grained, heavy density material which will produce a minimum amount of dust when blasted. The small amount of dust created is expected to settle close to the blast site within the quarry boundary. Also, the proposed mine plan indicates that blasting will take place only during the spring, after the ski season has finished.

Dust generation resulting from the transport of raw material from the quarry to the millsite, which will only take place for a short period in the spring, will be minimized by the use of dust suppressants on roads during dry conditions.

The regulation of dust generation from the mill process is a responsibility of B.C. Environment, under the *Waste Management Act*. Based on a preliminary review of the company's Stage I report, the Ministry requested additional information regarding pre-discharge baseline dust conditions, as well as details of the proposed on-going air quality monitoring program.

The additional information provided by Polestar satisfied B.C. Environment. The mill design may have to meet a total particulate emission rate of 1 mg/mol or 41.5 mg/m<sup>3</sup> from a stack or point source discharge. Further to this requirement, Polestar may be required to meet the dustfall objective of 1.7 mg/dm<sup>2</sup>/d at the property boundary, listed in Table I of the Pollution Control Objectives for the Mining, Smelting and Related Industries of British Columbia, 1979.

Fugitive dust (non-point source discharge) in and around the mill will be monitored regularly, and allowable levels will be restricted to 0.1 mg/m<sup>3</sup>, respirable dust for a normal 8 hour work shift, as described in the *Mines Act Health, Safety and Reclamation Code*.

The technical review of all dust sources and management strategies indicate that dust will not pose any problem to ski hill operations, local residents, or mine and mill employees.

## NOISE

Due to the proximity of the project to the Apex Alpine ski area, concern has been expressed regarding noise from blasting, and mill operations impacting the employees and patrons of the ski area, and local residents. Should any problems arise, Polestar has committed to adopt blasting procedures designed to mitigate noise emissions from blasting.

These include reducing the quantity of explosives and blasting on clear days only (low cloud cover reflects sound waves downward). Noise levels and ground vibrations will be monitored by the company.

The *Mines Act Health, Safety and Reclamation Code* controls allowed noise levels for unprotected ears on a daily basis at 85 dBA average for 8 hours with no exposure to steady state noise over 109 dBA and no exposure to impact noise over 140 dBA. As such, noise from the mill will be controlled to acceptable levels which will minimize impacts onsite, and offsite.

### **GRAZING/LIVESTOCK IMPACTS**

Maintaining fences between the two grazing license areas will require cattleguards on new roads, and appropriately located fencing to protect livestock from the mining operations. Reduction of rangeland for mining purposes is considered acceptable; however, Polestar will be required to continue meeting with range licensees and the grazing division of the Ministry of Forests to ensure mitigation of impacts on grazing are minimized to acceptable levels.

### **FOREST MANAGEMENT IMPACTS**

The Ministry of Forests accepts that timber value losses due to quarry and infrastructure development are expendable given the acreages stated. Restoration of forest and range values should be a priority in the company's reclamation plans for project abandonment, and all efforts to minimize impacts on these values during quarry operation should be considered.

### **RECLAMATION/BONDING**

Approval for exploration and requirements for exploration reclamation are covered under an inter-Ministry protocol agreement between the Ministry of Energy, Mines and Petroleum Resources and B.C. Parks. Reclamation of the disturbance caused by the company's exploration program which was designed to collect Stage I information requirements, met the requirements of both ministries, and no outstanding reclamation issues remain. However, the company will be required submit a detailed reclamation and abandonment plan covering all components of the project, including watercourses, waste dumps, pit walls, tailings pond, spill way and roads, pursuant to Section 10 of the *Health, Safety and Reclamation Code*. The plan should include reclamation plans for premature shutdown and for long-term closure at the end of the mine life. Based on a review of the reclamation plan the province's Reclamation Advisory Committee will make recommendations to the Chief Inspector of Mines on an appropriate level of bonding to cover the costs of reclaiming disturbed areas and managing outstanding liabilities.

## **RECREATION ASSESSMENT**

The B.C. Parks background report concluded that a mining operation of 60 000 tonnes/year of finished product would not significantly impact the recreation resources and values of the area. The direct impacts on recreation would be reduced access to a popular scenic viewpoint on Mount Riordan, and the need to re-route up to two kilometres of hiking and cross-country ski trails. The contents of the background report were presented at open houses held in Penticton on November 7 and 8, 1990. The findings of the report and the comments received from the public at these meetings will be incorporated into the final recreation management plan.

## **VISUAL ASSESSMENT**

Mount Riordan is an important landscape feature at Apex Alpine and the village. The garnet body covers a large portion of the mountain. Much of the area is densely forested by conifers, such that trees screen out the view of the summit of Mount Riordan from the Apex Alpine Village and the eastern shore of Nickel Plate Lake.

The company's quarry, mill and haul road are not visible from the village. This mitigates the problem of visual impairment from this area for the current mine plan. However, as the garnet reserves on Mount Riordan are extensive, any future proposed mine expansion plans will be subject to a full review to ensure no significant impacts on the village.

The quarry will now only be visible from the southern and western shores of Nickel Plate Lake, the lake itself, northwestern summit of Beaconsfield Mountain, the Potholes, southern slopes of Vista Ridge and the meadows at the Nickel Plate Nordic Centre. The quarry would also be visible at a distance from the western flanks of Apex Mountain and from the Golden Zone, but it would not be a dominant landscape feature. In winter, the quarry would be blanketed by snow, so visual impacts are expected to be minimal.

The processing plant will be located at a lower elevation, where trees would screen it from most viewpoints. The plant may be visible from the northwestern summit of Beaconsfield Mountain and the western slopes of Mount Riordan.

## **TOURISM ASSESSMENT**

The Ministry of Development, Trade and Tourism has advised the Mine Development Steering Committee of its concerns with the potential for the mine to impact on the present and future tourism values, and the need to ensure that all steps are taken to minimize impacts on the viability of Apex Alpine as a ski area and all season resort.

Although the company was requested to provide an assessment of comparable ski areas in proximity to mines, the province appreciates that no sufficiently comparable situation can be found for a fair evaluation. The Stage I technical review has not demonstrated any physical impacts that would contribute to an economic impact on the ski hill and related

infrastructure. The potential impacts of the mine can be best addressed in a properly designed monitoring program, and any resulting hard evidence of negative economic impacts can be considered in a review of ongoing mine operations, and of any future expansion or extension proposals. The monitoring program can be developed and implemented jointly with representatives of all identified stakeholders.

#### **FEDERAL GOVERNMENT REVIEW COMMENTS**

Environment Canada and Fisheries and Oceans Canada reviewed the company's prospectus and Stage I submissions pursuant to the federal Environmental Assessment Review Process Guidelines (EARP). Based on these reviews and discussion with the provincial B.C. Environment staff regarding the potential for fisheries habitat impacts, the federal government has concluded that the potentially adverse impacts may be mitigated with known technology, and that the project may proceed to permitting. The federal environmental review agencies have no objection to the granting of approval-in-principle for this project, however, have expressed an interest in reviewing relevant permit applications at Stage III.

September 18, 1991