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FILE NO:

MINE DEVELOPMENT REVIEW PROCESS
PROJECT FACT SHEET

CORPORATE DATA:

Project Name	Moose Creek Magnetite
Company Names/Addresses	St. Paul Minerals Limited 8515 - 142 Street Edmonton, Alberta T2R 0M2
Contact/Title	P. Demcoe, President

PROJECT DETAILS:

Location	Moose Creek, southeast of Golden, B.C. (NTS 82N/1: 51 Degrees 11' 30" North, 116 Degrees 21' West)
Estimated Capital Cost	$ 2,000,000.00
Minerals	Initial mineral magnetite
Mining System	Open pit in unconsolidated material (talus)
Estimated Production	120,000 tonnes concentrate, producing 60,000 tonnes of magnetite annually
Processing Plant	Mine: Wet screening and magnetic concentration Mill: 2 stage ball mill grinding with magnetic separation and drying
Mineral Reserves/Resources	(tonnes of magnetite)
Proved Reserves	205,000 tonnes
Indicated Reserves	362,000 tonnes
Resources	1,900,000 tonnes
Average Grade of Ore	5.5%
Cut Off Grade	2.5%
Potential for Additional Reserves	Very favourable, especially in the intrusive body

Access/Transportation	
Road	TransCanada Highway and forestry trunk road
Rail	Canadian Pacific Railway Mainline at Leancoil, 20 kilometres east of Golden
Air Access	Golden airport - no scheduled commercial flights
Power Supply	On-site generation
Requirements	Approximately 1000 kw
Supply Alternatives	No reasonable alternative
Work Force Information	
Total operational work force	54
Housing options	1) Commuting from Golden 2) Camp managed by local lodge 3) Summer camp near millsite
Construction work force	Modest 10 work years
Construction camp	Commute from Golden
Work Force Rotation	Mine: 12 days on, 2 days off 3 1/2 summer months, or as directed Mill: Normal three shift rotation, or as directed
Indirect/Induced Employment	Not available
Development Schedule	
Stage I submission filed	February 1991
Site construction start up	Third Quarter 1991
Production start up	Stockpile - Third Quarter 1991

THE MOOSE CREEK MAGNETITE PROJECT

LOCATION AND PROPERTY HISTORY:

The property is located on the north east slope at the head of Moose Creek Valley. Moose Creek drains southward to the Beaverfoot Valley, which in turn joins the Kicking Horse drainage system south east of Golden, British Columbia (Figure 1.)

GEOLOGY:

The basic geology of the area consists of folded and faulted sedimentary and metasedimentary rocks of Cambrian-ordovician age in the mountains. These are chiefly dolomite, limestone, sandstone and argillite. In the upper Moose Creek area these sediments have been intruded by a mafic intrusive (See Figure 2.)

The property was described by J.A. Allen in Geological Survey of Canada (GSC) Memoir number 55 (1914). The deposit was evaluated by H.V. Ellsworth and John F. Walker in GSC Summary Report 1925, part A.

The deposit is referred to by Allen as "... the large area of basic rock at the head of Moose Creek that contains as much as 14-15% magnetite." Ellsworth and Walker examined the deposit in terms of knopite, a titanium bearing mineral, "... occurring in a fairly coarse basic pegmatite composed essentially of hornblende, biotite and magnetite. The pegmatite outcrops at an elevation of 8,500 feet. It is lenticular, 30 feet wide and appears to be intrusive."

From the descriptions cited above, it can be seen that the deposit consists of a large mafic magnetite - containing intrusive with coarse grained mineral segregation zones containing magnetite, knopite and cesium group minerals. Recent work on the talus slope has unearthed boulders of diorite, olivine, sodalite and other unidentified mineral types.

A large talus slope has developed from the erosion of the basic or mafic rock mass. It appears that the magnetite-containing rocks are more friable than the host rocks, resulting in talus in which the large, coarse material up to large boulder size contains very little magnetite. The fine fraction (minus 4 mesh) contains substantially all of the minerals of commercial interest.

RESERVES:

Magnetite in the talus slope is the mineral of commercial interest at this time. Economic feasibility of producing any other minerals occurring in the deposit will be evaluated on an ongoing basis as development proceeds.

Results from a bulk sampling and analysis program have demonstrated reserves of magnetite contained in the broken, talus material as follows:

Proved reserves:	205,000 tonnes
Indicated reserves:	365,000 tonnes
Resources:	1,900,000 tonnes
TOTAL	**2,500,000 tonnes**

(Please refer to the small scale (1:2500) map in the attached pouch.)

Present consumption of magnetite in British Columbia and Alberta by the coal industry is approximately 60,000 tonnes per year. At this rate of production, total indicated reserves/resources are sufficient for over 40 years.

PROPOSED PILOT MINING AND ORE PROCESSING:

The mining method proposed is an earth moving operation utilizing bulldozers and front end loaders. Because of its simplicity, no pilot mining activity is contemplated.

The ore processing procedure is also fundamentally simple in nature. The high specific gravity and magnetic characteristics of magnetite allow simple proven procedures for its concentration from the waste materials.

PROPOSED PRODUCTION LEVELS:

Full production of 60,000 tonnes per year of magnetite will supply the present requirements of the western Canadian coal industry. Because of the elevation of the deposit, snow conditions limit mining operations to between 3 and 3 1/2 months per year. Scheduled production anticipates a three shift operation essentially during the months of July, August and September. Magnetite production of 20,000 tonnes per month will require processing 360,000 tonnes of talus or about 14,000 tonnes per day. Talus reserves/resources alone without consideration of the magnetic content within the intrusive rock mass is projected to exceed forty years of production at current consumption levels.

MINING AND EXTRACTION:

There is no overburden or ground cover in the central part of the talus deposit because it is an active avalanche area. The volume of talus in this part of the deposit alone is sufficient to sustain 9 to 10 years of mining operations. Elsewhere on the deposit there is little ground cover (See pictures and panoramic composite).

Mining operations will be basic earth moving activities. A bulldozer will push talus to a feeder hopper equipped with a grizzly to eliminate over size rocks. The hopper will be fed by a front end loader. Extraction (See flow sheet 5A Figure 5) will be a wet screening operation with a magnetic drum collecting the magnetic material from the fine screened fraction.

Waste rock and stripped fines will be delivered by a portable conveyor belt to a disposal area where it will be contoured to a stable slope angle. Initially, waste disposal will be carried out on an existing low profile barren talus slope west of the mining area (lower end of line $C\text{-}C_1$). When a slot of suitable size has been developed to bedrock, waste rock will be spoiled in the mined out area.

Waste water from the screens will be pumped to a tailings pond off drainage channels. Settled water will be returned to the extraction unit for reuse. Seepage losses will be made up from slope runoff and groundwater.

It can be seen from the brief description given above that the mine site operation is a simple dozing/screening operation requiring no drilling or blasting and no overburden removal.

The mineral concentrate will be delivered to a storage bin or a surge stockpile and will be hauled to the mill site stockpile at the mouth of Moose Creek, eleven kilometres downstream (See Figure 3).

MILLING AND TAILINGS SYSTEMS:

The mine concentrate will be hauled to the mill site stockpile on an ongoing basis during the 3 to 3.5 months of mine operations. Stockpile capacity will be about 100,000 tonnes. A tentative site has been chosen (See Figure 3) which will permit a gravity flow mill design. Mill capacity will be designed for 325-350 tonnes of product per day operating during the months of May through November. The mill circuit (See flow sheet 5B, Figure 5) will accept mine concentrate which will be wet ground in a first stage ball mill to reduce the particle size sufficiently to liberate gangue particles attached to the magnetite. Gangue will be removed by wet cyclones.

Cleaned magnetite will be dewatered and dried. Secondary dry grinding in a ball mill with air classification will produce minus 325 mesh product suitable for heavy media and coal cleaning circuits. The product will be transported pneumatically to the product storage bins.