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Tulsequah Chief

December 10, 1996

To: Honourable Dan Miller
Minister of Employment and Investment

Re: Briefing Note - Meeting with Redfern Resources Ltd.

Enclosed please find an information Briefing Note for your upcoming meeting with Redfern Resources Ltd., on December 12, 1996 at 9:00 a.m., regarding the Tulsequah Chief Mine Project.

The Briefing Note was written by staff of the Environmental Assessment Office, and approved by their Deputy Minister, Dr. Sheila Wynn.

This note has been reviewed by Ministry of Employment and Investment staff and represents the issues well.

- since '87: spent \$20 m on Tulsequah.
- Project Report filed with govt - Nov 25 - screening
- barges, west creek - riversilted up.
- roads the one option.

Blair Redlin
Acting Deputy Minister

- analogous to Westmain - 941 mine level but
optimistic re much longer

Enclosure

- 160 km road; 115 km is new, rest is placer roads

- SUA - special access, gated, stalled
poaching.

PO, ADMEM

Regional Operations,

Health & Safety Br.

Br. File # 280-20

Log #EMD960422

DM. - like mines, expect to see where add'l
dms can help

set up three systems to
clear the projects

MO9607848

- interim financing, then project name
financing given project name → gov't of BC
will support it

**ENVIRONMENTAL ASSESSMENT OFFICE
BRIEFING NOTE**

TULSEQUAH CHIEF COPPER/LEAD/ZINC/GOLD/SILVER PROJECT (MINE PROJECT)

Redfern Resources Limited (Redfern) proposes to reopen the former producing Tulsequah Chief mine located on the east bank of the Tulsequah River 14 km north of its junction with the Taku River. The project is 100 km due south of Atlin, British Columbia and 64 km northeast of Juneau, Alaska. The proposal is to develop an approximately 2500 tonnes per day underground base/precious metal mine and mill, and transport the ore concentrate to Skagway, Alaska.

BACKGROUND:

Redfern is a publicly traded company based in Vancouver and sole owner and operator of the Tulsequah Chief Project. Redfern's involvement in the Tulsequah Project area commenced in 1981. The project site was a former producing mine operated by Cominco Ltd. in the 1950s, with initial discovery and development dating back to the early 1920s. Redfern staked claims surrounding the mine and later secured an option agreement with Cominco to renew exploration of the deposit. Major exploration programs commenced in 1987 and continued each succeeding year through 1994. During this period Redfern negotiated and exercised an option to purchase Cominco's interest and become the sole owner of the property.

In June 1994 Redfern submitted an application under the former Mine Development Assessment Process to reopen the mine. Redfern was provided with draft terms of reference for further studies based on the review of the application and the results of multi-stakeholder group workshops. Upon proclamation of the *Environmental Assessment Act* on June 30, 1995, the project was transferred to the environmental assessment process at the step known as "Draft Project Report Specifications". Final project report specifications were provided to the proponent in February 1996.

CURRENT STATUS AND EMERGING ISSUES:

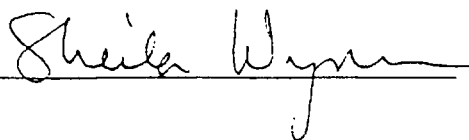
- Redfern has submitted their Project Report and is currently involved in the 25 day screening stage of the EA review process. If the project committee accepts the project report, it will then enter into the project review period.
- Mine life of ten years is planned with an operational workforce of 199 people on site and 60 positions contract trucking. A two year construction program will involve 700,000 person hours with 337 people employed at peak construction. During the two year construction period approximately \$40 million will be spent in labour costs. The operational period will see approximately \$15 million spent on labour. Mine operating costs will average \$32 million with supplies at \$25 million and road maintenance of \$1 million. The project is expected to pay out \$191 million to governments.

- The issue of access is the major concern for First Nations, review agencies and the public. The original proposal was to ship mine concentrate by use of shallow-draft barges down the Taku River to Juneau. Based on economic feasibility, Redfern has rejected this mode of transportation in favour of constructing a 160 kilometer new private industrial gravel road, through the upper Taku River Valley, to the public road system at Atlin. There is increasing public pressure to object in principle to the road based on potential wilderness and tourism impacts.
- Concerns have also focused on the type and level of wildlife information, in particular for grizzly bears, moose, and other important wildlife resources required to satisfy key review agencies, the public and First Nations with regard to assessing impacts of the road option on wildlife.
- The Taku River Valley and the proposed road corridor to Atlin is deemed to be available for integrated resource management, as it was not included as a proposed Area of Interest (AOI), during the Protected Area Strategy process, and has not been subject to a Land Resource Management Planning Process (LRMP).
- First Nations (Taku River Tlingkit) are particularly concerned that the proposed road may adversely alter traditional cultural sustenance uses.
- Acid rock drainage (ARD) exists at the project created during the Cominco mining period. Redfern proposes to eliminate this problem and ensure that no additional ARD occurs as a result of its project by placing high sulphide tailing back underground and by ensuring that tailings deposited on the surface are not acid generating.

CONFIDENTIAL

The road access issue is extremely controversial. First Nations are expected to reject this mode of transportation as they believe it will adversely affect their traditional use and cultural and sustenance sources. Allied with the First Nation is the Taku Wilderness Association and a number of environmental activist groups who oppose access to "the last unroaded wilderness area in B.C." This issue is very similar to the Windy Craggy access issue. Media support for rejecting the road will be encouraged by these groups, which have already begun soliciting provincial and national support. Ministry of Environmental, Lands and Parks will be under duress to defend or reject the road on the basis of impacts to grizzly bear, moose and other important wildlife resources. An extension to the 25 day screening period may be required in order for First Nations, U.S. federal governments and other agencies to fully determine if the project report has met the project report specifications and is acceptable for full review.

Deputy Minister Sign-Off



Contact: Mike Kent
Telephone: 356-0312
Date: December 4, 1996

**TULSEQUAH CHIEF MINE
NORTHWEST BRITISH COLUMBIA**

REDFERN RESOURCES LTD

Project Summary

Presented to

Hon. Dan Miller

Deputy Premier and Minister of Employment and Investment

December 12, 1996

TULSEQUAH CHIEF MINE

EMPLOYMENT

- 700,000 person-hours of employment, up to 397 positions during two year construction period
- 260 full-time highly paid positions during operation over minimum 9 year mine life

ECONOMICS AND REVENUE

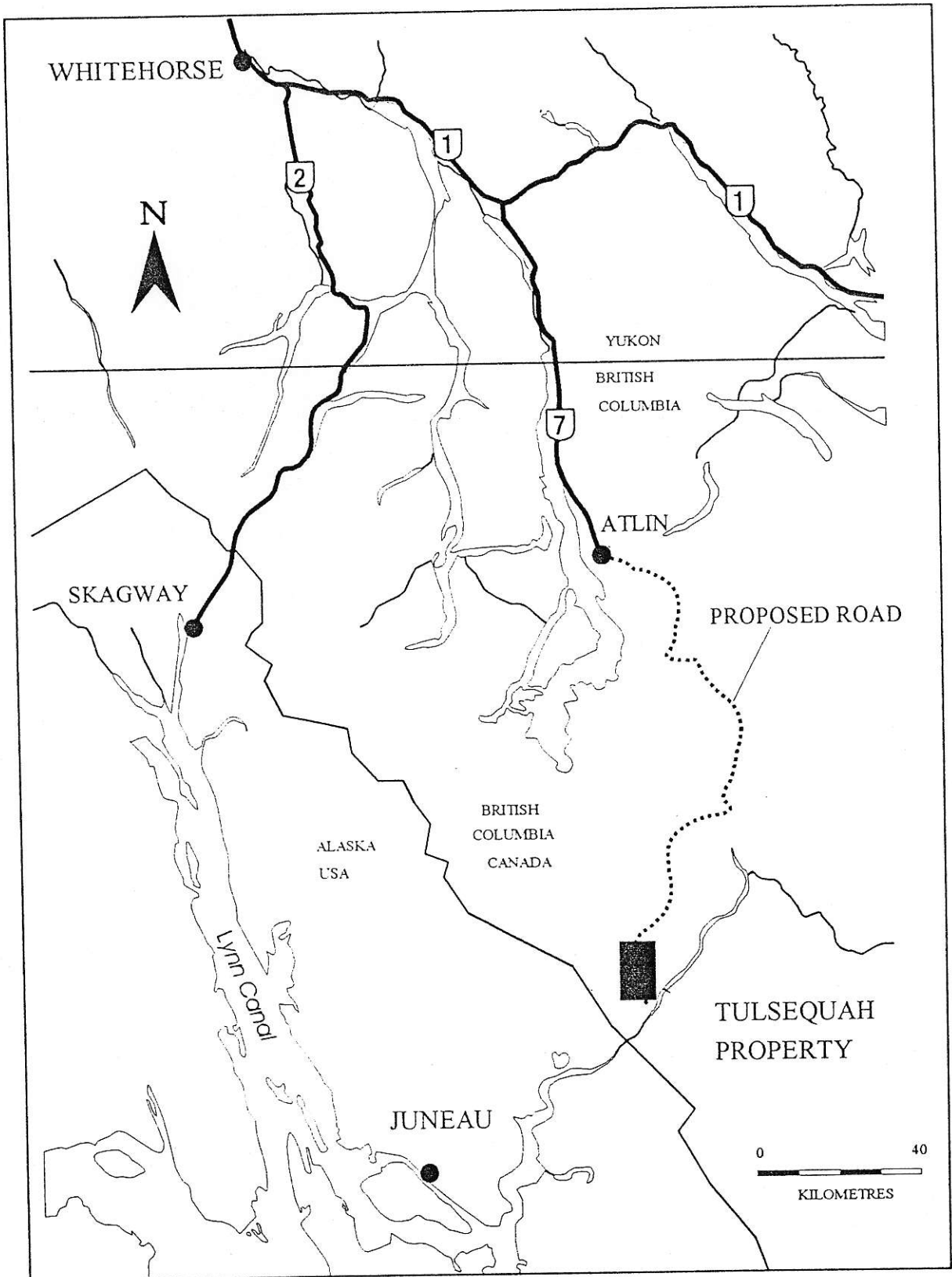
- \$250 million in revenue to governments over mine life
- Project payback in 3.2 years
- Rate of return before tax of 24.6%

ENVIRONMENT

- Re-open and clean-up old mine site
- Underground mine - low surface impact
- All potential acid generating waste returned to mine for safe disposal
- Neutral waste products designed for permanent surface storage and closure

FIRST NATIONS

- Project lies entirely within Taku River Tlingit First Nation territory
- Phase 1 Agreement in place, contemplates future comprehensive Impacts and Benefits Agreement
- Consultation is comprehensive and ongoing
- Taku River Tlingits are at Stage 4 in land claims process



General Site Location Map - Tulsequah Chief Project

Reserves

Tonnes	Zinc%	Copper%	Lead%	Silver (g/t)	Gold (g/t)
7.91 million	6.35	1.27	1.18	100.91	2.42

Forecast Average Annual Production of Metals

Metal	Zinc (tonnes)	Copper (tonnes)	Lead (tonnes)	Silver (ounces)	Gold (ounces)
Annual	53,200	10,090	9,350	2.42 million	56,000
Total	489,400	92,800	86,000	22.2 million	516,000

Construction and Operating Expenditures

Construction: \$142 million capital over two years

Operating: \$50 million operating costs annually, \$436 million in total
\$29 million capital over 9.2 year mine life

main revenue is zinc

Direct Employment

During construction: 700,000 direct person-hours over two years, up to 397 positions and \$40 million in labour wages.

During operation: 260 employees and contract positions, \$15.5 million in wages and benefits, average \$74,000 per position annually.

Revenue

9 year mine life, open to increase
3.2 year payback, 24.6% pre-tax IRR

Mine life total revenue:	\$935 million
Shareholder return (after taxes, capital recovery)	\$184 million
Mine life direct Government revenues	\$191 million
plus employee income taxes, estimate	\$ 30 million
plus spin-off employment income tax, est.	\$ 30 million
<u>Total government revenue, estimated</u>	<u>\$251 million</u>

Environmental Protection Measures

- New mine will effect complete clean-up of old mine site and existing river contamination
- Underground mine with low surface area disturbance
- Underground mill and rock crushers for minimal surface noise
- Mine design avoidance of potential acid-generating rocks
- Maximum return of waste products to the underground mine
- Safe neutral tailing disposal on surface for permanent reclamation and re-vegetation on mine closure
- Treatment plant for all minewater discharge to ensure water quality compliance
- Restricted access road management to preserve wildlife values

Access and Infrastructure

- Construction of a 160 kilometer single lane mine access road from Atlin south to the mine site; 115 kilometers of new construction. Total cost of \$30.4 million.
- Public highway 7 from Atlin, B.C. to the Alaska highway requires base strengthening and upgrading
- Surface plant and facilities, 9 megawatt diesel power plant, underground mill
- Airstrip, tailings impoundment site and limestone quarry

First Nations

- Located within Taku River Tlingit First Nation (TRTFN) traditional territory. There are no other overlapping First Nation land claims
- Redfern and TRTFN have signed a Phase 1 agreement covering protocols for information exchange and environmental assessment assistance. This agreement contemplates negotiation of a future Impacts and Benefits Agreement.
- Redfern and TRTFN are maintaining frequent meetings and consultation.

Summary Features of the Tulsequah Chief Mine Proposal

December 12, 1996

Ownership

- Property was formerly owned and operated in the 1950's by Cominco, shutdown in 1957.
- Major exploration programs since 1987 with expenditure by Redfern of \$20 million.
- Redfern has consistently employed local people and used Atlin/Whitehorse based services to the utmost possible.
- Redfern purchased Cominco's interest in 1992 and posted an escrow cash account to cover remediation of historical mining effects. This account stands at \$1.37 million.
- Redfern currently owns 100% of the project.**
- Redfern has an excellent record of compliance with government regulation and has demonstrated responsible corporate citizenship in the environmental arena.

Production

- Proposed underground mine, 7.9 million tonne minable reserve (open)
- 6.35% Zinc, 1.27% copper, 1.18% lead, 2.42 g/t gold and 100.91 g/t silver
- At full production, 2466 metric tonnes/day - 900,000 tonnes per annum
- 9 year mine life with current reserves, open to increase.
- Approx. 151,000 tonnes/year of concentrate to be shipped
- Approx. 35,000 tonnes/year of inbound supplies (fuel, lime, cement)

Economics

- \$142.3 million up front capital requirement
- \$29 million sustaining capital requirement (shaft, equipment replacement)
- Average operating cost of \$56/tonne, NSR of \$118/tonne, revenue margin of \$62/tonne
- 3.2 year payback, 17.6% after-tax IRR
- 199 employees (130 on-site at any one time) + 60 contract trucking/transport
- Average annual compensation of \$74,000 per year
- \$191 million payments to government (taxes, royalties)

Pro-active Environmental Protection Measures

- Underground mine development concentrated in non-acid generating hanging wall rocks.
- Operational segregation of potential acid-generating rocks for return to vacant stopes.
- Tailings treatment:
 - Flotation and segregation of waste sulphide (pyrite concentrate) for return to mine as backfill.
 - Cleaned tailings (~1% S) mixed with cement as paste backfill to seal historical mine workings
 - Tailings used with pyrite con and cement to form paste backfill for sub-water table

- mine backfill.
- Remaining cleaned tailings (30% of tonnage) mixed with finely ground limestone to ensure acid neutrality and stored in tailings pond.
- Historical waste rock to be incorporated in backfill program for sub-water table in-mine stopes.
- Closed system capture of mine water and process water with temporary storage in tailings pond.
- Water treatment plant for effluent discharge - reduces metal loads to government criteria levels. Treated effluent water has passed bio-assay tests with 100% fish survival rate.

Access:

- Redfern proposes construction of a 160 kilometer road from Atlin south to the project.
- Extensive fisheries, wildlife and geotechnical studies are incorporated in the road design for environmental mitigation.
- Redfern proposes stringent access management to restrict non-Company use to other legitimate permitted tenure holders for the purpose of their tenure use only.
- Management will be by manned gate, patrol by company vehicles, mandated radio use.
- Redfern will seek imposition of a no hunting corridor along the road and a ban on fire-arms.
- Redfern expects to post a bond and carry out road de-activation on mine closure.

TULSEQUAH CHIEF PROJECT OVERVIEW

The Tulsequah Chief mine development proposal presents an opportunity to re-activate a historic mining district of B.C. under present day stringent environmental standards and expectations. The project is economically robust with a high grade, polymetallic deposit open to expansion. Revenues are forecast from 4 contained metals: zinc, copper, gold and silver. This provides a "built-in" resilience for weathering cyclic periods of depressed metal prices as it is unusual for all of these metals to be in a low cycle at the same time. The excellent precious metal content gives this deposit an extra edge over typical base metal producers.

After eight years of intensive exploration in the period 1987 to 1994, the Tulsequah Chief project was advanced into final feasibility studies and entered the Mine Development Assessment Process in the fall of 1994. Environmental baseline studies were initiated in detail in May of 1994. Public consultation and government agency review and meetings were held in 1995 leading up to the acceptance of the project into the Environmental Assessment Process in July of 1995. Draft Project Report Specifications were issued by the Environmental Assessment Office on November 24, 1995. After review and incorporation of additional items, final Project Report Specifications were issued on February 15, 1996. Redfern has conducted additional studies to meet the final specifications and recently submitted the Project Report to the Project Assessment Committee for 25 day screening. If accepted, the Project Report will be filed for formal review in support of Redfern's Project Approval Certificate application. Under normal guidelines, a decision on the application could be made by mid year, 1997.

In response to the necessary remediation of past mining effects and in recognition of the sensitive wildlife and salmon habitat in the vicinity and downstream of the proposed mine, Redfern sought to achieve a very high standard of environmental mitigation and compliance in the project development and operation. The feasibility study incorporates these plans in the mine costs. The development will utilize and meld a number of proven recent technologies into a very effective, model mining operation. These techniques include the separation of waste pyrite; pastefill ground control to maximize ore extraction and return of waste material back to the mine; identification, avoidance and treatment of acid-generation; remediation of historic mine workings; and mine design which plans for effective and permanent safe closure.

Economic and environmentally sound access is vital for the mine proposal. Due to the relative remoteness of the site and the high tonnage of metal concentrates produced, access is a critical cost component for the feasibility of the mine. A number of access alternatives were examined at an early stage and ultimately all but one were discarded as infeasible. The exception is the overland option involving construction of a 160 km. road from Atlin to the site, thereby allowing year round trucking to Skagway.

The proposed mine will provide over 250 direct and contract transportation jobs and have a beneficial economic impact for the local communities and the Province. Independent surveys undertaken by the

Atlin community leadership indicate a decided majority in favour of the project. An even higher percentage are in favour if the potential for logging development is controlled. This has emerged as the issue which concerns most locals. This anti-logging sentiment of the Atlin area has been communicated to the Ministry of Forests and may have influenced the recent decision to maintain Atlin's annual harvest levels at the current rate despite the large increase in Annual Allowable Cut levels elsewhere in the Cassiar Forest District.

Redfern's liaison and consultation with the Taku River Tlingit First Nation (TRTFN) has been ongoing since Redfern took over ownership of the project in 1992. Meetings commenced in earnest in early 1993 and have accelerated through the mine development review process. Redfern and TRTFN negotiated a preliminary agreement in 1996 covering information requirements for the environmental assessment process. This agreement allows for further negotiation of an Impacts and Benefits Agreement if the environmental assessment is acceptable to the TRTFN.

The characteristics of the Tulsequah Chief deposit and development proposal make it a microcosm of the challenges facing the B.C. mining industry in the 90's. Mines face unrelenting environmental scrutiny, a complex and overlapping maze of regulatory agencies and permitting requirements, the uncertainties of the ongoing native land claims process and the natural technical challenges of economic operation in a competitive global marketplace. Within this framework Tulsequah Chief emerges as a worthy and responsible mine development proposal.

PRO-ACTIVE ENVIRONMENTAL PROTECTION MEASURES

- Underground mine development concentrated in non-acid generating hanging wall rocks.
- Operational segregation of potential acid-generating rocks for return to vacant stopes.
- Tailings treatment:
 - Flotation and segregation of waste sulphide (pyrite concentrate) for return to mine as backfill. Pyrite stored in lined site pending backfill.
 - Cleaned tailings (~1% S) mixed with cement as paste backfill to seal historical mine workings
 - Tailings used with pyrite con and cement to form paste backfill for sub-water table mine backfill.
 - Remaining cleaned tailings (30% of tonnage) mixed with finely ground limestone to ensure acid neutrality and stored in tailings pond.
- Historical waste rock to be incorporated in backfill program for sub-water table in-mine stopes.
- Closed system capture of in-mine water and process water with temporary storage in tailings pond.
- Water treatment plant for effluent discharge - reduces metal loads to government criteria levels. Treated effluent water has passed bio-assay tests with 100% fish survival rate.
- Former mine workings sealed for mine closure. New mine flooded and sealed. Clean-up of existing acid mine water discharge.
- Site infrastructure to be removed and surface reclaimed on closure.
- On closure, tailings impoundment water to be drained and treated. Tailings will be covered with original substrate material and re-vegetated. Test plots will be evaluated during mine-life.
- On completion of site reclamation, mine access road will be de-activated and reclaimed.

ROAD ACCESS - OPERATING PARAMETERS

- Preferred alignment (see map) runs for 160 kilometers north from site, up Shazah Creek valley, on east and south sides of Nakonake River, across Sloko River, northeast to Atlin plateau and across Silver Salmon Creek, east of Kuthai lake, across Silver Salmon again, east of Dixie lake, across O'Donnel River, up Wilson Creek, on south side of Spruce creek, across Spruce creek and along existing placer roads to Pine Creek road and then cuts across to Como Lake, bypassing Atlin.
- Capital cost is \$30.4 million, operating cost approx. \$9.5 million including maintenance and haulage on existing roads to Skagway.
- Haulage based on 155,000 tonnes/year out-bound, 35,000 tonnes per year in-bound, 330 operating days, and 60 day window for restricted loads. *Terrain Ecosystem Mapping*
- Road construction will be overseen by an environmental supervisor acceptable to government who will monitor and ensure appropriate construction practice. Site specific criteria will be followed for safe and environmentally acceptable stream crossings. Some crossings may be amenable to habitat enhancement at minimal cost.
- Maintenance costs \$1.1 million/year. Road is a single lane, gravel haul road built under Forest Practices Code guidelines.
- Traffic will consist of up to 13 trucks per day on average haul basis of 982 kilometers round trip to Skagway. This implies 26 road transits or about one every 55 minutes. Concentrate trucks will bring most of the inbound supplies in on backhaul. Specialized supplies such as explosives, refrigerated food etc. will amount to about 3 additional trucks per week. One bus per week will rotate supervisory personnel.
- Traffic will be radio-controlled with pullouts for traffic passage spaced every 250 m. on average. Access will be controlled by a manned gate established at a suitable point - probably south of the O'Donnel river. Access will be restricted to permitted users only for the purpose of their permit.
- Mine personnel will be on 2 -4 week rotation. Hunting will not be permitted on mine property or road route.
- Redfern expects to be required to post a bond for road de-activation and reclamation on mine closure.