SULPHURETS GOLD/SILVER PROJECT

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INFORMATION SUPPORTING A SCREENING DECISION UNDER THE FEDERAL ENVIRONMENTAL ASSESSMENT AND REVIEW PROCESS GUIDELINES ORDER

VOLUME 1
SUMMARY

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Conservation and Protection | Conservation et Protection
Canada

SULPHURETS
GOLD/SILVER PROJECT

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Environment Canada
Conservation and Protection
Inland Waters
Vancouver, British Columbia
March, 1990

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EXECUTIVE SUMMARY

The Sulphurets Gold/Silver Mine Project is located in the drainage basin of the international Unuk River which flows between British Columbia and the State of Alaska. The mine project includes the construction of hydro dams which requires federal licensing pursuant to the International River Improvements Act (I.R.I.A.). Because the issuance of a licence by the Minister of Environment constitutes a federal decision making responsibility, Environment Canada is the federal initiating department for the purposes of the Federal Environmental Assessment and Review Process (EARP) Guidelines Order.

Since both federal and provincial jurisdictions are involved in the Sulphurets Project, it was both advantageous and necessary for both governments to work together. In this way it was possible to avoid duplicating separate environmental reviews yet satisfy the requirements of the federal EAR Process. The environmental assessment information produced under the established provincial Mine Development Review Process (MDRP) was drawn upon in conducting the federal review. The federal environmental assessment considered the areas addressed by the provincial review process (both environmental and social effects) but was also extended to specifically include matters of particular relevance to federal responsibilities. These included potential impacts on water quality and quantity, fish and fish habitat, migratory birds, navigable waters and rare and endangered species. In compliance with the EARP Guidelines Order, effects external to Canadian territory were also considered in the federal review. In addition, to ensure the concerns of the public (specifically native people) are considered an additional review opportunity has been provided to the Nisga'a Tribal Council.

This three volume report documents that the Sulphurets Project has undergone an environmental assessment in accordance with EARP. The report demonstrates that all the potential environmental impacts associated with the project have been assessed. The report concludes that the project will not result in significant adverse effects to water quantity including

downstream water uses and waterways, water quality at the Canada-U.S. boundary, aquatic biota including fish and fish habitat and migratory birds. Accordingly, pursuant to section 12 (c) of the EARP Guidelines Order, the impacts of the proposed project are determined to be insignificant or mitigable with known technology. This report provides the basis for reaching an environmental screening decision.

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INTRODUCTION

The proposed Sulphurets Gold/Silver Mine is located, approximately 40 km from the Canada - U.S. (B.C. - Alaska) border, in the drainage basin of the international Unuk River.

The project would involve;

- an underground mine with six years of mining operations at a mill throughput rate of 318 tonnes per day, utilizing gravity separation followed by flotation of a silver-rich sulphide concentrate,

- underwater disposal of potentially acid generating waste rock and of mine tailings into Brucejack Lake,

- a storage reservoir on Brucejack Lake and a hydroelectric generating facility on Brucejack Creek, and

- permanent access roads and barge-loading sites on Bowser Lake and a camp facility for a workforce of 112 persons.

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Since the Unuk River is an international river, Newhawk Gold Mines Ltd. will require the federal Minister of the Environment to issue a license for the hydro storage dams of the project pursuant to the International River Improvements Act (I.R.I.A.). The Federal Court of Canada's decision of April 1989 on the Rafferty-Alameda project reaffirmed that in issuing such a license the EARP Guidelines Order must be complied with.

Between May 1987 and December 1989 an environmental assessment of the potential impacts of the project on areas of both provincial and federal jurisdiction was carried out by a cooperative federal-provincial effort.

The provincial review was conducted under the established B.C. Mine Development Review Process (MDRP) in which federal agencies participated. The federal EARP review drew upon the environmental and socioeconomic assessment information produced under the provincial MDR Process but was also extended to include matters of particular relevance to federal responsibilities. These included water quality and quantity, migratory birds, fish and fish habitats, navigable waters and rare and endangered species. In compliance with the EARP Guidelines Order, effects external to Canadian territory and concerns of the public (specifically native people) regarding the proposal were also added to the federal review.

For the Sulphurets Project, the federal responsibilities can be summarized under the following headings:

International Waters: Canada has authority over transboundary water quality (Canada-U.S. Boundary Waters Treaty). The federal government is also obligated to ensure that water quantity is maintained and improvements or control structures do not adversely affect downstream users, in this case, Alaska (International River Improvements Act).

Migratory Birds: Canada is responsible for the protection of migratory birds under the Migratory Birds Convention Act. Riverine areas in the Sulphurets Project area could provide habitat for migratory birds, and Canada must ensure the Project does not adversely effect migratory birds.

Fish and Fish Habitat: Canada has responsibility for protection and management of fish and fish habitat under the federal Fisheries Act and may regulate activities that could alter flows or affect water quality in any way that may harm fish. The Sulphurets Project has the potential to affect water levels and water quality in Brucejack Creek, Sulphurets Creek and the Unuk River. The federal Metal Mining Liquid Effluent Regulations (MMLER) pursuant to the Fisheries Act apply to metal mines, except gold mines employing the cyanidation process, and prohibit the direct discharge of tailings into fish bearing waters.

Rare and Endangered Species: Canada has no direct mandate for protection of rare and endangered species, but it cooperates with other governments on a national and international level in their conservation and protection efforts, partly through the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). No rare or endangered species have, however, been identified in the Sulphurets Project area.

Navigable Waters: The federal government, through Transport Canada, administers the Navigable Waters Protection Act (NWPA), and the Canada Shipping Act. Any project that may affect navigation on a navigable waterway must apply to the Minister of Transport for a license under the Act. Vessel operations are required to meet the standards of the Canada Shipping Act.

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The objectives of this report, comprised of this summary Volume 1 and appendices A to L, Volumes 2 and 3 are to:

1) provide the basis for the federal environmental screening decision; and

2) document compliance with the federal Environmental and Assessment Review Process.

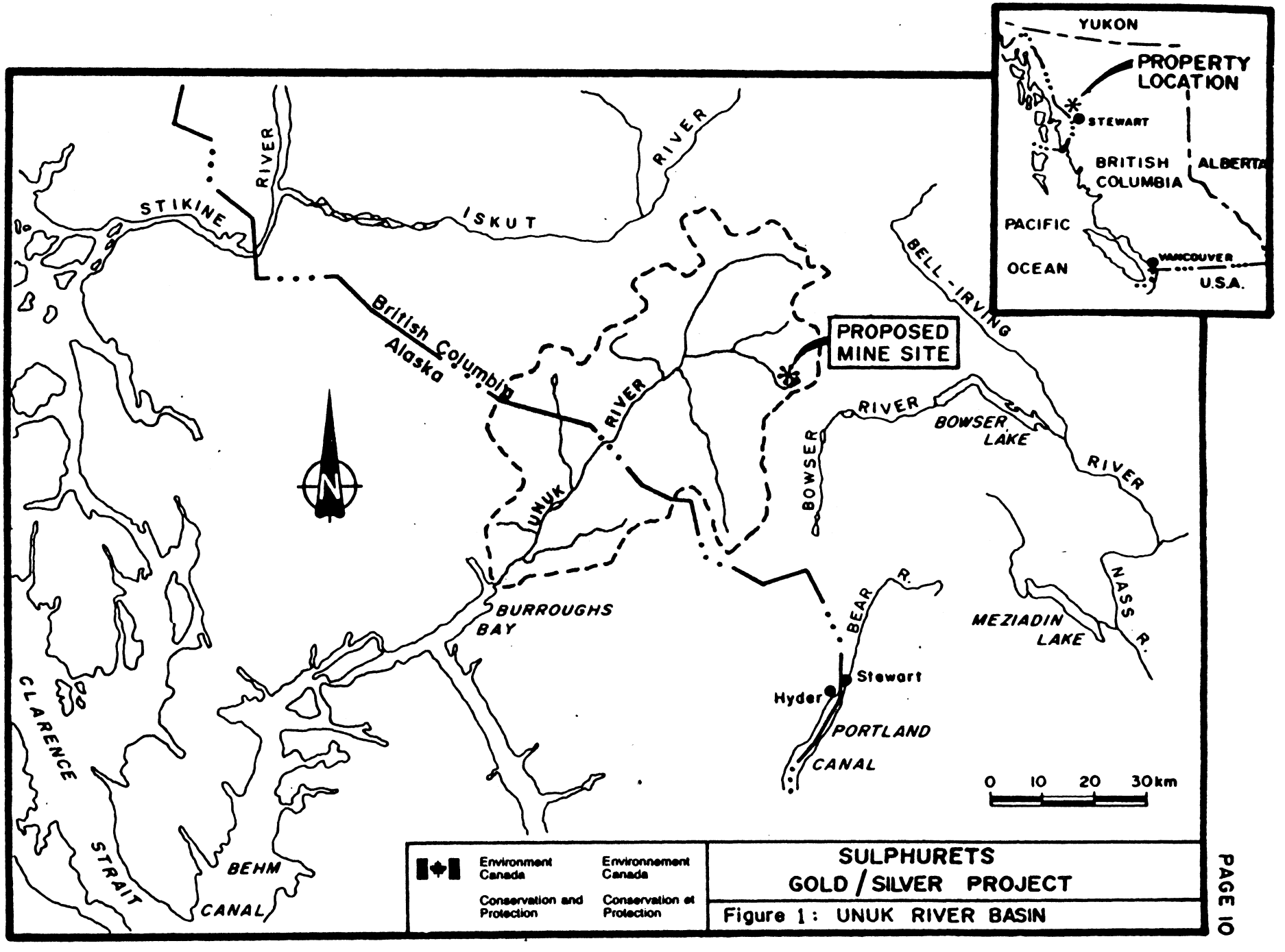
PROJECT PROPOSAL

PROJECT SETTING

The Sulphurets Project is located in northwestern B.C. in the drainage basin of the international Unuk River (Figure 1). It is 56 km northwest of Stewart, B.C. and approximately 40 km from the British Columbia-Alaska border.

The mine property is at high altitude within an area of high mountain peaks and ice-fields in the Boundary Ranges of the Coast Mountains. The mine site is glacial terrain with exposed bedrock, some glacial till and a limited cover of alpine vegetation. The higher elevations of the mine property remain permanently ice-covered.

The drainage area of the property is characterized by high plateau glacial fed lakes, dominated by Brucejack Lake, and are ice-bound most of the year (Figure 2). The drainage from the lakes is westward beneath the Sulphurets Glacier and it emerges as Sulphurets Creek. Sulphurets Creek is then joined by Mitchell Creek and from there flows downstream to the confluence with the Unuk River. The Unuk then flows southwest through narrow canyons for approximately 25 km to the Canada-U.S. border. Once in Alaska, the Unuk crosses 35 km of U.S. territory before emptying into Burroughs Bay. East of the mining property the Knipple Glacier drains eastward to the Bowser River-Lake system.


YUKON
PROPERTY LOCATION
STEWART
BRITISH COLUMBIA
ALBERTA
PACIFIC OCEAN
VANCOUVER
U.S.A.
STIKINE RIVER
ISKUT RIVER
British Columbia
Alaska
PROPOSED MINE SITE
BELL-IRVING
UNUK RIVER
BOWSER RIVER
BOWSER LAKE
RIVER
BURROUGHS BAY
BEAR R.
NASS R.
MEZIADIN LAKE
Stewart
Hyder
PORTLAND CANAL
CLARENCE STRAIT
BEHM CANAL
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0 10 20 30km
Environment Canada
Environnement Canada
Conservation and Protection
Conservation et Protection
SULPHURETS
GOLD / SILVER PROJECT
Figure 1: UNUK RIVER BASIN

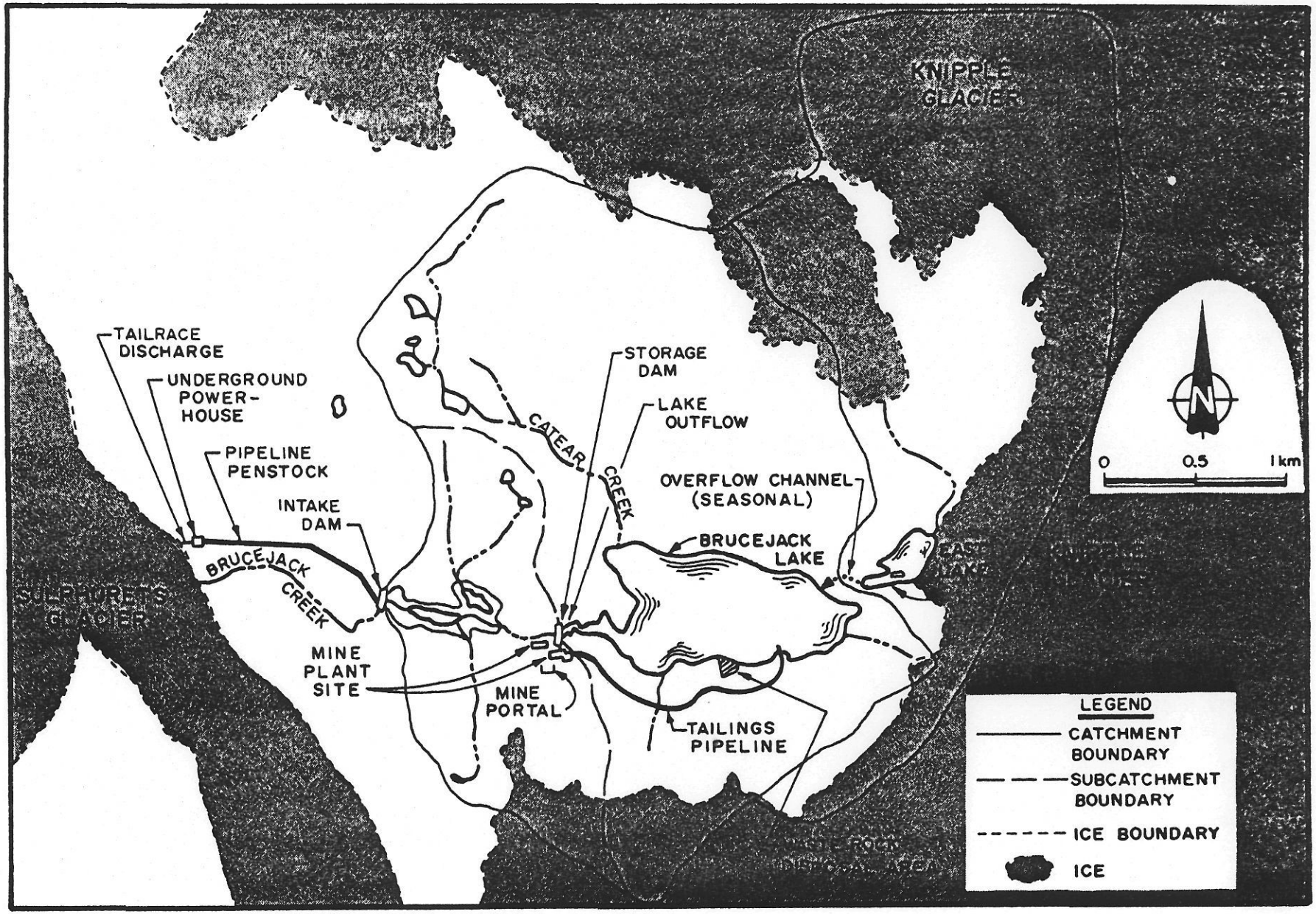

FIGURE 2. Sulphurets Gold / Silver Mine Development Project–Setting

PROJECT DESCRIPTION

The Project components include:

- mining and ore recovery processes;
- tailings and waste rock disposal to Brucejack Lake for long term control of acid generation potential;
- on-site development of 1.8 MW of hydro power from Brucejack Lake and Brucejack Creek;
- plant, camp, and recreational facilities for a total workforce of 112 persons; and
- an associated access corridor of extended Forest Service Roads from Highway 37, ice breaking barge and tug on Bowser Lake and tracked vehicle access over Knipple Glacier to the mine site at Brucejack Camp.

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Mine and Recovery Processes

The geographic area has a long history of gold, silver and base metal exploration and mining. The proposed Sulphurets Project is for the gold and silver mining of the West Zone of the Sulphurets property and it has a total ore reserve of 774,800 tonnes (measured, indicated and inferred) and a total ore grade of 0.354 g/t for gold and 786.5 g/t for silver. The projected mine life is 6 years but there is good potential for developing additional reserves within the mine property.

Mining of the West Zone is to be by underground mechanized cut-and-fill operation with a mill throughput of 318 tonnes of ore per day. Ninety tonnes per day of waste rock is expected to be generated of which

approximately 50% is to be left underground and used as backfill. The remaining 45 tonnes/day (15,750 tonnes/year) of waste rock is to be hauled to the surface for disposal.

The ore consists of native gold and silver with some of the gold locked in either pyrite or quartz gangue while the bulk of the silver is associated with, or a component of, various sulphide minerals. The proposed ore recovery process is by the utilization of crushing, grinding and gravity concentration followed by flotation of a silver-rich sulphide concentrate.

Tailings and Waste Rock Disposal

Both tailings and waste rock will be disposed underwater in Brucejack Lake. The tailings slurry together with mine water will be discharged from the mill by gravity flow (or pumped) through an overland pipeline to subaqueous disposal 65 m deep in Brucejack Lake. Waste rock known to have potential for acid generation will be disposed of in the lake just west of the tailings outfall (Figure 2). This waste rock is to be stockpiled near the mine portal then removed to the lake shore where it will be dumped close to the waters edge and subsequently placed below the water when the lake is at its lowest level each year (May - June).

Hydroelectric Power Development

Electrical power (1.8 MW) for the proposed operation will be generated on-site utilizing the hydroelectric potential of Brucejack Lake and Brucejack Creek (Figure 2). The development would involve the construction of a low earth dam at the outlet of Brucejack Lake to store water in the lake during high runoff period and a spillway structure and outlet works for releasing stored water. The lake will be raised by approximately 4 m at full storage. A low rollcrete intake dam across Brucejack Creek

downstream of Brucejack Lake is also proposed to provide diurnal storage and penstock intake. A 1425 m long surface penstock (610 mm diameter pipeline) is proposed from the intake dam to the powerhouse to produce a total head of 340 m. The powerhouse will be underground, located near the edge of the Sulphurets Glacier and house three 600 KW turbine/generator sets and electrical switchgear and equipment. A floating lake pumpstation (2 pumps) is proposed to draw water from the lake when gravity discharge through the storage dam is no longer possible. This will include a 300 m pipeline from the pumping installation to its discharge point under Brucejack Lake dam. Pumping during the low flow period will result in a drawdown of Brucejack Lake by as much as 13 meters.

Mine Facilities

The plant site of the mine will house a mill complex consisting of a mill, crushing building, assay laboratory, warehouse and maintenance shops, offices and administration area. A camp capable of accommodating up to 112 employees will be provided with accommodation units, mine dry building and kitchen/recreation facilities. The chosen site is located on the south side of Brucejack Lake and it is in close proximity to the proposed 1400 m mine portal (see Figure 2).

Access Corridor

Newhawk's proposed access corridor to the mine site is presented in Figure 3. This land route was chosen following an evaluation of three alternative land routes which were submitted to the B.C. Mine Development Screening Committee (MDSC) in the report "Access Road Corridor Options Assessment" (Rescan 1988). The corridor begins from highway 37 and follows 16 km of an existing Forest Service road. The corridor is to be extended 11 km westward to a barge-landing site approximately 0.5 km east of Graveyard Point. A barge and tug reinforced for ice-breaking will be used for permanent access to the mine site and will require 14 km of barge

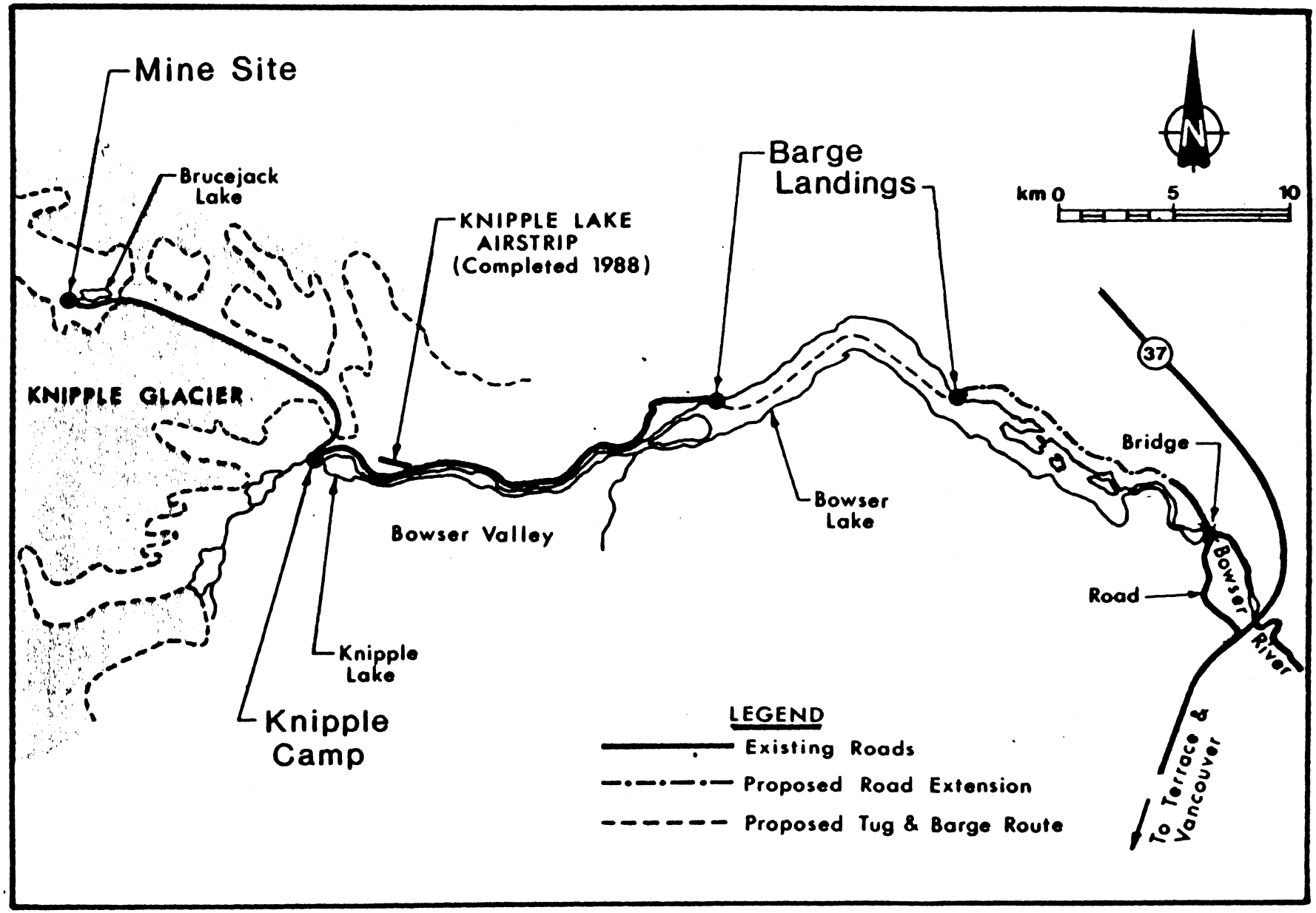

FIGURE 3. Sulphurets Gold/Silver Mine Development Project – The Bowser Lake Access Corridor

sailing. The existing west barge-landing site is to remain (i.e. just north of the Upper Bowser River) and is to be upgraded to permit drive on/drive off traffic. The western leg of the road between Bowser Lake and Knipple Camp was upgraded in 1988 to a permanent all weather access road under a Special Use Permit issued by the B.C. Ministry of Forests. From Knipple camp, the existing road is ramped onto the Knipple Glacier and then ascends 21 km of glacier to the mine site at Brucejack Lake. At Knipple Camp, materials will be offloaded and transferred to sleighs towed by tracked vehicles for the transport over Knipple Glacier. Similarly concentrates will be held at Knipple Camp for transfer to trucks being shipped out. In the fall of 1988, an 1050 m long industrial airstrip was constructed near Knipple Lake by the proponent under Licence of Occupation issued by the B.C. Ministry of Crown lands. The airstrip is to provide year-round access for personnel and some supplies.

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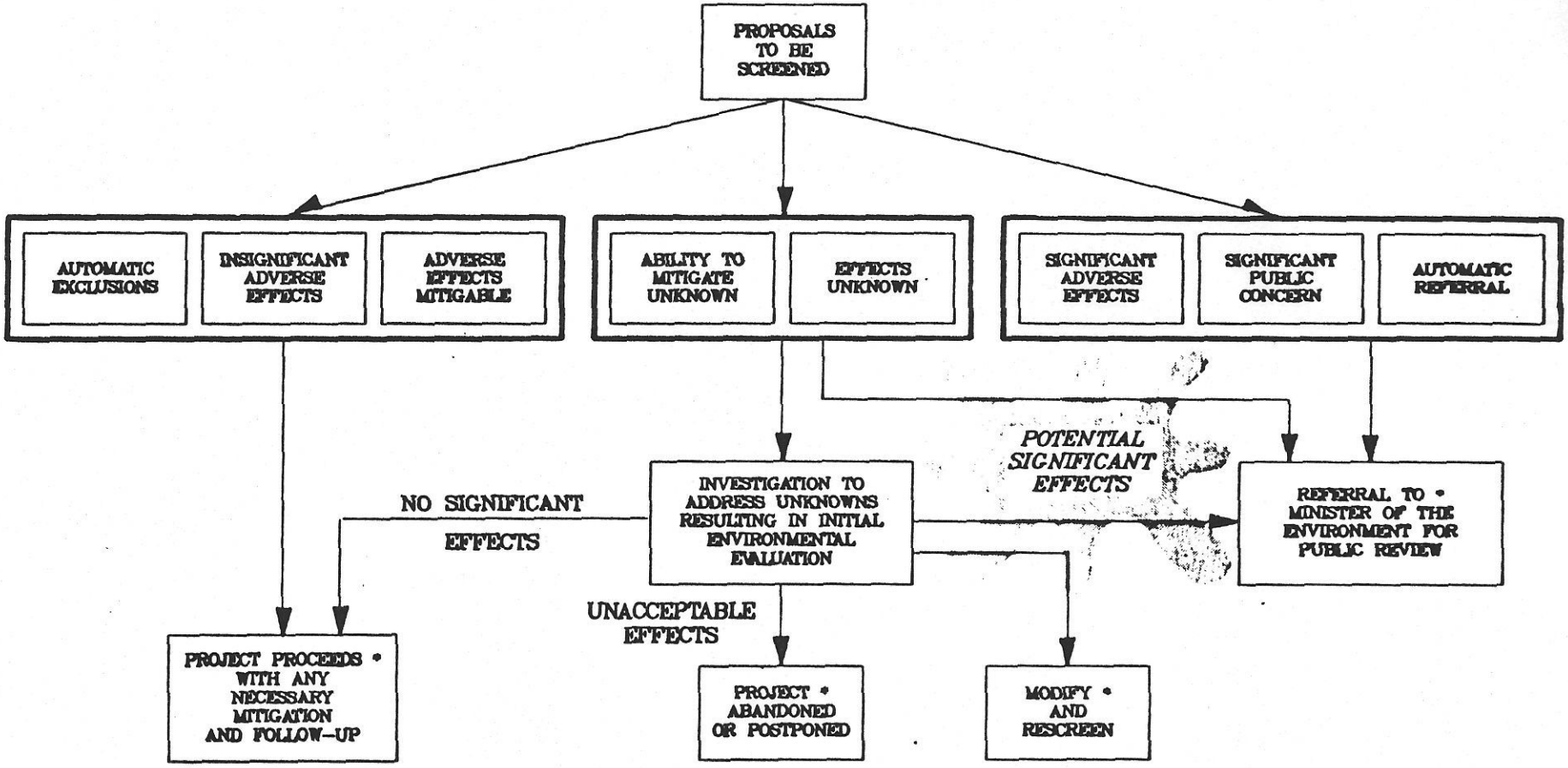
ENVIRONMENTAL ASSESSMENT PROCESSES

FEDERAL

The Federal Environmental Assessment and Review Process (EARP) requires that federal projects, programs and activities, and any other proposals that may have an environmental effect on areas of federal responsibility, undergo assessment early in their planning stages to ensure that environmental effects and implications are taken into account. The 1984 EARP Guidelines Order establishes the process and sets out the requirements, procedures and responsibilities of the participants. The process is one of self-assessment - every federal department, and therefore every federal minister, is responsible for applying EARP to proposals within their area of decision-making responsibility, that may have an environmental impact.

EARP can be viewed as occurring in a series of steps. The initiating department retains the decision-making power to either proceed to the next step of the process, abandon the project or approve the project if environmental, and socio-economic criteria are satisfied during any particular phase of the review.

The first phase of the process, referred to as the initial assessment phase (Figure 4), has two components: (1) screening - a brief, systematic documented assessment of environmental implications of a proposal, including potential effects, and (2) further investigation if the screening stage finds the significance of project effects to be unknown. Further investigation entails the production of a documented assessment of the potential environmental impacts, describing their nature, extent and significance and the identification of mitigative measures. This documented assessment is normally referred to as an Initial Environmental Evaluation (IEE). If adverse effects are significant and/or if public concern is such that a public review is desirable then a decision by the Minister of the initiating department may be made to have the proposal referred for review by a Panel.



* Initial Assessment constitutes all the screening and any subsequent environmental investigations needed to reach one of the initial assessment decisions.

Screening is a component of initial assessment phase which places a proposal into one of the 8 screening decision routes.

Initial Environmental Evaluation is the documented result of investigation needed to address unknowns identified at the screening stage which are impeding an initial assessment decision.

Source
Initial Assessment Guide Federal Environmental Assessment and Review Process. Federal Environmental Assessment Review Office, Ottawa, Ontario. April, 1986.

FIGURE 4. Federal Environmental Assessment and Review Process, Initial Assessment

PROVINCIAL

The British Columbia (B.C.) government has a specific review procedure for new mine developments and for major expansions of existing mines that was established by the Environmental and Land Use Committee (ELUC) of the Cabinet (see Volume 2, Appendix A). This review procedure is called the B.C. Mine Development Review Process (MDRP). The process (Figure 5) is initiated by the submission of a prospectus or letter of intent from the proponent to the Mine Development Steering Committee (MDSC), a committee chaired by the B.C. Ministry of Energy, Mines and Petroleum Resources and with representation from other Ministries. The process involves three possible stages. Stage I is an initial review similar to the IEE requirement under the federal EAR Process. Stage II is a more detailed assessment where major impact potential is clearly recognized and is similar to the Environmental Impact Statement step under EARP. Stage III is the licensing stage. It is initiated after approval-in-principle has been granted by the Mine Development Steering Committee.

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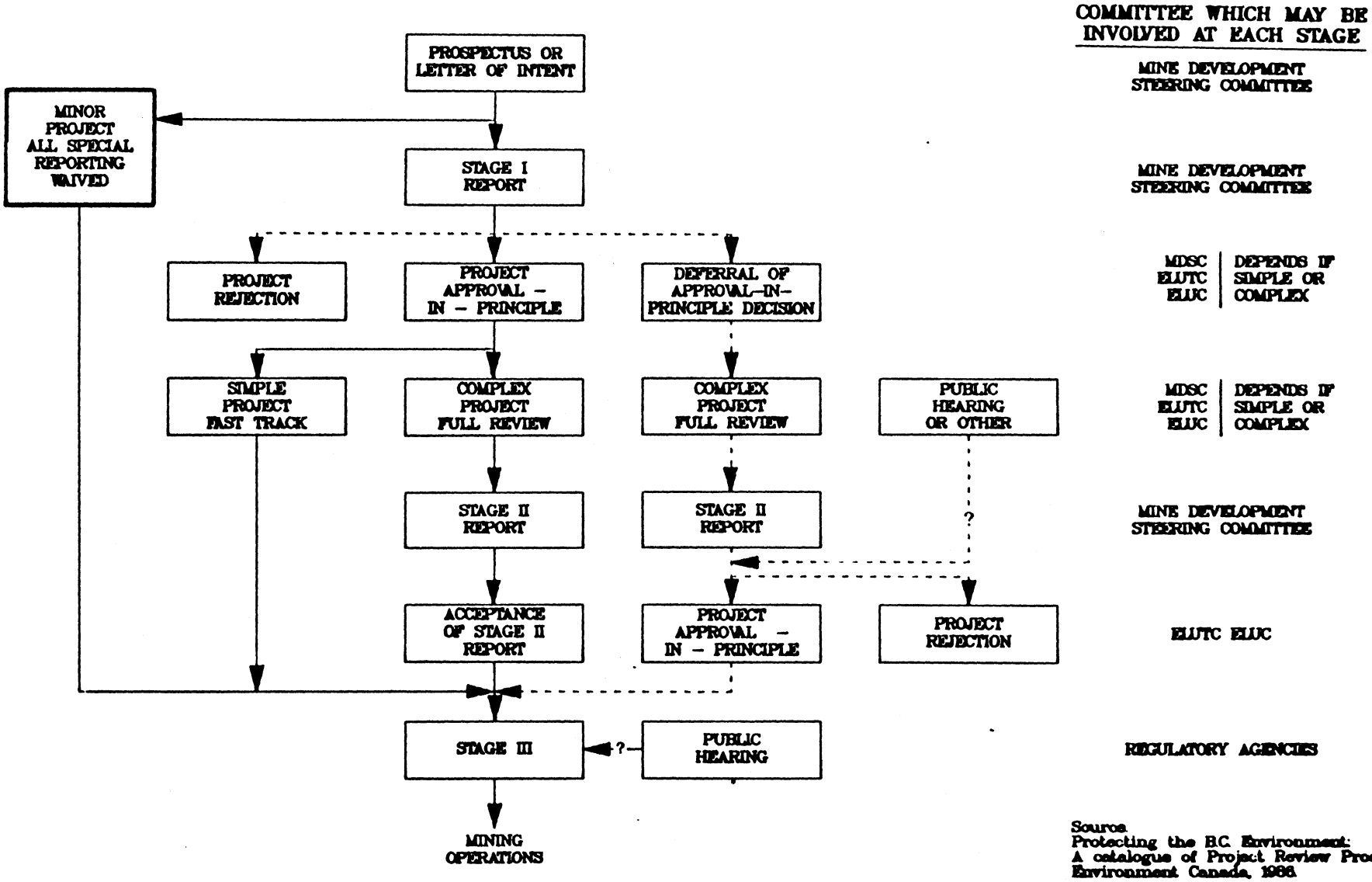

Source
Protecting the B.C. Environment:
A catalogue of Project Review Processes,
Environment Canada, 1986

FIGURE 5. The Province of British Columbia Mine Development Review Process

THE ENVIRONMENTAL ASSESSMENT CONDUCTED FOR THE SULPHURETS PROJECT

Mine developments in British Columbia come under the purview of the provincial Mine Development Review Process. However, the Sulphurets Gold/Silver Mine Proposal includes the construction of hydro dams which requires the issuance of a federal licence by the Minister of Environment. Issuing such a licence under the International River Improvements Act constitutes a federal decision making responsibility. Environment Canada therefore becomes the federal initiating department of the proposal for the purpose of applying the EAR Process.

Because of the involvement of both federal and provincial jurisdictions, it was both necessary and advantageous for both governments to work together in the environmental assessment of the Sulphurets Project. Federal participation in the provincial Mine Development Review Process was already well established under an existing working policy. In this way it was possible to avoid duplicating separate environmental reviews yet satisfy the requirements of both the provincial MDR Process as well the federal EARP.

Under the B.C. MDR Process, the proponent of the Sulphurets Project (Newhawk Gold Mines Ltd.) was required to submit a Stage I level assessment. A Stage I level assessment report is similar to the Initial Environmental Evaluation document required under the federal EAR Process when the significance of project effects are unknown. The study requirements upon which the Stage I assessment was conducted were determined by terms of reference developed with federal participation at the early Prospectus stage. The submitted Stage I report was reviewed federally and the province was advised that both additional information and additional potential impact analysis was required. To fulfill these specified federal requirements, Newhawk Gold Mines Ltd. completed a Stage I Supplement Report and produced results of revised water quality modelling

studies. Other studies on separate aspects of the mine development, i.e. access road and barge facilities on Bowser Lake, were also produced by the proponent and were again assessed by federal agencies.

As a result of this interactive process, the federal participation was instrumental in identifying study needs, evaluating impact assessment study findings, identifying deficiencies and securing additional impact assessments. The overall cooperative effort allowed the assessment studies (both environmental and socioeconomic) produced under the B.C. MDR Process to be drawn upon in conducting the federal review. The federal review, in addition to considering the areas addressed by the province under the MDR Process, also specifically included environmental matters of particular relevance to federal responsibilities such as water quality and quantity, fish and fish habitat, migratory birds, navigable waters and rare and endangered species. The consideration of effects external to Canadian territory and concerns of the public (specifically native people) regarding the proposal were added to the federal review. This overall review provides the basis for making a federal environmental screening decision on the Sulphurets Project.

Included in the federal review assessment of the Sulphurets Project were the following documents:

- Sulphurets Joint Venture. Prospectus. Newhawk Gold Mines Ltd. May 1987;
- Access Road Corridor Options Assessment. Rescan, 1988;
- Sulphurets Project Access Road Bowser Lake to Knipple Glacier. April 1988;
- Newhawk Gold Mines Ltd. Stage 1 - Environmental and Socioeconomic Impact Assessment for the Sulphurets Property. January 1989;
- Newhawk Gold Mines Ltd. A Supplementary Submission to the Stage 1 Report. Sulphurets Property. March 1989; and
- Newhawk Gold Mine Ltd., Sulphurets Project. Revised Modelling Results for Brucejack Lake Outflow and Downstream Receiving Water Quality. May 1989.

A chronology of major environmental assessment activities for the Sulphurets Project is shown in Table 1.

TABLE 1: CHRONOLOGY OF MAJOR ENVIRONMENTAL ASSESSMENT ACTIVITIES FOR THE SULPHURETS PROJECT

DATE	EVENT
May 27, 1987	Newhawk Gold Mine Ltd.'s Prospectus (May 1987) for its Sulphurets Gold/Silver Project was submitted to Mine Development Steering Committee (MDSC).
June 4, 1987	MDSC's request for review of the Prospectus by the MDRP participants (including federal agencies).
June 10, 1987	MDSC's request to Newhawk Gold Mines Ltd. to forward the Prospectus to local governments, Native Groups and local public libraries.
June 19, 1987	Prospectus and solicitation for review were sent by DOE to the U.S. and Alaskan agencies and to the Hyder Community Association.
July 28, 1987	Alaska Department of Fish and Game response to Environment Canada (DOE) on the Prospectus which was subsequently sent to MDSC on August 26, 1987 by DOE.
August 4, 1987	DOE and DFO review comments on the Prospectus sent to the MDSC Chairman and copied to the U.S. and Alaska agencies.
August 17, 1987	Alaskan public interest group, Sealaska Corporation, Prospectus review comments sent to Environment Canada and subsequently sent to MDSC and August 26, 1987 by DOE.
August 28, 1987	Release of the MDRP compendium of review comments on the Prospectus and the requirements for a Stage 1 submission to Newhawk Gold Mines Ltd. and the MDRP participants.
September 29, 1987	U.S. Forest Service Misty Fiords National Monument response to DOE on the Prospectus which was subsequently sent to MDSC on October 20, 1987 by DOE.
January 22, 1988	MDSC's request for review of the Access Road Corridor Options Assessment (January, 1988) by the MDRP participants.
March 7, 1988	DFO review comments on the Access Road submission was sent to the MDSC.
March 18, 1988	DFO review comments on the Access Road along the upper Bowser River sent to the MDSC.
March 28, 1988	MDRP compendium of review comments on the Access Road Corridor Options Assessment sent to Newhawk Gold Mine Ltd. and the MDRP participants.
October 5, 1988	Request from the MDSC for the MDRP participants to review the Bowser Lake Ferry Access Proposal as a permanent alternative to road development within the Wildfire Road corridor.
October 20, 1988	DFO review comments on the Bowser Lake Ferry Proposal to the MDSC.
January 23, 1989	Stage 1 submission was sent by DOE to U.S. and Alaskan agencies for review.
February 2, 1989	MDRP compendium of review comments on the Bowser Lake Ferry Access Proposal to the Newhawk Gold Mines Ltd. and the MDRP participants.
	Stage 1 submission was sent by MDSC to MDRP participants for review.
	Newhawk Gold Mines Ltd. submitted an application for the Sulphurets Property pursuant to section 6 of the IRI Act with the federal Minister of the Department of the Environment.
March 28, 1989	Supplement to the Stage 1 Report was sent by MDSC to MDRP participants for review.
March 30, 1989	Supplement to the Stage 1 Report was sent by DOE to U.S. and Alaskan agencies for review.
May 11, 1989	Document on "Revised Modelling Results for Brucejack Lake Outlflow and Downstream Receiving Water Quality" was sent by Newhawk Gold Mines Ltd. to selected MDRP participants.
June 12, 1989	DOE's compendium of review comments for federal agencies on the Stage 1 submissions was sent to MDSC and copied to U.S. and Alaskan agencies, supporting project to proceed to Stage III (permitting).
July 14, 1989	State of Alaska, Office of the Governor response to the Stage 1 submissions supporting the Canadian federal position on the project.
September 20, 1989	MDSC granted Newhawk Gold Mines Ltd. approval-in-principle, waived Stage II of the MDRP and consigned the project to the licensing, Stage III.
October 10, 1989	MDSC Stage I compendium of review comments was sent to the MDRP participants.
November 3, 1989	INAC informing DOE-IW that the Nisga'a are requesting a meeting with DOE regarding the Sulphurets Project.
November 27, 1989	MDSC Stage I compendium of review comments was sent by DOE to the U.S. and Alaskan agencies.
December 12, 1989	Information meeting was held with Nisga'a Tribal Council representatives, and their solicitor, and with federal and provincial officials regarding the Sulphurets Project.
January 31, 1990	INAC informs DOE-IW that funding assistance for the Nisga'a review of the Sulphurets Project will only be available for fiscal year 1990-91.

PUBLIC CONSULTATION

Under the B.C. Mine Development Review Process, the mine proponent (Newhawk Gold Mines Ltd.) was primarily responsible for public consultation. Official submissions to the MDR Process were public documents and the proponent ensured there was reasonable public access to these documents in the local region of the development (Volume 2, Appendix B, letters of 1987-06-10 and 1989-02-03). In addition, the Mine Development Steering Committee distributed compendia of government review comments to those who raised concerns during the review process (Tables 2 and 4). The public could also have made direct representation to the Environment and Land Use Committee (ELUC) or to the Mine Development Steering Committee (B.C. MDR Process Volume 2, Appendix A, page 10 of Overview).

Native groups, municipal councils and regional district boards were provided with the opportunity to review the MDR Process submissions under the coordination of the federal Department of Indian and Northern Affairs and the B.C. Ministry of Municipal Affairs respectively (see Tables 2, 3 and 4).

There is no formal appeal of ELUC decisions under the Mine Development Review Process. However, ELUC's approval-in-principle decision is not a final, legally binding judgement, but rather a statement of government policy designed to precede applications for legally required permits. Anyone may write to ELUC at any time to question or comment on approval-in-principle decisions. Many of the specific provincial permits or licences required by a mine proponent at Stage III are, however, subject to appeal (Volume 2, Appendix A, page 52 of report on Protecting to B.C. Environment).

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TABLE 2: SULPHURETS PROJECT ENVIRONMENTAL REVIEW CONSULTATION PROCESS FOR THE PROPECTUS SUBMISSION

REVIEWERS	PROSPECTUS (May 1987)		
	SENT	RESPONDED	MDRP * COMPENDIUM OF REVIEW COMMENTS SENT (August 28, 1987)
FEDERAL			
Dept. of the Environment (DOE)			
- Environmental Protection (EP)	x	x	x
- Inland Waters Directorate (IWD)	x	x	x
- Canadian Wildlife Service (CWS)	a		
- Parks Canada	a		
- Atmospheric Environment Service (AES)	a		
Dept. of Fisheries & Oceans (DFO)	x	x	x
Dept. of Transport (DOT) Coast Guard			
Dept. of Indian & Northern Affairs (DINA)	x	x	x
PROVINCIAL			
Ministry of Energy, Mines & Petroleum Resources			
- Engineering & Inspection Branch	x	x	x
- Geological Survey Branch	x	x	x
Ministry of Environment	x	x	x
Ministry of Parks	x	x	
Ministry of Agriculture & Fisheries	x	x	
Ministry of Forests	x	x	x
Ministry of Crown Lands	x	x	x
Ministry of Transportation & Highways	x	x	x
Ministry of Native Affairs	x	x	x
Ministry of Municipal Affairs, Recreation and Culture			
- Development Services Branch	x	x	x
- Archaeology & Outdoor Recreation Branch	x	x	x
Ministry of Advanced Education & Job Training	x	x	x
Ministry of Regional Develpoment	x	x	x
Ministry of Health	x	x	x
Ministry of Social Services & Housing	x	x	x
Ministry of Education	x		
Ministry of Attorney General	x		
AMERICAN			
Alaska Office of the Governor	x		x (DOE/DFO review only)
Alaska Coastal Management Program **	x		
Alaska Dept. of Natural Resources			
- Mining	x		
- Land & Water Management	x		
Alaska Dept. of Environmental Conservation	x	x	
Alaska Dept. of Fish & Game	x	x	
U.S. Environmental Protection Agency (EPA)	x		
U.S. Dept. of the Interior			
- Fish & Wildlife Service	x		
U.S. National Marine Fisheries Service			
- Auk Bay Laboratory	x	x	x (DOE/DFO review only)
U.S. Forest Service			
- Misty Fiords National Monument	x	x	
Hyder Community Association	x		
Sealaska Corporation	x	x	
PUBLIC			
Village of Hazelton	x		x
District of Stewart	x		x
City of Terrace	x		x
Town of Smithers	x		x
Kitimat-Stikine Regional District	x		x
Village of Telkwa	x		x
Tahltan Tribal Council	x		
Nisga'a Tribal Council	x		b
Iskut Band Council			
Stewart Library	x		
Smithers Library	x		
Hazelton Library	x		
Telkwa Library	x		
Terrace Library	x		

* MDRP - B.C. Mine Development Review Process (includes federal assessment and review comments)
** Distribution list contains 21 reviewers see Volume 3, Appendix L letter 1987-06-24
(a) Pre-screening by DOE determined no federal interest
(b) Sent following Nisga'a meeting of December 12, 1989

TABLE 3: SULPHURETS PROJECT ENVIRONMENTAL REVIEW CONSULTATION PROCESS FOR ROAD-LAKE ACCESS STUDY

REVIEWERS	ROAD-LAKE ACCESS STUDY		
	SENT	RESPONDED	MDRP * COMPENDUIM OF REVIEW COMMENTS sent
FEDERAL			
Dept. of the Environment (DOE)			
- Environmental Protection (EP)	x		x
- Inland Waters Directorate (IWD)	a		
- Canadian Wildlife Service (CWS)	a		
- Parks Canada			
- Atmospheric Environment Service (AES)	a		
Dept. of Fisheries & Oceans (DFO)	x	x	x
Dept. of Transport (DOT) Coast Guard			
Dept. of Indian & Northern Affairs (DINA)	x	x	x
PROVINCIAL			
Ministry of Energy, Mines & Petroleum Resources			
- Engineering & Inspection Branch	x	x	x
- Geological Survey Branch	x	x	x
Ministry of Environment	x	x	x
Ministry of Parks			
Ministry of Agriculture & Fisheries			
Ministry of Forests	x	x	x
Ministry of Crown Lands	x	x	x
Ministry of Transportation & Highways	x	x	x
Ministry of Native Affairs	x	x	x
Ministry of Municipal Affairs, Recreation and Culture			
- Development Services Branch	x	x	x
- Archaeology & Outdoor Recreation Branch	x	x	x
Ministry of Advanced Education & Job Training			x
Ministry of Regional Develpoment	x	x	x
Ministry of Health	x	x	x
Ministry of Social Services & Housing			
Ministry of Education			
Ministry of Attorney General			
AMERICAN			
Alaska Office of the Governor			
Alaska Coastal Management Program **			
Alaska Dept. of Natural Resources			
- Mining			
- Land & Water Management			
Alaska Dept. of Environmental Conservation			
Alaska Dept. of Fish & Game			
U.S. Environmental Protection Agency (EPA)			
U.S. Dept. of the Interior			
- Fish & Wildlife Service			
U.S. National Marine Fisheries Service			
- Auk Bay Laboratory			
U.S. Forest Service			
- Misty Fiords National Monument			
Hyder Community Association			
Sealaska Corporation			
PUBLIC			
Village of Hazelton			
District of Stewart	x		
City of Terrace			
Town of Smithers			
Kitimat-Stikine Regional District	x		
Village of Telkwa			
Tahltan Tribal Council	x		
Nisga'a Tribal Council	x		b
Iskut Band Council			
Stewart Library	x		
Smithers Library	x		
Hazelton Library	x		
Telkwa Library	x		
Terrace Library	x		

* MDRP - B.C. Mine Development Review Process (includes federal assessment and review comments)
** Distribution list contains 21 reviewers see Volume 3, Appendix K letter 1987-06-24
(a) Pre-screening by DOE determined no federal interest
(b) Sent following Nisga'a meeting of December 12, 1989

TABLE 4: SULPHURETS PROJECT ENVIRONMENTAL REVIEW CONSULTATION PROCESS FOR STAGE 1 SUBMISSION

REVIEWERS	DOCUMENTS SUBMITTED FOR REVIEW						
	STAGE 1 (January 1989)		STAGE 1 SUPPLEMENT (March 1989)		WATER QUALITY MODELLING RESULTS (May 1989)		MDRP * COMPENDIUM OF REVIEW COMMENTS (October 10, 1989)
	sent	response	sent	response	sent	response	sent
FEDERAL							
Dept. of the Environment (DOE)							
- Environmental Protection (EP)	x	x	x	x	x	x	x
- Inland Waters Directorate (IWD)	x	x	x	x	x	x	x
- Canadian Wildlife Service (CWS)	a	x					
- Parks Canada							
- Atmospheric Environment Service (AES)	a						
Dept. of Fisheries & Oceans (DFO)	x	x	x	x	x		x
Dept. of Transport (DOT) Coast Guard	x	x					x
Dept. of Indian & Northern Affairs (DINA)	x	x	x	x			x
PROVINCIAL							
Ministry of Energy, Mines & Petroleum Resources							
- Engineering & Inspection Branch	x	x	x	x	x	x	x
- Geological Survey Branch	x	x	x	x			x
Ministry of Environment	x	x	x	x	x	x	x
Ministry of Parks							
Ministry of Agriculture & Fisheries							
Ministry of Forests	x	x	x	x			x
Ministry of Crown Lands	x	x	x	x			x
Ministry of Transportation & Highways	x	x	x	x			x
Ministry of Native Affairs	x	x	x	x			x
Ministry of Municipal Affairs, Recreation and Culture							
- Development Services Branch	x	x	x	x			x
- Archaeology & Outdoor Recreation Branch	x	x	x	x			x
Ministry of Advanced Education & Job Training							
Ministry of Regional Development	x	x	x	x			x
Ministry of Health	x	x	x	x			x
Ministry of Social Services & Housing	x	x	x	x			x
Ministry of Education							
Ministry of Attorney General							
AMERICAN							
Alaska Office of the Governor	x	x	x	x			x
Alaska Coastal Management Program **							
Alaska Dept. of Natural Resources							
- Mining							
- Land & Water Management							
Alaska Dept. of Environmental Conservation							x
Alaska Dept. of Fish & Game	x		x				x
U.S. Environmental Protection Agency (EPA)							
U.S. Dept. of the Interior							
- Fish & Wildlife Service							
U.S. National Marine Fisheries Service							
- Auk Bay Laboratory	x		x				x
U.S. Forest Service							
- Misty Fiords National Monument	x		x				x
Hyder Community Association							
Sealaska Corporation	x		x				x
PUBLIC							
Village of Hazelton	x		x				
District of Stewart	x		x				
City of Terrace	x		x				
Town of Smithers	x		x				
Kitimat-Stikine Regional District	x	x	x	x			x
Village of Telkwa	x						
Tahltan Tribal Council	x	x	x	x			
Nisga'a Tribal Council	x		x		b		b
Iskut Band Council	x		x				
Stewart Library							
Smithers Library	x		x				
Hazelton Library	x		x				
Telkwa Library							
Terrace Library	x		x				

* MDRP - B.C. Mine Development Review Process (includes federal assessment and review comments)
** Distribution list contains 21 reviewers see Volume 3, Appendix K letter 1987-06-24
(a) Pre-screening by DOE determined no federal interest
(b) Sent following Nisga'a meeting of December 12, 1989

PUBLIC PARTICIPATION

Limited public participation resulted from the public consultation previously referred to for the Sulphurets Project. Comments were raised to the Mine Development Steering Committee only by the Regional District of Kitimat-Stikine (Volume 2, Appendix B, letter 1989-10-10 page 8) and by, the federal Department of Indian and Northern Affairs on behalf of the Tahltans (Volume 2, Appendix B, letter 1989-10-10 page 11). The B.C. Ministry of Native Affairs had pointed out in their review comments that the Sulphurets Project area fell under the comprehensive land claims of the Nisga'a. Since only the Tahltans had responded to the Stage I submission, DOE asked the Department of Indian and Northern Affairs to confirm that the Nisga'a had no comments to raise. Indian and Northern Affairs Canada consulted the Nisga'a Tribal Council and at the Nisga'a's request an information meeting was arranged on December 12, 1989. The attendees of the meeting and minutes are filed in Volume 3, Appendix L, memo of 1990-01-04. At that meeting, the Nisga'a acknowledged that they had not commented on the submissions but expressed the need to review the assessment documents because they had general concerns.

Under the federal EAR Process an initiating department must consider the concens of the public regarding the proposal and the social effects directly related to the environmental effects. All documents and compendia of review comments produced during the review of the Project have been provided to the Nisga'a (see Volume 3, Appendix L, letters 1990-02-23 and 1990-03-13). Given the Nisga'a have not completed their review of these documents, Environment Canada has provided an additional period of time (up to May 31, 1990) for their review. Once the Nisga'a Tribal Council have completed their review and have submitted their comments and/or concerns to Environment Canada, the EAR Process can be completed.

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POTENTIAL ENVIRONMENTAL EFFECTS EXTERNAL TO CANADIAN TERRITORY

As part of the federal review process for the Sulphurets Project, Environment Canada provided four U.S. agencies, six Alaskan agencies, one native group in Alaska and five public interest groups with copies of submissions filed under the B.C. MDRP (see Tables 2 and 4 and Volume 3, Appendix K, letters 1987-06-19 and 1987-06-24).

At the Prospectus stage, Environment Canada received three U.S. and Alaskan letters, raising concerns and questions regarding potential degradation of downstream water quality and fish habitat of the lower Unuk River (Volume 3, Appendix K, letters 1987-07-28, 1987-08-17 and 1987-09-29). After the federal assessments were conducted, Environment Canada also provided U.S. and Alaskan agencies with the Canadian federal assessments (Tables 1, 2, and 4). Subsequently, Environment Canada received a coordinated response from the office of the Governor of Alaska which stated agreement with the compiled Canadian Federal agency impact assessment findings (Volume 3, Appendix K, letter 1989-07-14). The State of Alaska advised Environment Canada that the proposed mining development should not result in significant impacts to U.S. waters and the proposed environmental management plan should ensure compliance with Alaska water quality standards. At the same time, the State of Alaska requested monitoring reports in order to confirm that water quality standards are met.

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IMPACT ASSESSMENT FINDINGS AND REQUIRED MITIGATION

Based on assessments conducted by federal agencies, and pursuant to Section 12 (c) of the Guidelines Order, the impacts of the proposed Sulphurets Projet are determined to be insignificant or mitigable with known technology.

The following sections summarize the essential findings of the federal review of the project. The detailed assessment findings are given in Volumes 2 and 3, Appendices B to L and are comprised of compendia of review comments and correspondence with the agencies of the B.C., federal, Alaska and U.S. governments and the public.

Assessment findings are presented below for the major areas of federal responsibility.

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WATER QUANTITY

The federal area of concern for water quantity for this proposed development is with potential downstream impacts in Alaska arising from changes in the normal flow regime of the international Unuk River.

Presently Brucejack Lake and Creek exhibit a characteristic coastal alpine hydrologic regime. There are high summer flows due to snow and ice meltwater followed by occasional major rain or rain-on-snow floods during the fall. Winter flows are low during the prolonged freezing conditions. The water use in the Brucejack-Sulphurets watershed and in the Unuk River downstream to the Canada-U.S. border is virtually unexploited. In B.C. there are no permanent human settlements or native reservations downstream of the proposed development.

Project Impacts

The proposed development will have an impact on local surface water hydrology. As a result of the hydroelectric development, both the water level of Brucejack Lake and the stream flow of Brucejack Creek will be affected. The storage dam on the outlet of Brucejack Lake will result in a 4 m rise of the lake level. Pumping during the low flow period will result in a lake drawdown of up to 13 metres. Downstream of the storage dam there will also be an intake dam. Between the two dams, Brucejack Creek will be flooded and subject to some fluctuation in water levels during the operation. Downstream of the hydro installation, Brucejack Creek will experience a change in flow regime with increased winter flows and reduced peak flows. The damming of the river channel and the retention of water does raise the risk of dam failure and catostrophic flood events resulting in downstream damages.

Other potential impacts on surface water hydrology assessed include: 1) the utilization of make-up water from Brucejack Lake for the milling operation; and 2) the diversion of surface runoff around the mine area. Also assessed was the groundwater hydrology which could be affected by the dewatering of the underground workings. Such dewatering may reduce the normal groundwater flow entering Brucejack Lake and Brucejack Creek.

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Mitigation

The year round production of hydroelectric power will ensure the maintenance of minimum flows in Sulphurets and Brucejack creeks, especially during the winter low flow period. The release of water, approximately 0.72 m^3/s, needed for power generation (Newhawk Gold Mines Ltd's Stage 1 Report, January 1989, page 9-7) will augment natural low flows. Under the 10 year minimum daily flow condition, the water released from Brucejack Lake will constitute up to 50% of the flow in Sulphurets Creek at its confluence with the Unuk River.

In order to reduce the risk of downstream flood damage, the storage dam, intake dam, spillways, culverts and bridges will be designed to withstand the instantaneous peak flow of a 200 year flood.

The milling operation will require an average of 48.74 m^3/hr of make-up water from Brucejack Lake. However, most of this water will be returned to the lake at an average rate of 44.58 m^3/hr as tailings slurry resulting in an insignificant loss of lake water volume. All diversion of surface runoff will also be returned to the Brucejack watershed.

The flows from the dewatering of the underground workings will be pumped to the surface for disposal into Brucejack Lake. This will avoid the possible loss of groundwater recharge to the Brucejack watershed.

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Residual Impacts

The changes to water levels and streamflow cannot be avoided and will persist as long as the hydro development is in operation. However, the B.C. government has made a requirement that both intake dam and storage dam be completely removed and the natural watercourses restored on decommissioning of the development (Volume 3, Appendix B, letter 1989-10-10 page 2). The province has requested the proponent to provide options on breaching and/or removing the embankment material in a controlled way in the reclamation plan to be submitted at the Stage III licensing stage.

Impact Assessment Conclusion

Environment Canada is satisfied that the operation of the storage dams should have no significant adverse effects on the water quantity of downstream water uses and waterways (Volume 3, Appendix C, letter 1989-06-12 page 4).

WATER QUALITY

The federal areas of concern for potential quality impacts from the Sulphurets Project are:

1) meeting the effluent quality standards of the federal Metal Mining Liquid Effluent Regulations; and

2) protecting the downstream water quality of the transboundary Unuk River.

The surface water quality of Brucejack Creek is characterized by generally soft water with near neutral pH and low levels of suspended solids. Downstream from Brucejack Creek, the surface waters become slightly more alkaline and higher in both hardness level and suspended solids. In particular, Sulpherets Creek has high background levels of suspended solids for several months during the high flow period. Sulphurets Creek also has total metal concentrations that are naturally high and at times exceed the Canadian Water Quality (CCREM) Guidelines (1987) for copper, silver, lead and zinc. In the Unuk River, at the Canada- U.S. boundary, total copper levels have been recorded to exceed the Canadian Water Quality (CCREM) Guidelines.

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Project Impacts

The major potential impacts on water quality from the Sulphurets Project are:

1) the potential for acid mine drainage and mobilization of metals. The information contained in the Stages 1 submissions indicates that the majority of the waste rock has the potential to generate acid;

2) the release of metals from tailings and mine water and nutrients being leached from waste rock bearing explosives related nitrate;

3) the release of suspended sediments from construction activities and from the ore extraction process; and

4) the spills from the handling and transfer of fuel, ore concentrate and other chemicals used during construction and mine operation.

Potential impacts on surface water quality from the access road corridor and barge facilities are discussed under a following section on fish and fish habitat.

Mitigation

Acid generation will be mitigated by disposing tailings and waste rock underwater in Brucejack Lake. Other disposal methods were investigated but were determined to be less suitable given the Sulphurets setting (Volume 2, Appendix B, letter 1897-12-07).

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Waste rock will be placed in Brucejack Lake when the lake is at its lowest level each year (May-June) to ensure that the waste rock will be at least 6m below the normal lake level. Both Environment Canada and the B.C. Ministry of Environment have stipulated that once waste rock has been deposited in the lake it must remain underwater at all times. It was determined that the mine's six year production of waste rock will occupy only about 0.1% of the total volume of the lake.

To maximize the retention time for settling of fine tailing particles, the tailings slurry will be discharged into Brucejack Lake at depth of 65 metres. This discharge will be in the deepest part of the lake and at the opposite end from the lake's outflow. The discharge of the denser mine effluent into the deeper water would minimize its recirculation into upper water layers. It was also determined that the lake's available storage volume below the 70m depth contour, was sufficient to hold 3.5 times the volume of tailings solids to be disposed during the mine's proposed 6 year operational life.

Brucejack lake was modelled to estimate the quality of water that would be discharged from the lake outlet. Levels of total metals were then calculated from downstream locations using dilution factors derived from estimates of downstream creek and river flows. The results showed that for a complete mixing of the top 55m of the lake, due to late summer turnover, both federal and provincial effluent criteria would be met. Similarly, receiving water quality criteria in the Unuk River would be achieved under all flow scenarios except for total silver and copper which can naturally exceed the Canadian Water Quality (CCREM) Guidelines due to existing high background levels.

To ensure that these water quality criteria are maintained the proponent has submitted a detailed effluent and receiving water quality monitoring program to be conducted during the operation of the mine. Should effluent quality approach levels that are considered unacceptable, the proponent has indicated several feasible contingency measures that could be implemented to control these effects. These include adjusting percent fines in backfill, using mine water as mill process water, adding flocculant to tailings before discharging to the lake or adding flocculant to the Brucejack Lake discharge thereby allowing settling behind the intake dam.

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To mitigate the release of sediment loads to receiving waters from instream construction activities, the use of coffer dams, an optimized sequence of construction and preparation of spillways to provide alternative flow paths during construction have been incorporated into project design.

For accidental spills, the inclusion of provisions for the control of spills at source have been included in project design. To prevent operational spills, several controls have been built into the design such as interlocking shut-offs on conveyers, low flow shut-off switches and others. All fuel storage will be located within bermed areas. The proponent is also preparing a detailed spill contingency plan for the handling and transportation of all hazardous materials for both the access corridor and the mine operation. This is to be submitted at Stage III.

Impact Assessment Conclusion

During the Stage 1 review Environment Canada questioned the assumption used in the Brucejack Lake model of lake turnover occurring only to a depth of 55 metres. Expert advice on the lake modelling assessment was obtained from Environment Canada's National Water Research Institute (NWRI). Expert opinion was that wind and convective cooling could induce stirring at greater depth. Subsequently a revised modelling of the lake was conducted by the proponent which included complete mixing down to the 65m depth. Further review of this revised modelling by Environment Canada, for the worst case scenario, demonstrated that in terms of water quality at the Canada - U.S. boundary, no adverse effects on the aquatic biota are anticipated from the project. This conclusion is based on the provision that the pH of downstream water does not appreciably deviate from current levels particularly at low flows. Even when NWRI applied a more detailed model involving complete turnover [surface to bottom (88m) of the lake], it predicted only slightly greater concentrations of suspended solids and total metals at downstream locations. Therefore, the same conclusion was reached with respect to no adverse effects on aquatic biota at the International Boundary, (Volume 3, Appendix E, letters 1990-02-22 and 1990-02-19).

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Under the worst case scenario, total copper and zinc may still exceed the Canadian Water Quality Guidelines in Sulphurets Creek due to high background levels. However, the predicted levels of copper and zinc, at the outlet of Brucejack Lake will be less than the natural levels found downstream in Sulphurets Creek. Similarly, total silver levels will be exceeded in the Unuk River at the border. However, a large portion of the silver will be in a form unavailable and non-toxic to biota, as long as acidic conditions are not present. Predicted total mercury levels in the Unuk River at the boundary may also exceed the provisional B.C. criterion (Volume 3, Appendix C, letter 1989-06-12) for aquatic life. This could present a problem if there was a high probability for the methylation of mercury. The conditions of low water temperatures and low organic content in the Brucejack system, however, would not favour mercury methylation.

The Sulphurets Project will not be employing the cyanidation process for gold extraction. Therefore, the federal Metal Mine Liquid Effluent (MMLE) Regulations apply and will have to be met. These MMLE Regulations were considered in the above discussed lake modelling. The model also indicated that not only would the Regulations be met but even more stringent effluent criteria can be achieved. Environment Canada has, therefore, advised the MDSC that more stringent effluent criteria will be applied to the lake discharge in order to further ensure the protection of downstream water quality and salmon resources (Volume 3, Appendix C, letter 1989-06-12 pages 5 and 6). In addition, the B.C. government together with Environment Canada and the proponent will develop criteria for acceptable levels of water quality in any leachates. (Volume 2, Appendix B, letter 1989-10-10 page 4).

The federal and provincial assessments also served to identify several requirments to further mitigate potential water quality impacts. These are given in the MDRP compendium of review comments, Volume 2, Appendix B, letter 1989-10-10.

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FISH AND FISH HABITAT

The federal areas of concern for potential fish and fish habitat impacts of the Sulphurets Project are:

1) the impacts of the access road and operation of the barge facilities on salmon and salmon habitat of Bowser Lake and its tributaries; and

2) the impacts of the mining and hydroelectric development on the salmon and salmon habitat of Sulphurets Creek and the Unuk River.

Bowser Lake is an important area for rearing and spawning of coho and sockeye salmon. It has an estimated average annual escapement of 25,000 sockeye. In addition, four small tributary creeks of Bowser Lake, to be crossed by the access road, have valuable coho rearing and spawning habitat.

The Unuk River supports all five species of Pacific salmon, although neither chum or pink salmon are found in the Canadian portion of the river. In the Ketchikan area of Alaska, the Unuk River is considered important for the production of chinook salmon. The river is rated as a moderate producer of chinook and the watershed has a potential run size of up to 10,000 chinook. The Unuk River is a valuable migratory corridor and provides critical overwintering habitat for juvenile chinooks. The closest salmon and salmon habitat to the mine site are located approximately 20 km downstream in Sulphurets Creek, about 1 km upstream from its confluence with the Unuk River. This is due to a large waterfall located in that area which precludes the upstream migration of anadromous fish into Sulphurets Creek and its headwaters. No fish have been observed in Brucejack Lake or Creek and the potential fisheries value is considered very low.

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Project Impacts

The major potential impacts on salmon and salmon habitat from the Sulphurets Project are similar to those of water quality discussed in the previous section. They include:

1) increases in pH and metal levels in the receiving waters from the disposal of tailings, mine water and waste rock in Brucejack Lake;

2) increases in sediment loads to receiving waters from construction activities and from the tailings effluent disposal in Brucejack Lake;

3) destruction of salmon and/or salmon habitat and/or obstruction to migratory corridors from stream crossing and barge landing sites; and

4) accidental spills of fuel, chemical agents or other toxic materials during construction and mine operation.

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Mitigation

The mitigation discussed in the previous section on water quality applies to the above potential impacts of 1), 2) and 4). Timing of instream work and avoidance of valuable rearing and spawning habitat areas will mitigate against direct impacts on salmon and disturbance to fish use. The culverts and/or bridges will be designed to accommodate the 200 year peak flows thus providing for unrestricted passage of both fry, juvenile and adult salmon. Application of known construction techniques for stream crossings will further minimize impacts on the salmon resources.

Impact Assessment Conclusion

The federal assessment has concluded that the proposed mining operation will not result in the degradation of fish habitat or in the direct toxicity to salmon. The assessment has also concluded that the Stage I submissions on the mining operation complies with the federal Fisheries Act (Volume 3, Appendix C, letter 1989-06-12 and Volume 3, Appendix G, letter 1989-05-24).

The federal Department of Fisheries and Oceans (DFO) supports the approval of the concept of the barge facilities on Bowser Lake (Volume 3, Appendix H, letter 1989-06-27). However, the access road and operation of the barge facilities have the potential to adversely affect the salmon resources in Bowser Lake and its tributaries. Thus, at Stage III, the Department of Fisheries and Oceans will be seeking information on construction and operational measures chosen to reduce adverse impacts, and compensation for any unavoidable impacts to salmon habitat as outlined by their No Net Loss Habitat Policy.

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MIGRATORY BIRDS AND THEIR HABITAT

Canada has responsibility for the protection of migratory birds under the Migratory Birds Convention Act. This is administered by the Canadian Wildlife Service (CWS) of Environment Canada.

The Stage I submission reported that waterfowl production for the mine property area is considered to be very low and that there is a lack of suitable habitat for nesting, feeding and rearing. For lover elevations, such as the Bowser Lake area where the access corridor is located, migratory bird resources are more diverse.

The CWS response on the Sulphurets Project is given in Volume 3, Appendix F, letters 1990-02-19 and 1989-04-28. CWS identified three aspects of the Project which have potential to impact on migratory bird resources. These include:

1) potential loss of some of the fragile alpine habitat as a result of construction and operation of the mine;

2) potential impact on migratory bird habitat as represented by the riparian zone adjacent to Sulphurets and Brucejack creeks due to mine effluent carried by the outflow of Brucejack Lake; and

3) potential impact on migratory bird habitat from the construction of the access corridor.

The federal assessment has concluded that the proposed mine construction and operation will not pose a significant threat to migratory birds if the constraints requested by the regulatory agencies are upheld. In particular mine activity should be confined to the minimum area required for essential operations in order to minimize potential impacts on the fragile alpine habitat. In addition, the federal assessment conclusion that the proposed mine will not result in significant impacts on downstream water quality or fisheries also supports a similar conclusion for migratory

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bird habitat. Regarding the construction of the access corridor, its potential impact should not be considered additional to impacts occasioned by the construction of logging roads in the general area.

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NAVIGABLE WATERS

Canada retains exclusive authority over matters of navigation and vessels and their operation. For the Sulphurets Project the federal interest is defined under the Navigable Water Protection Act (NWPA) and the Canada Shipping Act (CSA) since access to the mine site includes a barge and tug operation on Bowser Lake. Both Acts are administered by Transport Canada.

Applications under the NWPA and CSA will be addressed at Stage III. For the NWPA application, Newhawk Gold Mines Ltd. must submit an outline of the proposed works and provide detailed design drawings of all fixed works within the wetted perimeter of Bowser Lake. This would include, at minimum, detailed designs (plans and sections) of the two barge landing sites, including protection works, bubbling facilities and dredging. Proposed navigational aids must also be outlined.

The NWPA application will be referred to Environment Canada for review under an established federal working policy. Environment Canada then coordinates a review among its relevant agencies. These comments and recommendations are provided to Transport Canada for their consideration and the proponent is accordingly advised.

The barge and tug operation will be required to meet the standards of the CSA including standards for the vessels, operating personnel, ice-breaking methodology and provision of emergency gear. The operation is subject to unscheduled Transport Canada, Coast Guard inspection, and the operation may be shut down if CSA standards are not met.

Transport Canada has advised (per. comm. H. Adrian, March 26, 1990) that the construction of the hydro storage dams on Brucejack Creek will not require permitting pursuant to the Navigable Waters Protection Act.

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