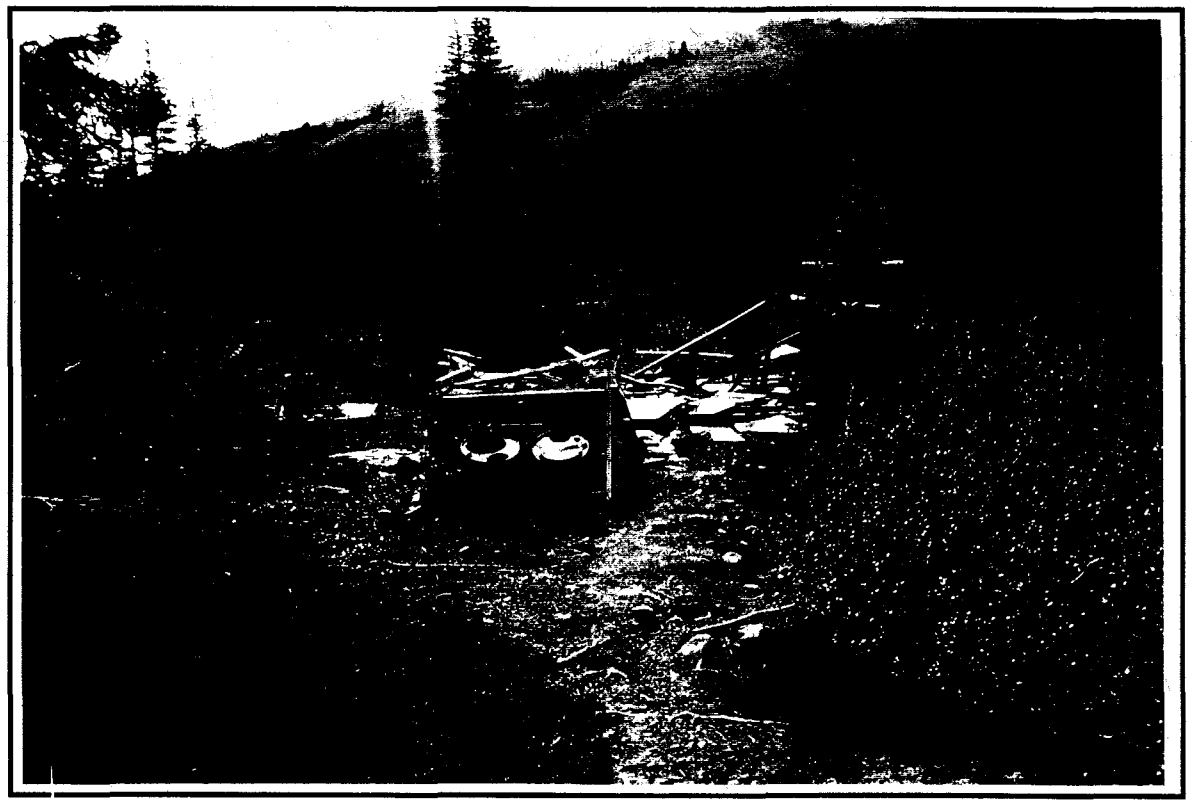
MIN - 032

# PWGSC

## Quality in Environmental Services

# PHASE II ENVIRONMENTAL ASSESSMENT OF THE HART ABANDONED MINE SITE



prepared for:

Action on Waste Program
Indian and Northern Affairs Canada

prepared by:

Environmental Services
Public Works and Government Services Canada

February 1997

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada
Canada

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# PHASE II
# ENVIRONMENTAL ASSESSMENT
# of the
# HART MINE SITE

**Prepared for:**

**Action on Waste Program**
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**March 1997**

# EXECUTIVE SUMMARY

A phase II environmental assessment was conducted at the Hart abandoned mine site (60°19'20"N; 130°40'30" W) in July, 1996 by Environmental Services, Public Works and Government Services Canada for the Action on Waste Program, Indian and Northern Affairs Canada. Based on the findings of the Phase I investigation performed in 1993 by DIAND Technical Services, a phase II assessment was conducted to a) identify potential environmental and human health risks associated with the present condition of the mine site, and b) provide recommendations and preliminary cost estimates for remediation of those risks.

A field investigation of the abandoned mine site was conducted to evaluate environmental and human safety concerns with respect to: mine openings and workings; buildings and infrastructure; waste disposal areas; waste rock disposal areas; surface water (including adit and waste rock seepage, and receiving waters); and hazardous and non-hazardous materials on the site.

The results of the investigation concluded that the site presents a very low risk. No adits were identified on site and the only incidence of waste rock consisted of minor trenching activity to the southwest of the site. Environmental concerns consisted of one 150 l barrel of jet fuel on site. Aesthetic concerns consisted of collapsed wood structures on site and assorted wood and metal waste including barrels on site. No watercourses were observed in the vicinity of the site.

Using applicable federal and territorial criteria as well as northern mine reclamation guidelines, recommendations are to flare off aviation fuel on site, crush and bury barrels and miscellaneous metal waste on site, and demolish and burn wooden structures and combustible waste on site.

No further work is required at this site following the implementation of these recommendations.

## SUMMARY OF CONCLUSIONS & RECOMMENDATIONS

| ASSESSMENT COMPONENT | RISK | RECOMMENDATION |
|---|---|---|
| **1. Building, Infrastructure, Equipment** | | |
| 2 collapsed wood structures | Aesthetic | Burn on site. |
| **2. Non-Hazardous Waste Material** | | |
| Misc. metal debris & barrels | Aesthetic Concern | Crush & bury on site. |
| **3. Hazardous Materials** | | |
| One 150 l. barrel of aviation fuel | Environmental | Burn on site. |
| **4. Water Quality** | | |
| Mine Seepage | None | None |
| Site Drainage | None | None |
| Receiving Waters | None | None |
| **5. Waste Rock Disposal Areas** | | |
| None | None | None |
| **6. Mine Openings** | | |
| None | None | None |
| **7. Tailings** | | |
| None | None | None |

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# 1.0 INTRODUCTION AND BACKGROUND

## 1.1 Location:

The Hart mine site is located at 60°19'20"N, 130° 40'30"W, approximately 28 km west Rancheria, YT. and 2.75 km east southeast of the Silver Hart minesite on a relatively level plateau area at an elevation of 1400 m **(See Photo 1)**. No adits were identified in the previous report and this condition was confirmed during this site visit.

## 1.2 Overview of Site Development:

Work on the Hart site began in 1971 based on DIAND and YTG assessment file and MinFile Data. The property includes four claim areas with the Nite claims in the centre, the SH claims to the north, the Glory to the southwest and the Orly to the south of Edgar Lake. Work to date includes:

- eight diamond drill holes totalling 476.5 m (1971) and bulldozer trenching on the Nite claims (1971, 1988)

- bulldozer trenching (1980, 1987, 1992, 1993) and some reclamation and road building (1992, 1993) on the SH claims area and

- prospecting and geological mapping (1992, 1994) on the Glory, Glue and Orly claims areas

The majority of the field exploration work was reportedly done in 1971. A small tent camp was established near the original Nite claim, possibly dating from 1988 based on dates found stamped on a fuel drum found on the site (DIAND, 1993).

## 1.3 Site Access:

Access to the site is available via a service road which branches north from mile 720 of the Alaska Highway, 16 km west of Rancheria, Y.T. This service road in turn follows the east bank of the Rancheria River north to Northwind Lake, jogs eastward past Roy Lake and Edgar Lake, then jogs north to the Silver Hart mine site. A road access to the Hart mine site travels east from Silver Hart however was obstructed. Estimated distance from the Alaska Highway to the Hart site is approximately 45 km over rough road.

# 2.0 PURPOSE AND SCOPE OF WORK

The following assessment activities were completed:

- Inspection of mine openings and workings, buildings and infrastructure, and waste disposal areas;
- Photo documentation and mapping of relevant site features;

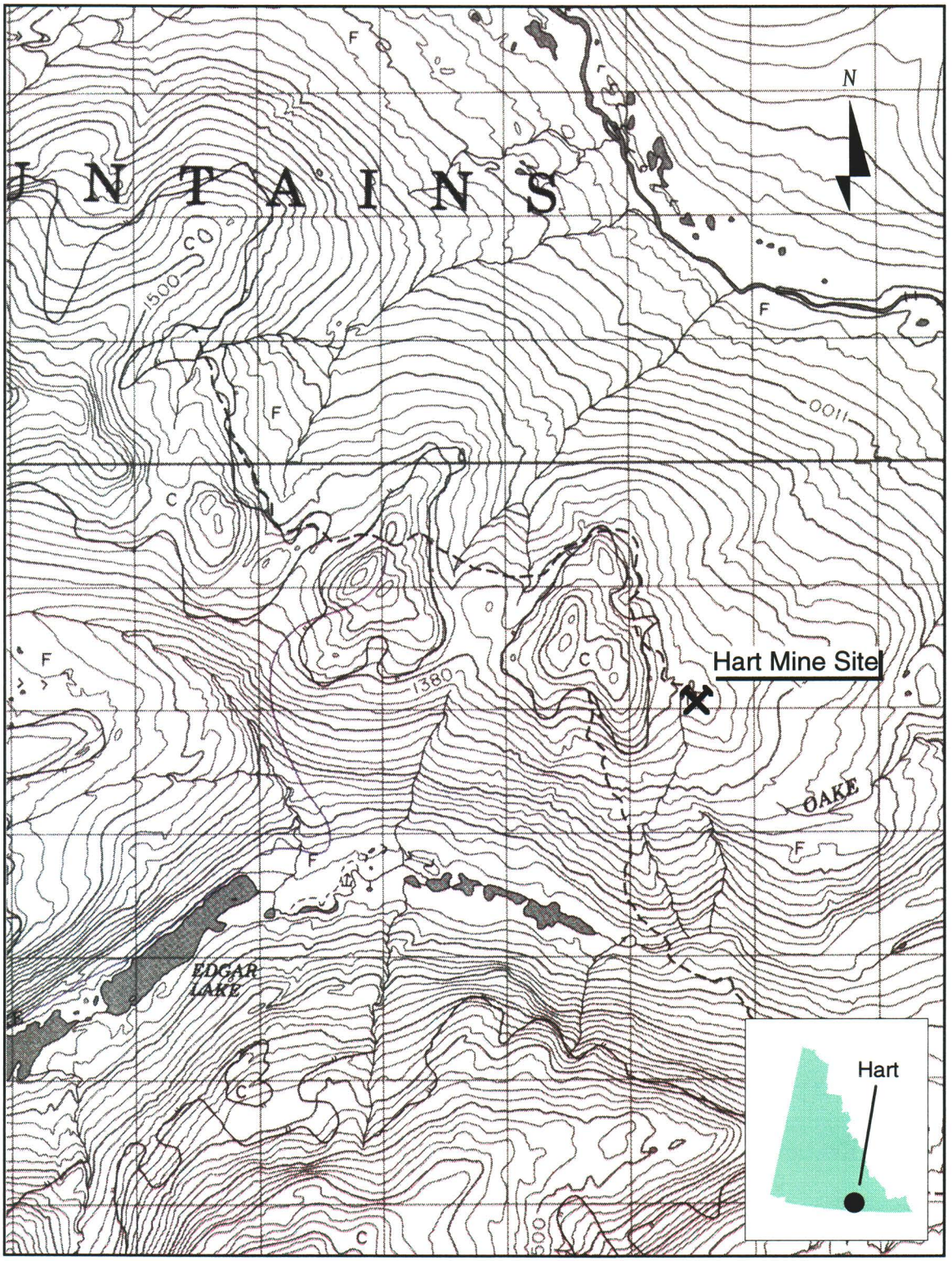
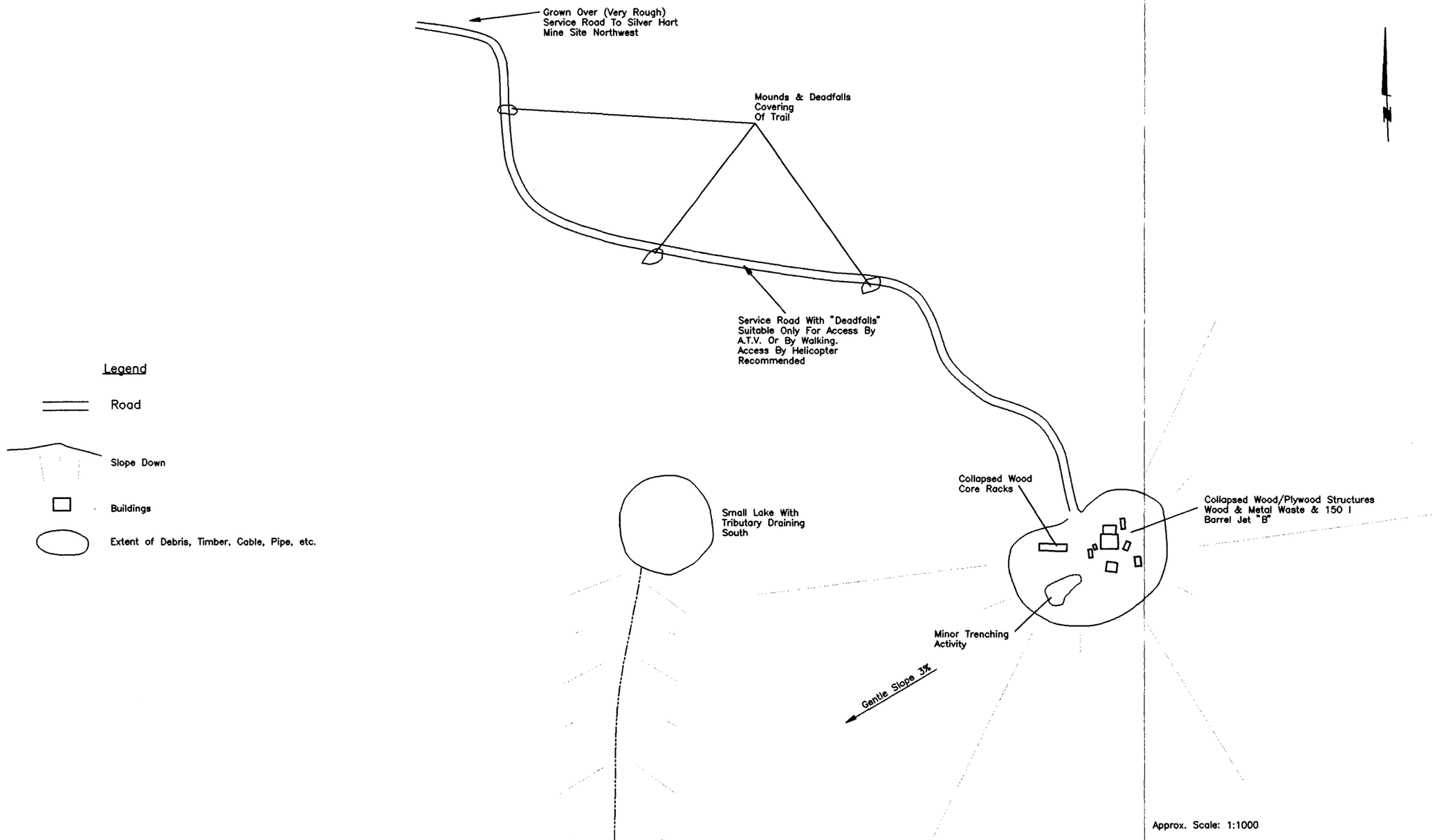



Figure 1: HART SITE

N.T.S. 105 B/7 Map Name: Sab Lake Map Scale: 1:50,000

Latitude: 60° 19' 20" N Longitude: 130° 40' 30" W




Approx. Scale: 1:1000

PLOT: 1=1
CAD FILE: INVEN-96\HART\HART-1

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada

Architectural & Engineering Services
Western Region

designed by: / concu par: — date:
drawn by: / dessine par:
approved by: / approuve par:
revisions:

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# Hart Mine Site Development & Geological Information

Yukon Territory

project no. / no. du projet: 626967

dwg. no. / dessin no.: 1 of 1

- Sampling of waste rock disposal areas, stained soils, surface water (including adit and waste rock seepage, and receiving waters) and barrel contents;
- Identification and inventory of hazardous and non-hazardous materials on the site;
- Identification of potential or actual environmental pathways and receptors for site contaminants; and
- Assessment of human safety hazards and potential for accidental or deliberate access to hazardous areas.

Upon completion of these activities, preliminary cost estimates were generated to meet the following remediation/mitigation requirements:

- Physical stabilization of waste rock disposal areas;
- Chemical stabilization of the waste rock disposal areas as appropriate to local and background conditions, taking into account impact, on-site resources, and accessibility;
- Sealing of all mine openings;
- Consolidation and landfill of all non-hazardous, non-combustible solid wastes;
- Remediation or removal and disposal of contaminated soils as required to meet the more stringent of: Yukon Government's Contaminated Sites Regulations (1996) Schedule 1; and Canadian Council of Ministers of the Environment's Interim Canadian Environmental Quality Criteria for Contaminated Sites (1991) Commercial/Industrial criteria for soils;
- Removal and disposal of hazardous solid wastes;
- Draining, cleaning and disposal of drums or other containers containing petroleum products or other liquid hazardous wastes;
- Onsite flaring or removal and off-site disposal of petroleum products and other liquid hazardous wastes; and
- Demolition of buildings and infrastructure to foundation level and burning of combustible non-hazardous materials in approved location

# 3.0 SITE ASSESSMENT METHODOLOGY

## 3.1 Assumptions:

At each mine site, the assessment was limited to the area specifically developed or occupied for mine exploration or mining purposes and immediately adjacent areas within applicable claim boundaries as well as off-site environmental resources believed to be affected by mine exploration or development activities. water samples were taken off-site to determine potential impact to surface water bodies due to mining activities. Access roadways to mine sites were not included in the assessments.

## 3.2 ASSESSMENT CRITERIA

### 3.2.1 Criteria and Guidelines

Metal Mining Liquid Effluent Regulations and Guidelines (Environmental Protection Service, Environment Canada, 1977)

The intent of the requirements defined in this document is to limit the discharge of deleterious substances from base-metal, uranium and iron ore mines. These requirements are uniformly applied national standards and intended to provide protection for fish and other aquatic life.

Interim Canadian Environmental Quality Criteria for Contaminated Sites (Canadian Council of Ministers of the Environment, 1992)

The Canadian Council of Ministers of the Environment (CCME) Interim Canadian Environmental Quality Criteria for Contaminated Sites are numerical limits for contaminants in soil and water intended to protect, maintain or improve environmental quality and human health at contaminated sites in general. CCME criteria include two types of benchmarks for soil and water quality - assessment criteria and remediation criteria. Assessment criteria are approximate background concentrations or approximate analytical detection limits for contaminants in soil and water, and remediation criteria are used as clean-up benchmarks based upon intended land use. Remediation criteria do not address site-specific conditions. They are considered generally protective of human and environmental health for specified uses of soil and water at contaminated sites. The remediation criteria for soil are classified by three land uses:

1) Agricultural,
2) Residential/Parkland, and
3) Commercial/Industrial.

Remediation criteria for water are classified by four uses of water likely of concern at contaminated sites:

1) Freshwater aquatic life,
2) Irrigation,
3) Livestock watering, and
4) Drinking water.

Contaminated Sites Regulations (draft) (Yukon Government, 1996)

According to these draft regulations a site is contaminated if it used for agricultural, commercial, industrial, parkland, or residential land use and contains a substance in concentration greater than or equal to:

(I the generic numerical soil standard of Schedule 1, or
(ii) the matrix (pathway specific) numerical soil standards of Schedule 2
and, surface or groundwater used for aquatic life, irrigation, livestock, or drinking water which exceeds a concentration greater than or equal to:

(I) the generic numerical water standard of Schedule 3, or
(ii) the local background concentration of that substance in the soil, surface water, or groundwater.

Below 3 metres of the surface, commercial land use criteria is applicable.

Mine Reclamation in Northwest Territories and Yukon (INAC, 1992)

This report defines factors which are to be considered in reclamation of abandoned mine sites operating in northern climates. Factors include:

- open pit and underground mines;
- special mines such as uranium, sand and gravel, and coal;
- waste rock and tailings disposal;
- acid generation and leaching; and
- estimating cleanup costs.

### 3.2.2 Application of Criteria and Guidelines

The following assessment criteria were used for the Hart abandoned mine site:

**A. Soils:**

CCME: Remediation Criteria for Soil - Commercial/Industrial standard

YUKON RENEWABLE RESOURCES: Draft Contaminated Sites Regulations - used for hydrocarbon screening parameters

**B. Water:**

Envir. Canada: Metal Mining Liquid Effluent Regulations & Guidelines - are compared to seepage from mine openings, & river/stream water quality

Background: Downstream water quality results of rivers and streams are compared to the results of upstream (background) water quality.

CCME: Remediation Criteria for Water - Freshwater Aquatic Life guideline for river and stream water quality

[Note: In this screening assessment of water quality, analytical results are primarily compared to background values which may more accurately characterize the local environment.]

**C. Mine Clean-Up and Reclamation:**

INAC: Mine Reclamation in Northwest Territories and Yukon

## 3.3 METHODS

### 3.3.1 Background Information

Available background information was consolidated from the Yukon Chamber of Mines mine records, Whitehorse Public Library, Yukon Archives holdings, and records and reports from the Yukon Renewable Resources Library, Yukon Water Board, DIAND Lands Branch, DIAND Water Resources, and DIAND Library. INAC (1994) provided an overview assessment of the Hart mine site to that date. Other published information sources were examined for site or regional information as applicable. On the basis of available information, knowledge gaps regarding existing or potential safety and environmental risks at the site were identified and a site assessment plan was developed.

### 3.3.2 Site Assessment Components

A site assessment was conducted to identify existing or potential safety and environmental risks on the site. The assessment included the following components:

*Waste Rock* disposal areas were inspected and sampled by a professional geologist to assess acid rock drainage potential by:

- Identifying waste rock mineralization with potential to release acidic and/or metal-contaminated drainage
- Mapping and logging waste rock, tailings, pit walls and rock faces
- Collecting and field testing representative samples of mine wastes

*Mine Openings* were inspected and documented to identify closure requirements.

*Non-Hazardous Site Debris* was inventoried.

*Contaminated Soil Areas* were measured and sampled to determine the degree and type of contamination and estimate soil volumes for remediation.

*Hazardous Materials* were inventoried and sampled for identification of contaminant constituents, as necessary.

*Buildings and other Structures* were inspected for hazardous material and assessed for stability.

*Borrow Sources* were identified and assessed for accessibility and approximate quantity and type of granular material.

Scale site plans were prepared to identify the dimensions and locations site structures, mine workings and adits, waste rock disposal areas, on-site sampling locations (as applicable), and

any other pertinent information.

### 3.3.3 Sampling Methods and Quality Assurance

Test Pit Sampling

Test pits were excavated to a depth of about 0.3 m to 1.0 m. Horizons in the test pit walls were logged, noting colour/weathering, rock composition, primary and secondary mineralization, particle size distribution, paste pH and paste conductivity, and moisture content. The test pit and was photographed and its location was marked on the field map. Approximately 2 kg of rock was collected at each sample site. For test pits showing a homogeneous wall face, a plastic sheet was placed at the bottom of the test pit and the pit wall was cut vertically down with a cleaned shovel. All rock larger than 75 mm in size was discarded. The sample was coned and quartered, discarding opposite quarters, until a 2 kg sample was obtained. For test pit walls showing clearly-distinguishable horizons (distinguishable by the sulphide and carbonate contents), the horizons were sampled individually.

Water Sampling

Samples were collected from surface streams upstream and downstream of mine related flows, and from representative seeps emanating from waste rock, tailings, pit walls, and/or adits. 250 ml water samples were collected by hand, facing upstream, ensuring that the sample is not contaminated by disturbed sediment, debris and other floating materials. Sample bottles were rinsed three times with water from the sample stream prior to collecting the sample. Two (2) ml of $HNO_3$ were immediately added to water samples destined for metals analyses. For analyses of non-metallic parameters, water samples were brim-filled to minimise head space, placed in a cooler, and maintained at 4° C until delivery to the laboratory.

Soil Sampling

Soil lithology was recorded from observations of the side walls of the test pit, and soil samples for both field and laboratory testing were collected. Observations were recorded for each soil sample site, including soil particle size, consistency, colour, moisture, discolouration, stratification, odour, and any other observations of significance. Samples were collected at depth intervals selected on the basis of stratigraphic observations and anticipated or apparent contamination. The lab samples were collected using disposable latex gloves and decontaminated stainless steel sampling utensils. All samples intended for organic analyses were stored in laboratory-cleaned 250 ml glass jars; samples intended for metals analyses were placed in new "Whirl-Pak" bags. All samples were placed in a cooler for shipment to the laboratory.

Barrel, Pail, and Above-Ground Storage Tank Sampling

Barrels and pails suspected as containing hydrocarbons were sampled with 1.2 m clean hollow glass rods ("drum thieves"), capable of extracting up to 25 ml of product. The rods were

inserted into the drum or pail, and the uppermost open tip was sealed to maintain the sample within the rod as it was extracted from the drum or pail. The sampled hydrocarbon was then drained into a 40-ml laboratory-cleaned vial. The extractions were repeated until at least 20-30 ml of product was obtained. The vial was then sealed and placed in a container for shipment to the laboratory. Each used drum thief rod was subsequently destroyed to prevent accidental re-use.

No above ground storage tanks or 205 litre barrels with petroleum hydrocarbon contents were identified or sampled during the site visit.

Quality Assurance

Quality Assurance (QA) is a set of procedures for ensuring that the results of chemical analyses are, and can be shown to be, accurately representative of field conditions. A complete QA program includes both a field component and a laboratory component. In addition to the standard sample collection methods outlined above, the field QA measures that were implemented for this assessment study include:

- chain of custody procedures and forms;
- a sample labelling and sample location identification scheme;
- laboratory preparation of all sampling containers;
- laboratory defined sample preservation and shipping procedures; and
- regular maintenance (including re-calibration) and cleaning of field equipment.

Laboratory QA measures included replicate analyses of selected soil and water samples. Replicate analytical results were submitted with each analytical report

# 4.0 ENVIRONMENTAL SETTING

## 4.1 Mineralization

The Hart Mine site is located within the extreme southeastern portion of the Pelly Mountain Ecoregion. The overriding geological influence on this ecoregion is the Cassiar Mountains which are composed mainly of intrusive rock (consisting of biotite, quartz monzonite and granodiorite with significant bodies of chert, limestone, slate, argillite, and quarzite as well as minor inclusions of greenstone schist. (Ecoregions of Yukon Territory, Oswald, E.T. & Senyk, J.P., p. 32) Mineralization in the Nite claims area is predominated by scheelite and minor molybdenum hosted in garnet-quartz-wollastonite skarn. The skarn is developed along the boundary between Cretaceous granodiorites of the Cassiar Batholith and Cambrian to late Proterozoic marble and quartz-biotite schist sequences. The skarn mineralization strikes over 1100 m along azimuth 045° and dips 45° to the northwest. Iron sulphides are reported as uncommon in the skarn, a favourable difference to the mineralogy of the nearby Silver Hart mine. Narrow, late stage quartz-sphalerite veins cross-cut the skarn.

One major quartz-uraninite vein assaying 0.203% $U_3O_8$ was also identified cross cutting the skarn (MinFile 105B-021). The Blue claims host an east to northeast striking system of sub-parallel and echelon veins of quartz-sulphide and massive galena. Mineralization of the quartz veins includes up to 10% fine disseminated pyrite, arsenopyrite, tetrahedrite, galena and sphalerite.

### 4.2 Surface Hydrology

Surface water runoff in the areas of trenching was not observed. It is considered unlikely due to the limited annual precipitation in the area and the porous conditions of the underlying colluvium at the higher elevations. A small lake is reported near the camp site but was not observed during this investigation. The lake is topographically connected to a minor creek gully which drains south eventually joining the Meister River 6 km to the northeast. The status of the creek drainage was not established however no immediate water sample sources were identified and no samples were collected.

### 4.3 Climate

The Hart mine site lies in the extreme southwestern portion of the Liard River Ecoregion which comprises an area of 21,275 $km^2$ and is located in the southeastern portion of the Yukon Territory. The site is situated within the southeastern portion of the Yukon and is subject to a predominating cold continental climate which provides colder winter and warmer summer temperatures than other areas of the Yukon which are under a more significant marine influence.

Generally speaking, the climate of this portion of the Yukon consists of long cold winters and short warm summers. Mean annual temperatures are below freezing and vary from a low of -25°C to a high of 15°C with annual precipitation varying from 375 mm to 500 mm, increasing with elevation and during the summer months of July, August and September. More specifically, for the Liard River Ecoregion, annual precipitation averages 430 mm with amounts in the west averaging 400 mm and increasing to 625 mm in the eastern portions of the ecoregion. Mean annual temperature is -3°C at an elevation of 685 m with a January mean of -25 °C and a July mean of 15 °C. (Ecoregions of Yukon Territory, Oswald, E.T. & Senyk, J.P., p. 14 & p. 26)

### 4.4 Vegetation

The Hart site is located in the Liard River Ecoregion, comprising an area of 21,725 $m^2$ with predominate stands of black and white spruce and lodgepole pine is included in the Eastern Yukon forest subregion. The ecoregion is forested primarily with closed stands of conifers and hardwoods reaching heights of 30 m adjacent to river terraces and has the highest potential for growing trees of any Yukon area. Lodgepole pine tends to predominate in hilly areas as a result of fire while aspen appears in pure or mixed stands on south facing slopes. Paper birch appears scattered throughout other species on upland slopes with a northern orientation. (Soil, Site & Land Classification, Rowe, J.S. 1972).

Understory vegetation consists of shrub and moss growth beneath mature conifer stands along with alder, soapberry, blueberry, rose and willows. Coarse textured soils are covered with lichens, forbs and various shrubs. Much of the site is composed of moderately well drained areas which are covered by sedge or sphagnum hummocks/tussocks which in turn support ericaceous shrubs, cinquefoil or lichens. Ground birch and willow tend to become prevalent above treeline.

## 4.5 Fish and Wildlife Resources

### 4.5.1 Fish Resources:

Fish species reported to be found in the Liard River system generally include: Arctic Grayling, Burbot, Dolly Varden Char, Emerald Shiner, Finescale Dace, Flathead Chub, Goldeye, Inconnu, Lake Chub, Lake Trout, Lake Whitefish, Longnose Dace, Longnose Sucker, Mountain Whitefish, Ninespinie Stickleback, Northern Pike, Rainbow Trout, Round Whitefish, Slimy Sculpin, Spottail Shiner, Trout Perch, White Sucker, and Yellow Walleye. The species of most importance to domestic and sports fisheries includes Arctic Grayling, Dolly Varden Char, Lake Trout and Northern Pike. (Foothills Pipelines Ltd. 1976)

The Rancheria River is reported to support a sport fishery for Arctic Grayling, Dolly Varden Char (Foothills Pipelines Ltd., 1976). Both the Rancheria and Meister River systems possess important overwintering habitats for many fish species that move into smaller tributaries in the spring following breakup. Two unnamed creeks located northwest of Oake Creek drain to the northeast and into Meister River about 3 and 4 km downstream from Caribou Lake.

### 4.5.2 Wildlife Resources

The subject site includes primarily boreal and subalpine vegetation which serves to provide summer and fall range for small numbers of moose and caribou. Food resources are minimal during winter months due to snow depth. Black bear are present in small numbers at lower elevations with grizzlies occasionally moving through the area.

Other small animals which may occur in the area include: wolf, coyote, red fox, lynx, marten, wolverine, mink, river otter, and ermine. Beaver and muskrat likely occur at lower elevations along the marshy edges of Northwind, Roy and Edgar Lakes. Bird species in the area would include hawks, falcons, owls, ptarmigan, spruce grouse, and (diving duck) waterfowl (Silver Hart Project Overview Report, prepared by Norecol Environmental Consultants, Dec. 1987. p. 4-2 to 4-4).

## 4.6 Site Topography and Soils

The Hart area site is situated at an elevation of 1400 m on the east to southeast facing shoulder of a long mountain ridge. Topography slopes moderately steep off to the south but more gently to the north and northeast. Above 1500 m elevation, about 80% of the area is under a cover of colluvium with outcrop exposed over 20% of the area. Below 1500 m, the area is partially

covered by ablation till, reworked glacial deposits, outcrop and colluvium (Klassen, 1983). Test pits established for the Silver Hart mine site feasibility work indicated most of the till deposits have been worked as colluvium (McLeod, 1987). Surficial deposits in the valley bottoms are largely alluvial. Kame deposits have formed side channel valleys behind moraine dams.

### 4.7 Permafrost

The Hart site is situated within the scattered permafrost subzone of discontinuous permafrost zone that stretches across 80% of the land mass of the Yukon. In this area, permafrost tends to be localized with the active layer varying in thickness and depth. Quite often, the relative distribution of permafrost varies according to terrain and elevation

## 5.0 SITE DESCRIPTION AND FINDINGS

### 5.1 Buildings, Infrastructure, Equipment

The Hart mine site consists of a small centralized area with two collapsed wood structures situated side by side as well a core storage structure situated at the west end of the site **(See Photo 2).** The only remaining infrastructure on site is deteriorating canvas and metal stove parts **(See Photo 4)**.

| Structure | Construction Features | Interior Contents |
|---|---|---|
| Wood structures | 2 collapsed wood structures side by side | n/a |
| Core racks | Located at west end of site | Rock core. |

### 5.2 NON-HAZARDOUS WASTE MATERIALS

Non-hazardous waste materials observed in and around the site are listed in **Table 2 below**.

**Table 2 Non-Hazardous Waste Materials**

| Waste Material | Number/ Volume | Location | Comments |
|---|---|---|---|
| Empty 205 litre barrels | 8 | Scattered about site | Crush and bury on site. |
| Wood & metal waste | 20 $m^2$ | Scattered about site | Collect and burn in open area |

## 5.3 HAZARDOUS MATERIALS

The major portion of hazardous materials remaining on site consisted of one 150 litre metal barrel (red) marked Jet B aviation fuel. No landfills or waste areas were observed on site during the visit.**(see Photo 3)**.

## 5.4 SURFACE WATER QUALITY

No water courses through the mine site or in the immediate vicinity of the mine site were observed consequently no water samples were collected for this site.

## 5.5 WASTE ROCK DISPOSAL AREAS:

No waste rock dumps resulting from mining activity were observed at the Hart site. The stripped and stockpiled overburden, exposed skarn mineralization and quartz-sulphide veins are not expected to significantly increased the potential for acid generation or metals contamination above natural levels based on:

- limited exposure to broken sulphide rich rock

- limited total contained iron sulphides and

- low seasonal volumes of surface water

No samples of the stripped material were collected and analyzed. A comparison to the adjacent Silver Hart mine site where similar mineralization has been explored by underground mining suggests the potential for some acid generation if blasted waste rock is generated and stockpiled by future mining activity.

## 5.6 MINE OPENINGS:

No underground mine workings or blasted pit areas were observed on the property during the site visit. The most significant work conducted of the property to date includes bulldozer trenching to strip overburden. The total area disturbed was not investigated. Trenches and stockpiled overburden to the north (including both the Nite and Silver Hart areas) cover approximately 2 ha. Reclamation is reported to have been conducted on the Silver Hart claims area to the north however the total area and work done were not reported.

## 5.7 Tailings

There has been no milling or ore processing on the Hart site and there are no mill tailings present on the site as a result.

# 6.0 CONCLUSIONS

## 6.1 HEALTH AND SAFETY:

Risks relating to mine safety at the Hart mine site are limited solely to the presence of the collapsed wood buildings on site.

## 6.2 ENVIRONMENTAL RISKS:

The overall environmental risks of the Hart site relating to exploration activity are considered very low with no potential for acid generation. The potential for release of a range of metals into the environment is regarded as low in consideration of the low surface water volumes and limited exposure of mineralized rock. Lead, zinc, silver, tungsten and molybdenum are all present in elevated contractions at Hart. The occurrence of uraninite is minor only exposed on surface with no broken waste rock present and low grade. This occurrence is not considered significant enough to cause any adverse environmental damage.

The results of this environmental assessment of the potential for acid generation and metals contamination resulting from mining and exploration work done on site are limited by the lack of samples taken to represent the various stockpiles of stripped overburden or surface water draining the site. This environmental assessment of the geologically related aspects of the Hart site, although lacking sample analysis results, can be considered low due to the present body of data available. Although sampling and analysis of available surface waters would more definitively test the potential environmental risks at the site, no further testing is recommended at this time.

## 6.3 AESTHETIC CONCERNS

Primary aesthetic concerns consist of wood waste remaining on site as well as metal waste, 205 litre metal drums, assorted metal waste and aviation fuel.

# 7.0 RECOMMENDATIONS

***Recommendation 1.***

Gather up remaining wood waste on site and burn in an open area.

***Recommendation 2.***

Gather up remaining metal waste on site crush and bury in trenchworks area.

## 8.0 COST ESTIMATES TO IMPLEMENT RECOMMENDATIONS

Recommended remediation and management actions are compliant with applicable federal or territorial regulations and criteria, are reliant upon available technology, and are intended to be appropriate for local conditions and sensitivities. An estimated breakdown of expected remediation/mitigation costs to an accuracy of 25% is provided under separate cover to this report. The cost estimate includes contractor and project management costs and contingencies. The estimated cost to implement the recommendations is provided under separate cover.

# REFERENCES:

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# APPENDIX A

# SITE PHOTOGRAPHS

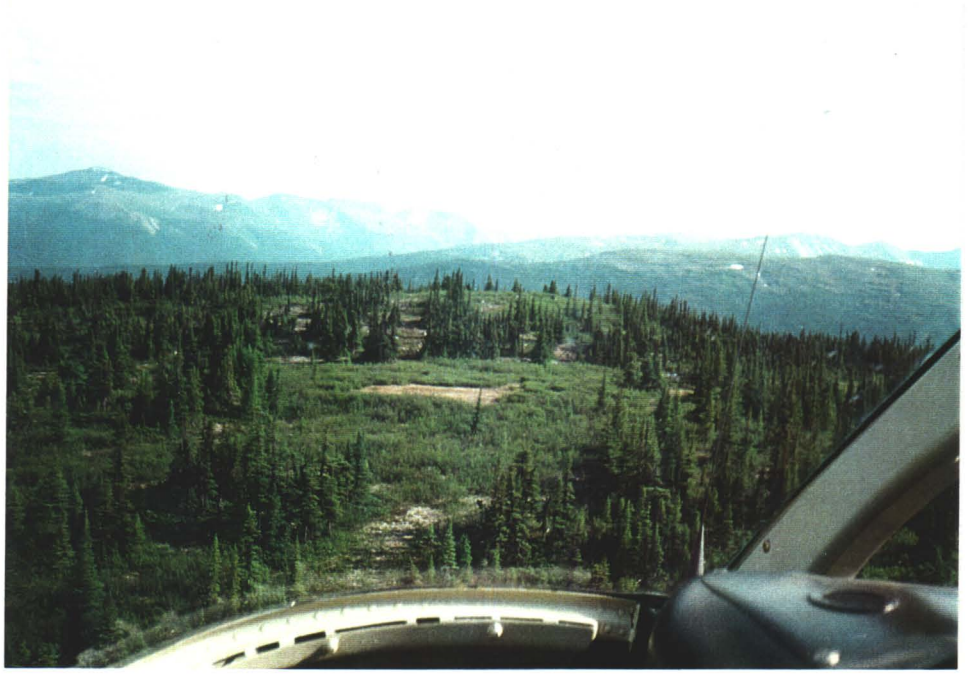

Photo 1 View of Hart mine site looking south.

Photo 2. Remains of wood frame buildings in camp area with empty metal drums and assorted metal waste (background).

Photo 3. Further detail of derelict structures with 150 litre barrel of Jet B fuel (centre).

Photo 4. Barrels and wood core storage structure at western edge of site. Note old metal "airtight" stoves.