MN-017

Yukon Abandoned Mine Assessment

CORN (BONNET PLUME) MINE SITE

Prepared for:

Waste Management Program
Indian and Northern Affairs Canada

Environmental Services
Public Works and Government Services Canada

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Executive Summary

The Corn exploration site (previously identified as "Bonnet Plume" in DIAND files) is located at 64°38'23"N, 133°14'20"W, approximately 6 km north of Corn Creek and 12.5 km east of the Bonnet Plume River. Environmental Services, Public Works and Government Services Canada was retained to conduct an assessment of the Corn abandoned mine site to identify specific environmental and human safety risks and aesthetic concerns. The Corn mine site was inspected by PWGSC on July 28, 1998. Assessment components included mine workings and non-hazardous materials on the site.

No mining-related workings were visible other than two former diamond drill pads. Neither of these features poses any safety risk. Overall mining-related disturbance is very limited.

Mineral and waste rock at the Corn site contain abundant carbonates, and therefore the potential for ARD is negligible. No hazardous materials or stained soil were observed at this site. Aesthetic concerns associated with a wooden tent frame platform and metal wastes are very minor. No further assessment or remedial work is required for this site.

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Yukon Abandoned Mine Assessment

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1. BACKGROUND

In 1993, assessments of 98 abandoned Yukon mine exploration and development sites were completed under the Arctic Environmental Strategy - Action on Waste program by DIAND Technical Services. These initial assessments provided a general overview of historical activities, described site infrastructure, workings and wastes, summarized existing environmental or safety concerns on each site, and provided general recommendations for remediation or mitigation work. No rock, soil or water samples were collected during the 1993 DIAND assessments.

In 1996, PWGSC Environmental Services completed assessments of 49 abandoned mine sites, with follow-up assessments in 1997 and early 1998 at six of those sites. DIAND Waste Management has determined that the remaining 49 sites should be assessed; candidate sites for this second round of assessments were identified in accordance with a process shown in Figure 1.

1.1 Location and Site Access

The Corn exploration site (previously identified as "Bonnet Plume" in DIAND files) is located at 64°38'23"N, 133°14'20"W, approximately 6 km north of Corn Creek and 12.5 km east of the Bonnet Plume River. Site access is by helicopter from Mayo.

1.2 Overview of Site Development

The mine site was first staked as PING claim (Y86146) in March 1974 by Bow River Resources and Highhawk Mining, which conducted mapping, hand trenching and geochemical surveys and acquired the adjoining HW and CAN claim (Y87798) from D. Waugh later in the year. Following hand trenching and an IP survey, Cominco optioned the property in July 1975 and drilled 7 holes (526 m) later in the year.

The option was transferred in 1976 to Coast Copper Mining, which performed electromagnetic surveys and drilled 6 holes (466 m). In 1971, Grandora Exploration changed its name to Dora Exploration. In 1979, Highhawk changed its name to Newhawk Gold Mining. In September 1995, P. Hajek staked Tet claim 1-2 (YB65010), Strata claim 7-8 (YB65012) and Nib claim 1-10 (YB65020) around the occurrence. Hajek staked Strata claim 1-6 (YB65072) in October 1975 (Yukon Geology Program Minfile 106C 019).

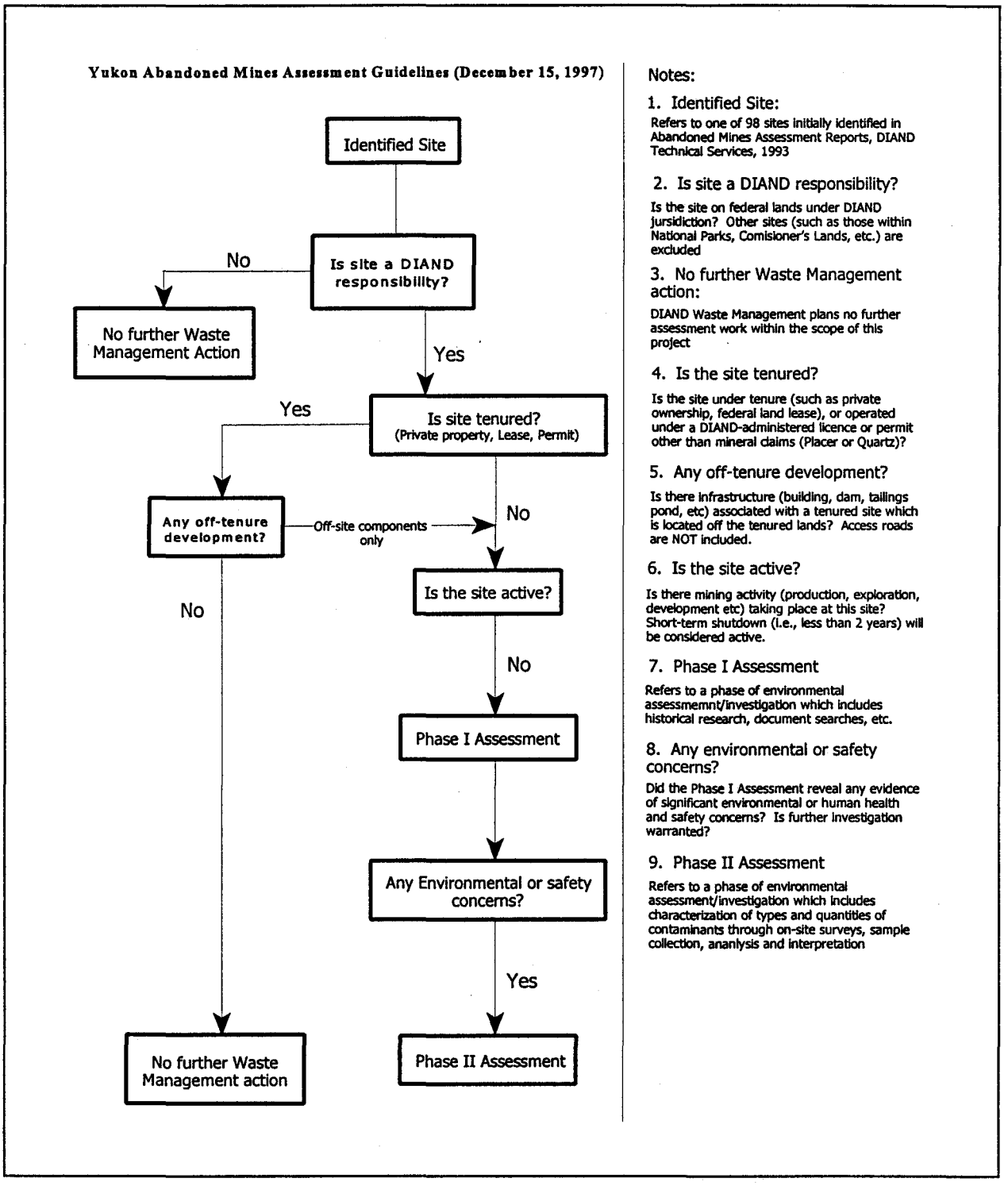


Figure 1. DIAND Abandoned Mine Assessment Flowchart

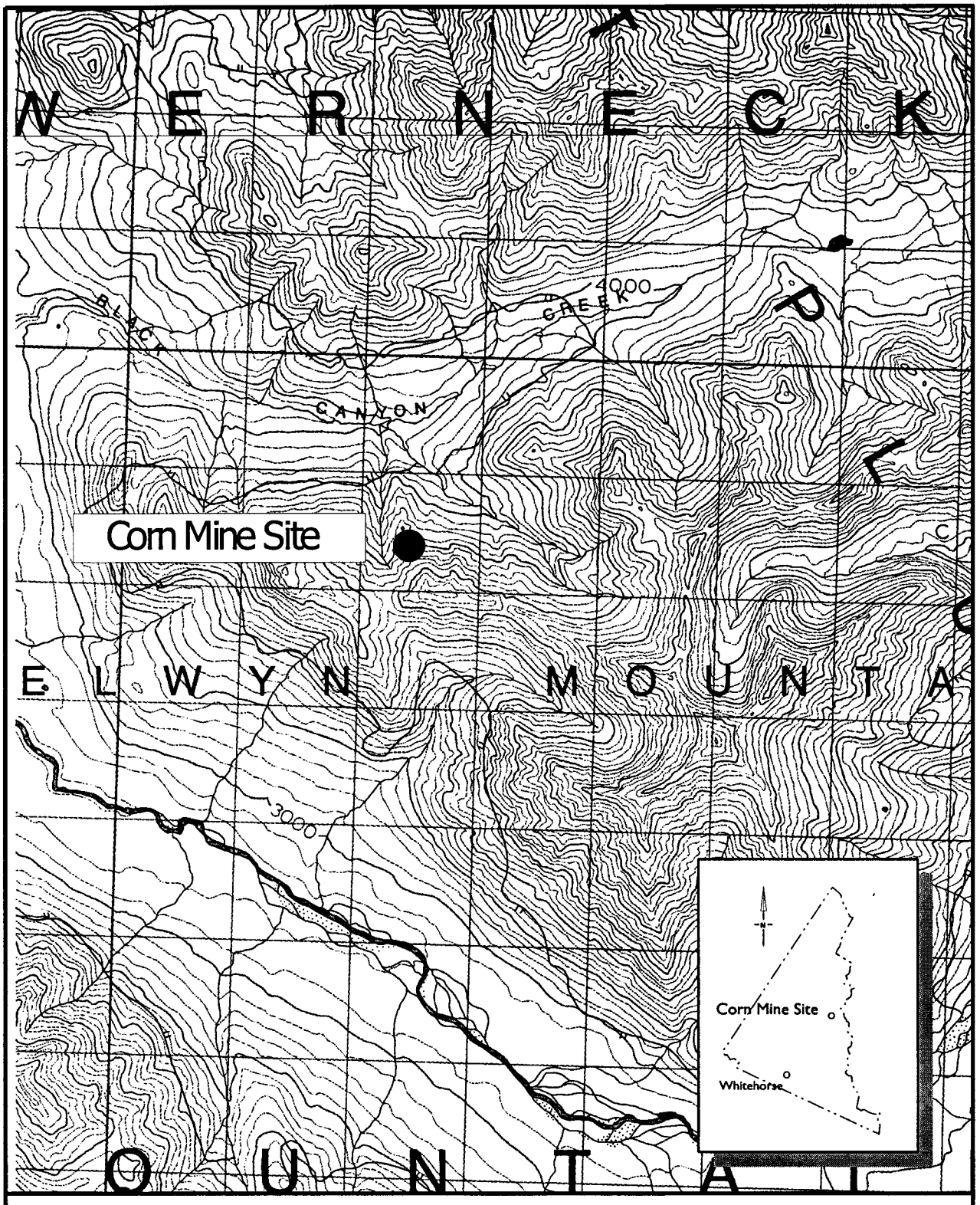
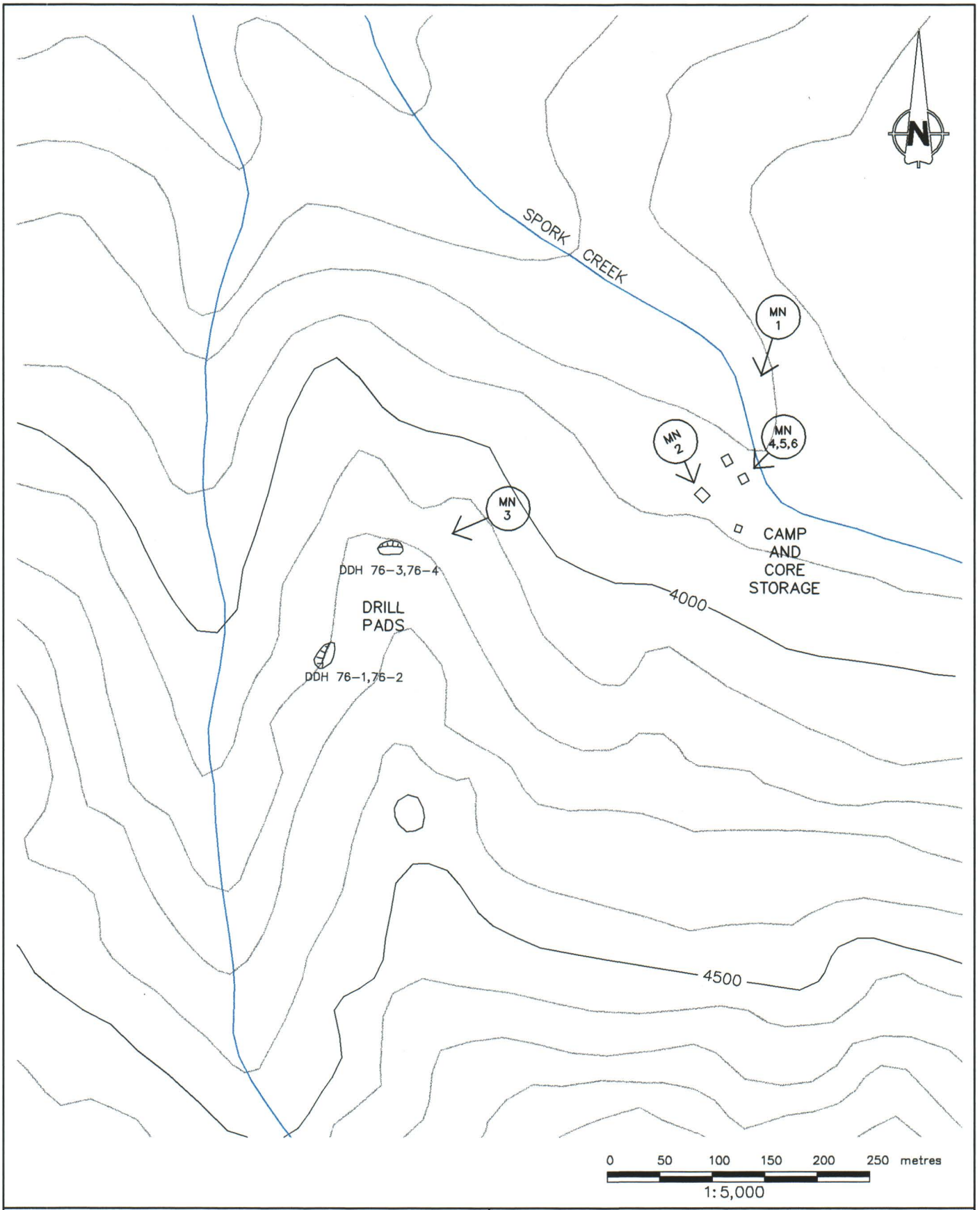


Figure 2. **Corn Mine Site** DIAND Site No. 106C-11-1

Map Sheets: 106 C11 Map Scale: 1:50,000 Site Location: 64° 38' 23", 133° 14' 20"



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PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ARD ASSESSMENT, YUKON

CORN
SITE DEVELOPMENT AND PHOTOS

PROJECT NO.	DATE	APPROVED	FIGURE
1CP001.04	NOV. 1998		3

FILE REF:FIG-2.DWG

1.3 Previously-Identified Site Issues

A DIAND Technical Services assessment form dated 25 July, 1993 states "Nothing at this site. Very remote. Did not land in area." No other site information was noted on that form. DIAND's file for the Corn site did not contain any information related to existing or potential environmental and human safety risks or aesthetic issues.

2. PURPOSE AND SCOPE OF WORK

Since environmental and human health/safety-related site information was essentially non-existent, PWGSC Environmental Services visited the Corn exploration site on July 28, 1998 to identify any existing or potential mine-related environmental and health/safety issues. Assessment activities included:

- Visual inspection of mine workings;
- Photo documentation and mapping of relevant site features;
- Identification and inventory of non-hazardous materials on the site;
- Assessment of safety hazards and the probability of human access to hazardous areas; and
- Assessment of acid rock drainage potential in waste rock and mine development areas.

3. MINERALIZATION

The deposit consists of three galena-sphalerite zones within a 320 m thick carbonate unit of Late Proterozoic age. The carbonate unit consists of a lower dolomite-limestone-quartzite-siltstone unit and an upper dolomite-conglomerate unit that is separated by an angular unconformity. This sequence is covered by a shale-carbonate unit.

The main showing (Zone 1) lies approximately 91 metres above the base of the lower member of the carbonate unit, and consists of massive sulphide mineralization (galena and sphalerite that has been brecciated and cemented with secondary dolomite. Assays from this zone contain between 7.9 to 24% lead, 1.3 to 14.8% zinc, and 61.7 to 150.9 g/t silver. Zone 2 occurs stratigraphically above Zone 1, and consists of pods of massive sphalerite and disseminated galena in the matrix of a dolomite breccia. The third zone consists of massive sphalerite float. (Bow River Resources Ltd. and Highhawk Mines Ltd., 1975).

4. SITE DESCRIPTION AND FINDINGS

4.1 Buildings, Infrastructure, and Equipment

No buildings, infrastructure, or equipment were observed at the Corn site. Several core storage boxes are stacked near the unnamed creek and former camp area. The core box stack is unprotected and has tipped: most core samples have been disturbed (Photo MN 2). A partially-rotted wooden tent platform (Photo MN 4) was found at the former camp and core storage area.

4.2 Non-Hazardous Waste Materials

Non-hazardous wastes were limited to the remains of a camp stove and an aluminum frame (Photo MN 5, and several cans of tinned meat.

4.3 Hazardous Materials

No stained soils or other solid hazardous materials were observed during the site visit. No petroleum hydrocarbons or other liquid hazardous wastes were present.

4.4 Surface Water Quality

No ponded water, surface runoff, or seepage were observed, and actual mining-related disturbance was very limited; therefore no surface water samples were collected.

4.5 Waste Rock Disposal Areas

Observable, mining-related disturbance was limited to the two diamond drill pads. No evidence of hand trenching (described in Yukon Geology Program Minfile 106C-019) was observed.

Abundant carbonates are indicated in the ore and host rock geology. As well, the disturbance due to exploration activity is negligible compared to natural weathering processes. SRK has therefore assessed the potential for ARD production at this site as negligible (see the *Determination of Acid Rock Drainage Potential* report for the Corn site attached as Appendix A).

4.6 Mine Excavations

No adits or other mine-related excavations were present at the Corn site. Two former diamond drill platforms are located approximately 300 m southwest of the camp area (Photo MN 3).

Neither feature poses any risk to human health and safety.

5. CONCLUSIONS AND RECOMMENDATIONS

PWGSC's inspection revealed no substantial health and safety hazards. No environmental and only very minor aesthetic concerns exist at the Corn mine site.

No further assessment or cleanup work is required.

REFERENCES

Bow River Resources Ltd. and Highhawk Mines Ltd., February, 1975. Assessment Report No. 061490. prepared by J.W. MacLeod.

Indian and Northern Affairs Canada. "Mine Reclamation in Northwest Territories and Yukon". Prepared by Steffen, Robertson and Kirsten (B.C.) Inc. for DIAND Northern Affairs Program, April 1992.

Indian and Northern Affairs Canada. Exploration and Geological Services Division, 1996. Yukon Minfile No. 106C 019.

Appendix A

Determination Of Acid Rock Drainage Potential

1CP001.04

CORN (BONNET PLUME)
ACID ROCK DRAINAGE POTENTIAL
ASSESSMENT REPORT

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1CP001.04

CORN (BONNET PLUME)
ACID ROCK DRAINAGE
ASSESSMENT REPORT

1. INTRODUCTION

This appendix reviews the existing and potential acid rock drainage (ARD) conditions at the Corn (Bonnet Plume) site. The report: "*Yukon Abandoned Mine Site Assessment, Evaluation Of Acid Rock Drainage, 1998 Review Report*", prepared by SRK, includes similar assessments for a number of sites, and details regarding the site assessment methodology, ARD remediation options and option evaluation. The accompanying Public Works and Government Services Canada (PWGSC) report "*Phase I Environmental Assessment of the Corn (Bonnet Plume) Abandoned Mine Site*", presents the complete environmental assessment of the Corn site.

The Corn site is located in the Bonnet Plume Range of the Wernecke Mountains, Yukon Territory, approximately six kilometres from Corn Creek (Figures 1 and 2). The site is accessible by helicopter.

Mining related disturbances include a small camp and core storage area, and two to three small fly-in drill pads (Figure 3). Hand trenching activities were also recorded. (DIAND, 1996)

The group of claims was first staked in 1974. Activities at that time included mapping, hand trenching and geochemical surveys. In 1976, Coast Copper ML, performed EM surveys and drilled 6 holes at the site. Since that time, the only activity recorded in the MINFILE (DIAND, 1996) was staking. The area in which the majority of the activity has occurred is staked as the PING claims, as shown in Figure 1.

2. GEOLOGY AND MINERALIZATION

The deposit consists of three galena-sphalerite zones within a 320 m thick carbonate unit of Late Proterozoic age. The carbonate unit consists of a lower dolomite-limestone-quartzite-siltstone unit and an upper dolomite-conglomerate unit that is separated by an angular unconformity. This sequence is covered by a shale-carbonate unit.

The main showing (Zone 1) lies approximately 91 metres above the base of the lower member of the carbonate unit, and consists of massive sulphide mineralization (galena and sphalerite that has been brecciated and cemented with secondary dolomite. Assays from this zone contain between 7.9 to 24% lead, 1.3 to 14.8% zinc, and 61.7 to 150.9 g/t silver. Zone 2 occurs stratigraphically above Zone 1, and consists of pods of massive sphalerite and disseminated galena in the matrix of a dolomite breccia. The third zone consists of massive sphalerite float. (Bow River Resources Ltd. and Highhawk Mines Ltd., 1975).

3. WASTE DISPOSAL AREAS

Only a limited amount of "mining" related disturbance was found at the site. The drill pads were likely dug by hand, and were approximately 5 m by 3 metres in size, with a trivial amount of disturbance to the native soils (Photo MN3). Hand trenching was noted in the MINFILE, but not evident on the ground. Some sloughing was noted on the ridge west of the camp area, however this appears to be related to natural weathering processes.

Due to the limited extend of ground disturbance, no rock or water samples were collected.

4. EXISTING AND POTENTIAL ACID ROCK DRAINAGE CONDITIONS

The potential for ARD from this site is negligible. The extent of disturbance at the drill pads is very small compared to natural rock exposures in the area. In addition, the carbonate host rocks would tend to neutralize any acidic seepage produced as a result of sulphide oxidation from natural or anthropogenic disturbances.

5. REMEDIATION OPTIONS

No ARD related remediation is needed at this site.

6. CONCLUSIONS AND RECOMMENDATIONS

This site should be regarded as a mining exploration site. The extent of disturbance is very minor, and ARD related risks are negligible.

7. REFERENCES

DIAND, Exploration and Geological Services Division, 1996. Yukon Minfile No. 106C 019.

Bow River Resources Ltd. and Highhawk Mines Ltd., February, 1975. Assessment Report No. 061490. prepared by J.W. MacLeod.

Appendix B
Site Photographs

MN 1. Aerial view of former camp and core storage area (unnamed creek - "Spork Creek" - visible at lower left of photo).

MN 2. Core storage area.

MN 3. View to northwest, showing drill pad and natural weathering on ridge west of former camp.

MN 4. Wooden remnants of tent platform at former camp area.

MN 5. Minor metal wastes south of former camp area.

MN 6. Spork™ cans near unnamed creek (hence, "Spork Creek").

Appendix C
Assessment Methodology

CORN MINE SITE ASSESSMENT METHODOLOGY

1. Assessment Area Constraints

The abandoned mine site assessments carried out for DIAND Waste Management have been restricted to a) the area specifically developed or occupied for mine exploration or mining purposes (i.e., excavation areas, waste rock dumps, mine camp) and b) any off-site environmental resources potentially affected by the mine-specific exploration or development activities. The assessments include all infrastructure associated with the specific site exploration or development, regardless of whether the infrastructure is located on or off the mine claim area. However, access roads have not been included in these assessments.

2. Assessment Criteria

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
- waste rock and tailings disposal
- acid generation and leaching, and
- estimating cleanup costs.

3. Methods

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 Corn 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.

3.2 Site Assessment Components

Waste rock disposal areas were assessed by a professional geologist for Acid Rock Drainage (ARD) and metal leachability potential. The ARD and leachability assessment included:

- review of existing site geological data to identify probable areas and sources of ARD and leachable metals; and
- mapping and logging of waste rock disposal areas and rock faces as appropriate for the site.

Mine-related disturbances (diamond drill pads) were visually inspected and documented to identify any safety concerns.

Non-hazardous site debris was inventoried. Scale site plans were prepared to identify the dimensions and locations of site features, wastes, and any other pertinent information.