

**ASSESSMENT REPORT**

**105D-02-1**

**VENUS**

**PREPARED BY**

**DIAND TECHNICAL SERVICES**

**DECEMBER, 1993**

## 105D-02-1

### VENUS

#### LOCATION

Latitude: 60° 01'12"N

Longitude: 134° 37'58"W

The mine site is located approximately 22km south of the village of Carcross on the South Klondike Highway. The site is on a steep slope above Windy Arm of Tagish Lake and below Dall Peak in the Boundary Ranges (Coast Mountains). The site is beside the South Klondike Highway. The site is between 950-1000m above sea level.

Site maps showing the location of the site are attached as Appendix A to this report.

#### WORK HISTORY

The site was first staked over 92 years ago. A summary of the work history according to the Department of Indian and Northern Affairs Yukon Minfile 105D 005 is presented below.

- September, 1901 - The north end of the Venus vein system was first staked by J.M. Pooley, A.B. Palmer, and J.M. Stewart as Venus, Uranus, etc. claims.
- 1904-1917 - The south end of the Venus vein system plus the Red Deer and Humper veins were staked and known as the Dail-Fleming group (Venus Extension, Nipper, Beach, Red Deer, Ruby Silver, and Humper 1 & 2 claims) were staked between 1904-1906. These claims were optioned by the Anglo-American Consolidated Co. from 1906-1908, by Conrad Consolidated Mining Ltd. briefly in 1908, and by Caribou Mining Co. Ltd. in 1917. These claims were explored with at least five adits and three shafts.
- 1905-1912 - The north end claims were transferred to Conrad Consolidated Mining Ltd. which explored with at least 914m of drifting from four adits and three shafts and constructed a 460m aerial tramway and a 91 tonne mill at a cost of \$750000. The claims were taken to lease in 1912 by Yukon District Gold Mining Co. Ltd. About 1830 tonnes were mined, mostly from the Venus 2 claim, but only a small portion was milled due to poor recoveries. The remainder was hand sorted and shipped directly to smelters at Ladysmith and Tacoma.
- 1912-1920 - Lackinaw and Tagish Mining Ltd. in 1916 and Canadian Harper Mining Corporation Ltd. and Montana-Yukon Mining Co. Ltd. in 1920 shipped 1556 tonnes of high grade ore worth \$120000 and 30 tonnes of concentrate worth \$26000.
- 1922 - Maybell Mining Co. excavated a 975m adit on the Maybelle fraction adjoining

the Venus mine.

1928 - Yukon Gold Co. acquired the Venus Extension, Ray, and Peggy claims.

1940-1960 - The property was consolidated by the Tagish Lake Syndicate.

1966 - The Tagish Lake Syndicate sold the property to Venus Mining Ltd. Venus constructed a road from Carcross, completed 2059m of drifting, 387.7m of raising, and 2191.8m of underground drilling from two adit levels.

September, 1970 - Production commenced.

June, 1971 - The mine was closed because of poor recoveries. The mill treated 58900 tonnes.

1979 - The Tagish Lake Syndicate property was optioned by United Keno Hill Mining Ltd. which added GHI claims, resampled the underground workings, drove 295m of crosscuts, and drilled 27 holes.

October, 1980-October, 1981 - About \$9 million was spent to construct a 91 tonne/day mill 10km south of the adit but production was deferred because of low metal prices.

1984 - Exploration included 324m of drifting, two raises, and 108.5m of sublevel drifting. Nine diamond drill holes and 31 rotary holes explored the Venus and Uranus vein systems were explored from the surface.

### **CLAIMS STATUS**

Status of mineral claims including claim names and numbers, claim expiry dates, and current owners in the vicinity of the Venus site have been noted as of 1992/05/01 as follows;

<u>CLAIM NAME/NUMBERS</u>	<u>EXPIRY DATE</u>	<u>OWNER</u>
Columbia 2, 3, 9, 11, 13	May 8, 1992	United Keno Hill Mines
GHI 1-27, 28, 48-51	Various 1992/1993	United Keno Hill Mines/ Tagish Lake Syndicate Ltd.
Venus 5-10, 25, 27	December 31, 1992	United Keno Hill Mines
Sandpiper 1, 2 (mill/tailings)	September 16, 1994	J.B. O'Neill
Raindrop 1-2 (mill/tailings)	August 10, 1992	Roxanne Hilker

The major commodities identified at this site are silver and gold. The minor commodities identified at this site are lead, zinc, and cadmium.

Most of the development has been on the main Venus vein, a north trending shallowly west dipping quartz fissure vein system which cuts intermediate volcanic rocks of the Cretaceous age. Mineralization consists of coarsely crystalline quartz and carbonate carrying irregular bands and pods of pyrite, arsenopyrite, galena, and sphalerite with minor tetrahedrite and chalcopyrite.

## CURRENT SITE CONDITIONS

The Venus mine site is beside the South Klondike Highway approximately 22km south of the village of Carcross. The mine is situated on a steep westerly slope above Windy Arm of Tagish Lake between Dall Peak and Pooly Creek. The mill site and tailings is located about 3km north of the mine site just south of Montana Creek between the Klondike Highway and the west bank of Windy Arm. The mine tailings is as close as 30m to the lake. The mine workings extend approximately 4km along the highway between the mill and tailings at the north end of the site to the southern most adits. Steep trails have been constructed from the Klondike Highway to the mine sites.

Site photographs showing current site conditions are attached as Appendix B to this report.

The mine sites are on very steep dry slopes. The only stream flowing through the area is Pooly Creek which is well away from any past mining activity. Some drainage is coming out of two of the mine adits. This drainage is piped out one of the mine adits onto the slope below and onto the waste piles. Seepage from the other adit is uncontrolled and flows out the adit dispersing across the site. Overall the site is very dry with only snowmelt and rainfall contributing to any other surface water in the area.

The site is sparsely vegetated partly because the area is so dry and partly because the site is so rocky and without surficial soils. The vegetation across the site consists of stunted poplar 3-5m high, black spruce, grasses, and stunted willows. Generally the vegetation is growing better in depressions and flatter areas, and gets thicker closer to the lake. The vegetation has been removed or has died wherever site disturbance has occurred. For instance it was observed that vegetation partly covered at the toe of waste rock piles has died.

Surficial soils at the site consists of a thin veneer of weathered soil overlying bedrock. The bedrock, containing a high percentage of quartz, is highly oxidized and fractured near the surface. Talus slopes are predominant high on the slope.

Extensive development of the Venus property has taken place over the past 85 years. Development took place in three distinct areas, namely;

- exploration and mining of claims at the south end claims,
- exploration and mining of claims at the north end claims, and
- mill and tailings.

Significant development has taken place within these three sites. A description of the infrastructure and development found at each site is described below.

## South End Claims

According to historical records at least five adits and three shafts were excavated from 1904 to 1917. Later in 1966 two adit levels were added with 2059m of drifting and 388m of raising. It appears these were worked again in 1979. Most of the remaining material and infrastructure was found at these two adits located upslope of the South Klondike Highway. These adits are reached from a steep trail trending north from the South Klondike Highway.

### Adit 1

Material and infrastructure found at this sealed adit includes;

- concrete foundations and floor slab measuring 7.6x30.5m, with in-floor plumbing/heating ducts and a wood retaining wall (partly collapsed) against the back slope,
- large amount of 915mm diameter galvanized ventilation ducting,
- sealed adit with water draining out the entrance, estimated between 90-125 litres/minute  
This adit is well sealed. The surface water seeps into the waste rock and seeps out the bottom of this waste rock.
- 2.4x3.7m plywood clad wood frame storage shed,
- approximately 100 lengths of steel pipe, varying from 50-150mm diameter, and 6m long situated on the top of the waste rock dump,
- a large pile of rail and other metal junk equal in size to the pile of pipe,
- 2 - 205 litre rusted barrels,
- pieces of cable, pipe, etc. scattered on the slope of the waste rock pile.
- plywood clad storage shed adjacent to 100-200 pieces of 150mm diameter water pipe, empty cable spools, 80-100 full core boxes, two empty fuel barrels, a pile of wooden pallets, and spools of conveyor belt, and
- 3.7x3.7m plywood storage shed beside the concrete foundation.

A large pile of waste rock has been placed downslope of the adit. This waste rock was dumped in the easiest way, down the slope outside the entrance to the adit, spilling down the slope to a point where the natural angle of repose of the rock intersects the natural slope angle.

### Adit 2

This adit is partially sealed. A man door at the adit was unlocked allowing access to the adit. Inside the entrance to this adit is one 204 litre barrel of gear oil.

The following infrastructure and materials was found at this adit;

- 2.4x3.7x4.9m high plywood clad wood frame building housing a 1.8m diameter and 3.7m high stainless steel "mixing tank" with pipe in adjacent utilidor,
- several wooden power poles strung with electrical cable,
- 4.9x7.3m ventilation building housing mine ventilation equipment perched on a steep slope about 15m above the adit,
- 2.4x2.4m plywood clad wood frame storage building near the rail tracks,
- 1.2x1.2m plywood clad wood frame shed also by the rail tracks,
- 3.7x4.9m plywood clad wood frame storage shed housing;
  - 1 - 23 litre can of penta phenol wood preservative,
  - 1 - 23 litre can of airline defrosting fluid,
  - 3 - 204 litre barrels of gear oil,
  - 1 - 204 litre barrel of gas, and
  - 1 - 204 litre empty gear oil barrel,
- several hundred metres of rail, and
- two log frame structures with retaining walls and cribbing constructed as an ore loading structures. The lower structure is very old, constructed of locally cut logs, is rotting, and is supporting several hundred tonnes of waste rock.

Once again this waste rock was dumped over the slope outside the entrance to the adit, spilling down the slope to a point where the rock embankment angle of repose intersects the natural slope angle. The result is that approximately 100m of slope has been covered with waste rock.

Water from the adit has been piped from the adit through a 600mm diameter drainage pipe below the waste rock outletting midpoint down the slope of the waste rock embankment.

On the slope above these two adits, another four hand excavated adits were found. The entrances to these adits are open and quite inconspicuous. It is quite possible that other adits exist but were not found. These can be reached from a narrow steep trail above the two developed adits. One other shallow adit was found close to the highway at the beginning of the trail.

### **North End Claims**

Four adits and three shafts were developed between 1905 and 1912 with a 460m aerial tramway constructed to transport ore from the adits and shafts to a loadout facility on Windy Arm. The headframe of the tramway is still located on the slope, however most of the towers between the headframe and the loadout are gone. The loadout structure on the lake is approximately 6m wide and drops over 20m to the lake. This structure is approximately 40m long. This very old wood clad, wood framed structure is fitted with some old ore handling equipment including cables, flywheels, pulleys, etc. This old structure is a point of historical interest along the South Klondike Highway. The infrastructure on the north end claims is much older than that remaining on the south end claims, apparently developed between 1912 and 1920.

Approximately one kilometre north of the old loadout on the alluvial fan of Pooley Creek a caretakers residence and maintenance building is being kept active. A mobile home residence with electrical power hook-up was occupied at the time of inspection on 1993/06/22. Because this site was occupied it was not inspected. However it was noted that in addition to the mobile home a small plywood clad wood frame building (approximately 2.4x 3.7m), a large metal clad metal frame maintenance or storage building, a core storage shed with core, and a large propane tank are part of this site.

### **Mill and Tailings**

The old mill site and tailings pond was constructed approximately 2.5 kilometres north of Pooley Creek. According to historical records this mill was constructed between 1905 and 1912.

The concrete foundation is the only remains from the mill. All the superstructure has been removed within the past five years from the site. The concrete foundations and floor slab for the mill measures approximately 38x46m, with a separate concrete foundation for the primary crusher remaining behind the mill foundation.

The mill tailings are bounded by Tagish Lake (Windy Arm) to the east, the South Klondike Highway to the west, and by the mill to the north. The tailings pond is in the path of a small creek draining off the slope to the west and appears to have been constructed on the alluvial fan of this creek. Because of the road and mine development in the past, it is difficult to confirm the original topography and ground conditions of the site. An extensively fractured bedrock ridge also partly contains the tailings area to the north and east side of the site. This tailings pond is irregularly shaped but measures approximately 285x115m. As noted, an unnamed creek flows into the tailings pond and is drained through a 600mm pipe with its inlet near the north side of the tailings pond and the outlet onto the shore of Windy Arm. This drainage pipe controls the water level in the tailings pond. The water in the pond covers an area approximately 60m in diameter and appears to be not more than about 0.5m deep.

There is little remaining evidence how the tailings was moved from the mill to the tailings pond. Some old cribbing and timbers were found, indicating that a tailings pipe was extended into the tailings area on cribbing. One can speculate that the tailings was deposited by gravity through either a pipe or flume. It appears that the tailings material, sand sized particles with chemicals used in the milling process, and water, was deposited creating a berm on the low side of the site. This would have created a retention area with infilling of the pond area later. From an inspection of the site it appears that this tailings is at least 2m thick in some areas and was placed directly on the original ground. However, a subsurface investigation is needed to confirm more precisely what the soil profile is and how deep the tailings is across the site.

As noted, a drainage pipe was installed in the centre of the tailings area with the outfall on the shore of Windy Arm allowing any fluids in the tailings pond to be drained into the lake. It is apparent that this tailings structure was not constructed to prevent any seepage into the adjacent lake or into the subsurface strata. Significant flushing has been occurring from the relatively large volumes of surface water that is flowing through the tailings pond. Ultimately this water has entered the lake beside the tailings pond. This process has been ongoing for several years.

## **RECOMMENDATIONS**

Past exploration, mining, and milling has resulted in extensive disturbance to the area. Recommendations for each section of claims, the mill site and tailings area is provided separately.

### **South End Claims**

Development of the south end claims included development of two adits, associated waste dumps, buildings, and mechanical systems. Road access to these sites was also developed. Remaining parts of this past development present specific environmental concerns and hazards. Recommendations addressing these concerns and hazards are presented below.

#### **Adit 1**

It is obvious that a substantial amount of development took place at one time at this site as observed from the remains of infrastructure and the large amount of waste rock. The following recommendations for site remediation is presented below.

- \* The adit has been well sealed and is inaccessible to the general public. This adit should not be considered a safety hazard at this time. Periodic inspections should be completed to ascertain that these conditions do not change.
- \* The three remaining small wooden buildings will continue to deteriorate. Eventually these structures may pose a small hazard to personal injury, however this risk should be slight.
- \* A large amount of material has been left on site including galvanized ventilation ducting, water pipe, victaulic couplings, up to 300 pieces of 6m long pipe, rail, barrels, cable, cable spools, wooden pallets, spools of conveyor belt, etc. This material does not pose a significant hazard to the environment, however it is considered a mess and is unsightly. This material should be removed from the site if a clean-up program is initiated for the area.

- \* The large concrete foundations and floor slab should be left in place. It is recommended that the collapsing retaining wall behind the floor slab be removed or placed on the floor slab. The oversteepened slope above should then be flattened by covering the foundation and floor slab with slope material to reduce any risk of future slope failure in the area.
- \* Any wood waste should be piled and burned using acceptable methods.
- \* The remaining core, if recoverable, should be properly recorded, removed from the site and stored in a suitable location.
- \* Water from the adit should be sampled and analyzed to determine if it is a source of chemical contamination.

#### Adit 2

This second adit was also well developed with a significant amount of infrastructure left behind and another large waste rock pile dumped down slope at this site. Site remediation recommendations follow.

- \* The adit entrance is sealed but has a man door that was unlocked at the time of inspection on 1993/06/22. This door should be locked to prevent access by the public into the adit.
- \* Five plywood clad wood frame buildings are on site. Each of these buildings poses different environmental hazards each which is described separately.
  - The largest building is the 4.9x7.3m ventilation building which is perched approximately 15m above the adit on a very steep slope. This building is precariously supported on vertical posts. This building is housing large ventilation equipment extending into the adit. This building is exposed to rapid deterioration from the weather, with exposure to snow slides. It is expected that within the next few years this building could start collapsing depending on snow loads and rate of deterioration of the supporting timbers. Plans to remove this structure and equipment as well as closure of the ventilation shaft should be made.
  - The four other buildings are small plywood clad wood frame structures close to the adit. These structures pose very little environmental hazard to the area but will deteriorate with time. If a clean-up program is initiated at this site it is recommended that these buildings be dismantled and the lumber either salvaged or burned.
- \* Hydrocarbon products and other toxic fluids found on the site should be removed from the site as soon as possible. Although these products are contained in barrels or pails

they are exposed to vandalism and spillage. These fluids should be relatively easy to remove from the site.

- \* Metal waste including all the rail and scattered metal at this site does not appear to be causing a serious environmental hazard, however this material should be gathered and removed if a clean-up program is undertaken at this site.
- \* The loadout structure will continue to rot and deteriorate with time and eventually start to collapse. Climbing or walking on or below this structure is considered dangerous now and will only worsen with time. Once the upper loadout structure and the lower retaining structure start collapsing, material behind these structures will begin sloughing and ravelling downslope. It is possible that some of the larger material could reach the highway below, especially if it was to fail suddenly. Because this area is close to the highway and accessible to the public, this site should be posted to alert people to the potential danger. Alternatively these structures could be removed, however this is not a very practical solution as it will be difficult, costly, and dangerous to remove.
- \* In winter the drainage from the adit outlets on the waste rock slope resulting in icing downslope to the highway. These icing problems on the highway create an ongoing maintenance problem for the Yukon Department of Highways and Transportation. This may be solved by eliminating this concentrated flow, however care must be taken not to create more stability problems from redirecting or blocking this flow completely. It is recommended that discussions be completed with the Yukon Government to properly quantify the problem.
- \* Water samples should be collected from the adit and analyzed to determine if this water is a source of chemical contamination.
- \* The visual impact from the waste rock on the slope is obvious, however little can be done to improve this. Revegetating these dry rock slopes is not practical. Some future instability should be expected from these very steep fills, especially with the large volumes of water from the adit flowing onto the slope. Care should be taken not to cover any seepage or natural drainage on this slope. Doing so could increase the potential for instability.
- \* Five other adits were found on the slope. Others could exist but were not found. These adits are shallow hand excavated holes that are not well marked. These adits are not causing any notable environmental damage, however they do pose a safety hazard if someone unsuspectingly fell into one. For this reason it is recommended that these adit entrances be covered.

### **North End Claims**

As noted records show that four old adits and three shafts have been developed on the north end claims. None of these were found at the time of inspection due to difficult access. If it is practical, it is recommended that these adits be located and properly

covered to eliminate the possibility of someone entering them and getting injured. Because the workings in this area is so old there may be some value in preserving them for historical or tourism opportunities. The headframe and loadout for the tramway could be removed and the site cleaned up, however this is considered a **LOW** priority disregarding the historical or tourism interest.

The remaining caretaker's residence and maintenance area beside Pooley Creek was occupied and being used at the time of inspection. This appears to be an active site and recommendations are not given for this area.

## **Mill and Tailings**

### Mill Site

The mill site has been cleaned up by removing all the buildings from the site. The concrete foundations, floor slab, and some above ground concrete superstructure is the only remaining part of the old mill. The clean up that has been completed appears to have been well done and it is recommended that this part of the site be left in its present condition. Removing the concrete from this site is not considered practical or of any real benefit to the environment.

### Tailings Pond

Before any site remediation is contemplated at this site additional research will be required. For instance, a report completed in 1980 by Environment Canada entitled " Baseline Study of the Watershed Near Venus Mine, Yukon and Venus Mill, British Columbia" stated that;

" The environmental quality near the abandoned tailings pond continues to be adversely affected by this past operation. Significantly higher concentrations of cadmium, lead and zinc were found in sediment samples in the lake near the abandoned tailings pond than in sediment samples from unaltered parts of the watershed. Arsenic concentrations in abandoned tailings pond drainage and mine water were significantly higher than those in water in the unaltered part of the watershed."

Signs posted around the site indicates the vegetation surrounding this site contains high levels of arsenic.

It is recommended that the first step in developing a site remediation plan will be to review all research completed and recorded for this site. This review will provide the basis in defining what current information needs to be gathered to finalize a site remediation plan. For instance;

- \* because water has been "flushing" the site, it is unknown to what extent site conditions have changed from the last time information was gathered,
- \* research conducted in the past may not be appropriate for developing a site remediation plan.

This additional work is likely to include a groundwater and subsurface soil sampling program to determine current site conditions including;

- confirming depths of tailings,
- subsurface soil profiles,
- collection of surface water and groundwater samples for chemical analyses,
- collection of soil samples for chemical contaminant analyses, and
- developing groundwater movement models.

Vegetation samples should also be collected and analyzed to determine any current vegetation contamination.

Once this information is gathered and analyzed, a site remediation plan can be prepared if it is deemed necessary.

Because this site could be having a significant impact on the environment it is recommended that this investigation be considered as a **HIGH** priority.

#### **Site Summary**

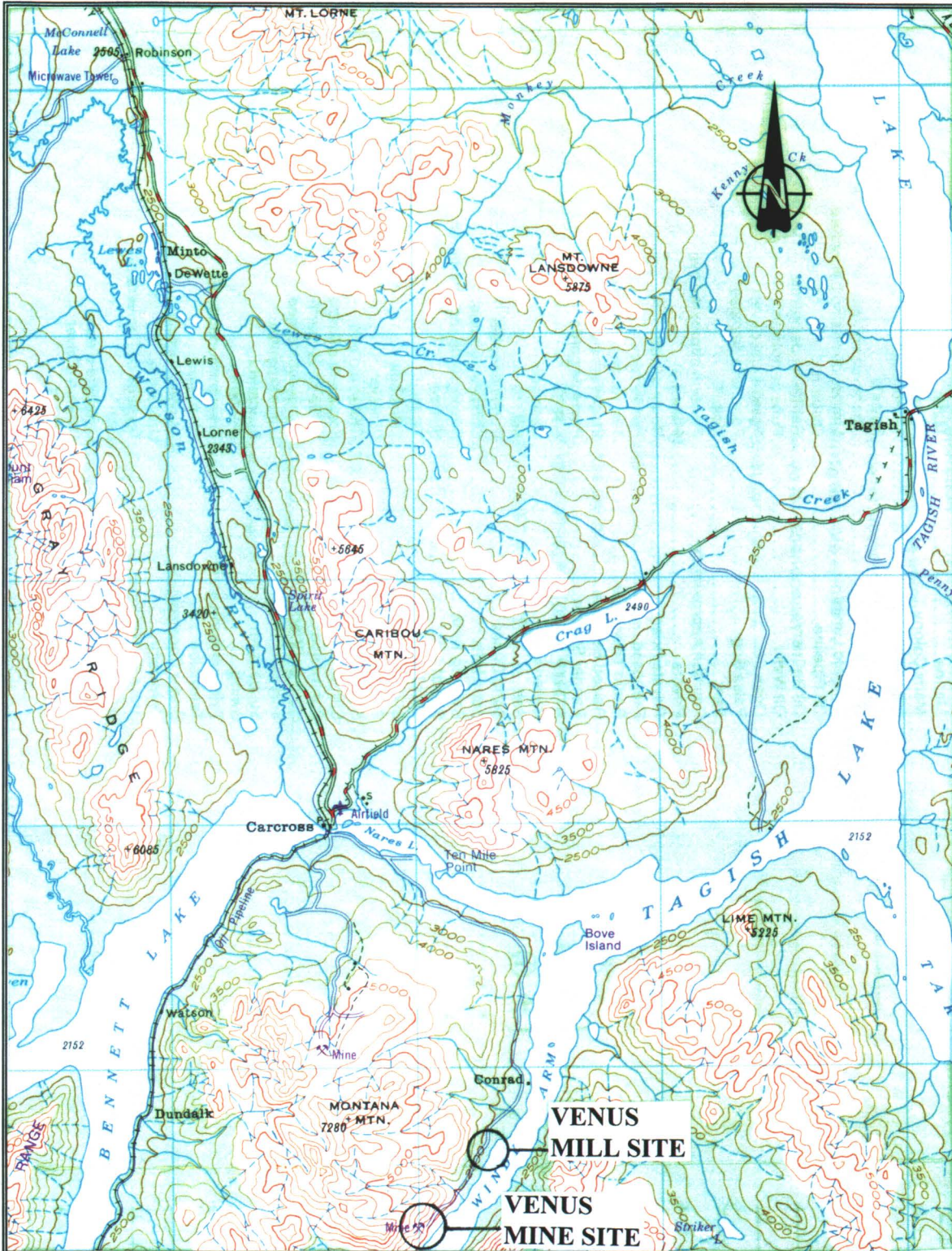
In summary it is recommended that all adits be properly sealed for public safety. This should be considered a **HIGH** priority.

Clean up of all the old metal waste, equipment, and buildings around the adits is considered a **MEDIUM** priority. Removing the barrels of oil, gasoline, wood preservatives, and de-icing fluids should be considered a **HIGH** priority and should be completed as soon as possible.

A detailed assessment of the tailings, tailings pond, and surrounding vegetation should be considered a **HIGH** priority.

**APPENDIX A**

**SITE LOCATION MAPS**



SITE NAME: **VENUS**

SITE NUMBER: **105D-02-1**

MAP NUMBER: **105D**

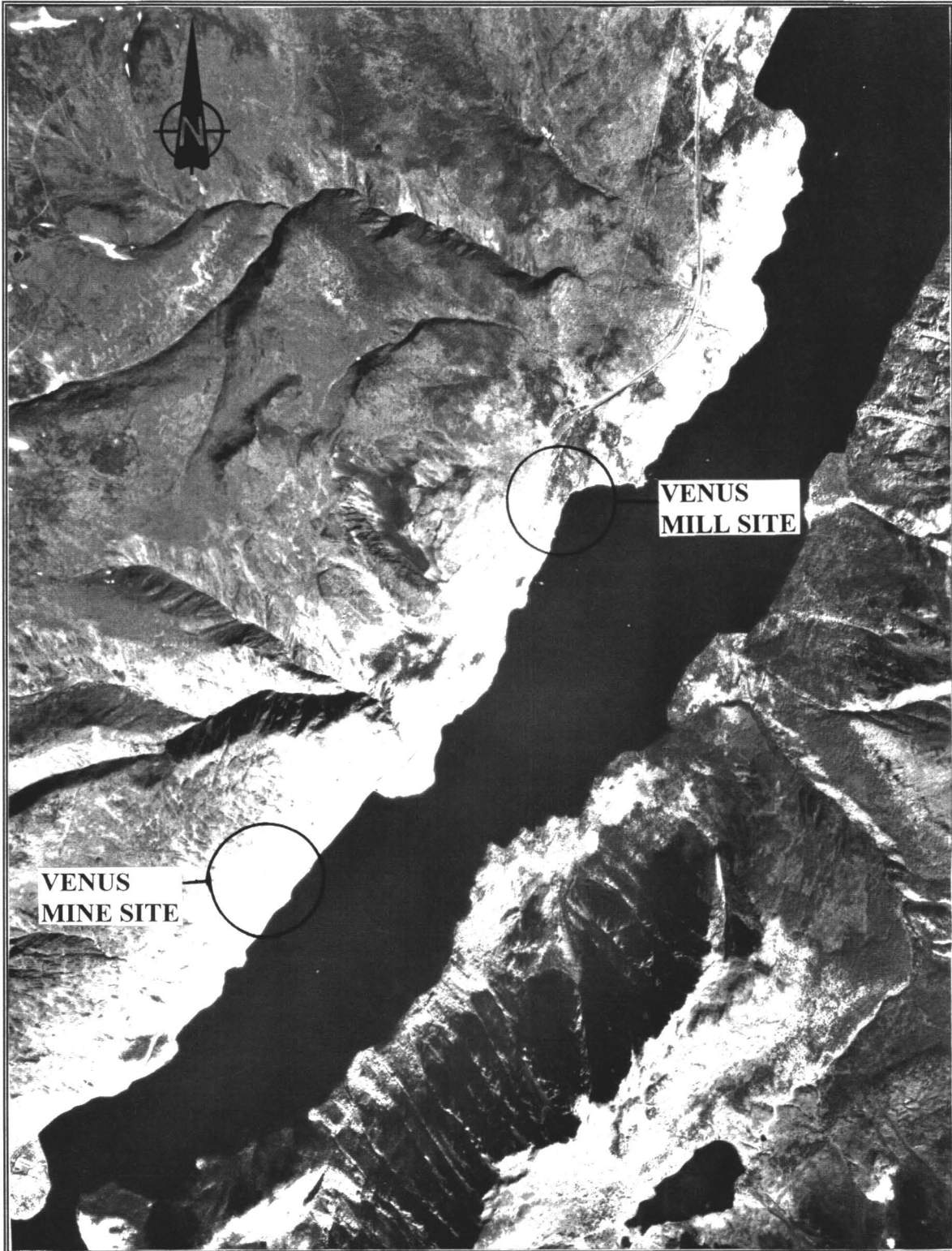
MAP NAME: **WHITEHORSE**

MAP SCALE: **1:250000**

SITE LOCATION:

LATITUDE: **60° 01'12"**

LONGITUDE: **134° 37'58"**



SITE NAME: VENUS

SITE NUMBER: 105D-02-1

AIRPHOTO NUMBER: A27016-150      YEAR: 1986

AIRPHOTO SCALE: 1:40000

SITE LOCATION:                      LATITUDE: 60° 01'12"

LONGITUDE: 134° 37'58"

**APPENDIX B**

**SITE PHOTOGRAPHS**



OVERVIEW OF SOUTH END CLAIMS



ADIT NEAR SOUTH KLONDIKE HIGHWAY



ROAD ACCESS TO SOUTH END CLAIMS



WASTE ROCK FROM ADIT #1



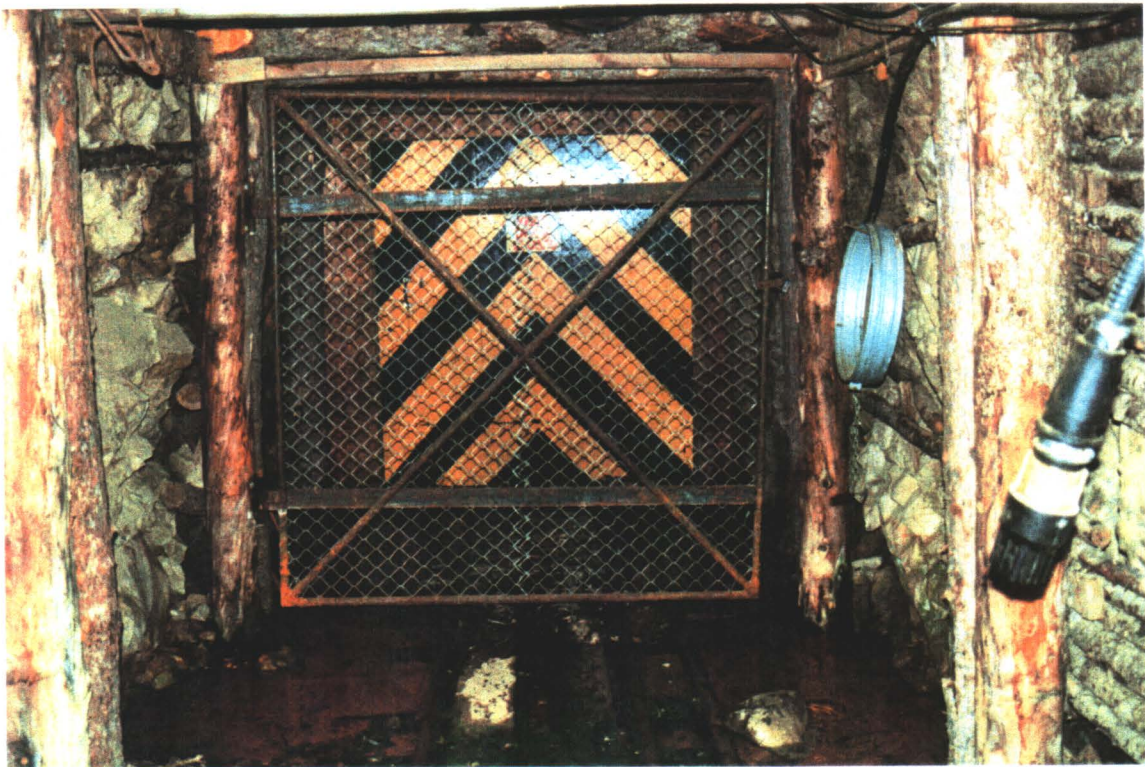
DEAD VEGETATION AT TOE OF WASTE ROCK



RAIL, BARRELS, AND PIPE ON WASTE PILE TO ADIT #1 (NOTE DRAINAGE)



ENTRANCE TO ADIT #1



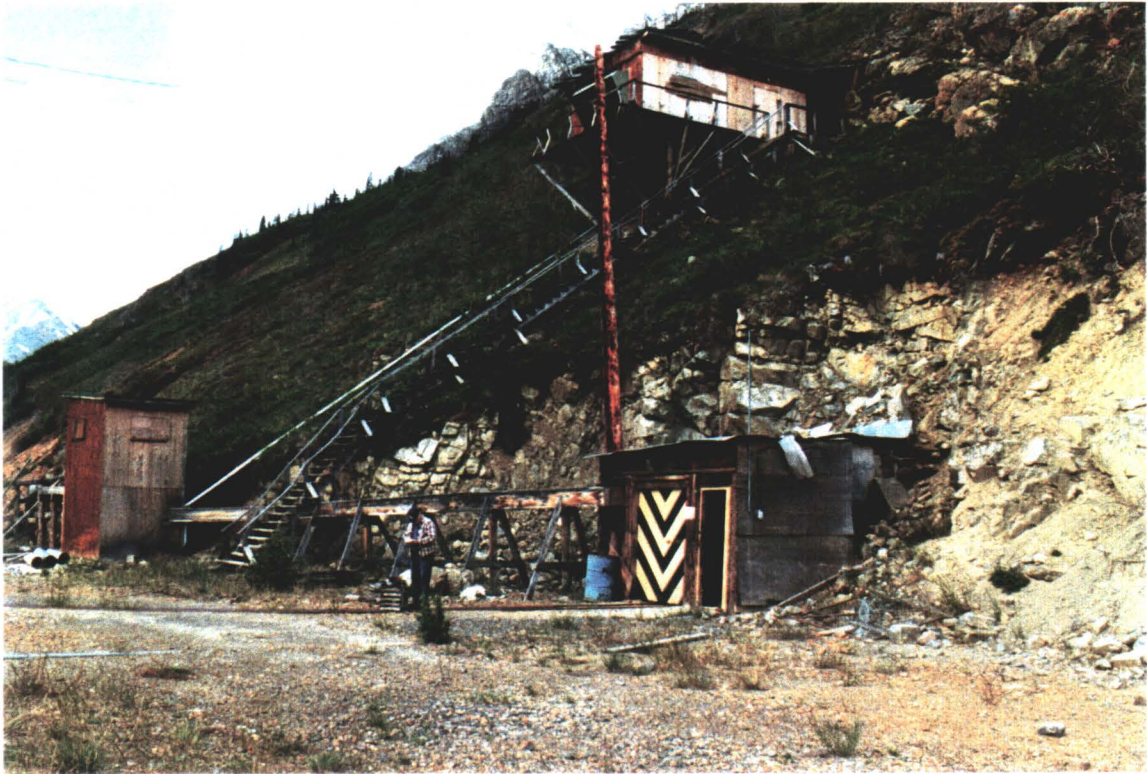
GATES ACROSS ADIT #1



CONCRETE FLOOR SLAB, FOOTINGS, AND DEBRIS  
WITH WASTE ROCK IN BACKGROUND



VENTILATION DUCTING AND PIPE



ADIT #2 AND VENTILATION BUILDING



ADIT #2 FACING SOUTH



ADIT #2 DUMP AND LOADOUT



DRAINAGE OUTLET ON WASTE ROCK SLOPE



INTERIOR OF ADIT #2



LOADING STRUCTURE



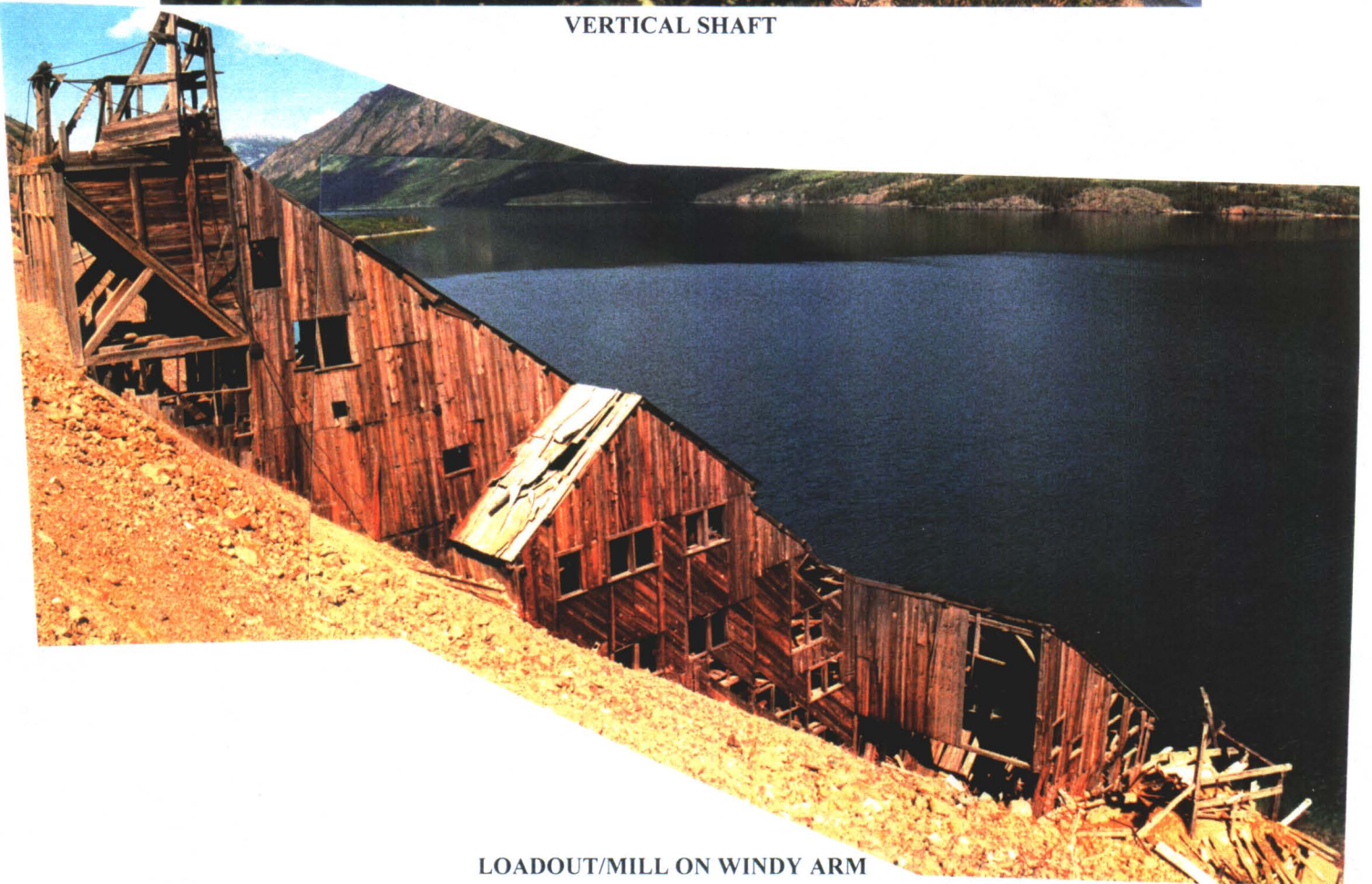
DOWNSLOPE OF LOADING STRUCTURE.  
NOTE DETERIORATING RETAINED WASTE ROCK



ADIT UPSLOPE OF DEVELOPED ADITS



VERTICAL SHAFT



LOADOUT/MILL ON WINDY ARM



MOBILE HOME AT POOLEY CREEK



WAREHOUSE AT POOLEY CREEK



FOUNDATION OF MILL SITE



TAILINGS POND



SEEPAGE UPSLOPE OF TAILINGS



OUTFALL FROM TAILINGS INTO WINDY ARM



TAILINGS POND (LOOKING TOWARDS MILL SITE)



INLET TO DRAINAGE PIPE



SIGNAGE POSTED AT SITE