KENO VALLEY/DUBLIN GULCH
ENVIRONMENTAL BASELINE ASSESSMENT

VOLUME III: Keno Valley Sites #21 to #40

Prepared for
Waste Management Program
Indian and Northern Affairs Canada

By
Environmental Services
Public Works and Government Services Canada

March, 2000

At the request of the client, there has been no interpretation of data compiled and gathered for this assessment. Therefore, this report does not draw comparisons or make references to environmental quality criteria, guidelines, or codes of practice, and makes no recommendations for future action.

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SADIE LADUE/WERNECKE CAMP

SITE #21

MINFILE 105001w,x

1. LOCATION AND ACCESS

The Sadie-Ladue mine site is located on the northwest slopes of Keno Hill at an elevation of 1,260m. The mine workings are spread across a number of claims and more than 700m northeast-southwest in what has become known as the Wernecke Camp. UTM coordinates for the centre of the Wernecke Camp are 7,092,000m north and 486,400m east. The Wernecke Camp site is located 5.7km along the two-wheel drive Wernecke Road from the Wernecke Road/Keno Mine Road junction in Keno City.

2. SITE PHYSIOGRAPHY

The area surrounding Wernecke slopes moderately at roughly 7° to the northwest. Soils are poorly developed, consisting of discontinuous deposits of decomposed weathered bedrock and glacial till. The area of the camp itself is highly disturbed, the result of many years of mining. Permafrost is discontinuous in areas of northerly aspect. A previous study (McTaggart, 1960; cited in UKHM, 1996) reported that permafrost was noted to a depth of 80m in the area.

Surface water on the site is limited to seeps and ponded, stagnant groundwater. All the mine water is drained from the workings out the Sadie-Ladue 600 level (site #77) located approximately 800m to the north at an elevation of 1100m. The water from the Sadie-Ladue 600 drains down a gully to a lake at the head of Ladue Creek in the valley bottom (elevation of 750m). The gully is dry above the Sadie-Ladue 600 all the way up to the Wernecke site. Roadcut seeps collect and run west along the Wernecke Road ditch line beginning at the Lucky Queen road turnoff. A single seep was observed draining from above the Sadie mine area and the Lucky Queen road. Seeps are common along road cuts in the area, specifically the Wernecke Road and the Lower Faro Gulch Trail. Stagnant groundwater has collected in bedrock pits at the west and east ends of the site. The Wernecke area is located more than 650m west of Gambler Gulch, the nearest significant drainage.

3. GEOLOGY AND MINERALIZATION

The Sadie-Ladue mine is situated along the contact of Devono-Mississippian Earn Group carbonaceous phyllite and overlying meta-volcanic quartz-sericite-chlorite schists (Roots & Murphy, 1992). Silver and lead rich quartz-sidertite veins occur along the contact between the phyllitic quartzites and a large concordant greenstone (gabbro) intrusive body. Mineralization consists of galena, sphalerite, freibergite and a range of other minor minerals.

The Wernecke camp is in an area of anomalously elevated metals values (Boyle, 1965; Gleeson & Boyle, 1980; both sited in UKHM, 1996). The host phyllites and schists have geochemical signatures that are anomalous in

PB, Zn, Cu, As, Sb, Mo and Ba. Significantly elevated levels of Ti, Ni, Co, Cu appear to be associated with the greenstones. High metal concentrations associated with the vein occurrences include silver, lead, zinc, copper, cadnium and antimony. Similar metal associations are reported for ore from the Lucky Queen mine (site #26) which was also processed on the site.

4. SITE HISTORY

The Sadie-Friendship and Ladue mines were begun as separate operations in 1921 by Keno Hill Limited (KHL) and the Treadwell Yukon Company, Ltd. (TYCL), respectively. In 1923 the Ladue mine was flooded by excess water, requiring development of the Ladue 600 level waste and drainage tunnel (Sadie-Ladue 600; site #77). In 1924, TYCL optioned the Sadie-Friendship mine and amalgamated the operation of the two mines. The Wernecke camp and mill site were built in that same year to service he what then became known as the Sadie-Ladue mine.

Mining continued on the Sadie-Ladue mine until 1929. All ore was hauled up shafts to surface, while most of the waste rock and all mine drainage was removed out the Sadie-Ladue 600 Level. The mill operated from 1925 to 1932, processing ore from the Sadie-Ladue and later the Lucky Queen (site #26) mines. Ore from the Lucky Queen located 2.5km to the south was brought by aerial tram to the Wernecke. Tailings from the mill were initially contained in a small pond structure below the mill. Later the tails were allowed to flow down the dry gully below the site to a lake at the head of Ladue Creek in the valley below. The Wernecke tailings (site #80) now fill roughly a quarter of the lake. Tails material was observed along the upper sections of the gully above the Sadie-Ladue 600. The Wernecke mill was dismantled and moved to the Elsa mine site (site #3) in 1935-36.

The Wernecke camp was a small town extending over an area of over 32ha with bunkhouses, various residences, cabins, a mess hall and kitchen and a recreation hall, complete with bowling alley. Mine buildings included warehouses, powerhouse, boiler house, assay office and the mill itself. Over 18 buildings remain on the site in various states of disrepair.

In the 1980s, Archer Cathro & Associates Ltd. optioned the site and began a program of mining the mine crown pillars from surface. The Sadie and Ladue mine areas were extensively stripped of overburden and a series of pits and trenches were established during this phase of work. All ore recovered was shipped off site.

United Keno Hill Mines Ltd. has been monitoring the Sadie-Ladue mine waters at the Saddie-Ladue 600 level adit since 1985 (UKHM, 1996). An initial environmental site investigation was conducted on the site by the Department of Indian and Northern Development (DIAND) Technical Services Branch in 1993. In 1996, a more detailed environmental assessment was conducted of the site by Norecol, Dames and Moore, Inc. (NDM, 1997)

for Public Works and Government Services Canada (PWGSC). The work reported in this 1999 study was conducted to update the environmental inventory and baseline data of the site.

The site is part of a local tourism network of trails and selected historic mine sites. Access to the site is actively promoted in pamphlets provided to the public.

5. MINE DEVELOPMENT

The Wernecke camp area can be divided into halves: the Ladue portion on the northeast end and the Sadie portion on the southwest end. The Sadie portion is located roughly 125m southeast and parallel to the Wernecke Road as it approaches the Ladue portion of the site. Mining operations in the Wernecke Camp site has progressed in three episodes. Most of the underground development was completed from 1925 to 1929. Two shafts at each of the Sadie and the Ladue mines provided access to extensive underground workings on six levels. A raise (probable manway) on the Ladue portion and reported open stopes are also present. Waste rock piles associated with the original mining is present at the east end of the site. Rehabilitation work conducted in the 1960s on the 600 level had little effect on the Wernecke Camp area. Surface trenching and open pit mining in the 1980s resulting in the most significant surface disturbances on the site. This work included the development of 4 small pits, over 10 trenches and five large dumps of striped overburden and waste rock. A collapsed stope is also present on the Ladue portion of the site.

5.1 Mine Openings and Excavations

Four shafts, a possible raise and 4 pits are described in this section. Due to there being more than ten, the trenches are described in general terms only. The Sadie-Ladue 600 level adit is not described here (see site #77).

No. 1 Shaft (Photo 21-1, 21-2 21-3)

Description: The shaft headframe structure has been completely removed, the shaft partially backfill and opening sealed with wood planks. The shaft is still partially open to roughly 5m depth. Recent (1980s) stripping work may have reduced the elevation of the shaft collar by over 1m.

Location: Located on the flat, excavated area at the base of the slope below the managers house, the old headframe structure and outhouse.

Dimensions: Dimensions of the shaft collar are 1.2m by 1.4m. The shaft is open to a depth of roughly 5m, although it is partially filled with rock.

Supports: There are no square set timber supports in the collar of the shaft. Two timbers protrude out the collar and the opening is decked over with planking.

Condition: The shaft poses some safety risks due to loose rock. The plank cover is reasonably sound.

Accessibility: The Shaft is not accessible, although the planking could be easily pried up. The shaft opening is partially blocked by loose rock.

Raise/Manway (Photo 21-2)

Description: A hole into bedrock is visible below the outhouse. It is largely filled with loose rock, but may have been a raise or manway.

Location: The possible raise is located just west of the manager's house and above the Shaft #2 on a rocky knob. The outhouse is situated over the opening.

Dimensions: The opening is roughly 1.2m square and 0.7m deep.

Supports: There are no supports present.

Condition: The opening poses no obvious safety risks.

Accessibility: The opening is filled with loose rock and is inaccessible.

Ladue Shaft #1, Sadie Shafts #1 and #2

Three other shafts existed on the site. These have all been back filled and the sites recontoured. They are discussed generally below.

Description: The Ladue #1, Sadie #1 and the Sadie #2 shafts have all backfilled and all related structures have been removed. The sites are not easily located now.

Location: Ladue #1: roughly 150m northwest of the Ladue #2 shaft adjacent to the steeper slope. Site marked by a small pile of waste rock and scattered mine timbers.

Sadie #1: Shaft was located just north of the road to the Lucky Queen. The site has been extensively disturbed by trenching and striping and is not identifiable now.

Sadie #2: The shaft was located roughly 135m southwest of the Sadie #2. The exact site is not now identifiable.

Dimensions: Not available.

Supports: Not available.

Condition: All sites backfilled.

Accessibility: All sites backfilled. All sites inaccessible.

Collapsed Stope (Photo 21-1, 21-4)

Description: Collapsed ground resulting from failure of the underground workings below.

Location: Located between Shaft #2 and Pit #1, approximately 15m north-east of Pit #1.

Dimensions: The opening is approximately 7m long x 4m wide. The cavity formed is approximately 2m high and extends up to 5m underground.

Condition: The site geology consists of near flat lying quartzites with phyllitic partings that have fallen off in slabs into the abandoned workings below, forming the cavity. Slabs of rock up to 50kg are

loose in the backs (roof) of the opening and pose a serious risk to persons entering. No signs have been posted identifying the hazard.

Accessibility: The site is easily accessible.

Open Pit #1 (Photo 21-1, 21-5)

Description: The largest pit on site oriented roughly azimuth 045°; developed in the 1980s to mine ore left behind by the original mining. Benched down in two levels. The southeast wall is the highest with a vertical lift of over 6m. The bottom of the pit is dry.

Location: Located on southwest end of the Ladue portion of site, approximately 80m southwest of the Ladue #2 shaft.

Dimensions: The pit has been developed in two bench levels. The upper bench is approximately 40m wide by 80m long and varies 3m to 4m deep. The lower bench varies between 10m and 20m wide by up to 50m long. The lower level is between 2 and 4m deep.

Condition: The pit is stable, although loose rock is common on most level surfaces.

Accessibility: The pit is easily accessible.

Open Pit #4 (Photo 21-6)

Description: Pit #4 may be a trench where no ore was removed, although it is excavated into bedrock. The east end of it is filled with water from groundwater seeps. There is no surface inflow of outflow.

Location: Pit #4 is located at the far northeast end of the site.

Dimensions: The pit is over 80m long and average 10m wide. It is between 1m and 3m deep.

Condition: Stable.

Accessibility: Easily accessible.

Open Pit #2, Open Pit #3, Open Pit # 5

The three remaining pits are small and described here together. They were all developed in the 1980s.

Description: Pits #2, #3 and #5 represent small excavations, possible sites where no ore was mined.

Location: Pit #2 and #3: located in the middle of the Ladue portion of the site, 15m apart and approximately 150m northeast of Pit #1. Pit #2 is west of Pit #3.

Pit #5: located in the Sadie portion of the site, roughly 75m southwest of the Lucky Queen road.

Dimensions: Pit #2: 10m long x 3m wide x 3m deep.

Pit #3: 15m long x 5m wide x 6m deep.

Pit #5: 20m long x 5m wide x 1m to 2m deep.

Condition: All sites are stable.

Accessibility: All sites are easily accessible.

Trenches

There are over 10 bulldozer trenches on the Sadie portion of the site. The trenches were not individually inventoried and are described below in general terms only.

Description: The trenches are all generally cut through the overburden to outcrop below and are oriented at a variety of azimuths.

Location: The trenches occur within an area of stripped overburden 75m wide and extending 200m out both sides of the Lucky Queen Road.

Dimensions: The trenches vary in length from 20m and 100m, but are all 4m wide and 1 to 2 metres deep.

Condition: All stable.

Accessibility: All easily accessible.

5.2 Waste Rock Disposal Areas

There are eight waste rock disposal areas, numbered WR-01 beginning at the northeast end in the Ladue area to WR-8 at the southwest end of the Sadie area. They are grouped below based on location, composition and source. No water was observed draining through or over any of the waste rock piles on the site.

Waste Rock Pile WR-01 and WR-02

Description: WR-01 and WR-02 are from the original development work of the Ladue mine, prior to construction of the Sadie-Ladue 600 level. They are composed of phyllite with minor quartzite interbeds and greenstone ranging in size from less than 0.5cm to 5cm. Pyrite and quartz vein material are present in minor amounts only. Oxidation is minor and there is minimal iron staining. No surface or subsurface water was noted draining from the waste rock piles. WR-01 has been naturally re-vegetated by alders; WR-02 has no vegetation.

Location: WR-01 is located at the extreme northeast end of the site along the start of the lower Faro Gulch Trail. WR-02 is located approximately 100m southwest of WR-01.

Dimensions: WR-01: (150m long) x (25m to 45m wide) x (2m to 5m high).
WR-02: (50m long) x (40m wide) x (3m to 5m high)

Sampling: No samples were collected in 1999.
1996 sampling (Norecol, 1997; see Attachments):

Pile WR-01	Sample:	1996WWR7
Pile WR-02	Sample:	1996WWR6

Waste Rock Pile WR-03

Description: WR-03 is comprised of phyllite and greenstone excavated from Pit #1. Material ranges in size from less than 0.5cm to over 25cm and contains minor amounts of pyrite and quartz vein.

Oxidation is minor and there is minimal iron staining. No surface or subsurface water was noted draining from the waste rock piles. Only minor willow vegetation is present.

Location: Located immediately southeast of Pit #1.

Dimensions: 100m long x 25m wide x (2m to 3m) high

Sampling: No samples were collected in 1999.

1996 sampling (Norecol, 1997; see Attachments):

Pile WR-03 Samples: 1996WWR2
1996WWR4

Waste Rock Piles WR-04, WR-05, WR-06, WR-07 and WR-08

Description: WR-04, -05, -06, -07 and -08 are mostly comprised of stripped overburden material (primarily residual soils and till) mixed with varying percentages of waste rock from mining. The northeast half of pile WR-04 is composed of up to 70% reworked mine waste rock, compared to only 30% on the southwest half. Piles WR-05 and WR-07 are primarily composed of stripped overburden. Piles WR-06 and -08 consist of between 20% and 30% reworked mine. No surface or subsurface water was noted draining from the waste rock piles. All of the piles are fairly recent (1980s) and have little vegetation cover.

Location:
- WR-04: Extends along main portion of site from Pit #1 northeast to the area of Pit #3
- WR-05: Immediately southeast of WR-03 and Pit #1. Consists of material stripped from the Pit #1 area.
- WR-06 to -08: Located around the perimeter of the Sadie portion of the site, moving from the northeast to the southwest. They are associated with the excavation of the trenches and Pit #5.

Dimensions: All dimensions approximate.
- WR-04: (250m long) x (50m to 70m wide) x (0.5 to 3m high)
- WR-05: (75m long) x (30m wide) x (2m high)
- WR-06: (100m long) x (100m wide) x (1m to 2m high)
- WR-07: (75m long) x (10m to 20m wide) x (2m high)
- WR-08: (80m long) x (30m wide) x (1m to 3m high)

Sampling: No samples were collected on any of these waste rock piles in 1999, or as part of any previously reported investigation.

5.3 Tailings Impoundments

Tails from the Wernecke mill were allowed to flow down the slope below the site. The tails are now spread on the slope from the site all the way to a small lake situated at the headwater of Ladue Creek in the valley below. A delta comprised of tails fills up roughly 6ha of the lake (see Site #80 for a full description). Some attempt to contain the tails in a small impoundment structure, although most of the tails are spread down the slope below.

Tailings Impoundment Structure (Photo 26-7)

Description: Constructed out of sheet metal supported by wooden fence posts, the structure provided only limited physical confinement of the tails. The structure was not sealed against leakage or overflows. The structure is now largely collapsed. The tails material has a medium to coarse sand texture and is moderately to strongly oxidized.

Location: Located directly below waste rock pile WR-04, roughly 50m southwest of the road down to the Sadie-Ladue 600 adit site.

Dimensions: (60m long) x (20m wide) x (1m to 2.5m high)

Samples: No samples were taken in 1999 or any as part of any other study of the tails in the impoundment structure.

Tailings Deposits

Description: The slope west of the road between the Sadie-Ladue 600 and the Wernecke camp is covered with a fan of tails material up to 0.3m deep. The tails material is similar to that found in the impoundment structure above. The tails were deposited directly on the slope or were allowed to overflow the impoundment structure and are not immersed in water.

Location: Located directly below the tailings impoundment structure. The road down to the Sadie-Ladue 600 level forms the east boundary of the dispersion fan.

Area: The total area of tailings material is not accurately know. The area outlined is based on aerial photo interpretation and was not investigated.
(300m long) x (150m wide) x (0.1m to 0.3m thick)

Structures: There are no associated pumping facilities, piping ore decant structures associated with the tails material.

Samples: A paste pH field test was conducted on a sample of tails material in 1999:

Sample 21T01-01 pH: 6.4
Conductivity: 120µS/cm

A soil sample collected in 1996 was analyzed for metals (Norecol, 1997; see Attachments):

Sample 1996WS2

No acid-base accounting (ABA) analysis has been conducted on the tails material in either 1999 or previously.

5.4 Mine Site Water Treatment

No water treatment facilities are present at the Wernecke site.

6. MINE SITE INFRASTRUCTURE

Mine infrastructure includes the remains of over 18 buildings only. All other facilities, such as the mill, power plants, fuel storage sites have been removed.

6.1 Buildings

A total of 18 building structures were inventoried at the Wernecke site. These are summarized in Table 1 below.

TABLE 1
WERNECKE CAMP BUILDINGS

No.	Description General Location	Photo No.	Size L (azimuth) x W	Age (approx.)	Condition
21-A	Mine Managers House Located south of Ladue Shaft #2 area.	21-9	20m (@140°) x 12m	1920's	Fair; foundation failing; roof intact; floors and walls warping; metal roofing intact. Modified in 1980s.
21-B	Sauna Located near Bldg. 21-A.	21-10	4.5m (@060°) x 3.5m	1980s	Good; shake roof; still operational
21-C	Office/bunkhouse (?) Located near Bldg. 21-A.	21-11	4 m (@0130°) x 4m	1920s	Poor; roof partially collapsed; no foundation; metal roof.
21-D	Tent frame Located near Bldg. 21-A.	21-12	4 m (@090°) x 3m	1980s	Good; sound; no foundation; frame for tent; no roof.
21-E	Shed	21-13	3 m x 3m	1920's	Poor; collapsed, no foundation; metal roof.
21-F	Mine building/house (?) Located near Bldg. 21-A.	21-14	12 m (@040°) x 10m	1920s	Poor; partially collapsed and striped; no roof; wood post foundations beginning to shift; some wood and plastic debris.
21-G	Mess and recreation hall Kitchen Located east of road down to Sadie-Ladue 600 level.	21-15	15 m (@000°) x 10m	1920s	Poor; hall partially collapsed; wood frame with wood truss roof; floor removed. Kitchen building attached; log construction; partially collapsed foundation and roof. Metal roof on both structures; partially removed.
21-H	Bunkhouse Located near Bldg. 21-G.	21-15	6m x 5m (approx.)	1920s	Poor; totally collapsed; wood frame; no roofing material.
21-I	Bunkhouse Located near Bldg. 21-G.	21-15	7m x 5m (approx.)	1920s	Poor; totally collapsed; wood frame; no roofing material.
21-G	Lookout (attached to kitchen) Located near Bldg. 21-G.	21-16	3 m (@160°) x 2.5m	1920s	Fair to poor; still standing; built on 4m stilts; flooring and foundation partially rotten; metal roof.
21-J	Unknown mine building Located west of road down to Sadie-Ladue 600.	21-17	16 m (@140°) x 10m	1920s	Poor; collapsed; wood frame; no roofing material.
21-K	Boiler house Located near Bldg. 21-J.	21-18	n/a	1920s	Poor; collapsed wooden shed adjacent to steel boiler.
21-L	Houses or bunkhouses. Located west of Pit #1 below access road.	21-19	n/a	1920s	Site of 4 buildings; all in poor condition; all partially collapsed; all wood frame with metal clad roofs.
21-M	Log shack On Lucky Queen road	None	n/a	1920s	Poor; log construction; collapsed metal clad roof.
21-N	Outhouse Located near Bldg. 21-A.	None	n/a	1980s	Fair; metal clad wood structure.

All the buildings on the site are wood frame with wood foundations. No asbestos containing materials (siding, tiles) or painted surfaces were observed. All the buildings were empty; no hazardous materials were found in any of the structures.

6.2 Fuel Storage

There was no fuel stored on the site at the time of this inspection. Previous investigations (Norecol, 1997) reported the past use of the site as a fuel cache (12 barrels of Jet B fuel) for a local helicopter operator. These have been removed.

Samples: One soil sample tested for BTEX, VPH, LEPH and HEPH (Norecol, 1997; see Attachments):

Sample: 1996WS1

6.3 Rail and Trestle

No rail or trestle structures exist on the site.

6.4 Milling and Processing Infrastructure

The Wernecke mill was completely removed from the site and all structures have been removed or destroyed. An assay lab existed on the site, but has also been removed. No evidence of any of these structures remains due to later stripping and mining activity on the site.

6.5 Electrical Equipment

No electrical equipment exists on the site. All generators, including a small camp generator used on the site in the 1980s, transformers and power lines have been completely removed. A power line did extend between the Sadie-Ladue 600 level, the Wernecke camp and then over the ridge south of the Lucky Queen mine site. The cable has been removed from the Wernecke camp and Sadie-Ladue 600 areas.

7.0 SOLID WASTE DUMPS

Two solid waste dumps are located on the Wernecke site. One site consists primarily of large metal waste, presumably from the mill and mine operations. The second dump consists of kitchen wastes.

Mine Waste Dump

Location: Located west of the Sadie Ladue 600 road just below the

Dimensions: (40m long) x (30m wide)

Drainage: Occurs at the upper limit of a dry gully. No significant drainage within 1km.

Composition: Wood and large metal debris including drums, rail, hoist wheels, strapping and beams. The latter is likely from the dismantled mill. The strapping appears to be from wooden treatment vats from the mill. At one location, the soil was reported by Norecol (1997) to appear

"darkened and stained", possibly resulting from mill concentrate residue from mill equipment abandoned on the site.

Vegetation: The site is overgrown with willows.

% covered: The dump is not covered.

Samples: No samples were collected in 1999.

One soil sample collected in 1996 was analyzed for metals (Norecol, 1997; see Attachments):

Sample: 1996WS4

Camp Waste Dump (Photo 21-20)

Location: Located directly below the lookout and kitchen buildings (Bldg. 21-G) and the base of a small bluff.

Dimensions: (25m long) x (10m wide) x (1.0m deep)

Drainage: No significant drainage within 1km.

Composition: Approximately 65% metal (tin cans and lesser empty barrels, tubs), 20% wood, 10% glass, and 5% bone, cloth and rubber.

Vegetation: The site is surrounded by willows and small evergreen trees.

% covered: None of the dump is covered.

Sampling: No samples were collected in 1999, or as part of any previous investigation.

8. POTENTIAL CONTAMINANTS OF CONCERN

8.1 Out-of-Service Transformers

No transformers were observed on the site.

8.2 Metals and Hydrocarbons in Soil

Aside from expected elevated background levels for metals (silver, lead, zinc, copper, cadnium, antimony, iron) on the Wernecke site, three sites have been shown through preliminary sampling to be elevated in metals. These include the tails deposits (see Section 5.3), soils associated with the mine waste dump site (see Section 7.0) and approximately 0.6m^3 of ash residue located at the base of the boiler. The boiler ash was elevated in cadnium, lead, zinc (Norecol 1997).

Sites where hydrocarbons were observed or suspected in soils are limited at the Wernecke site, due in part to the fact the site has been significantly altered since the 1920s. Three sites were identified. A fuel or oil stain was observed roughly 10m east of Pit #1. The stain was not reported in the report suggesting it has occurred since. It covered a total area of less than 5m^2 and penetrated to less than 5cm into the broken waste rock. It was not sampled. Soils at a site used for the temporary storage of Jet B helicopter fuel during a 1996 inspection was tested for BTEX, VPH, LEPH and HEPH (Norecol, 1997; see Section 6.2). Analysis of the boiler in 1996

identified elevated levels of benzo(b+k)flouranthene and indeno(1,2,3-c,d)pyrene (Norecol, 1997; see Attachments).

Samples: No samples were collected in 1999.

Four soil samples were collected in areas of suspected contamination in 1996 (Norecol, 1997):

Helicopter pad:	1996WS1	Analyzed for BTEX, VPH, LEPH and HEPH.
Tails:	1996WS2	Analyzed for metals.
Boiler ash:	1996WS3	Analyzed for BTEX, VPH, LEPH and HEPH, metals.
Mine Dump:	1996WS4	Analyzed for metals.

8.3 Liquid Hazardous Materials

No hazardous liquid materials were observed on the site.

8.4 Solid Hazardous Materials

No hazardous solid materials were observed on the site.

9. WATER QUALITY

A single water sample representing upstream background water conditions was collected on the Wernecke site in 1999. Sample Sadie-WS-1 was collected from a seep originating from roughly 50m up slope above the Lucky Queen road and the Sadie mine area. It flows over the grassy and willow covered slope above the Lucky Queen road until it drains into the coarse rock in the stripped area below.

Mine waters and down stream samples include the Sadie-Ladue 600 adit water sample (site #77; sample 77WQ01-01/02) and the inflow stream sample for the Wernecke Tailings site (site #80; sample 99-100-WQ-04) respectively.

A single water sample was collected in 1996 by Norecol from the ponded water in Pit #4 (Norecol, 1997; see Attachments).

10. RECLAMATION (Photo 21-1)

Natural reclamation of the site has occurred with the spread of willows and small fir trees over most of the site. The areas stripped in the 1980s remain between 80% and 90% bare, however the waste rock dumps comprised on overburden material have greater vegetation cover. None of the waste rock piles, pits or trenches have been re-contoured. No reclamation has been completed on the tails, waste dump sites or buildings.

11. OTHER INFORMATION AND DATA

The Wernecke site has been the subject of at least 3 previous environmental studies. The Department of Indian and Northern Development (DIAND) Technical Services Branch conducted an initial environmental site

investigation in 1993, but collected no samples. Access Mining Consultants Ltd. conducted a limited compilation on the Wernecke camp, but have presented extensive monitoring results for the Sadie-Ladue 600 mine drainage waters dating back to 1985 (UKHM, 1996). Detailed monitoring of water chemistry, including pH, sulphate, conductivity, flows, cadnium, lead, zinc and copper is available for the period 1990 to 1996. These results are available as an appendix to this study. Norecol (1997) conducted an investigation of the site in 1996 collecting a total of 12 samples on the site including: 7 waste rock samples; 4 soil samples, and; 1 water sample. These samples are described in more detail in the appropriate sections of this report and the results are provided as an attachment.

12. REFERENCES

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ATTACHMENT 2: 1999 SADIE LADUE/WERNECKE WATER SAMPLES LABORATORY RESULTS					
Sample Number	**Detection Limit**	**Units**	**Sadie-WS-1 18/9**	**99-100-WQ-04 - Wernecke Tailings - 17/09/99**	**77-WQ-01-02 - 17/09/99**
Site Desciption			Upstream surface seep Sadie area	Downstream sample	Sadie Ladue 600 level mine drainage
pH (field)	N/A	pH	-	6.7	7.8
Conductivity (field)	N/A	µS/cm	-	549	150
pH (Lab)	0.01	pH	7.51	7.97	7.79
Conductivity (Lab)	0.01	µS/cm	220	710	690
Total Alkalinity	5	mg CaCO3/L	55	170	168
Chloride	0.25	mg/L	<0.25	<0.25	<0.25
Hardness (CaCO3 equiv)	5	mg/L	111	438	357
Nitrate-N	0.05	mg/L	<0.05	0.09	0.13
Nitrite-N	0.003	mg/L	<0.003	<0.003	<0.003
Sulphate	1	mg/L	48.8	204	196
Total Dissolved Solids	5	mg/L	144	487	483
Analysis by ICP-USN					
Aluminum	0.0008	mg/L	0.0197	0.0141	0.0423
Antimony	0.005	mg/L	<0.005	<0.005	0.006
Arsenic	0.01	mg/L	<0.01	<0.01	<0.01
Barium	0.00004	mg/L	0.027	0.0469	0.0158
Beryllium	0.00001	mg/L	<0.00001	<0.00001	<0.00001
Bismuth	0.0004	mg/L	0.0005	<0.0004	<0.0004
Boron	0.002	mg/L	<0.002	<0.002	<0.002
Cadmium	0.00006	mg/L	0.0001	0.00489	0.00519
Calcium	0.002	mg/L	32.1	108	93.8
Chromium	0.00006	mg/L	0.00021	<0.00006	0.00051
Cobalt	0.00003	mg/L	<0.00003	0.00014	0.00024
Copper	0.00003	mg/L	0.00202	0.00054	0.00304
Iron	0.00001	mg/L	0.01	0.148	0.16
Lead	0.0003	mg/L	0.0008	0.0009	0.002
Lithium	0.001	mg/L	0.003	0.005	0.004
Magnesium	0.0005	mg/L	5.49	25.6	32.8
Manganese	0.00002	mg/L	0.00229	0.119	0.0452
Mercury	0.0001	mg/L	<0.0001	<0.0001	<0.0001
Molybdenum	0.00007	mg/L	0.00053	0.00087	0.00392
Nickel	0.00001	mg/L	0.0005	<0.0001	0.0175
Phosphorus	0.03	mg/L	<0.03	<0.03	<0.03
Potassium	0.4	mg/L	<0.4	0.4	0.6
Selenium	0.004	mg/L	<0.004	<0.004	<0.004
Silicon	0.004	mg/L	2.83	2.88	3.02
Silver	0.00005	mg/L	<0.00005	<0.00005	<0.00005
Sodium	0.004	mg/L	1	1.9	2.2
Strontium	0.00002	mg/L	0.084	0.29	0.424
Sulphur	0.008	mg/L	16.2	67.5	59.3
Thallium	0.001	mg/L	<0.001	<0.001	<0.001
Titanium	0.00002	mg/L	0.00031	0.00026	0.00104
Vanadium	0.00003	mg/L	<0.00003	<0.00003	na
Zinc	0.0002	mg/L	0.0091	0.555	0.746
Zirconium	0.00004	mg/L			<0.00004
Analysis by Hydride AA					
Arsenic	0.0002	mg/L	0.0004	<0.0002	0.0016
Selenium	0.0001	mg/L	0.0002	0.0004	0.0002

TABLE 1
WERNECKE SITE
SAMPLE PARAMETERS SUMMARY CHART
PUBLIC WORKS AND GOVERNMENT SERVICES
YUKON ABANDONED MINE SITES - WERNECKE
20749-013-310

Sample Identification	Sample Type	Parameters Analysed						
		PCB	Total Metals	ABA	BTEX/ VPH	LEPH/ HEPH	Conventional Parameters	PAH
WWR1	waste rock			X				
WWR2	waste rock			X				
WWR3	waste rock			X				
WWR4	waste rock			X				
WWR5	waste rock			X				
WWR6	waste rock			X				
WWR7	waste rock			X				
WS1	soil				X	X		
WS2	soil		X					
WS3	soil		X					X
WS4	soil		X		X	X		
WW1	surface water		X				X	

PCB - polychlorinated biphenyls

ABA - acid-base accounting

BTEX/VPH - benzene, toluene, ethylbenzene, xylenes, volatile petroluem hydrocarbons

LEPH/HEPH - light extractable petroleum hydrocarbons / heavy extractable petroleum hydrocarbons

Conventional Parameters - pH, sulphate, total suspended solids

PAH - polycyclic aromatic hydrocarbons

TABLE 2
MODIFIED SOBEK METHOD ACID-BASE ACCOUNTING
PUBLIC WORKS AND GOVERNMENT SERVICES
YUKON ABANDONED MINE SITES - WERNECKE
20749-013-310

Sample No.	Rock Type	Paste pH	S(T) %	S(SO4) %	AP	NP	NET NP	NP/AP
WWR1	Quartzite, grey; massive, <1% pyrite finely disseminated (5-10%)	7.45	0.51	0.18	10.3	90.0	79.7	8.7
WWR2	Quartzite, finely disseminated pyrite (1%); abundant fine calcium carbonate veining, partly oxidized	7.09	0.42	0.16	8.1	49.3	41.1	6.1
WWR3	Greenstone, dark green, <1% pyrite, 1% carbonate, massive	7.68	1.09	0.15	29.4	81.3	51.9	2.8
WWR4	Argillite, abundant quartz veining, iron staining associated with quartz veining, grey, slightly slate fabric	7.70	0.25	0.14	3.4	75.3	71.8	21.9
WWR5	Argillite to phyllite, abundant quartz veining, iron staining associated with quartz veining, grey, slightly slate fabric, slightly silky sheen	7.86	0.25	0.13	3.8	73.8	70.0	19.7
WWR6	Graphitic Schist, 20% carbonaceous material (graphite); medium to dark grey, silky sheen, platey texture, boudinage quartz veining, finely disseminated cubes of pyrite <1%	7.94	0.52	0.20	10.0	164.5	154.5	16.5
WWR7	Graphitic Schist, 20% carbonaceous material (graphite); medium to dark grey, silky sheen, platey texture, boudinage quartz veining, finely disseminated cubes of pyrite <1%	7.88	0.71	0.30	12.8	112.8	99.9	8.8

AP = Acid Potential in Tonnes CaCO3 Equivalent per 1000 Tonnes of material.
NP = Neutralization Potential in Tonnes CaCO3 Equivalent per 1000 Tonnes of Material.
NET NP = Net Neutralization Potential = Tonnes CaCO3 Equivalent per 1000 Tonnes of Material.

TABLE 3
CONCENTRATION OF BTEX AND VOLATILE PETROLEUM HYDROCARBONS IN SOIL SAMPLES
PUBLIC WORKS AND GOVERNMENT SERVICES
YUKON ABANDONED MINE SITES - WERNECKE SITE
20749-013-310
ug/g (ppm)

			Benzene	Ethylbenzene	Toluene	Xylenes	Volatile Petroleum Hydrocarbons
CCME	Commercial/Industrial		5.	50.	30.	50 (a)	NC
CMCS PHC	Commercial/Industrial						200.
Sample No.	Location	Depth (m)					
WS1	Helicopter Pad	0 - 0.15	<0.5	<0.5	<0.5	<0.5	<10.
WS4	Scrap Metal/Garbage Dump	0 - 0.15	<0.5	<0.5	<0.5	<0.5	<10.
Method Detection Limit			0.5	0.5	0.5	0.5	10.

CCME - Canadian Council of Ministers of the Environment Interim Canadian Environmental Quality Criteria for Contaminated Sites

CMCS PHC - Criteria for Managing Contaminated Sites, British Columbia, July, 1995 and New Petroleum Hydrocarbon Criteria, August, 1995

< - less than the detection limit indicated

NC - no criteria established

(a) - Criteria for total of m, p and o xylenes.

☐ - Greater than CCME criteria for commercial/industrial land use

☐ - Greater than CMCS PHC criteria for commercial/industrial land use

TABLE 4
CONCENTRATIONS OF LEPH & HEPH IN SOIL SAMPLES
PUBLIC WORKS AND GOVERNMENT SERVICES
YUKON ABANDONED MINE SITES - WERNECKE SITE
20749-013-310
ug/g (ppm)

			LEPH	HEPH
CMCS - PHC	Commercial/Industrial		2000.	5000.
Sample No.	Location	Depth (m)		
WS1	Helicopter Pad	0 - 0.15	<250.	<250.
WS4	Scrap Metal/Garbage Dump	0 - 0.15	<250.	<250.
Method Detection Limit			250.	250.

CMCS PHC - Criteria for Managing Contaminated Sites, British Columbia, July, 1995
and New Petroleum Hydrocarbon Criteria, August, 1995

< - less than the detection limit indicated

NC - no criterion established

☐ - Greater than CMCS PHC criteria for commercial/industrial land use

TABLE 5
CONCENTRATION OF METALS IN SOIL SAMPLES
PUBLIC WORKS AND GOVERNMENT SERVICES
YUKON ABANDONED MINE SITES - WERNECKE SITE
20749-013-310
ug/g (ppm)

			Silver	Arsenic	Boron	Barium	Beryllium	Cadmium	Cobalt	Chromium*	Copper	Mercury	Manganese	Molybdenum	Nickel	Lead	Antimony	Selenium	Tin	Vanadium	Zinc
CCME	Commercial/Industrial		40.	50.	NC	2000.	8.	20.	300.	800.	500.	10.	NC	40.	500.	1000.	40.	10.	300.	NC	1500.
Sample No.	Location	Depth (m)																			
WS2	Suspected Tailings	0 - 0.15	35.	0.2	55.	49.8	<1.	242.	2.	35.	79.	1.5	23400.	<4.	12.	2730.	37.	<0.5	<5.	21.	16700.
WS3	Boiler Ash	0 - 0.15	33.	0.14	84.	123.	<1.	35.4	12.	18.	91.	0.06	2000.	<4.	33.	2350.	59.	<0.5	16.	24.	1910.
WS4	Garbage Dump/Scrap Metal	0 - 0.15	51.	0.18	46.	63.2	<1.	222.	<1.	7.	61.	1.4	40400.	<4.	10.	2720.	110.	<0.5	<5.	12.	17200.
Method Detection Limit			2.	0.05	0.5	0.1	1.	0.25	1.	2.	1.	0.001	0.2	4.	2.	1.	10.	0.5	5.	0.5	1.

CCME - Canadian Council of Ministers of the Environment Interim Canadian Environmental Quality Criteria for Contaminated Sites
< - less than the detection limit indicated
NC - no criteria established
☐ - Greater than CCME criteria for commercial/industrial land use
* - Total Chromium

TABLE 6
CONCENTRATIONS OF POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) IN SOIL SAMPLES
PUBLIC WORKS AND GOVERNMENT SERVICES
YUKON ABANDONED MINE SITES - WERNECKE SITE
20749-013-310
ug/g (ppm)

			Benz(a)anthracene	Dibenz(a,h)anthracene	Chrysene	Benzo(b+k)fluoranthene*	Benzo(ghi)perylene	Pyrene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Acenaphthene	Acenaphthylene	Anthracene	Fluoranthene	Fluorene	Naphthalene	Phenanthrene	Total PAHs (a)	Total Low MW PAHs	Total High MW PAHs
CCME	Commercial/Industrial		10.	10.	NC	10.	NC	100.	10.	10.	NC	NC	NC	NC	NC	50.	50.	NC	NC	NC
Sample No.	Location	Depth (m)																		
WS3	Boiler Ash	0 - 0.15	4.2	1.6	8.3	17.	18.	6.	7.2	15.	<0.05	0.12	0.35	5.2	<0.05	0.07	1.8	84.8	2.34	82.5
Method Detection Limit			0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05			

CCME - Canadian Council of Ministers of the Environment Interim Canadian Environmental Quality Criteria for Contaminated Sites
< - less than the detection limit indicated
NC - no criterion established
(a) Total PAH concentration calculated using value of one half the detection limit where reported as "less than".
* - Criterion for each of benzo (b) and (k) fluoranthene.
☐ - Greater than CCME criteria for commercial/industrial land use

TABLE 7
CONCENTRATIONS OF CONVENTIONAL PARAMETERS AND TOTAL METALS IN SURFACE WATER
PUBLIC WORKS AND GOVERNMENT SERVICES
YUKON ABANDONED MINE SITES - WERNECKE SITE
20749-013-310
ug/L (ppb)

		pH	Total Suspended Solids (mg/L)	Sulphate SO4 (mg/L)	Silver	Aluminum*	Arsenic	Boron	Barium	Beryllium	Cadmium	Cobalt	Chromium	Copper	Iron	Mercury	Manganese	Molybdenum	Nickel	Lead	Selenium	Tin	Vanadium	Zinc
CCME	Freshwater Aquatic Life	6.5-9.0	NC	NC	0.1	5 - 100	50	NC	NC	NC	0.2 - 1.8	NC	2 - 20	2 - 4	300	0.1	100	NC	25 - 150	1 - 7	1	NC	NC	30
Sample	Location																							
WW1	Northernmost Trench - Pond	7.93	3.	433.	<0.1	<200.	<1.	<10.	8.	<3.	0.2	<1.	<1.	<1.	50.	<0.05	29.	3.	2.	<1.	<1.	<1.	<10.	47.
Method Detection Limit					0.1	200.	1.	10.	1.	3.	0.2	1.	1.	1.	30.	50.	3.	1.	1.	1.	1.	1.	10.	5.

CCME - Canadian Council of Ministers of the Environment Interim Canadian Environmental Quality Criteria for Contaminated Sites
< - less than the detection limit indicated
NC - no criteria established
☐ - Greater than CCME criteria for aquatic life (AW)
* - Criteria depend on pH or hardness of sample

- Building (22A: building site present reference*) Indicates Asbestos Material (22A*)
- Collapsed Building (22A)
- Adit
- Collapsed Adit
- Shaft
- Collapsed/Backfilled Shaft
- Mine Rock Dump
- Bedrock Open Pit
- Trench
- Stripped Overburden Stockpile
- Stripped / Disturbed Area
- Outcrop Boundary
- Highway
- Road (gravel, 2 wheel drive)
- Road (gravel, 4X4 accessible)
- Road (inaccessible)
- Trail
- Culvert
- 2450I-01 1999 Soil Sample (this study)
- Pre 1999 Soil Sample (other sources)
- 25WR04-01 1999 Waste Rock Sample (this study)
- Pre 1999 Waste Rock Sample (other sources)
- WQ-12-06 1999 Water Sample
- Pre 1999 Water Sample
- Tension Cracks
- Mass Movement (note: tor Forms; BelleKena)
- Groundwater Seep
- Surface Water Flow (Stream, Creek, River)
- Lake
- Settling Pond / Water Treatment Pond
- Tailings Dam / Tailings Pond / Mill Tails
- Ponded Water / Trench
- Barrels
- Abandoned Equipment (compressors, ore cars, rails, air and water pipe)
- Mine Rails / Trestle
- Collapsed Trestle
- Solid Waste Disposal Site
- Area of Soil Contamination
- *(6) Transformer Location (number of transformer in brackets)
- Power Line
- Power Line Collapsed
- Aerial Transmission Towers
- (5) Photo Site (arrow shows view direction)
- GPS Survey Location
- Former Building Site (Elsa)

Waste Rock Geological Legend

This legend intended for use as a key to the observed lithological content of the mine dumps and stockpiles of surficial materials investigated. It does not represent regional stratigraphy and no stratigraphic sequence is implied.

Pyrite content as percent: eg. Py 2%. Occurs as an alteration halo adjacent to vein fault structure.

Oxidation: Weak (wOx), moderate (mOx) and intense (tiOx).

Quarternary: (5) Undifferentiated, unconsolidated colluvium, glacial till.

Veins:
(4a) Quartz veins;
(4b) Quartz-pyrite veins;
(4c) Quartz-siderite ±trace galena-sphalerite veins;
(4d) Siderite-quartz ±trace galena-sphalerite veins;

Greenstone: (3) Amphibole-chlorite-plagioclase metadiorite or metagabbro.

Quartzite:
(2a) Thick bedded, blocky gray quartzite;
(2b) Thin banded, broken, quartzite with carbonaceous phyllite interbeds;
(2c) Calcareous quartzite.

Phyllite:
(1a) Broken sericite-chlorite phyllite;
(1b) Carbonaceous phyllite.

CAD FILE: SITE21.DGN

Public Works And Government Services Canada
Travaux publics et Services gouvernementaux Canada
Architectural & Engineering Services Western Region

designed by:
concu par:
drawn by: C.S. Nov. 99
dessine par:
approved by:
approuve par:
revisions:

Drawing title: Titre du dessin:

Sadie Ladue Site #21
Site Assessment
Yukon Territory

project no. 125-12.01
no. du projet:
dwg. no. 1 of 1
dessin no.

Photo 21-1: Panorama of main Werecke Camp and Sadie Ladue Mine area showing end dumped waste rock and overburden piles, Pitt#1 and decline hole to left, and partially collapsed shaft structures to far right.

Photo 21-2: Overview of Pit#1 developed in the late 1980's. (Azimuth 060°)

Photo 21-3: Open decline from recent (late 1980's) work. Note hazard from loose slabs in the roof resulting from horizontal foliation structures.(Azimuth 170°)

Photo 21-4: Sadie Ladue shaft area. Note dilapidated tressel, outhouse over callapsed manway and managers house in background. (Azimuth 080°)

Photo 21-5: Sealed haulage shaft. (Azimuth 000°)

Photo 21-6: Pit #4 with ponded water from groundwater seeps. (Azimuth 030°)

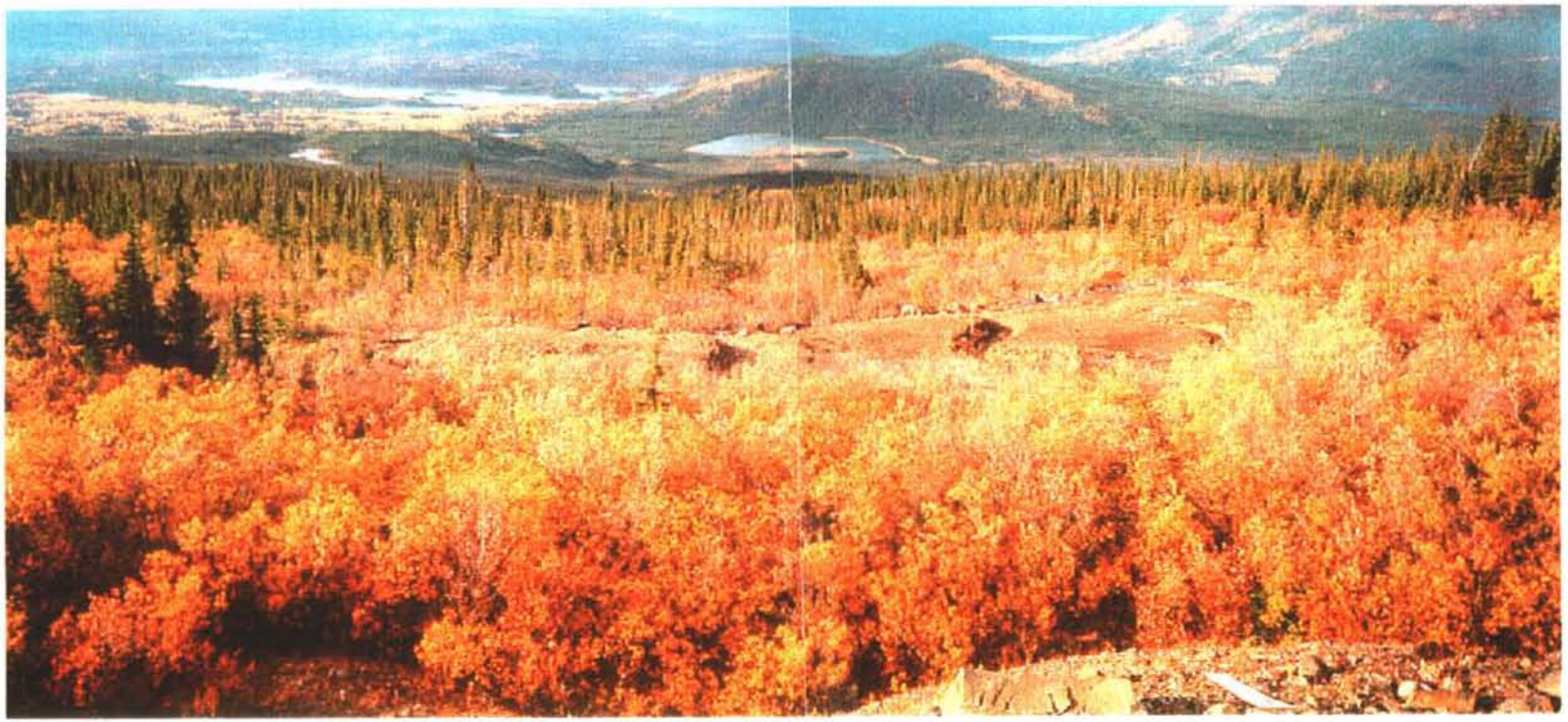


Photo 21-7: Mill tailings located below waste dumps. Note collapsed sheet metal impoundment structure and tailings delta in lake below at top-centre of photo. (Azimuth 335^{0})

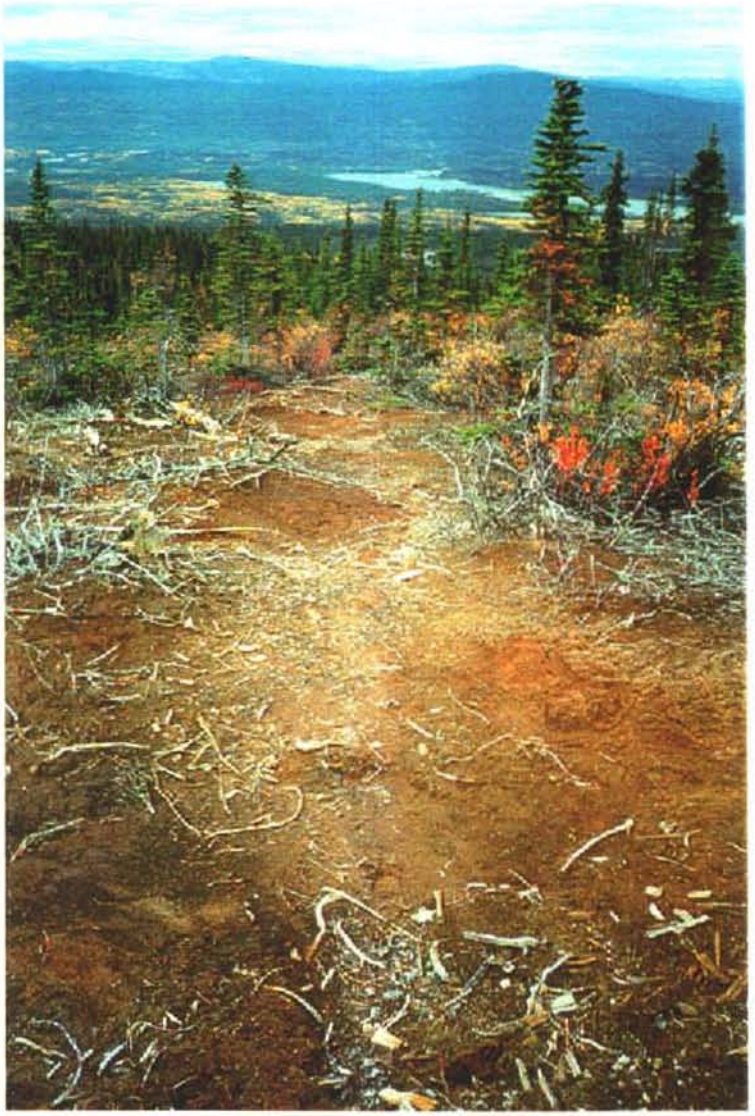


Photo 21-8: **Tailings material 250m down slope of Wernecke Camp area (el. 1220m).**

Photo 21-9: Managers house (Bldg. 21-A). (Azimuth 180°)

Photo 21-10: Sauna built in 1986 (Bldg. 21-B). Note sound condition. (Azimuth 180°)

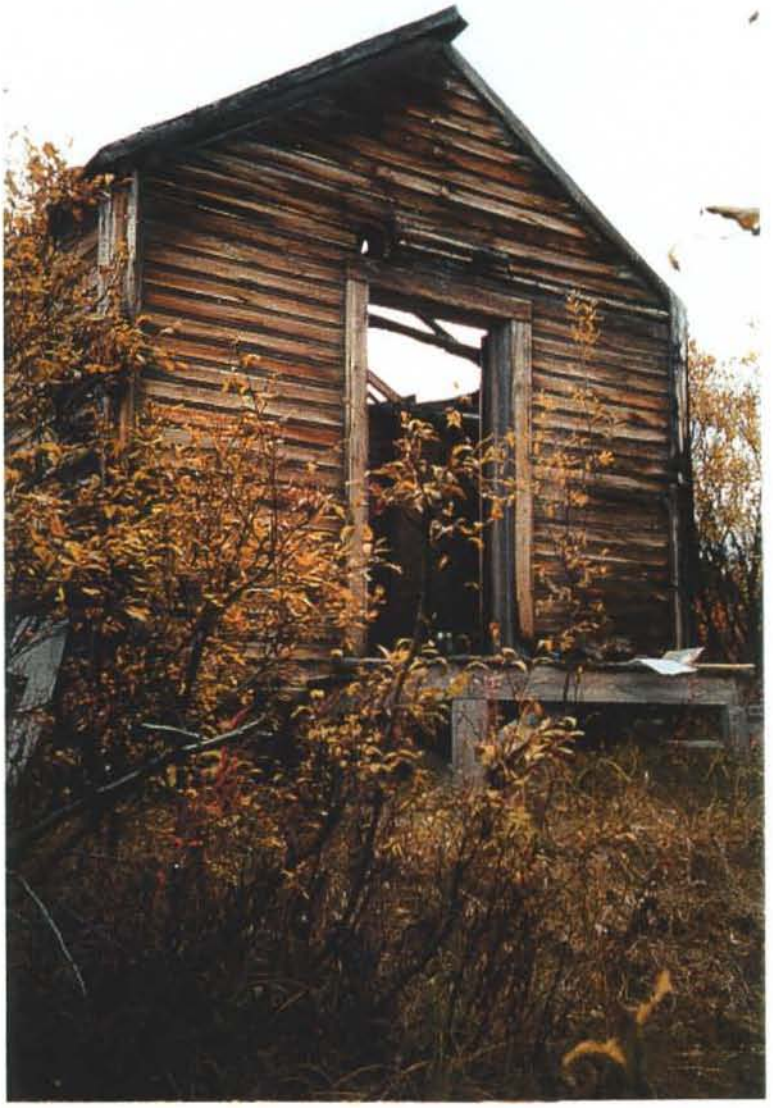


Photo 21-11: Partially collapsed building (Bldg. 21-C). (Azimuth 160°)

Photo 21-12: Tent frame structure (Bldg. 21-D). Note Bldgs. 21-A & C in background. (Azimuth 230°)

Photo 21-13: Collapsed shed (Bldg. 21-E) (Azimuth 000°)

Photo 21-14: Dilapidated mine building (Bldg. 21-F). (Azimuth 260°)

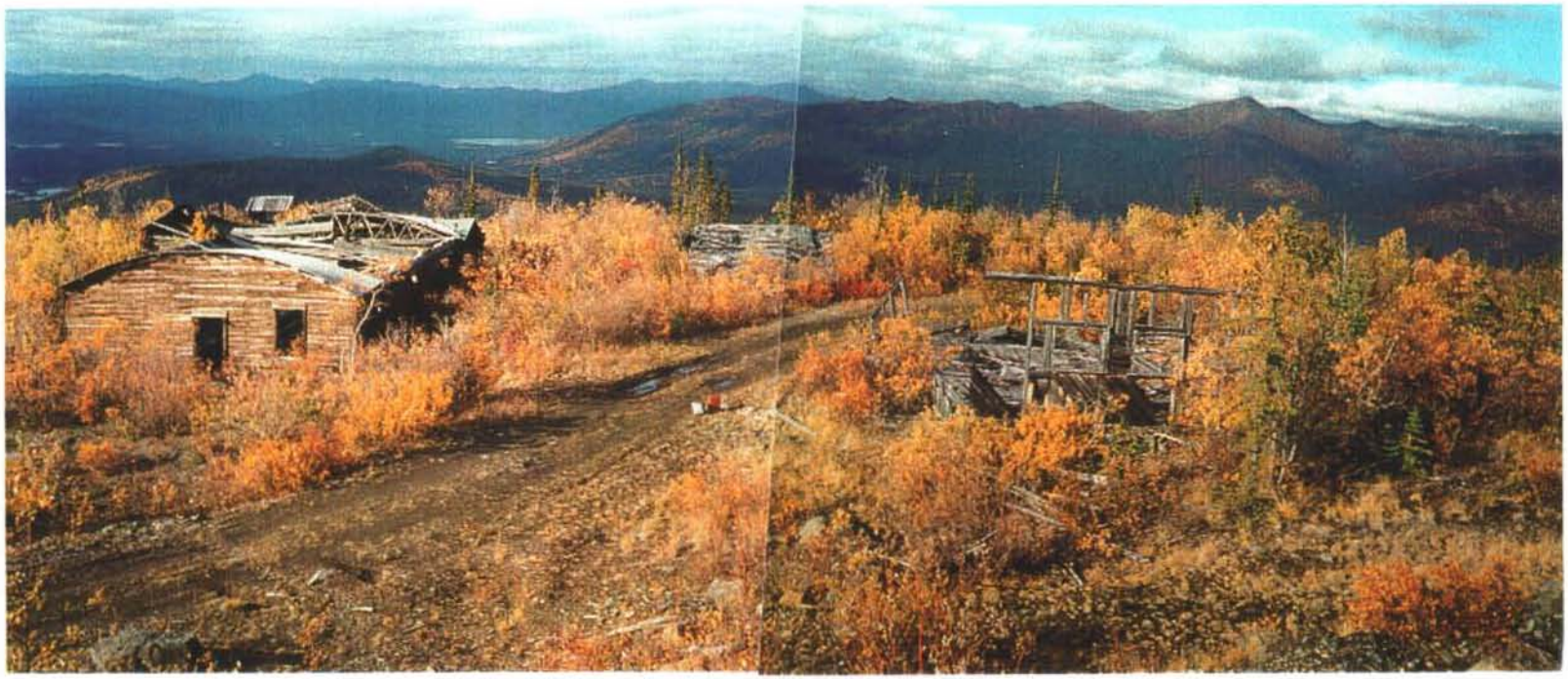


Photo 21-15: Mess hall, cookhouse and bunk houses (Bldgs. 21-G, H, I).
Note lookout roof visible behind mess hall. (Azimuth 340-010°)

Photo 21-16: Lookout (part of Bldg. 21-G). (Azimuth 020°)

Photo 21-17: Collapsed building (Bldg. 21-J). (Azimuth 320°)

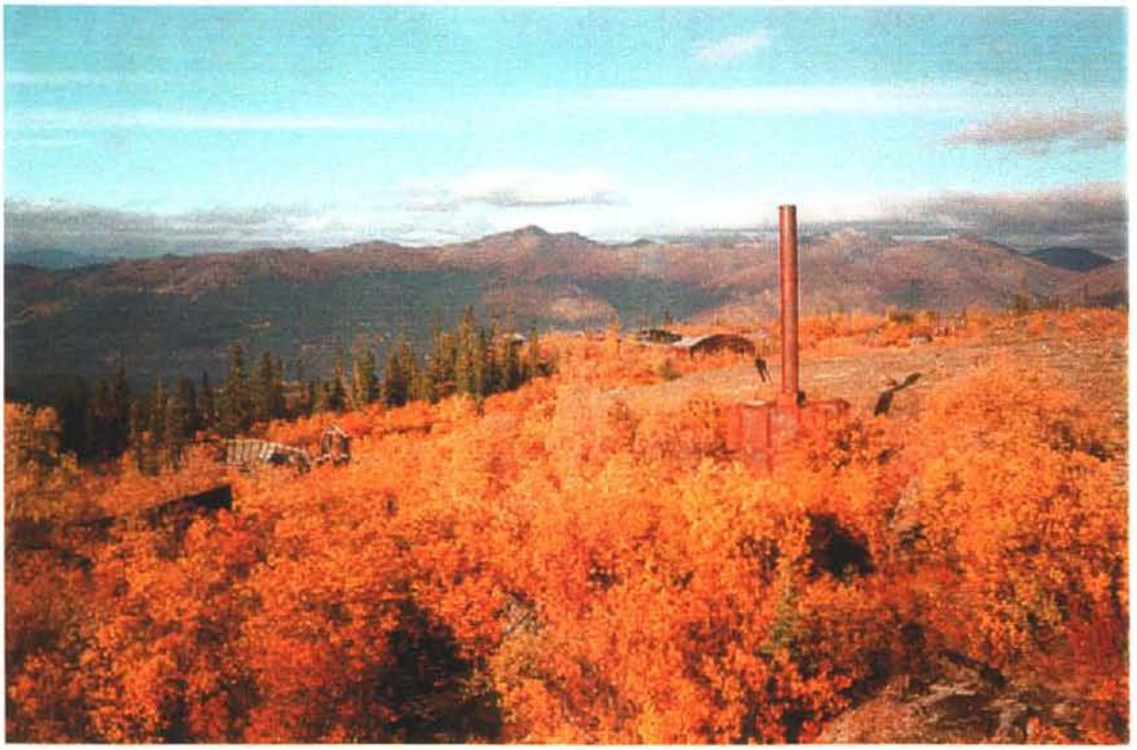


Photo 21-18: Boiler (Bldg. 21-K). (Azimuth 000°)

Photo 21-19: Partially collapsed buildings (Bldgs. 21-L). (Azimuth 280-340°)

Photo 21-20: Dump site consisting primarily of cans and glass below cookhouse. (Azimuth 000°)

BELLEKENO (#22)
(MINFILE# 105M 001y)

1. LOCATION AND ACCESS

Most of the Bellekeno site can be accessed by vehicle along the Sourdough Hill Trail about 2.5 to 3 km out of Keno City. The 625 level adit can be accessed along a maintained trail running on the north side of Lightening Creek out of Keno City and up Thunder Gulch. The site rises from an elevation of about 125 m at the 625 level adit to about 1400 m at the backfill site. The following UTM coordinates of the Bellekeno sub-sites are shown below.

SITE LOCATIONS		
	UTM Northing	UTM Easting
Bellekeno 625 level adit	7086760 m N	487480 m E
Bellekeno 200 level adit	7086650 m N	487100 m E
Bellekeno 100 level adit	7086460 m N	486890 m E
Mayo Mines adit	7086780 m N	487220 m E
Bellekeno Backfill site	7086260 m N	486580 m E
Eureka	7086240 m N	487120 m E

2. SITE PHYSIOGRAPHY

The Bellekeno site lies on the northeast slope of Sourdough Hill. Except for Eureka, the Bellekeno subsites are roughly aligned in a linear fashion up-slope from the 625 level adit to the backfill site. Surface water drainage from the area runs down the slope toward Thunder Gulch and Lightening Creek.

3. GEOLOGY AND MINERALIZATION

The major rock type observed at the Bellekeno site was a grey quartzite known locally as Keno Hill Quartzite. The minor rock types observed at the site included grey and black phyllite, white quartz and greenstone. The mineralization consisted of rare siderite, sphalerite, galena and pyrite. The sulphides encountered included sphalerite, pyrite, and galena. The carbonates present included siderite and minor occurrences of calcite. The minfile for Bellekeno reports that the quartzite in the area is locally calcareous.

4. SITE HISTORY

The minfile reports that work at the Bellekeno site began in 1921 at the Eureka sub-site and continued there until 1929. The development of the modern underground workings at Bellekeno

occurred in the early fifties at the 100 and 200 level adits and at the Mayo Mines adit. Production at the 625 level adit occurred from 1986 to 1990. The site is currently under care and maintenance status (Minfile).

5. MINE DEVELOPMENT

5.1 Mine Openings And Excavations

Bellekeno 625 level adit (photo 22-1)

This sub-site is currently active under care and maintenance status. The 625 level adit serves as the main access to 8 levels of mine developments. It is connected to the 100 and 200 level adits. The adit portal is housed inside an adit building attached to a dump shed (photo 22-3).
Location: The Bellekeno 625 level adit sub-site is located near the confluence of Thunder Gulch and Lightening Creek. The adit is located at the south end of the adit building (see Figure 2).
Dimensions (L x W x H): 20 m x 5 m x 2.5 m (exterior portal dimensions)
Supports: The portal is supported by timbers and the underground workings are supported with timbers, bolts and wire mesh.
Condition: The portal and underground workings are in good condition and continue to be maintained by United Keno Hill Mines.
Accessibility: The adit building and the portal are left open but access to the underground workings is limited by locked entrances to the deeper areas of the mine.

Bellekeno 200 level adit (photo 22-7)

This sub-site is currently active under care and maintenance status. The 200 level adit provides ventilation and serves as an escape route for the modern workings at lower levels. It is connected to the 100 and 625 level adits.
Location: The adit is located at the end of a road that turns left off Sourdough Hill Trail about 500 m before the power lines (see Figure 3).
Dimensions (L x W x H): 5 m x 5 m x 2.5 m (exterior portal dimensions)
Supports: The portal is supported by logs ranging in diameter from 3 to 6 inches
Condition: The portal is constructed of logs and planks. It has no foundation or roofing material other than the planks. It is in fair condition and continues to be maintained by United Keno Hill Mines.
Accessibility: The adit entrance is left open to allow ventilation and provide an escape route.

Bellekeno 100 level mine openings (photo 22-10 and photo 22-11)

The 100 level adit and shaft are abandoned but they are still connected to the Bellekeno 200 and 625 level adits.

Location: The adit and shaft are located just off Sourdough Hill Trail on opposite sides under the power lines (see Figure 1).

Dimensions: The adit dimensions could not be determined due to the collapse of the portal. The shaft is 2 m x 1.5 m and about 15 m deep.

Supports: The portal is no longer supported.

Condition: Both the adit portal and the shaft house have collapsed.

Accessibility: These mine openings are accessible.

Mayo Mines adit (photo 22-12)

The Mayo Mines adit is abandoned and it is not connected to other mine developments in this area.

Location: This adit is located about 200 m down-slope of the Bellekeno 200 level adit and about 100 m northwest of the power lines (see Figure 1).

Dimensions: The adit dimensions could not be determined due to the collapse of the portal.

Supports: The portal is no longer supported.

Condition: The adit portal has collapsed.

Accessibility: The adit can be accessed on foot from the Bellekeno 200 level adit. Viewing the adit's waste rock pile from the other side of Lightening Creek helps to locate it.

Eureka mine openings

The Eureka mine openings are an abandoned series of 3 shafts and a raise developed in the 1920s. They are not connected to the Bellekeno main workings. There may be an adit associated with these workings but it was not observed.

Eureka Shaft 1 (photo 22-15 and 22-16)

Shaft 1 is the most obvious because it lies in the middle of a trail leading off of Sourdough Hill Road. It is connected to an adjacent open stope that has broken through to the surface (see Figure 5).

Location: Shaft 1 is located about 80 m along a trail that turns off of Sourdough Hill Trail about 300 m beyond the power lines and 150 m before a hairpin turn.

Dimensions: 2 m x 2m and about 6 m deep. The stope opening is 10 m long, 2 m wide, and filled to within 2m of the surface.

Condition: The shaft and stope remain unstable and could be prone to continued collapse.

Accessibility: Shaft 1 is accessible on foot from Sourdough Hill Road.

Eureka Raise 1 (photo 22-17)

Raise 1 is a timbered raise situated in a mound north of Shaft 1.
Location: Raise 1 is located 25 m north of Shaft 1 (see Figure 5).
Dimensions: 1.2 m x 1.3m and about 9 m deep.
Condition: The timbers of the raise are in poor condition and may be prone to collapse.
Accessibility: Raise 1 is accessible on foot from Sourdough Hill Road.

Eureka Shaft 2

Shaft 2 is a small collapsed shaft.
Location: Shaft 2 is located 25 m south of Shaft 1 through the bushes (see Figure 5).
Dimensions: The dimensions of this shaft could not be determined due to its collapsed state.
Condition: This shaft is collapsed.
Accessibility: Shaft 2 is accessible on foot from Sourdough Hill Road.

Eureka Shaft 3 (photo 22-18)

Shaft 3 is a large shaft that is partially collapsed. There is a waste rock pile and several structures adjacent to it.
Location: Shaft 3 is located 12 m south of Shaft 2 (see Figure 5).
Dimensions: 2 m x 2m and filled to within 3 m of the surface.
Condition: This shaft remains unstable and could be prone to continued collapse.
Accessibility: Shaft 3 is accessible on foot from Sourdough Hill Road.
Trenches 1 to 5
Trenches 1 to 5 is a series of shallow trenches.
Location: Trenches 1 to 5 are located just south of Sourdough Hill Road at a hairpin turn 360 m below the backfill pad (see Figure 1).
Dimensions: The trenches range in length from 30 m to 60 m. They are all about 3 m wide and 1 m deep.
Condition: stable - 60% revegetated
Accessibility: Trenches 1 to 5 are accessible on foot from Sourdough Hill Road.

Trench 6

Large deep trench.
Location: located about 30m southeast of the abandoned shack at the Eureka sub-site (see Figure 1)
Dimensions: 60 m x 6 m x 4 m - longitudinal bearing AZ 130
Condition: stable - 80% revegetated.

Accessibility: accessible on foot from Sourdough Hill Road

Trench 7

Trench
Location: located at Eureka sub-site 25 m southeast of Shaft 1 (see Figure 5)
Dimensions: 40 m x 5 m x 3 m – longitudinal bearing AZ 162
Condition: stable - 60% revegetated.
Accessibility: accessible on foot from Sourdough Hill Road.

5.2 Waste Rock Disposal Areas

Bellekeno 625 level waste rock pile

The waste rock pile at the Bellekeno 625 level adit subsite has been piled and graded to create a site for buildings, laydown storage areas, effluent ponds and other work areas for the mine. The waste rock in this pile originated from the Bellekeno underground workings. The waste rock is up to 70% massive blocky light grey to grey quartzite (30% > 2 cm) with traces (-0.2%) of fine disseminated pyrite. The pile is 10% oxidized. Surface water collects on the graded portions of the pile in pools and drains through the pile into Thunder Gulch and Lightening Creek at the base. The lining (if there was one installed) of the effluent ponds located on the waste rock pile is allowing the treated water to drain through the pile. The drainage system installed for the ponds is dry. The slope of the waste rock pile ranges from 38° to 44°. An area of pile is failing at the south end because it is being undercut by Lightening Creek.
Location: This waste rock pile is located at the Bellekeno 625 level adit sub-site near the confluence of Thunder Gulch and Lightening Creek (see map).
Dimensions: 150 m x 30 m x 10 m

Bellekeno 200 level waste rock pile

The waste rock piles located at the Bellekeno 200 level adit have been piled and graded to create a site for buildings, laydown storage areas and other work areas for the mine. There are two piles here: one pile (WR200a) is at the mouth of the adit; another pile (WR200b) is located below with a dump point and grizzly at the top of it (see Figure 3). WR200a is 30 m long, 20 m wide and 4 high. WR200b is 30 m long, 10 m wide and 3 m high. The waste rock in these piles originated from the Bellekeno underground workings. The waste rock consists of grey quartzite with minor rusting. Veining includes siderite, sphalerite, pyrite, and galena in gossan (limonite). A zinc rich dump area is located near the grizzly (see Figure 3). The dumps are stable and show no indications of impending failure. Waste rock samples were taken from representative sections of WR200a (sample 99-22-03-01) and WR200b (sample 99-22-03-02) (see Figure 3). The field paste pH measurements for

samples 99-22-03-01 and 99-22-03-02 were 8.6 and 7.4 respectively. Laboratory analysis data are contained in Attachment B.

Bellekeno 100 level waste rock pile

A waste rock pile is located just below the Bellekeno 100 level adit. The pile is 8 m long, 3m wide and 3 m high. The waste rock in this pile consists of grey quartzite with siderite, quartz, pyrite, galena, and limonite mineralization. The waste rock is minorly rusted. The paste pH of an undocumented rock sample taken of the waste rock pile was 7.1. Parts of the waste rock pile were displaced during the construction of an adjacent power line. There is some natural reclamation of the site by moss and shrubs along the sides and top of the waste rock pile.

Mayo Mines waste rock pile

A waste rock pile is located at the Mayo Mines adit. The pile is 12 m long, 10 m wide, and 5 m high. The waste rock in this pile consists of grey quartzite with minor amounts of greenstone. Mineralization consists of sphalerite. The waste rock is minorly rusted. Waste rock sample 99-22-4-1 was taken from this pile. The field paste pH of this sample was 7.6. There is some natural reclamation of the site by moss and shrubs along the sides and top of the waste rock pile. Laboratory analysis data are contained in Attachment B.

Eureka waste rock pile

A waste rock pile is located at the Eureka workings near Eureka Shaft 3 (see Figure 5). The pile is 3 m long, 2 m wide, and 2 m high. The waste rock in this pile consists of steely grey and rusty oxidized ore. The rock is mainly grey quartzite with minor amounts of greenstone. Mineralization includes siderite, sphalerite, limonite, pyrite, and trace galena. Waste rock sample 99-22-06-01 was taken from this pile. The field paste pH of this sample was 6.4. Laboratory analysis data are contained in Attachment B.

5.3 Tailings Impoundments

There was no evidence found that ore was processed at this site. No tailings were encountered.

5.4 Minesite Water Treatment

Water collected in the Bellekeno mine system is pumped out at the 625 level and treated with lime to neutralize acid in the effluent. The treated water is collected in two ponds at the Bellekeno 625 level site where lime and precipitates are allowed to settle (photo 22-2).

Location: Bellekeno 625 level adit (see Figure 2)

Dimensions: Pond 1 – 10 m x 5 m x 2 m; Pond 2 – 20 m x 10 m x 2 m

Drainage: The ponds are designed to drain from an overflow system located in Pond 2 into

Lightening Creek. The treatment system is currently active, however Pond 2 is not filling up and there is no visible overflow. It is suspected that Pond 2 is draining through the waste rock pile and that its effluent is seeping into Lightening Creek at the waste rock pile's base.
Piping: PVC tubing is used to carry the effluent from the mine to the treatment plant and from the treatment plant to the settling ponds. There were no breaks or leaks observed in the piping.
Impacted vegetation: The treatment plant drainage area is highly disturbed due to placer mining operations. The impact on vegetation of the treatment plant can not be determined.
Samples: Water quality sample 99-22-05-WQ-1was taken from Pond 2. The field pH of the sample was 8.0. Laboratory analysis data are contained in Attachment B.

6. MINE SITE INFRASTRUCTURE

6.1 Buildings

Building 22A

Building 22A is the Bellekeno 625 level adit building. The 625 level adit lies at the south end. The building currently serves as indoor storage for mining equipment and equipment parts. It has a work area inside with a workbench. There is also a series of electrical panels and transformers that supplies the power entering the mine at the 625 level. An electric locomotive sits on rails coming out of the mine inside the building and leading into the dump shed. A lime mixing plant is found in a shed attached to the west side of this building.
Location: see Figure 2
Dimensions (L x W x H): 30 m x 5 m x 3 m
Construction: wood frame with corrugated steel siding.
Paint: none observed
Asbestos: none observed
Foundation: no floor or foundation
Non-Hazardous Contents: piping, electrical wire, tires, timber, empty 45 gallon oil barrels
Hazardous Contents: varsol, 50-70 lb acetylene canister

Building 22B

Building 22B is the Bellekeno 625 level adit dump shed. The rail system exiting the mine and running through the adit building (Building 22A) runs the length of this building. The floor of the building has gaps in it to allow mine workers to sort and dump ore and waste rock into piles on the ground below.
Location: see Figure 2
Dimensions (L x W x H): 30 m x 5 m x 3 m
Construction: wood frame and floor with corrugated steel siding.

Paint: none observed
Asbestos: none observed
Foundation: none
Non-Hazardous Contents: piping, 10 bags of cement, tires, timber, empty 45 gallon oil barrels
Hazardous Contents: 10 L of drill oil, 50-70 lb acetylene canister

Building 22C (photo 22-4)

Building 22C is the Bellekeno 625 level adit compressor house. 3 compressors are house inside the building and another mobile compressor is situated outside. A 2000 L gasoline storage tank is located in this building and appears to have been leaking at some time. The AST is currently empty. The building is also being used to store a variety of fuels, solvents and lubricants. The floor of this building is heavily stained with hydrocarbons.
Location: see Figure 2
Dimensions (L x W x H): 10 m x 6 m x 3 m
Construction: wood frame with corrugated steel siding.
Paint: none observed
Asbestos: none observed
Foundation: no floor or foundation
Non-Hazardous Contents: none
Hazardous Contents: 4 L of methyl alcohol, 20 L of tanner gas, 50-70 lb acetylene canister, 30 L motor oil, 45 gallon drum of transmission fluid, two 45 gallon drums of drill oil which have emptied into overflowing spill trays (see photo).

Building 22D

Building 22D is the Bellekeno 625 level adit office and lunchroom. This building was locked and could not be entered.
Location: see Figure 2
Dimensions (L x W x H): 10 m x 5 m x 3 m
Construction: wood frame with corrugated steel siding.
Paint: none observed
Asbestos: none observed
Foundation: none
Non-Hazardous Contents: unknown
Hazardous Contents: unknown

Building 22E

Building 22E contains equipment used to heat and ventilate the underground workings of the Bellekeno mine. It is located at the Bellekeno 625 level adit site. This building was locked and could not be entered.

Location: see Figure 2
Dimensions (L x W x H): 3.5 m x 2 m x 2.5 m
Construction: steel frame, roof and siding.
Paint: none observed
Asbestos: none observed
Foundation: rectangular concrete foundation extends beyond footprint of Building 22E to the west
Non-Hazardous Contents: unknown
Hazardous Contents: unknown

Building 22F (photo 22-7)

Building 22F is the Bellekeno 200 level adit portal. The Bellekeno 200 level adit lies at the south end. The portal appears stable.

Location: see Figure 3
Dimensions (L x W x H): 4 m x 3.5 m x 2.5 m
Construction: log frame with planked roof
Paint: none observed
Asbestos: none observed
Foundation: none
Non-Hazardous Contents: unknown
Hazardous Contents: 20 L container of oil

Building 22G (photo 22-7)

Building 22G is an electrical shed located at the Bellekeno 200 level adit site. It supplies the power going into the mine at the 200 level. The shed contains two switches, an electrical panel and a non-PCB transformer. The shed is in good condition.

Location: see Figure 3
Dimensions (L x W x H): 3 m x 2.5 m x 2.5 m
Construction: wood frame, plywood siding, and asphalt roof
Paint: unknown
Asbestos: none observed
Foundation: none
Non-Hazardous Contents: unknown
Hazardous Contents: none

Building 22H

Building 22H is an old powder magazine located at the Bellekeno 200 level adit site. This building is in poor condition although it does not appear to be failing.
Location: see Figure 3
Dimensions (L x W x H): 4 m x 3 m x 2.5 m
Construction: wood frame, roof and siding
Paint: none observed
Asbestos: interior walls lined with asbestos board
Foundation: cement
Non-Hazardous Contents: mechanical parts
Hazardous Contents: none

Building 22I

Building 22I is an old wash house located at the Bellekeno 200 level adit site. It contains a system for dispensing water to a shower, sink and tap. The building is in poor condition with the roof caving in and the stairs on the exterior rotting.
Location: see Figure 3
Dimensions (L x W x H): 6 m x 3.5 m x 4 m
Construction: wood frame, roof and siding
Paint: none observed
Asbestos: lined with asbestos paper on exterior
Foundation: log cribbing
Non-Hazardous Contents: water drums, tank and piping
Hazardous Contents: none

Building 22J (photo 22-10)

Building 22J is a completely collapsed cabin at the Bellekeno 100 level adit site.
Location: on the north side of Sourdough Hill Road at the Bellekeno 100 level adit site
Dimensions (L x W x H): 6 m x 3.5 m x 4 m
Construction: wood frame, roof and siding
Paint: none observed
Asbestos: none observed
Foundation: unknown
Non-Hazardous Contents: none
Hazardous Contents: none

Building 22K

Building 22K is a partially collapsed structure enclosing the shaft located at the Bellekeno 100 level adit site.

Location: on the south side of Sourdough Hill Road at the Bellekeno 100 level adit site
Dimensions (L x W x H): 2.5 m x 2.5 m x 2.5 m
Construction: wood frame, roof and siding
Paint: none observed
Asbestos: none observed
Foundation: none
Non-Hazardous Contents: none
Hazardous Contents: none

Building 22L

Building 22L is a completely collapsed structure at the mayo Mines adit site. It may have been a cabin or simply the adit portal.

Location: see Figure 1
Dimensions (L x W x H): unknown
Construction: wood
Paint: none observed
Asbestos: none observed
Foundation: unknown
Non-Hazardous Contents: wood stove
Hazardous Contents: none

Building 22M

Building 22M is a powder magazine located near Eureka Shaft 3. This building is in poor condition although it does not appear to be failing.

Location: 25 m SE of Eureka Shaft 3 (see Figure 5)
Dimensions (L x W x H): 2 m x 2 m x 2.5 m
Construction: wood frame, roof and siding
Paint: none observed
Asbestos: none observed
Foundation: none
Non-Hazardous Contents: none
Hazardous Contents: none

Building 22N

Building 22N is a completely collapsed cabin located near Eureka Shaft 3.
Location: 43 m SE of Eureka Shaft 3
Dimensions (L x W x H): 5 m x 3 m
Construction: wood
Paint: none observed
Asbestos: none observed
Foundation: none
Non-Hazardous Contents: none
Hazardous Contents: none

6.2 Fuel Storage

AST1 (photo 22-5)

AST1 is a single-wall aboveground steel tank with an estimated capacity of 20,000 L. It is located behind the compressor house at the Bellekeno 625 level adit site. It is used to store diesel fuel for the compressors. AST1 appears to be in reasonable condition. Aboveground steel piping delivers fuel to the compressors. There is no secondary containment for the tank or it's piping.

AST2

AST2 is a single-wall aboveground steel tank with an estimated capacity of 2,000 L. It is located inside the compressor house at the Bellekeno 625 level adit site. Evidence suggests that this tank was used to store gasoline. There is a small bucket containing dyed gas located underneath the tank. This container may have been used to catch fuel leaking from the tank's piping. AST2 is currently empty. Aboveground steel piping is used to deliver fuel from the tank to a dispensing hose. There is no secondary containment for the tank or its piping.

AST3 (photo 22-9)

AST3 is a mobile, single-wall steel, fuel storage tank mounted on skids. This tank has two compartments with an estimated capacity of 1000 L for gasoline and 2000 L for diesel. It currently contains about 200 L of fuel. There does not appear to be any leaks in this tank. AST3 has no secondary containment. There is a zone of staining adjacent to the tank, which may have resulted from spillage during the transfer of fuel.

6.3 Rail and Trestle

Bellekeno 625 level adit rail system

A rail system with steel rails and wood ties used to service the Bellekeno 625 level adit. The rails extend 60 m outside of the adit and continue inside the adit for approximately 2 km. Ore and waste rock from the mine were transported along this rail system to the dump shed (Building 22B) where the rails end. An electric locomotive is still stored in the adit building (Building 22A). The rail system appears to be in working condition.

Bellekeno 200 level adit rail system

Another rail system is located at the Bellekeno 200 level adit. The steel rails and wood ties of this system end at the mouth of the adit. It is unknown how far the rails extend into the adit. A small rail car is located inside the adit portal (Building 22F). This rail system is heavily rusted and is in poor condition.

6.4 Milling and Processing Infrastructure

There is a dump point with a grizzly located at the Bellekeno 200 level adit site (photo 22-8). It is located at the top of the lower waste rock pile (WR200b). The structure is made of logs and planks. It is in poor condition and in danger of collapsing. There was no other milling or processing infrastructure discovered at the Bellekeno site.

6.5 Electrical Equipment

There is electrical equipment located in 2 buildings at the Bellekeno site. Building 22A at the Bellekeno 625 level adit site contains a series of electrical panels and transformers. Building 22G at the Bellekeno 200 level adit site contains an electrical panel and a transformer. These transformers were installed new within the last 15 years and are not likely to contain PCBs. There is also a transformer station located at the Bellekeno 625 level adit site. The transformers at this station were installed new around 1986 and are not likely to contain PCBs.

7. SOLID WASTE DUMPS

Small solid waste dumps were observed at the Bellekeno 200 level adit site and at the Eureka site. Waste at the Bellekeno 200 level adit site was dumped at the northwestern edge of a waste rock pile (WR200a). It consists mainly of broken wood timbers, some rails, and an empty 205 L drums. Waste at the Eureka site was dumped about 5m northeast of Building 22N. It consists of discarded food cans, and a number of empty 205 L drums.

8. POTENTIAL CONTAMINANTS OF CONCERN

8.1 Out-of-Service Transformers

No out-of-service transformers were observed at the Bellekeno site.

8.2 Metals and Hydrocarbons in Soil

Bellekeno 625 level adit site

A large area of stained soil was observed in and around the compressor house (Building 22A) at the Bellekeno 625 level adit site (see map). The floor of the compressor house and areas at the entrance and behind the building are black with hydrocarbon contamination. The depth of the contamination is unknown. The estimated dimensions of this area of contamination are 25 m x 5 m. Minor surface soil staining was also observed in several locations in the area between the dump shed (Building 22B), lunchroom (Building 22D) and adit building (Building 22A). No soil samples were taken at this site.

Bellekeno 200 level adit site

Surface soil staining was observed adjacent to the mobile fuel storage tank at the Bellekeno 200 level adit site (see map). The dimensions of this area of contamination are approximately 3 m x 3 m. Other minor surface staining was observed near the centre of the upper dump pad at this site.
No soil samples were taken at this site.

Bellekeno Backfill site (photo 22-13)

The Bellekeno backfill pad was the site of an attempt to drill a hole from the surface into the Bellekeno mine workings. The hole was to be used to backfill the underground tunnels. The operation was abandoned before the drilling was completed. An area of soil contamination was observed at this site adjacent to the drilling site (see Figure 4; photo 22-14). The source of contamination appears to have been the oily metallic sludge produced during the drilling operation. The estimated depth of the contaminated soil is 0.15 m. The estimated dimensions of the area of contamination are 12 m x 4 m. Two more small areas of surface staining were observed adjacent to the larger area. Soil sample 99-22-1-1-.01 was taken from the contaminated area at a depth of 10 cm. A background sample was taken of the soil at the Bellekeno Backfill site at a depth of 10 cm (sample 99-22-1-2-.01). Laboratory analysis data are contained in Attachment B.

8.3 Liquid Hazardous Materials

Bellekeno 625 level adit site

Several containers of liquid hazardous materials were observed in the compressor house at the Bellekeno 625 level adit site (photo 22-6).

8.4 Solid Hazardous Materials

Bellekeno 200 level adit site

Building 22H and Building 22I at the Bellekeno 200 level adit site are constructed using asbestos containing materials.

9. WATER QUALITY

Water quality sample 99-22-05-WQ-1 was taken from the secondary treatment pond (pond 2) at the Bellekeno 625 level adit site. The field pH of pond 2 was 8.0. A field conductivity measurement was not taken. See Attachment B for laboratory analysis data. No surface water was observed at any of the other Bellekeno sub-sites. Surface water from the area drains towards Thunder Gulch and Lightening Creek.

10. RECLAMATION

Natural revegetation has occurred on much of the disturbed ground at the Bellekeno site. Most of the surface workings including trenches and bulldozer tracks are at least 50 % revegetated. There have been no known reclamation measures carried out by past or present operators of the site.

11. OTHER INFORMATION AND DATA

No additional information was noted.

12. REFERENCES AND PERSONAL COMMUNICATIONS

Minfile 105M 001y.

Sample Number		Detection Limit	Units	99-22-05-WQ-2 - BK600 - 20/09/99
pH (field)		N/A	pH	8
Conductivity (field)		N/A	µS/cm	not measured
pH (Lab)		0.01	pH	8
Conductivity (Lab)		0.01	µS/cm	1000
Total Alkalinity		5	mg CaCO3/L	144
Chloride		0.25	mg/L	<0.25
Hardness (CaCO3 equiv)		5	mg/L	559
Nitrate-N		0.05	mg/L	0.15
Nitrite-N		0.003	mg/L	<0.003
Sulphate		1	mg/L	375
Total Dissolved Solids		5	mg/L	768
Analysis by ICP-USN				
	Aluminum	0.0008	mg/L	0.0192
	Antimony	0.005	mg/L	<0.005
	Arsenic	0.01	mg/L	<0.01
	Barium	0.00004	mg/L	0.00483
	Beryllium	0.00001	mg/L	<0.00001
	Bismuth	0.0004	mg/L	<0.0004
	Boron	0.002	mg/L	<0.002
	Cadmium	0.00006	mg/L	0.00214
	Calcium	0.002	mg/L	167
	Chromium	0.00006	mg/L	<0.00006
	Cobalt	0.00003	mg/L	0.00107
	Copper	0.00003	mg/L	0.00121
	Iron	0.00001	mg/L	0.181
	Lead	0.0003	mg/L	0.0095
	Lithium	0.001	mg/L	0.013
	Magnesium	0.0005	mg/L	32.4
	Manganese	0.00002	mg/L	0.38
	Mercury	0.0001	mg/L	<0.0001
	Molybdenum	0.00007	mg/L	0.00058
	Nickel	0.00001	mg/L	0.0153
	Phosphorus	0.03	mg/L	<0.03
	Potassium	0.4	mg/L	<0.4
	Selenium	0.004	mg/L	0.004
	Silicon	0.004	mg/L	3.6
	Silver	0.00005	mg/L	<0.00005
	Sodium	0.004	mg/L	1.4
	Strontium	0.00002	mg/L	0.295
	Sulphur	0.008	mg/L	128
	Thallium	0.001	mg/L	<0.001
	Titanium	0.00002	mg/L	<0.00002
	Vanadium	0.00003	mg/L	<0.00003
	Zinc	0.0002	mg/L	0.644
Analysis by Hydride AA				
	Arsenic	0.0002	mg/L	0.0041
	Selenium	0.0001	mg/L	<0.0001

ATTACHMENT 2: 1999 BELLEKENO SOIL SAMPLES LABORATORY RESULTS				
Sample Number	**Detection Limit**	**Units**	**99-22-1-1-0.1 - Bellekeno - 14/09/99**	**99-22-1-2-0.1 - Bellekeno - 14/09/99**
Site Description			Stained soil observed at the drilling location at the Bellekeno Backfill site	Background sample of soil at the Bellekeno Backfill site
pH in Saturated Paste				
pH	0.1	pH	6.6	5.1
pH in Soil (1:2 water)				
pH	0.01	pH	6.77	5.37
LEPH/HEPH in Soil				
LEPHs10-19	10	mg/kg	1390	2160
HEPHs19-32	10	mg/kg	34800	973
Moisture				
% Moisture		%	3.4	9.1
PAH in Soil				
Naphthalene	0.05	mg/kg	0.07	0.08
Acenaphthylene	0.05	mg/kg	<0.05	0.06
Acenaphthene	0.05	mg/kg	<0.05	0.05
Fluorene	0.05	mg/kg	<0.05	0.25
Phenanthrene	0.05	mg/kg	0.26	0.68
Anthracene	0.05	mg/kg	<0.05	<0.05
Fluoranthene	0.05	mg/kg	0.05	0.13
Pyrene	0.05	mg/kg	0.24	0.95
Benzo(a)anthracene	0.05	mg/kg	<0.05	<0.05
Chrysene	0.05	mg/kg	<0.05	0.11
Benzo()fluoranthenes	0.05	mg/kg	<0.05	<0.05
Benzo(a)pyrene	0.05	mg/kg	<0.05	<0.05
Ideno(1,2,3-c,d)pyrene	0.05	mg/kg	<0.05	<0.05
Dibenzo(a,h)anthracene	0.05	mg/kg	<0.05	<0.05
Benzo(g,h,i)perylene	0.05	mg/kg	<0.05	<0.05
Surrogates				
Nitrobenzene-d5		%	97	109
2-Fluorobiphenyl		%	114	111
4-Terphenyl-d14		%	90	113
VPH in Soil				
VHs6-10	1	mg/kg		
VPHs6-10	1	mg/kg		
BTEX in Soil				
Benzene	0.02	mg/kg		
Toluene	0.02	mg/kg		
Ethylbenzene	0.02	mg/kg		
m,p-Xylene	0.05	mg/kg		
o-Xylene	0.03	mg/kg		
ICP Semi-Trace Scan - Metals				
Aluminum	5	µg/g wet	19600	45400
Antimony	2	µg/g wet	<2	<2
Arsenic	2	µg/g wet	<2	3
Barium	0.05	µg/g wet	589	1160
Beryllium	0.1	µg/g wet	0.5	1
Bismuth	5	µg/g wet	<5	<5
Cadmium	0.1	µg/g wet	2.5	0.4
Calcium	5	µg/g wet	4130	2080
Chromium	0.5	µg/g wet	46.5	51.8
Cobalt	0.1	µg/g wet	19.4	6
Copper	0.5	µg/g wet	86.7	29.5
Iron	1	µg/g wet	21000	32000
Lead	1	µg/g wet	151	21
Lithium	0.5	µg/g wet	11.1	32.3
Magnesium	1	µg/g wet	2270	3450
Manganese	0.5	µg/g wet	343	374
Mercury	0.01	µg/g wet	0.012	0.029
Molybdenum	1	µg/g wet	7	2
Nickel	0.2	µg/g wet	32.7	22.1
Phosphorus	5	µg/g wet	336	607
Potassium	20	µg/g wet	4980	8700
Selenium	2	µg/g wet	<2	<2
Silicon	5	µg/g wet	3650	560
Silver	0.5	µg/g wet	<0.5	<0.5
Sodium	5	µg/g wet	1350	2690
Strontium	1	µg/g wet	52	94
Sulphur	10	µg/g wet	1530	310
Thorium	1	µg/g wet	2	4
Tin	1	µg/g wet	3	<1
Titanium	0.2	µg/g wet	114	515
Uranium	5	µg/g wet	<5	<5
Vanadium	1	µg/g wet	39	100
Zinc	0.5	µg/g wet	156	67.5
Zirconium	0.1	µg/g wet	24.8	19.8

ATTACHMENT B: BELLEKENO WASTE ROCK SAMPLES LABORATORY RESULTS						
Site Number	**Detection Limit**	**Units**	**99-22-3-1 - BK 200 - 16/9 - Rock**	**99-22-3-1 - Bk 200 - 16/9 - Rock**	**99-22-4-1 - Mayo Adit - 16/9 - Rock**	**99-22-06-01 - Bk East - 15/9 Rock**
Sample Desciption			Bellekeno 200 level adit (WR200a)	Bellekeno 200 level adit (WR200b)	Mayo Mines Adit waste rock pile	Eureka site waste rock pile
Paste pH (field)	N/A	pH	8.6	7.4	7.6	6.4
Conductivity (field)	N/A	µS/cm	not measured	not measured	not measured	not measured
pH in Saturated Paste						
pH	0.1	pH	7.4	7.2	7.6	5.9
pH in Soil (1:2 water)						
pH	0.01	pH	7.2	7.1	7.8	5.5
ICP Semi-Trace Scan						
Aluminum	5	µg/g	10600	21400	36800	23700
Antimony	2	µg/g	5	230	<2	1840
Arsenic	2	µg/g	158	1580	144	1030
Barium	0.05	µg/g	163	262	32.8	139
Beryllium	0.1	µg/g	0.4	<0.1	<0.1	<0.1
Bismuth	5	µg/g	<5	24	<5	<5
Cadmium	0.1	µg/g	31.4	402	8	475
Calcium	5	µg/g	3680	1880	39900	1480
Chromium	0.5	µg/g	21.9	25.5	33.4	22.4
Cobalt	0.1	µg/g	5.9	7.5	25.7	14.7
Copper	0.5	µg/g	20.5	1120	112	1040
Iron	1	µg/g	15000	105000	62000	111000
Lead	1	µg/g	290	101000	166	111000
Lithium	0.5	µg/g	9.7	9.5	52.1	11.5
Magnesium	1	µg/g	1070	962	22900	2350
Manganese	0.5	µg/g	1760	10700	5640	18700
Mercury	0.01	µg/g	<0.01	0.47	<0.01	1.2
Molybdenum	1	µg/g	1	3	<1	6
Nickel	1	µg/g	22.5	43.7	47.5	93.9
Phosphorus	5	µg/g	506	292	422	498
Potassium	20	µg/g	2630	5600	1450	3860
Selenium	2	µg/g	<2	<2	<2	<2
Silicon	5	µg/g	9400	157	505	440
Silver	0.5	µg/g	3.7	1730	4.5	2200
Sodium	5	µg/g	293	434	55	403
Strontium	1	µg/g	23	25	34	11
Sulphur	10	µg/g	190	23000	270	38200
Thorium	1	µg/g	5	<1	<1	<1
Tin	1	µg/g	3	6	2	52
Titanium	0.2	µg/g	43.7	45.3	425	111
Uranium	5	µg/g	<5	<5	<5	<5
Vanadium	1	µg/g	20	31	79	39
Zinc	0.5	µg/g	2380	19100	1140	32700
Zirconium	0.1	µg/g	11.5	14	3.8	22.2

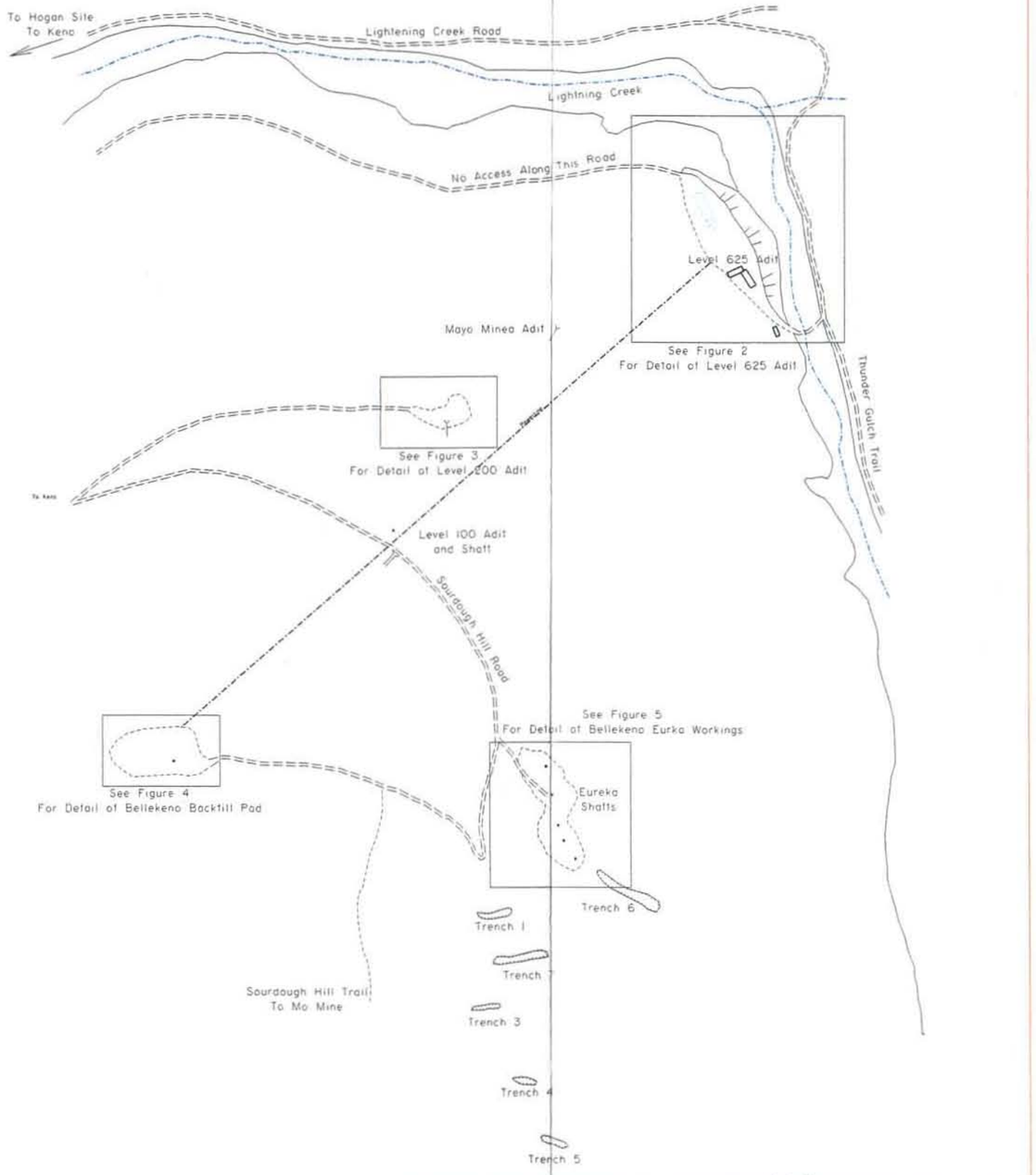
ATTACHMENT B: 1999 BELLEKENO WASTE ROCK SAMPLES LABORATORY RESULTS
MODIFIED SOBEK METHOD ACID-BASE ACCOUNTING TEST

SAMPLE	SITE DESCRIPTION	PASTE pH	S(T) %	S(SO4) %	AP	NP	NET NP	NP/AP
99-22-3-1 - BK 200 - 16/9 - Rock	Bellekeno 200 level adit (WR200a)	7.9	0.04	0.02	0.6	7.0	6.4	11.2
99-22-3-1 - BK 200 - 16/9 - Rock RE	Bellekeno 200 level adit (WR200a)	7.9	N/D	N/D	0.6	7.5	6.9	12.0
99-22-3-2 - Bk 200 - 16/9 - Rock	Bellekeno 200 level adit (WR200b)	6.5	1.06	0.40	20.6	37.3	16.6	1.8
99-24-4-1 - Mayo Adit - 16/9 - Rock	Mayo Mines Adit waste rock pile	8.1	0.09	0.03	1.9	98.3	96.4	52.4
99-22-06-1 - Bk. East - 115/9 - Rock	Eureka site waste rock pile	6.6	2.92	0.16	86.3	68.8	-17.5	0.8

AP = ACID POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NP = NEUTRALIZATION POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NET NP = NET NEUTRALIZATION POTENTIAL = TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NOTE: WHEN S(T) AND/OR S(SO4) IS REPORTED AS <0.01, IT IS ASSUMED TO BE ZERO FOR THE AP CALCULATION.
N/D = NO DUPLICATE ASSAY. CALCULATIONS ARE BASED ON ASSAY RESULTS OF THE INITIAL SAMPLE.
RE = REPLICATE.

NOTE - A HIGH LEVEL OF SOLUBLE METALS (ESPECIALLY IRON) WERE OBSERVED IN MANY SAMPLES DURING THE ABA TITRATIONS.
SAMPLES WITH A NEGATIVE NET NP SHOULD BE TESTED FOR MOBILE METALS USING STANDARD SHAKE FLASK EXTRACTION TESTS.

- Building (22A: building site present reference*) Indicates Asbestos Material
- Collapsed Building
- Adit
- Collapsed Adit
- Shaft
- Collapsed/Backfilled Shaft
- Mine Rock Dump
- Bedrock Open Pit
- Trench
- Stripped Overburden Stockpile
- Stripped / Disturbed Area
- Outcrop Boundary
- Highway
- Road (gravel, 2 wheel drive)
- Road (gravel, 4X4 accessible)
- Road (inaccessible)
- Trail
- Culvert
- 24501-01 1999 Soil Sample (this study)
- Pre 1999 Soil Sample (other sources)
- 25WR04-01 1999 Waste Rock Sample (this study)
- Pre 1999 Waste Rock Sample (other sources)
- WQ-12-06 1999 Water Sample
- Pre 1999 Water Sample
- Tension Cracks
- Mass Movement (note: for Forms: BelleKeno)
- Groundwater Seep
- Surface Water Flow (Stream, Creek, River)
- Lake
- Settling Pond / Water Treatment Pond
- Tailings Dam / Tailings Pond / Mill Tails
- Ponded Water / Trench
- Barrels
- Abandoned Equipment (compressors, ore cars, rails, air and water pipe)
- Mine Rails / Trestle
- Collapsed Trestle
- Solid Waste Disposal Site
- Area of Soil Contamination
- (6) Transformer Loaction (number of transformer in brackets)
- Power Line
- Power Line Collapsed
- Aerial Transmission Towers
- (5) Photo Site (arrow shows view direction)
- GPS Survey Location
- Former Building Site (Elsa)



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Western Region

Drawing title: / Titre du dessin:

Bellekeno Site Plan Site #22
Site Assessment
Yukon Territory

designed by:
conçu par:
drawn by:
dessiné par: C.S.
approved by:
approuvé par:
revisions:

project no. / no. du projet: 125-12.01

dwg. no. / dessin no. 1 of 5

- Building (22A: building site present reference*) Indicates Asbestos Material
- Collapsed Building
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- Shaft
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- Mine Rock Dump
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- Road (inaccessible)
- Trail
- Culvert
- 24501-01 1999 Soil Sample (this study)
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- WO-12-06 1999 Water Sample
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- Tension Cracks
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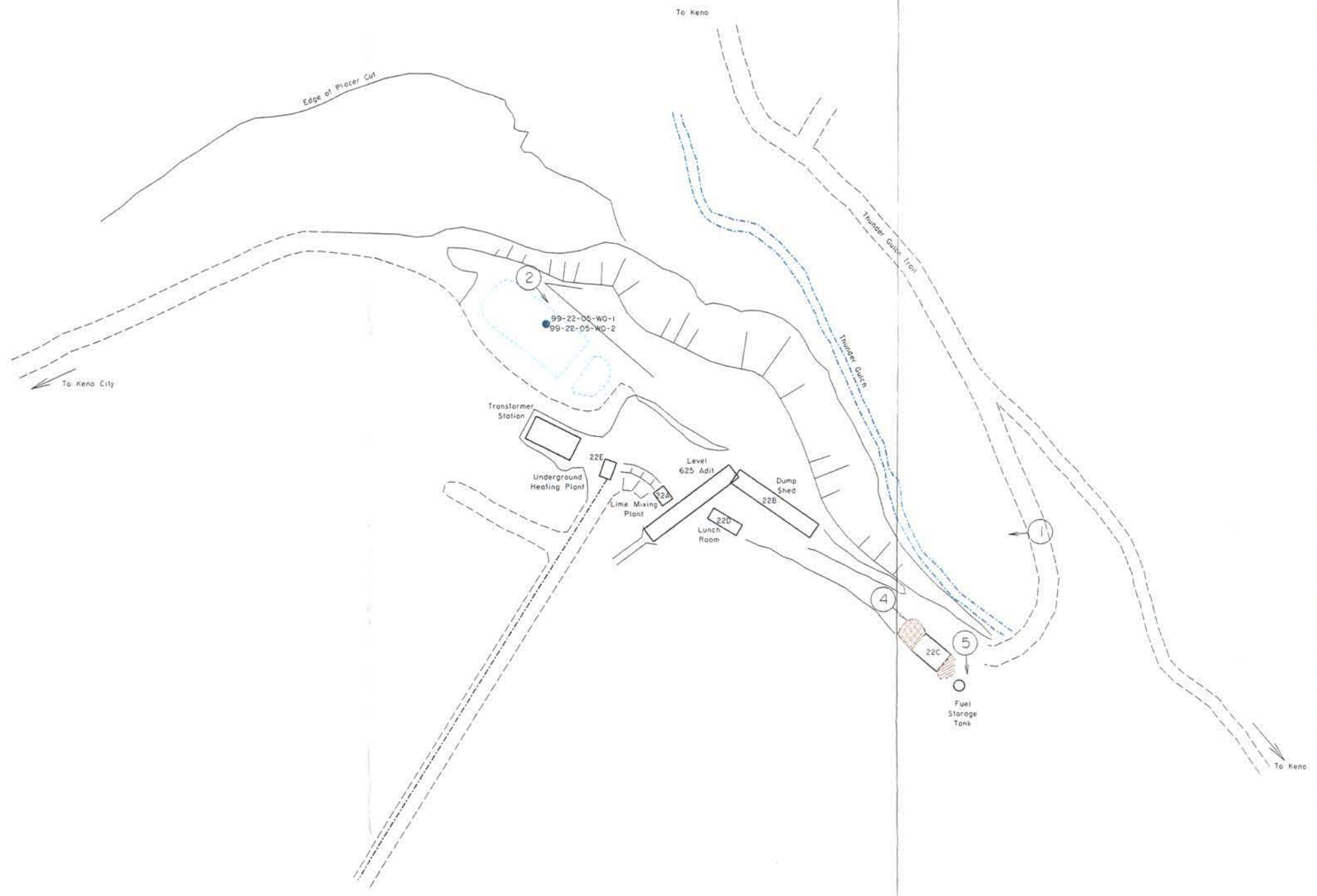

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CAD FILE: SITE22_2.DGN

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Western Region

Drawing title: / Titre du dessin:

Bellekeno 625 Level Adit Site #22
Site Assessment
Yukon Territory

designed by: / conçu par:	
drawn by: / dessiné par:	C.S. Nov. 99
approved by: / approuvé par:	
revisions:	
project no. / no. du projet:	125-12.01
dwg. no. / dessin no.	2 of 5

- Building (22A: building site present reference*) Indicates Asbestos Material
- 22A Collapsed Building
- Adit
- Collapsed Adit
- Shaft
- Collapsed/Backfilled Shaft
- Mine Rock Dump
- Bedrock Open Pit
- Trench
- Stripped Overburden Stockpile
- Stripped / Disturbed Area
- Outcrop Boundary
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- Trail
- Culvert
- 24501-01 1999 Soil Sample (this study)
- Pre 1999 Soil Sample (other sources)
- 25WR04-01 1999 Waste Rock Sample (this study)
- Pre 1999 Waste Rock Sample (other sources)
- WQ-12-06 1999 Water Sample
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- Tension Cracks
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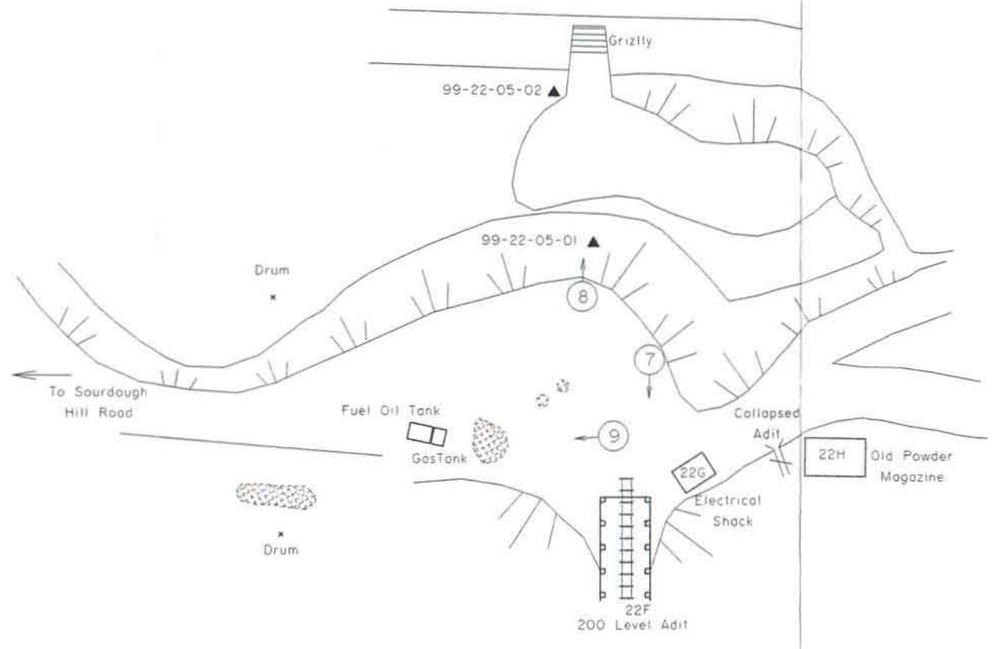

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Western Region

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drawn by: C.S. Nov. 99
dessiné par:
approved by:
approuvé par:
revisions:

Drawing title: / Titre du dessin:

Bellekeno 200 Level Adit Site #22
Site Assessment
Yukon Territory

project no. / no. du projet: 125-12.01

dwg. no. / dessin no. 3 of 5

- Building (22A: building site present reference*) Indicates Asbestos Material
- 22A Collapsed Building
- Adit
- Collapsed Adit
- Shaft
- Collapsed/Backfilled Shaft
- Mine Rock Dump
- Bedrock Open Pit
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- Trail
- Culvert
- 2450I-01 1999 Soil Sample (this study)
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- 25WR04-01 1999 Waste Rock Sample (this study)
- Pre 1999 Waste Rock Sample (other sources)
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- Pre 1999 Water Sample
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- Power Line Collapsed
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- (5) Photo Site (arrow shows view direction)
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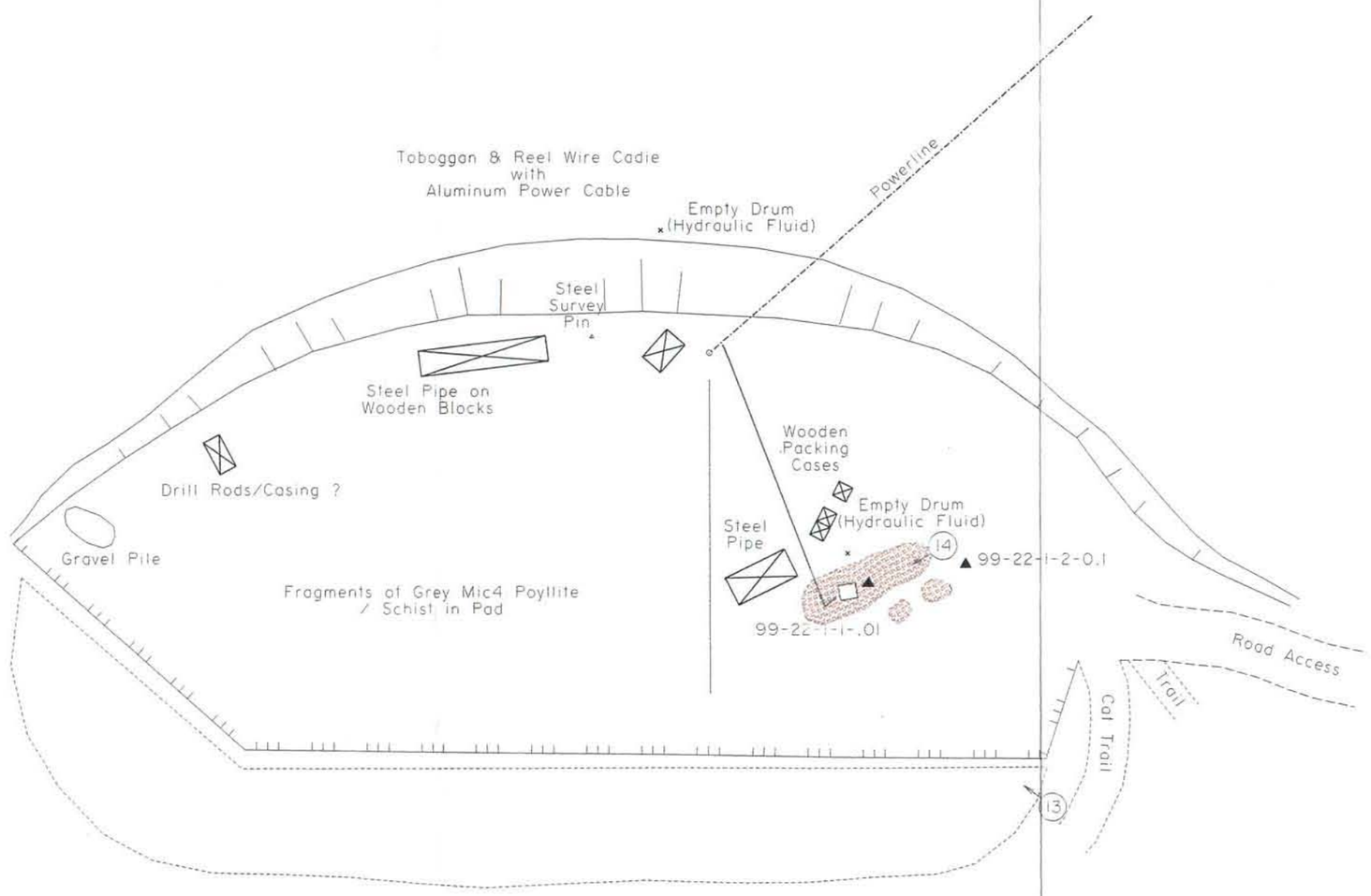
- Former Building Site (Elsa)



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CAD FILE: SITE22_4.DGN

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Architectural & Engineering Services Western Region

Drawing title: Bellekeno Backfill Pad Site #22
Site Assessment
Yukon Territory
Titre du dessin:

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drawn by: C.S. / dessine par: Nov. '99
approved by: / approuve par:
revisions:
project no. / no. du projet: 125-12.01
dwg. no. / dessin no. 4 of 5

- Building (22A: building site present reference*) Indicates Asbestos Material
- 22A Collapsed Building
- Adit
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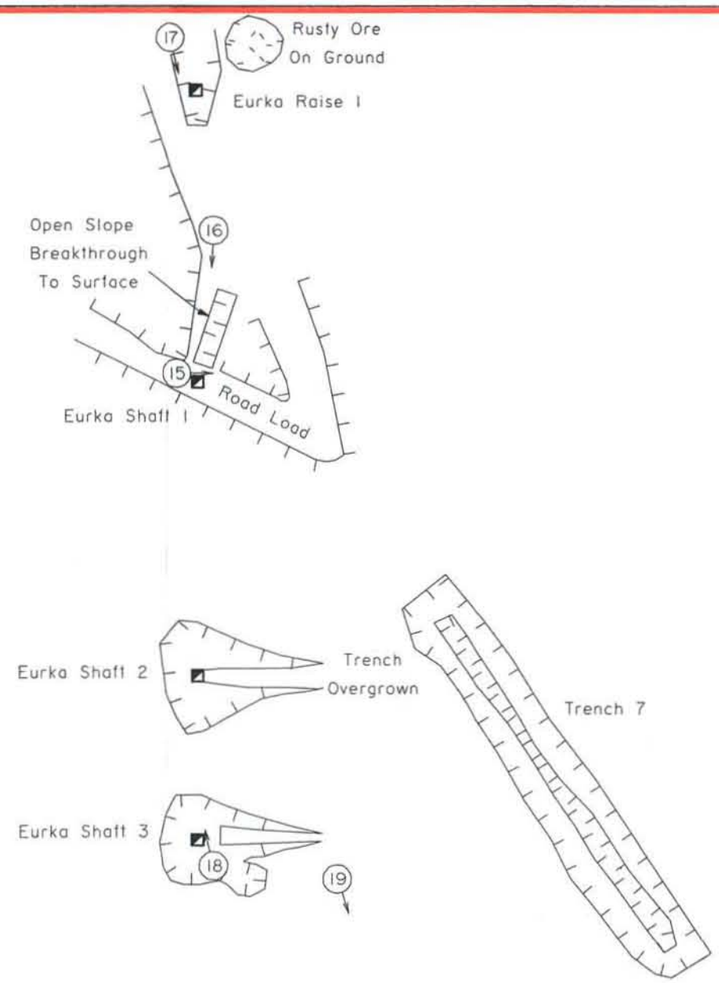

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CAD FILE: SITE22_5.DGN

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Bellekeno Eurka Workings Site #22
Site Assessment
Yukon Territory

date:

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conçu par:

drawn by: C.S. Nov./99
dessiné par:

approved by:
approuvé par:

revisions:

project no. / no. du projet: 125-12.01

dwg. no. / dessin no.: 5 of 5

Photo 22-1: View of Bellekeno 625 level adit site from opposite side of Thunder Gulch

Photo 22-2: Settling ponds for treatment of water removed from Bellekeno mine at 625 level adit.

Photo 22-3: View of Bellekeno 625 level adit from inside of adit building (Building 22A)

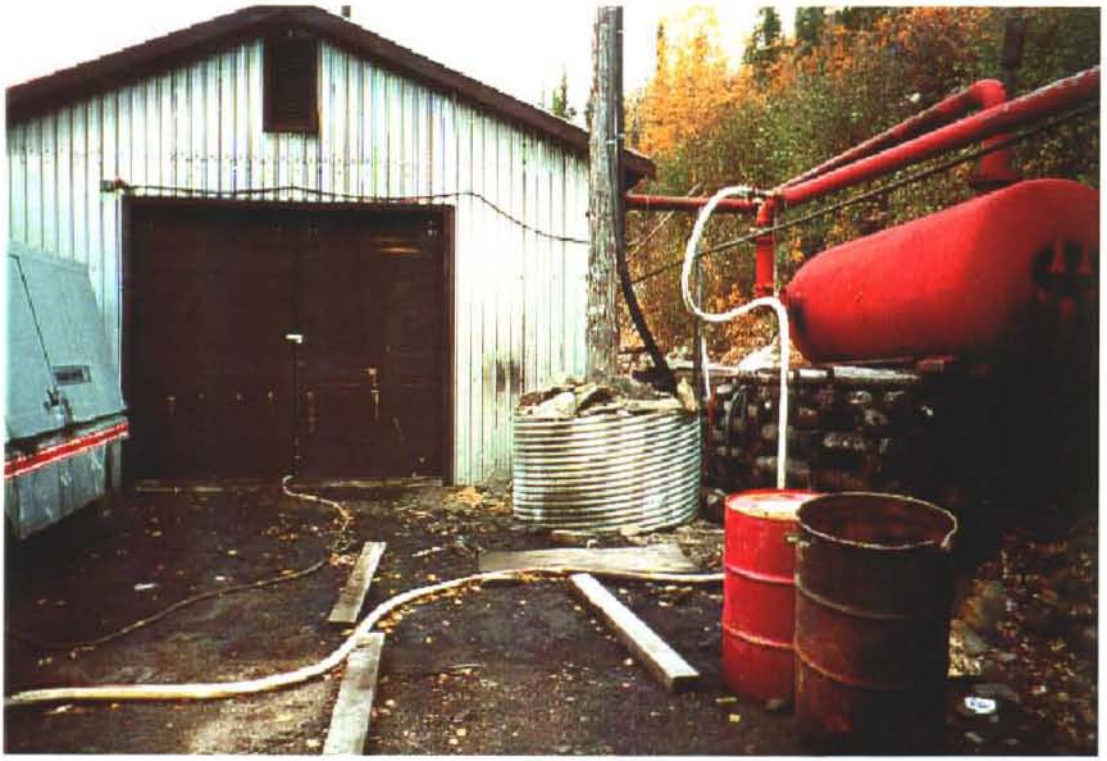


Photo 22-4: Compressor house at Bellekeno 625 level adit (Building 22C).
Hydrocarbon staining is evident at entrance.

Photo 22-5: Aboveground fuel storage tank behind compressor house at Bellekeno 625 level adit.

Photo 22-6: Oil barrels fitted with dispensing valves located inside compressor house. Spill trays are filled with oil and hydrocarbon staining is evident on floor.

Photo 22-7: View of Bellekeno 200 level adit entrance and green wooden electrical shed. (Azimuth 190°)

Photo 22-8: View of wooden load out from the edge of waste rock dump at Bellkeno 200 level adit (Azimuth 020°)

Photo 22-9: View of mobile fuel storage tank containing diesel and gasoline located adjacent to Bellekeno 20d0 level adit (Azimuth 304°)

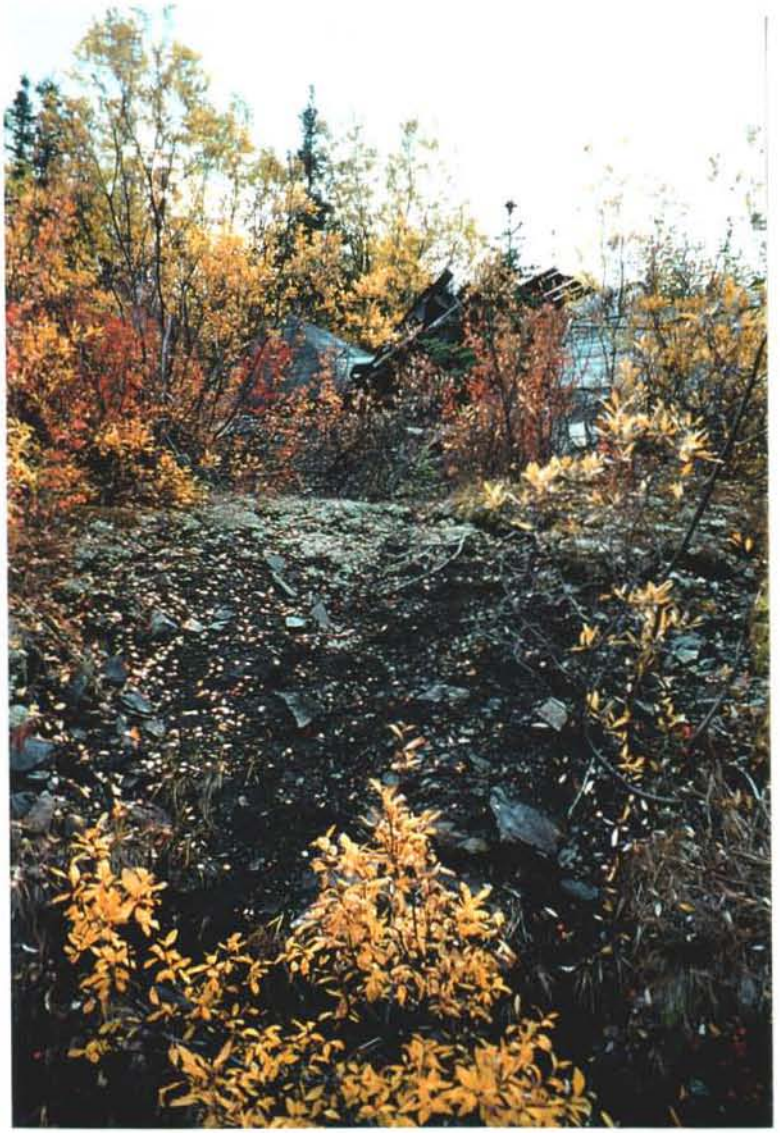


Photo 22-10: Collapsed entrance to Bellekeno 100 level adit with waste rock dump in foreground.

Photo 22-11: Collapsed structure enclosing shaft across Sourdough Hill Road from Bellekeno 100 level adit

Photo 22-12: View of collapsed entrance to Mayo Mines adit (Azimuth206^{o})

Photo 22-13: Bellekeno Backfill site. Drilling site is at centre of photograph next to laydown of pipes.

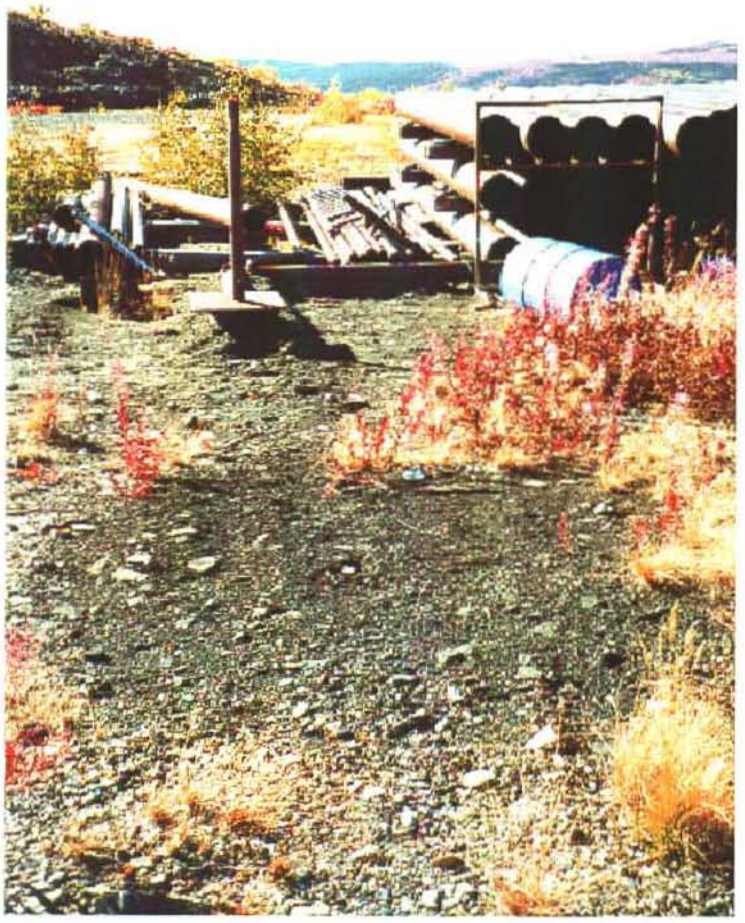


Photo 22-14: Drilling site with soil staining in foreground. Laydown of piping and empty hydraulic fluid barrel are in background.

Photo 22-15: Eureka Shaft 1 located in the middle of a trail off of Sourdough Hill Road.

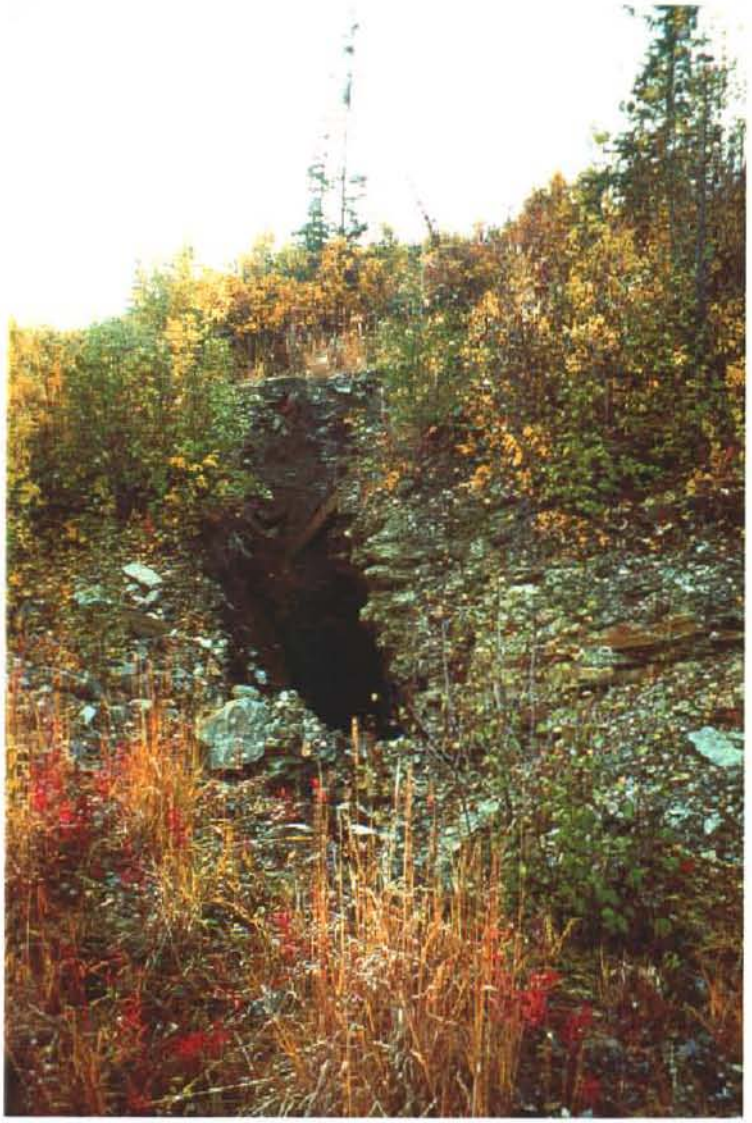


Photo 22-16: Stope broken through to surface just below Eureka Shaft 1.

Photo 22-17: Timbered raise (Eureka Raise 1). Open stope can be seen in background.

Photo 22-18: Partially collapsed shaft (Eureka Shaft 3) located about 37 m south of Eureka Shaft 1.

Photo 22-19: Powder shed located adjacent to Eureka Shaft 3.

Photo 22-20 : Overview of Bellekeno site. Note use of mine waste rock for road ballast and its proximity to creek in Thunder Gulch.(Azimuth 170^{0})

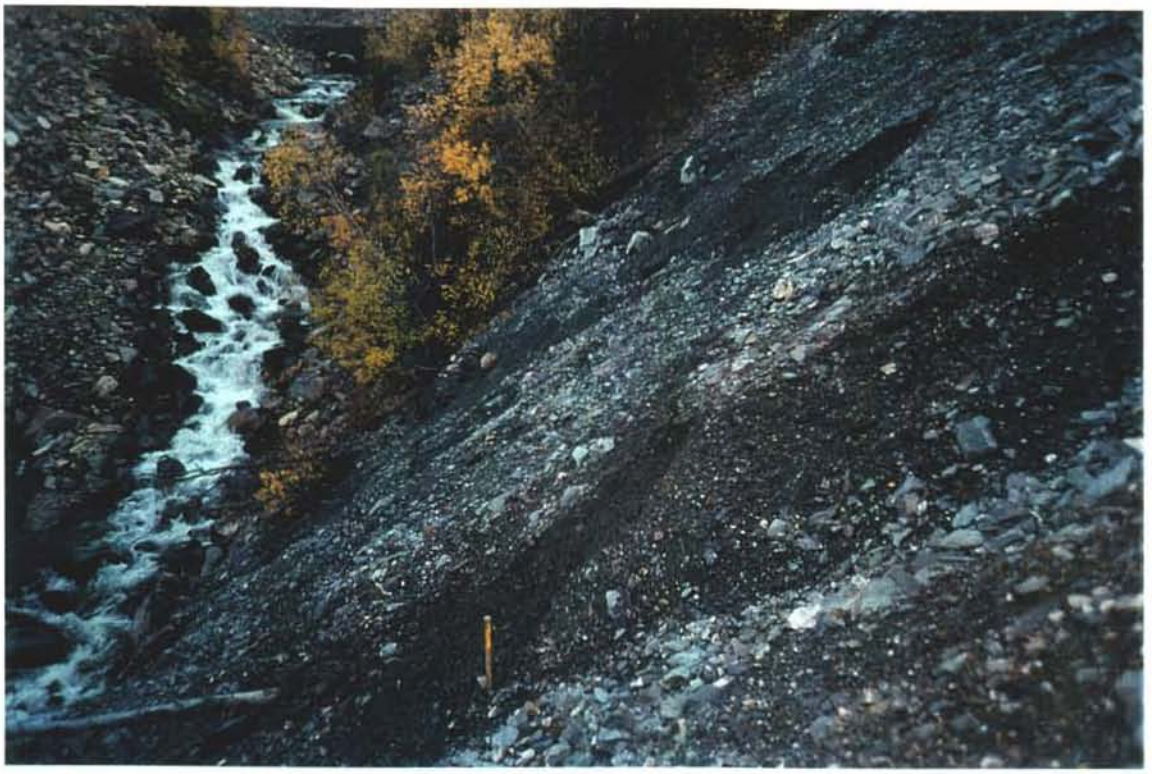


Photo 22-21 : Slumping evident in Bellekeno mine waste rock above Thunder Gulch creek. (Azimuth 160^{0})

KIJO

SITE #23

MINFILE# 105M001aa

1. LOCATION AND ACCESS

Kijo is on the mid-southwest slope of Keno Hill at an elevation of 1200m. The site is roughly 500m north of Erikson Gulch. Approximate UTM co-ordinates for Kijo are 7 089 600m N and 486 200m E. Two-wheel drive access is possible via Blackcap Road, which branches southeast off of Wernecke Road (3.8km from Keno Hill town site). Access to the Kijo site is best gained by proceeding 0.9km up the Blackcap Road and then walking down slope off the road approximately 80m at an azimuth 240°.

2. SITE PHYSIOGRAPHY

The Kijo site area is moderately sloped (15-20°) and is at an aspect of 220°. The site is situated at the perimeter of the the Erickson Gulch catchment. No surface runoff streams or pathways were observed. Moderately thick residual and colluvial soils and till cover the underlying host rock. Evidence of permafrost was observed in the vicinity on the Croesus No. 1 site (site #24) roughly 400m to the southeast. The area is thickly vegetated with fir, balsam, and spruce trees. Willows, moss growth, and shrubs were also observed. Wildlife game trails were observed throughout the immediate area.

3. GEOLOGY AND MINERALIZATION

The host rock is the Earn Group schist and phyllite. A narrow quartz breccia vein contains siderite and galena. The overburden is 30% coarse (0.3-0.5m) tabular chloritic schist.

4. SITE HISTORY

Site exploration includes bulldozer trenching and the development of three adits. The date of this exploration work is unknown. Given the amount of revegetation that has occurred, it is probable that the work took place sometime in the 1920s to 1930s.

5. MINE DEVELOPMENT

Mine development at this site includes an upper, middle and lower adit/trench. Due to the low topography, long trenches were excavated to the portal of the 3 adits. Waste rock piles are located at the end of the upper and lower trenches. Based on the evidence presented by the waste rock piles and portal

excavation, it is likely only minimal development was conducted into bedrock. A small pile of ore is stockpiled near the middle trench. Site photos are located in Appendix I.

5.1 Mine Openings and Excavations

There are 3 adits and associated trenches at this site. No field tests were conducted or samples collected on the site during the 1999 site investigation.

Upper Adit/Trench (photo 23-5)

The trench is oriented at 070°. The trench is overgrown with trees and shrubs. A colluvial rock pile composed of small boulders is deposited at the south end of the trench. The adit is collapsed and is not a safety risk. Vegetation has re-claimed the area.

Location: The upper adit/trench is the most northern adit/trench at this site. It is approximately 80m southwest of the road.

Dimensions (L x W x H): 20m x 5m x 1.5m (trench)

Supports: Likely wood or rock; however, it is not clear as adit has collapsed and is re-vegetated.

Stability: The walls appear to be relatively stable (some loose rock).

Condition: The adit is collapsed and not visible, and the trench appears to be safe. The trench has been reclaimed by shrubs and other bush.

Accessibility: The trench is overgrown but can still be accessed by foot. The adit has collapsed and cannot be accessed.

Middle Adit/Trench (photo 23-4)

The trench is oriented at 070°. The trench is overgrown with trees and shrubs. Timber used to construct the portal protrudes from angular colluvial greenstone boulders in the trench.

Location: The middle adit/trench is approximately 30m south of the upper adit/trench.

Dimensions (L x W x H): 12m x 4m x 1.5m (trench)

Supports: Likely wood or rock; however, the adit has collapsed and is re-vegetated. A portal timber was noted (see photo).

Condition: The adit is collapsed and not visible, and the trench appears to be safe. The trench has been reclaimed by shrubs and other bush.

Accessibility: The trench is overgrown but can still be accessed by foot. The adit has collapsed and cannot be accessed.

Lower Adit/Trench (photo 23-1)

The trench is oriented at 030°. The trench and portal is overgrown with trees and shrubs. The lower portal area is caved; there is a small opening into the adit.

Location: The adit is approximately 10m south of the middle trench.

Dimensions (L x W x H): 25m x 5m x 1.5m (trench)

Supports: Likely wood or rock; however, it is not clear as adit has collapsed and is re-vegetated. It is not clear from the small opening found onsite.

Condition: The adit is collapsed, and the trench appears to be safe. The trench has been reclaimed by shrubs and other bush.

Accessibility: The trench is overgrown but can still be accessed by foot. The adit has partially collapsed and the opening is too small to access the adit.

5.2 Waste Rock Disposal Areas and Ore Stockpiles

There are two waste rock piles at this site and one ore stockpile.

Waste rock pile #1 (photo 23-6)

Waste rock in this pile is from the upper adit/trench. The waste material is composed of roughly 80% overburden, soil, and coarse angular boulders. Revegetation of trees and bushes are growing on the waste rock pile. No surface water runoff was noted. No sign of oxidation was noted on the rock pile.

Location: The waste rock was deposited just outside the southwestern end of the upper trench.

Dimensions (L x W x H): 18m x 4m x 2m

Sampling: No samples were collected.

Waste rock pile #2 (photo 23-2)

Waste rock in this pile is from the lower adit/trench. The waste material is composed of overburden, soil, and trenched bedrock. Revegetation of trees and bushes are growing on the waste rock pile. No surface water runoff was noted. No sign of oxidation was noted on the rock pile.

Location: Waste rock was deposited just outside the southern end of the lower trench.

Dimensions (L x W x H): 20m x 3m x 1m

Sampling: No samples were collected.

Ore Stockpile #1 (photo 23-3)

The small ore stockpile is composed of strongly weathered semi-massive galena, tetrahedrite, siderite quartz vein. The ore was extracted from the middle adit/trench. No surface water runoff was noted. Oxidation on the ore rock was observed.

Location: The stockpile is located 8m to the southwest from the southwestern end of the trench.

Dimensions (L x W x H): 5m x 3m x 0.5m

Sampling: No samples were collected.

5.3 Tailings Impoundments

No ore was processed at this site, no tailings were encountered.

5.4 Minesite Water Treatment

There is no water treatment facility at this site.

6. MINE SITE INFRASTRUCTURE

No mine site infrastructure was encountered at this site.

7. SOLID WASTE DUMPS

No solid waste dumps were encountered at this site.

8. POTENTIAL CONTAMINANTS OF CONCERN

No hazardous materials were encountered on this site. The only contaminants of concern would be the possibility of dissolved metals seeping or washing from the waste rock piles.

9. WATER QUALITY

No surface water was encountered at this site. No samples were collected.

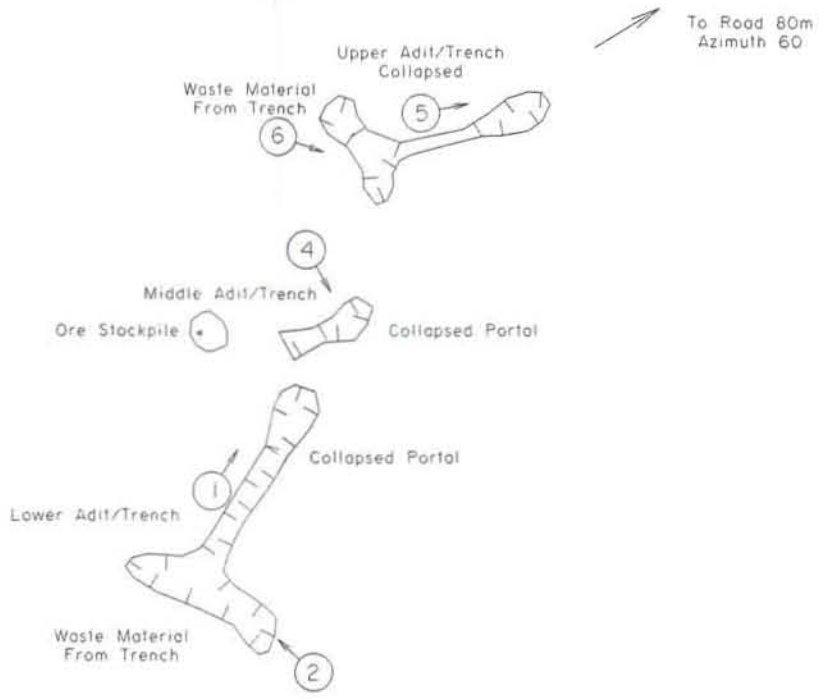
10. RECLAMATION

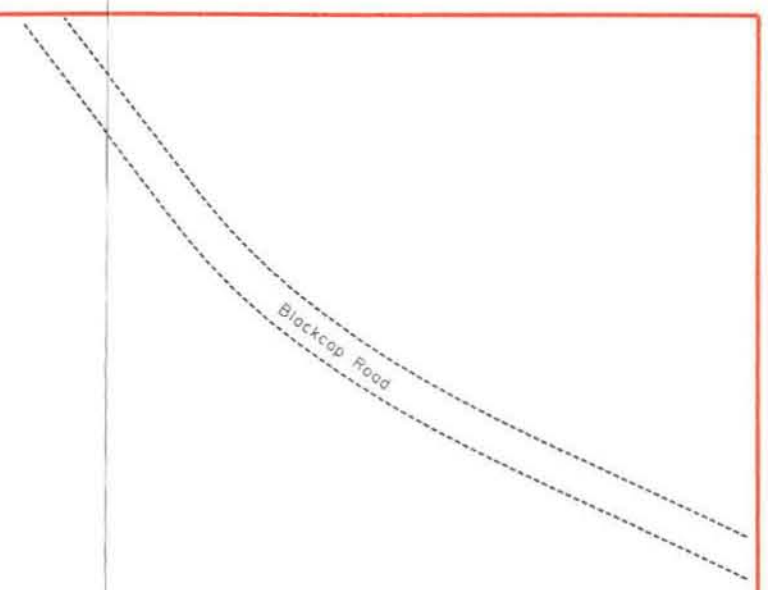
The site has almost fully revegetated naturally. All trenches are well overgrown with moss, bushes, alders (up to 2.5m high) and small evergreens up to 2 meters tall.

11. REFERENCES

Minfile #105M001aa

- Building (22A: building site present reference*) Indicates Asbestos Material
- 22A Collapsed Building
- Adit
- Collapsed Adit
- Shaft
- Collapsed/Backfilled Shaft
- Mine Rock Dump
- Bedrock Open Pit
- Trench
- Stripped Overburden Stockpile
- Stripped / Disturbed Area
- Outcrop Boundary
- Highway
- Road (gravel, 2 wheel drive)
- Road (gravel, 4X4 accessible)
- Road (inaccessible)
- Trail
- Culvert
- 2450I-01 1999 Soil Sample (this study)
- Pre 1999 Soil Sample (other sources)
- 25WR04-01 1999 Waste Rock Sample (this study)
- Pre 1999 Waste Rock Sample (other sources)
- WD-12-06 1999 Water Sample
- Pre 1999 Water Sample
- Tension Cracks
- Mass Movement (note: for Forms: BelleKeno)
- Groundwater Seep
- Surface Water Flow (Stream, Creek, River)
- Lake
- Settling Pond / Water Treatment Pond
- Tailings Dam / Tailings Pond / Mill Tails
- Ponded Water / Trench
- Barrels
- Abandoned Equipment (compressors, ore cars, rails, air and water pipe)
- Mine Rails / Trestle
- Collapsed Trestle
- Solid Waste Disposal Site
- Area of Soil Contamination
- *(6) Transformer Location (number of transformer in brackets)
- Power Line
- Power Line Collapsed
- Aerial Transmission Towers
- (5) Photo Site (arrow shows view direction)
- GPS Survey Location
- Former Building Site (Elsa)





Waste Rock Geological Legend

This legend intended for use as a key to the observed lithological content of the mine dumps and stockpiles at surficial materials investigated.It does not represent regional stratigraphy and no stratigraphic sequence is implied.

Pyrite content as percent: eg. Py 2%. Occurs as an alteration halo adjacent to vein fault structure.

Oxidation: Weak (wOx), moderate (mOx) and intense (iOx).

Quarternary: (5) Undifferentiated, unconsolidated colluvium, glacial till.

Veins:
(4a) Quartz veins;
(4b) Quartz-pyrite veins;
(4c) Quartz-siderite ±trace galena-sphalerite veins;
(4d) Siderite-quartz ±trace galena-sphalerite veins;
(4e) Suphide (galena-sphalerite) ±quartz±siderite veins.

Greenstone: (3) Amphibole-chlorite-plagioclase meladiorite or metagabbro.

Quartzite:
(2a) Thick bedded, blocky gray quartzite;
(2b) Thin banded, broken, quartzite with carbonaceous phyllite interbeds;
(2c) Calcareous quartzite.

Phyllite:
(1a) Broken sericite-chlorite phyllite;
(1b) Carbonaceous phyllite.

0 10 20 30 40

Scale 1:1000

CAD FILE: SITE23.DGN

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada
Architectural & Engineering Services
Western Region

Drawing title: Titre du dessin:

Kilo Site #23
Site Assessment
Yukon Territory

designed by: / conçu par:
drawn by: / dessiné par: C.S. Nov. 99
approved by: / approuvé par:
revisions:
project no. / no. du projet: 125-12.01
dwg. no. / dessin no. 1 of 1

Photo 23-1: Caved lower portal area; note small opening below mapper's feet and natural revegetation of the site. Photo Direction (Azimuth 040°)

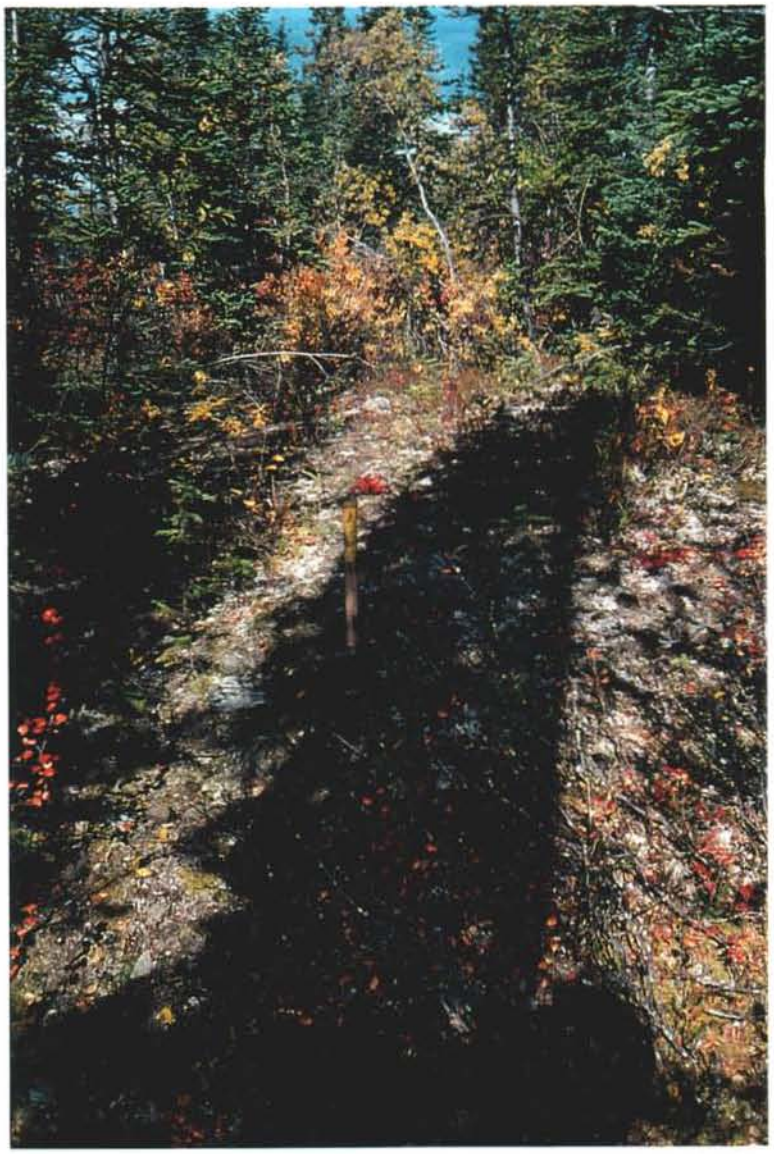


Photo 23-2: Rock dump from lower trench and adit. Note heavy natural revegetation. Photo Direction(Azimuth 340°)

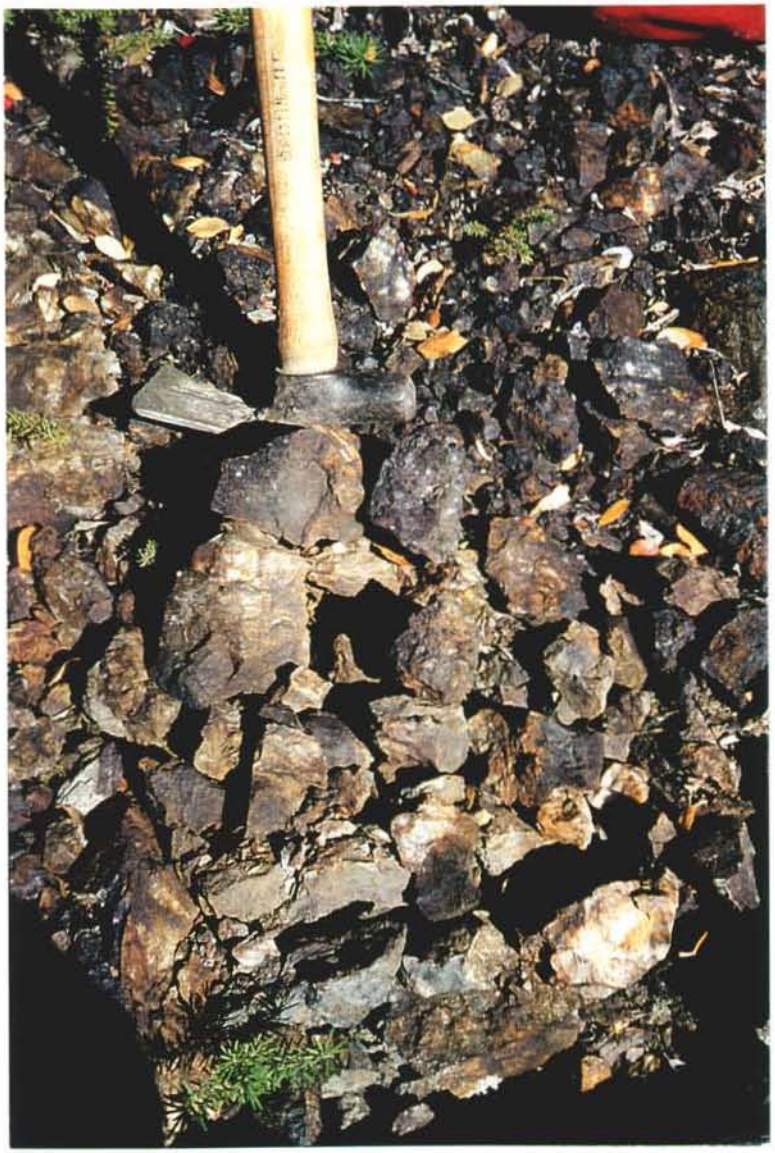


Photo 23-3: Close-up of strongly weathered, semi-massive galena-tetrahedrite siderite-quartz vein ore stockpile material (5m x 3m x 0.5m).

Photo 23-4: Collapsed middle trench and adit area. Note portal timber above pack protruding from angular colluvial greenstone boulders.
Photo Direction (Azimuth 150°)

Photo 23-6: Rock dump from upper trench and adit (18m x 4m x 2m). Material comprised of approximately 80% colluvial soil and angular greenstone boulders.
Photo Direction (Azimuth 120°)

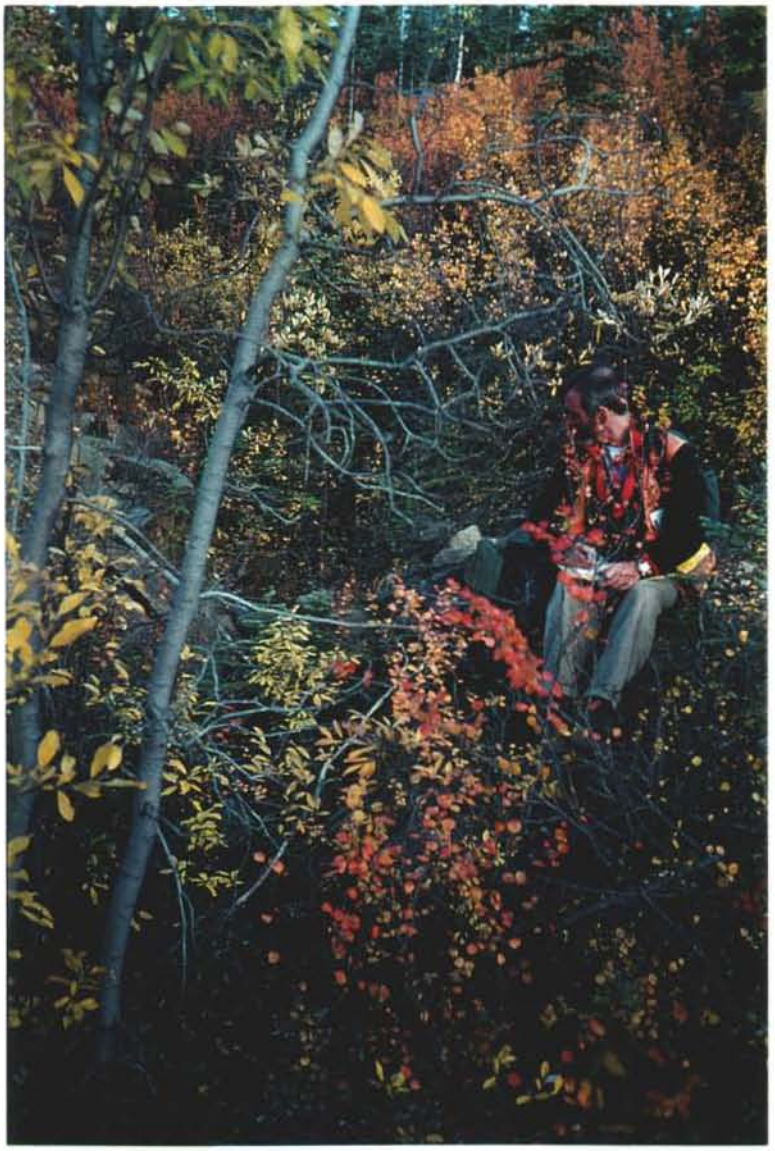


Photo 23-5: Collapsed upper trench and adit area.
Photo Direction (Azimuth 120^{0})

CROESUS NUMBER #1

SITE #24

MINFILE#105M001ab

1. LOCATION AND ACCESS

Croesus No. 1 occurs midway up the western slope of Keno Hill, extending roughly 350m along an azimuth of roughly 005° up the north side of Erikson Gulch from the creek at 1160m a.s.l. to 1280m a.s.l. The site is centred around UTM co-ordinates 7 089 425m N and 486 655m E. Two-wheel drive access is possible via Blackcap Road which branches off of Wernecke Road, 1.3km to the northwest. The site is off the road roughly 160m southeast of a Blackcap road switchback along an azimuth of 120°.

2. SITE PHYSIOGRAPHY (Photo 24-1)

Croesus No. 1 is located on a moderately steep, 26° slope within Erickson Gulch on the west side of Keno Hill. The site has a southern aspect and is thickly vegetated with spruce, fir, alder and willow. Below 1230m, the site occurs within the talus debris fan of a prominent outcrop of greenstone that extends up the slope of the hill. Soils are poorly developed, derived from colluvial materials and ranging in thickness up to 1.5m. Above 1230m, bedrock is covered with a blanket of glacial gravels. Permafrost is likely, especially in the shadow of the gulch on the lower portions of the slope. Minor earth flows are evident on the slope immediately west of the site.

No surface water was observed associated with the Croesus No.1 mine workings. Shallow seeps are likely based on the presence of coarse talus below 1230m. All runoff from the mine site flows southward to Erikson Gulch, a tributary of Christal Creek. Shallow ditches, probably cut by the early miners to channel spring runoff to the mine workings, were found above the site. Runoff from the upper section of the Blackcap Road is channeled off the end of the switchback and down the slope adjacent to the Croesus No.1 workings. There are no culverts or waterbars along the Blackcap Road to dissipate the runoff on to the shallow west facing slope above. The excess runoff has cut a gully into the unstable slope adjacent to the Croesus No.1 site.

3. GEOLOGY AND MINERALIZATION

The Croesus No.1 occurs along the roughly north-south running contact of Earn Group schist and phyllite and a large greenstone lens. A vein of massive siderite with minor galena (PbS) and freibergite ($(Cu, Fe)_{12}Sb_4S_{13}$) was outlined along a strike length of 300m.

4. SITE HISTORY

The history of the Croesus No.1 is not well documented. Most of the underground development work is considered to date from the 1930s. The larger cat trenches possibly date from the 1940s. The Minfile report lists all work as pre-1965. Work completed on the site includes 4 adits, 3 shallow shafts into overburden, 2 bulldozer trenches, and a small hand trench. A total of 9 tonnes of ore grading 7,431 g/t silver were shipped offsite, probably in the 1930s.

5. MINE DEVELOPMENT

There are four collapsed adits, three shafts and three trenches located on the property. There are five waste rock piles associated with these excavations. All the workings occur along a trend of azimuth 005° at the western edge of a prominent greenstone outcrop located roughly 160m east of the Blackcap Road switchback.

5.1 Mine Openings and Excavations

The adits are numbered in sequence, Adit #1 being the uppermost at an elevation of 1225m. Dimensions for the adits are estimated from the portal timbers and the sizes of the associated waste rock piles. The portals were constructed with log timbers but have collapsed and are no longer accessible. None of the adits produced any water and no samples were collected.

	Elevation	Dimensions (H x W x L)	Photo
Adit #1	1225m	1.5 x 1.2m x <5m	24-4
Adit #2	1220m	1.5 x 1.2m x <50m	24-5
Adit #3	1205m	1.5 x 1.2m x <5m	24-7
Adit #4	1185m	1.5 x 1.2m x <7m	24-8

Shafts #1-3

There are three shafts indicated on a map prepared in the 1960's by Boyle. A windless and a shaft bucket found in the base of the Trench #1 likely indicate the location of Shaft #1 (Photo 24-3). The shaft appears to have been filled by later trenching. A shallow boxhole dug into the overburden just above Adit #1 correlates to the site of Shaft #2 as indicated on Boyle's map. It is located at an elevation of roughly 1250m. The sides of the shaft have collapsed in and it is now less than a metre deep. There are no structures or equipment associated with it and it poses no risks. Shaft #3 is indicated by Boyle to be on the eastern side of Erickson Gulch just above the creek. This shaft was not investigated.

Trench #1 (Photo 24-2)

Trench #1 occurs at roughly 150m northeast of the Blackcap Road switchback. The trench was cut by bulldozer into glacial gravel and broken phyllite bedrock to a depth of 5m. The trench arcs in a 30m long semi-circle with steep sides that slope up to 40° into a narrow v-shape. The slopes are loose, but not a hazard. The site is partially revegetated with willows.

Trench #2

Trench #2 is a 50m long bulldozer trench running east-west across the slope 40m below Trench #1. It is up to 1.5 m deep and 3m wide cut into overburden and broken phyllite. The trench is heavily revegetated with fir, alder and willow.

Trench #3

Trench #2 is located beside Shaft #2 at an elevation of 1250m. This trench just a shallow hand dug excavation measuring 24m long by 2m wide by 0.5m deep that has since revegetated.

5.2 Waste Rock Disposal Areas

There are four waste rock piles associated with the adits and one waste rock pile associated with the Trench #1. None of the waste rock piles have surface water flowing over them or water seeping from them.

Waste Rock Pile WR-01

This waste rock pile was formed by end dumping from Adit #1. Up to 95% of the surface rock is composed of blocky, unoxidized greenstone.

Dimensions: 10m x 8m x 1.5m

Sampling: No samples were collected.

Waste Rock Pile WR-02 (photo 24-5, 24-624-7)

This waste rock pile was formed by end dumping from Adit #2. The majority (~67%) of the surface rock is coarse crystalline siderite, roughly 30% is blocky greenstone, 3% is quartz and there is trace calcite. The slope of the pile is about 30°. There is abundant manganese staining in the siderite vein material. Strong oxidation occurs to a depth of at least 50cm.

Dimensions: 40m x 17m x 3m

Sampling: Sample 24WR-01 was collected from the north end of the pile (see attachments for analytical results). Field test results included a paste pH of 6.7 and conductivity of 1090µS/cm.

Waste Rock Pile WR-03

This waste rock pile was formed by end dumping from Adit #3. It has the same surface composition as waste rock pile #2.

Dimension: 25m x 8m x 1.5m

Sampling: No samples were collected.

Waste Rock Pile WR-04 (Photo 24-9)

This waste rock pile formed by end dumping out of Adit #4. It is composed of 60% blocky greenstone and 40% medium grained, crystalline siderite. Moderate oxidation was observed.

Dimensions: 10m x 8m x 1.5m

Sampling: No samples were collected.

Waste Rock Pile WR-05

This waste rock pile is associated with the Trench #1. It is composed of 80% overburden. No oxidation was observed.

Location: The waste rock pile has formed at the western end of the upper trench.

Dimensions: 30m x 6m x 1m

Sampling: No samples were collected.

5.3 Tailings Impoundments

No ore was processed at this site; no tailings were encountered.

5.4 Minesite Water Treatment

There are no water treatment facilities at this site.

6. MINE SITE INFRASTRUCTURE

No mine site infrastructure was encountered at this site.

7. SOLID WASTE DUMPS

No solid waste dumps were encountered at this site.

8. POTENTIAL CONTAMINANTS OF CONCERN

No hazardous waste was encountered on the property. Potential contaminants of concern are any metals washing from the waste rock piles.

9. WATER QUALITY

No surface water was encountered at the site. Erickson Gulch is located roughly 90m downslope of Adit #4. A water sample (24WQ-S01-01/02) was collected from the Gulch roughly 40m down stream (see attachments for results). At the time of sampling, Erickson Creek had a flow of approximately 40L/sec.

10. RECLAMATION

Natural revegetation is occurring in the trenches, the waste rock piles have very little vegetation growing on them.

11. REFERENCES

Minfile #105M001ab

Boyle, R.W., 1965. *Lead-Zinc-Silver Deposits, Keno Hill-Galena Hill Area.* Geological Survey of Canada, Bulletin 111.

ATTACHMENT 2: 1999 CROESUS WATER SAMPLES LABORATORY RESULTS			
Sample Number	**Detection Limit**	**Units**	**24WQS01-01/02 Sept. 21/99**
Site Desciption			Erikson Gulch, downslope of the site
pH (field)	N/A	pH	N/A
Conductivity (field)	N/A	µS/cm	N/A
pH (Lab)	0.01	pH	7.53
Conductivity (Lab)	0.01	µS/cm	195
Total Alkalinity	5	mg CaCO3/L	43
Chloride	0.25	mg/L	<0.25
Hardness (CaCO3 equiv)	5	mg/L	94.6
Nitrate-N	0.05	mg/L	0.06
Nitrite-N	0.003	mg/L	0.005
Sulphate	1	mg/L	44
Total Dissolved Solids	5	mg/L	129
Analysis by ICP-USN			
Aluminum	0.0008	mg/L	0.0119
Antimony	0.005	mg/L	<0.005
Arsenic	0.01	mg/L	<0.01
Barium	0.00004	mg/L	0.0579
Beryllium	0.00001	mg/L	<0.00001
Bismuth	0.0004	mg/L	<0.0004
Boron	0.002	mg/L	<0.002
Cadmium	0.00006	mg/L	0.00007
Calcium	0.002	mg/L	27.7
Chromium	0.00006	mg/L	<0.00006
Cobalt	0.00003	mg/L	<0.00003
Copper	0.00003	mg/L	0.00023
Iron	0.00001	mg/L	0.015
Lead	0.0003	mg/L	0.0024
Lithium	0.001	mg/L	0.001
Magnesium	0.0005	mg/L	4.98
Manganese	0.00002	mg/L	0.00099
Mercury	0.0001	mg/L	<0.0001
Molybdenum	0.00007	mg/L	0.00023
Nickel	0.00001	mg/L	0.0002
Phosphorus	0.03	mg/L	<0.03
Potassium	0.4	mg/L	<0.4
Selenium	0.004	mg/L	<0.004
Silicon	0.004	mg/L	2.41
Silver	0.00005	mg/L	<0.00005
Sodium	0.004	mg/L	0.6
Strontium	0.00002	mg/L	0.0939
Sulphur	0.008	mg/L	14.6
Thallium	0.001	mg/L	<0.001
Titanium	0.00002	mg/L	0.00016
Vanadium	0.00003	mg/L	<0.00003
Zinc	0.0002	mg/L	0.0008
Analysis by Hydride AA			
Arsenic	0.0002	mg/L	0.001
Selenium	0.0001	mg/L	<0.0001

ATTACHMENT 2: 1999 CROESUS WASTE ROCK SAMPLES LABORATORY RESULTS			
Site Number	**Detection Limit**	**Units**	**24WR01-01 - Sept. 12/99**
Sample Desciption			North side of Waste Rock Pile #2
Paste pH (field)	N/A	pH	6.7
Conductivity (field)	N/A	µS/cm	1090
pH in Saturated Paste			
pH	0.1	pH	6.6
pH in Soil (1:2 water)			
pH	0.01	pH	7.1
ICP Semi-Trace Scan			
Aluminum	5	µg/g	11000
Antimony	2	µg/g	1780
Arsenic	2	µg/g	73
Barium	0.05	µg/g	66.2
Beryllium	0.1	µg/g	<0.1
Bismuth	5	µg/g	21
Cadmium	0.1	µg/g	1300
Calcium	5	µg/g	12600
Chromium	0.5	µg/g	7.6
Cobalt	0.1	µg/g	18
Copper	0.5	µg/g	3270
Iron	1	µg/g	230000
Lead	1	µg/g	3820
Lithium	0.5	µg/g	7
Magnesium	1	µg/g	1690
Manganese	0.5	µg/g	69200
Mercury	0.01	µg/g	11
Molybdenum	1	µg/g	6
Nickel	1	µg/g	20.7
Phosphorus	5	µg/g	<5
Potassium	20	µg/g	2780
Selenium	2	µg/g	<2
Silicon	5	µg/g	357
Silver	0.5	µg/g	1980
Sodium	5	µg/g	61
Strontium	1	µg/g	41
Sulphur	10	µg/g	11300
Thorium	1	µg/g	<1
Tin	1	µg/g	23
Titanium	0.2	µg/g	34
Uranium	5	µg/g	<5
Vanadium	1	µg/g	28
Zinc	0.5	µg/g	92200
Zirconium	0.1	µg/g	5.4

ATTACHMENT 2: 1999 CROESUS WASTE ROCK LABORATORY RESULTS
MODIFIED SOBEK METHOD ACID-BASE ACCOUNTING TEST

SAMPLE	SITE DESCRIPTION	PASTE pH	S(T) %	S(SO4) %	AP	NP	NET NP	NP/AP
24WR01-01 - Sept./99 - Soil	North side of Waste Rock Pile #2	7.4	0.45	0.33	3.8	30.0	26.3	8.0

AP = ACID POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NP = NEUTRALIZATION POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NET NP = NET NEUTRALIZATION POTENTIAL = TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NOTE: WHEN S(T) AND/OR S(SO4) IS REPORTED AS <0.01, IT IS ASSUMED TO BE ZERO FOR THE AP CALCULATION.
N/D = NO DUPLICATE ASSAY. CALCULATIONS ARE BASED ON ASSAY RESULTS OF THE INITIAL SAMPLE.
RE = REPLICATE.

NOTE - A HIGH LEVEL OF SOLUBLE METALS (ESPECIALLY IRON) WERE OBSERVED IN MANY SAMPLES DURING THE ABA TITRATIONS.
SAMPLES WITH A NEGATIVE NET NP SHOULD BE TESTED FOR MOBILE METALS USING STANDARD SHAKE FLASK EXTRACTION TESTS.

- Building (22A: building site present reference=) Indicates Asbestos Material
- 22A Collapsed Building
- Adit
- Collapsed Adit
- Shaft
- Collapsed/Backfilled Shaft
- Mine Rock Dump
- Bedrock Open Pit
- Trench
- Stripped Overburden Stockpile
- Stripped / Disturbed Area
- Outcrop Boundary
- Highway
- Road (gravel, 2 wheel drive)
- Road (gravel, 4X4 accessible)
- Road (inaccessible)
- Trail
- Culvert
- 24501-01 1999 Soil Sample (this study)
- Pre 1999 Soil Sample (other sources)
- 25WR04-01 1999 Waste Rock Sample (this study)
- Pre 1999 Waste Rock Sample (other sources)
- WG-12-06 1999 Water Sample
- Pre 1999 Water Sample
- Tension Cracks
- Moss Movement (note: for Forms: BelleKeno)
- Groundwater Seep
- Surface Water Flow (Stream, Creek, River)
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- Power Line
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- 5 Photo Site (arrow shows view direction)
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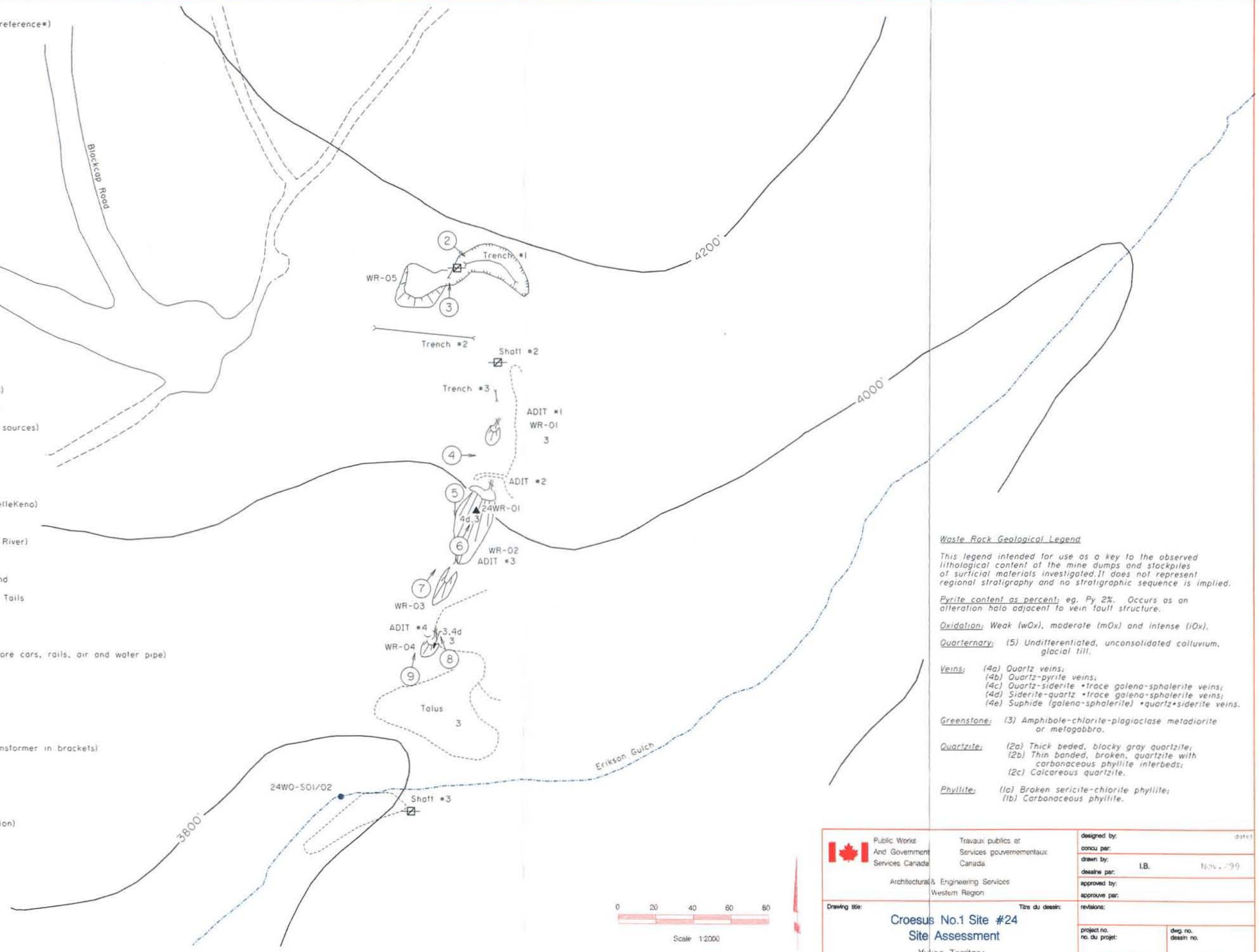

Waste Rock Geological Legend

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(4b) Quartz-pyrite veins;
(4c) Quartz-siderite •trace galena-sphalerite veins;
(4d) Siderite-quartz •trace galena-sphalerite veins;
(4e) Suphide (galena-sphalerite) •quartz•siderite veins.

Greenstone: (3) Amphibole-chlorite-plagioclase metadiorite or metagabbro.

Quartzite: (2a) Thick beded, blocky gray quartzite;
(2b) Thin banded, broken, quartzite with carbonaceous phyllite interbeds;
(2c) Calcareous quartzite.

Phyllite: (1a) Broken sericite-chlorite phyllite;
(1b) Carbonaceous phyllite.

Public Works And Government Services Canada
Travaux publics et Services gouvernementaux Canada
Architectural & Engineering Services Western Region

Drawing title: / Titre du dessin:

Croesus No.1 Site #24
Site Assessment
Yukon Territory

designed by: / conçu par: dated
drawn by: / dessiné par: I.B. Nov./99
approved by: / approuvé par:
revisions:
project no. / no. du projet: 125-12.01
dwg. no. / dessin no. 1 of 1

Photo 24-1: Overview of Croesus site. Note waste rock dump WR-02 from Adit #2 at phot centre; also Blackcap (Site #25) waste rock dumps at top right corner. (Azimuth 350°)

Photo 24-2: Upper Trench #1 into thick colluvial soils.(Azimuth 130°)

Photo 24-3: Windless and shaft bucket from backfilled shaft in area of upper trench (Shaft#1).

Photo 24-4: Adit #1 portal area. (Azimuth 030^{0})

Photo 24-5: Top of waste rock dump WR-02. Note abundant manganese stained siderite vein material. (Azimuth 010°)

Photo 24-6: Waste rock dump WR-02 test pit (sample 24WR01-01) at Adit#2. Note strong oxidation at depth in pit and abundant siderite vein cobbles.

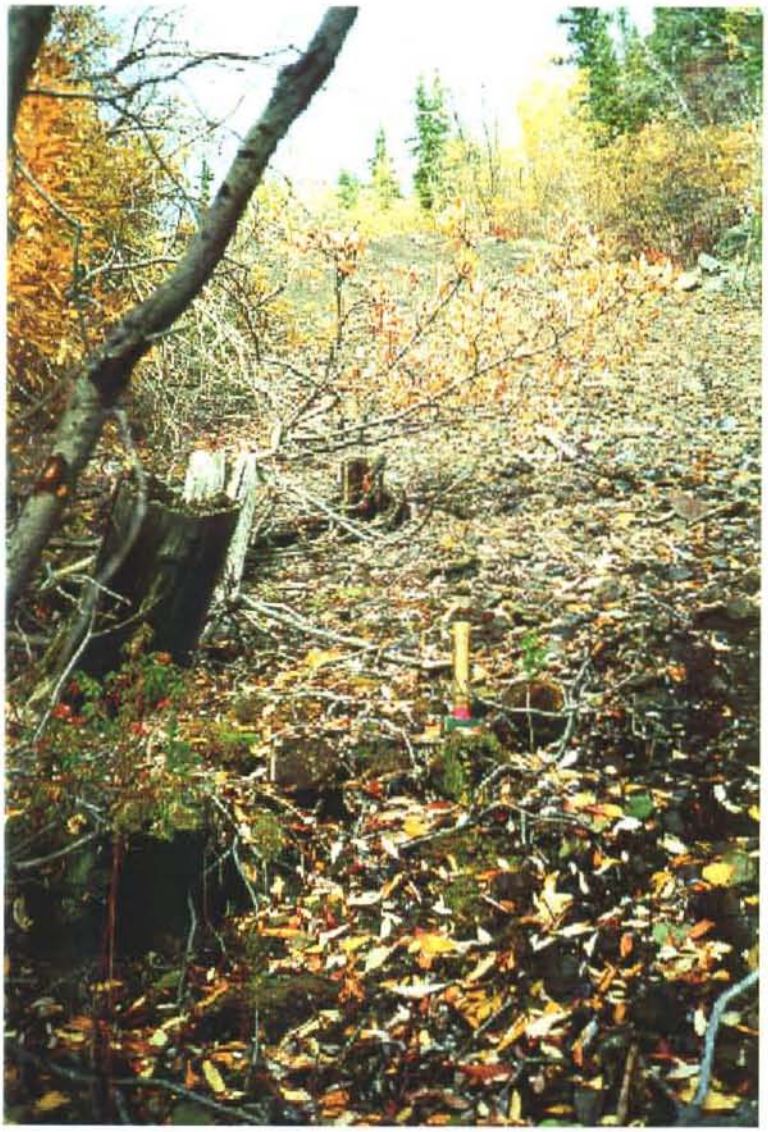


Photo 24-7: Adit #3 at base of rock dump WR-02. Note portal timbers to left of hammer. (Azimuth 000°)

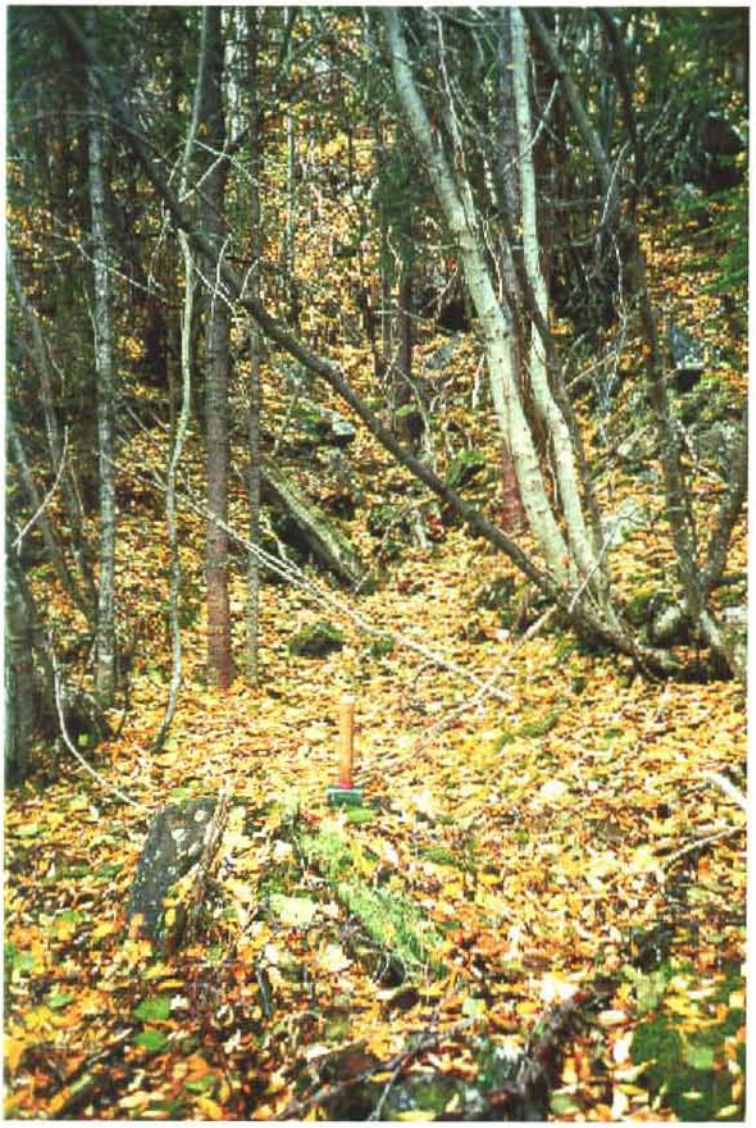


Photo 24-8: Collapsed portal at Adit #4. Note natural revegetation. (Azimuth 020°)

Photo 24-9: Rock dump WR-04. Note blocky greenstone and siderite vein material. (Azimuth 040°)

BLACK CAP, SHEPHERD AND LUCKY QUEEN ADITS

SITE# 25

MINFILE# 105M001ac

1. LOCATION AND ACCESS

This site includes three separate mine workings: the Black Cap open pit and adit, the Shepherd adit (also known as the Brewis Red Lake adit) and the Lucky Queen adit. The Black Cap, Shepherd and Lucky Queen (BSLQ) sites are situated within 450 metres of each other with Black Cap to the northeast and Shepherd in the southwest. They are all located on the western slopes of Keno Hill roughly a kilometre north of Erickson Gulch between elevations 1,360m and 1,480m (Figure 25-1; Photos 25-1, 25-2).

SITE LOCATIONS

	UTM Northing	UTM Easting	Elevation
Black Cap Pit	7,091,675m	486,950m	1,430m
Black Cap Adit	7,091,510m	486,910m	1,430m
Shepherd	7,091,310m	486,825m	1,375m
Lucky Queen	7,091,475m	486,750m	1,370m

A two-wheel drive road provides access to all three sites. The Black Cap road turns southeast off the Wernecke Road at 3.8km from Keno Hill town site. The road switchbacks once before reaching the Lucky Queen adit at 2.7km, the Shepherd adit at 3.9km and the Black Cap pit at 4.3km. The road is impassable past the Black Cap workings. A locked gate restricts larger vehicle access at the start of the Black Cap Road, although ATV's can easily get by (Photo 25-3). Site details and photograph locations can be found on Figure 1. Site photos are located in Attachment 1.

2. SITE PHYSIOGRAPHY (Photos 25-1, 25-2)

The BSLQ sites are situated at tree line on a west facing, moderately sloping area of thick colluvial soil and till, blocky talus and scattered bedrock outcrops. The slope increases across the site from 10° in the south to more than 15° in the north where bedrock outcrops are common.

Surface water is limited to small seeps below the site at 1,340m elevation. The only drainage channel connecting the site to Erickson Creek is the ditch along the upper road switchback. There are no culverts or waterbars along the entire 1km length to dissipate the spring surface water run off. Permafrost is likely present and solifluction is evident over much of the area.

3. GEOLOGY AND MINERALIZATION

The BSLQ site occurs at the contact between Earn Group sericite schist/phyllite to the south and medium to thick bedded Keno Hill quartzite with carbonaceous phyllite to the north. The Black Cap pit area occurs almost entirely in Keno Hill quartzites. The Lucky Queen adit was collared in Earn Group phyllites.

Siderite, galena and freibergite mineralization occurs in two zones of sheeted quartz veins on the Black Cap and Shepherd areas. The zones occur 15 metres apart along parallel sections of a regional shear structure striking 030°.

4. SITE HISTORY

Work on the site dates to before 1950 when a shaft was sunk on Black Cap. Between 1950 and 1952, the 6m winze and the 280m Brewis Red Lake adit were developed at Shepherd. Approximately 340m of drifting was completed on the Black Cap in 1967. Total production at the site is 44,068 tonnes grading 939 g/t silver, 1.61% lead and 0.28% zinc.

5. MINE DEVELOPMENT

There are two adits, one at Lucky Queen and one at Black Cap. The Shepherd was located roughly 180m southwest of the Lucky Queen Adit, however the site has been bulldozed level and no evidence of the adit or associated waste rock piles are apparent. The area was not investigated. There are two open pits at Black Cap; the North Black Cap Pit and the South Black Cap Pit. Five waste rock piles are associated with these excavations.

Mine development includes the Blackcap Road. The upper switchback of the Blackcap Road extends roughly 800 across the slope below the Lucky Queen Adit. There are no water bars or culverts to divert the ditch water back to the slope below the road. During spring runoff the ditch water runs off the end of the middle switchback into Erickson Gulch where poor slope stability and the excess runoff have caused minor slope failures.

5.1 Mine Openings and Excavations

Two adits and two open pits were encountered at this site.

Lucky Queen Adit (photo 25-7, 25-8, 25-9)

The adit is on the east side of the Black Cap Road, downslope of the Black Cap Pits. There is timber cribbing and wooden door at the collar of the adit. The timbers behind the adit door have collapsed, making the entrance impassible. An exterior wooden portal structure 4m wide by 2.5m high extends 15m between the door to the adit and the load-out building (building 25A). All the water lines (2 inch steel), air lines (6 inch steel), vent

tubing (0.5m plastic material) and electrical cable remain intact extending from the end of the portal underground. A 2 inch steel water line with a doubled copper heater coil inside it was installed to provide winter drainage. The water line drain and coil runs along the ditchline from underground, out the side of the load out building and then 70m northwest at azimuth 300° across the side hill. The heater coil extends a further 30m beyond the end of the pipe.

Black Cap Adit (photo 25-6)

The entrance to the adit is located roughly 100m south of the south end of the North Black Cap Pit. The opening measures about 2m high by 2.5m wide and is supported by timbers. No collapses were visible in the first 50m. The adit is filled with approximately 40cm of standing water making further investigation of the adit unpractical. A gravel berm located outside of the portal was built to damn mine drainage; however, water is seeping through the berm and a large puddle has formed on the other side. Water flowing from the puddle continues down the road for at least 50m before seeping back into the ground.

North (Upper) Black Cap Pit (photo 25-4)

The pit is located upslope of the Black Cap Adit. It measures roughly 130m long by 45m wide by 35m high. The steep-sided pit walls are comprised of predominantly quartzite containing some stacked quartz-siderite veins. A large volume of rock debris was observed at the base of the walls indicating a possible safety hazard. There was no vegetation observed in the pit.

South (Lower) Black Cap Pit (photo 25-5)

The pit is located between the North Pit and the Black Cap Adit. The pit measures roughly 80m by 50m by 15m high. The pit walls are composed of mainly quartzite with some outcropping of phyllite. There is a large volume of rock debris at the base of the pit walls. There was no vegetation observed in the pit.

5.2 Waste Rock Disposal Areas

There are five waste rock piles associated with the excavations on the BSLQ properties. No surface water was encountered on any of the piles; however, a strong flow of water was audible under Waste Rock Pile WR-02. There is very little vegetation growing on any of the waste rock piles. Rock samples were collected and analyzed. Paste pH tests were also performed. Refer to the attachments for these data.

Waste Rock Pile WR-01

The origin of the waste rock is likely from the South Black Cap Pit. The surface material comprises a mix of blocky quartzite with trace pyrite (65%), medium gray carbonaceous phyllitic schist (32%), and a small volume of rusty manganese-stained quartzite containing siderite-quartz veins and siderite-quartz-galena veins.

Location: The pile starts 120m southeast of Black Cap Adit.

Dimensions (L x W x H): 80m x 50m x (3 to 15m)

Sampling: Sample 25WR-01-01 was collected and analyzed.

Waste Rock Pile WR-02

The waste rock was excavated from the North Black Cap Pit. It is comprised of mainly phyllitic schists (62%) and thin to moderately banded quartzite (25%) with lesser amounts of blocky quartzite (10%), stacked quartz veins and veinlets (2%) and manganese stained siderite-quartz veins (1%).

WR-03 is potentially unstable. Large active solifluction lobes were observed in the natural soils at the toe of the southwest slope of WR-03. The southwest slope was also observed to be convex in shape and to have a profile of up to 40°.

Location: The pile is located immediately west of the North Black Cap Pit.

Dimensions (L x W x H): There are three lobes, comprising an area of 180m by 75m and an average height of 7m.

Sampling: Sample 25WR-02-01 was collected from the middle lobe and analyzed.

Waste Rock Pile WR-03 (photo 25-10, 25-12)

This waste rock is likely from the North Black Cap Pit but may also contain rock from the South Black Cap Pit. The pile is comprised of predominately phyllitic schist (50%) and massive, blocky quartzite (30%), with lesser amounts of thin to moderately banded quartzite (10%), quartzite with trace to 1% pyrite (5%), manganese stained siderite-quartz veins (3%) and stacked quartz veins and veinlets (1%). Tension cracks observed on the top of the pile and the over-steepened (40°), convex sides indicate that the toe of the slope is possibly moving due to solifluction.

Location: The pile is located to the southeast of the North and South Black Cap Pits.

Dimensions (L x W x H): 270m x 30m x 25m

Sampling: Sample 25WR-03-01 was collected and analyzed.

Waste Rock Pile WR-04

The waste rock was excavated from the Black Cap Adit. It is composed of almost all quartzite, both thin to moderately banded (60%) and massive (24%). There are minor amounts of greenstone (10%), stacked quartz veins and veinlets (5%) and manganese stained siderite-quartz veins (1%).

Location: The waste rock was dumped outside of the Black Cap Adit.

Dimensions (L x W x H): 110m x 40m x 15m

Sampling: Sample 25WR-04-01 was collected and analyzed.

Waste Rock Pile WR-05 (photo 25-11)

The waste rock in this pile was excavated from the Lucky Queen Adit. It is mostly quartzite, 50% banded with trace to 1% pyrite, and 20% massive. There is roughly 15% phyllitic schist, 10% greenstone and 5% stacked quartz veins and veinlets.

Location: The waste rock was dumped outside of the Lucky Queen Adit.

Dimensions (L x W x H): 200m x 50m x 35m

Sampling: Sample 25WR-05-01 was collected and analyzed.

5.3 Tailings Impoundments

No ore was processed at the site. No tailings were encountered.

5.4 Minesite Water Treatment

There is no water treatment facility at this site.

6. MINE SITE INFRASTRUCTURE

The tracks used to transport rock out of Lucky Queen Adit are still in place in the load-out structure outside of the adit. Various sized fuel containers were observed in the workshop nearby. Two more fuel storage areas were encountered on top of Waste Rock Pile WR-01.

6.1 Buildings (photo 25-13)

There are two buildings located on the BSLQ property; a load out and a workshop.

Building 25A: Load-Out

Outside of the Lucky Queen portal is a corrugated-metal clad building that was used as a load-out for the ore and waste rock. The rock was transported out of the adit and through the building by ore carts and then dumped into vehicles below. The building is L-shaped and measures 31m by 9m and 42m by 5m. It is in good condition and the rails are still in place. The building is a wood timber frame construction with no insulation and metal siding and roofing. No asbestos containing materials were encountered.

Building 25B: Workshop (photos 25-15, 25-16, 25-17)

To the east of the load-out is a 24m by 10m corrugated-metal clad workshop. The workshop has three rooms: a first aid room at one end, a garage area with two bay doors in the middle and a machine room at the other end. There are wooden floors in the first aid room and the machine room and a gravel floor in the garage area. There

were a number of fuel containers (described under Fuel Storage Areas below), drilling equipment, piping, pressure vessel and other miscellaneous debris. No asbestos containing materials were encountered.

6.2 Fuel Storage (Photos 25-15, 25-16 and 25-17)

There are two drum storage areas on the east side of Waste rock pile WR-01. One area contains 10 drums and the second has 5 drums. One of the drums in the 10 drum pile is roughly two-thirds full with 10% waste oil/transmission oil and the rest water. There is a 2m by 1m by 10cm stain, believed to be waste oil, near the 10 drum pile.

Inside the workshop there are three 45-gallon drums; one contains gasoline, one contains transmission oil and one is empty. There are a number of smaller pails that contain hydraulic oil, waste oil, transmission oil and some solvents. A number of stains were observed inside of the shop both on the wooden floorboards and on the gravel floor. One small stain was observed outside of the bay doors. Two soil samples were collected from each of two pits and analyzed for metals and petroleum hydrocarbons (LEPH/HEPH and VPH). Samples 25TP01-S01 and -02 were collected from soils inside the workshop (building 25B) where contamination from solvent was suspected. Samples 25TP04-S01 and -02 were background samples collected in front of the shop away from the suspected contamination. The area surrounding and inside the shop was graveled with up to 5cm of crushed rock from an unknown source.

6.3 Rail and Trestle (Photo 25-13)

There are roughly 75m of tracks that come out of the Lucky Queen Adit and into the load-out building (building 25A). The loadout is built up on a 3m high cribbed wall roughly 30m long. The track and loadout are in good condition and still functional.

Old trestle and rail have been pushed off the edge of the waste piles at the Blackcap adit (WR-04).

6.4 Milling and Processing Infrastructure

No ore was processed here. There is no milling or processing infrastructure at this site.

6.5 Electrical Equipment

No electrical equipment was encountered at the site. Electrical cable extends underground from the portal area of the Lucky Queen adit.

7. SOLID WASTE DUMPS (Photo 25-2)

Four abandoned and burnt out compressors are located at the south end of the North Black Cap Pit. They do not appear to be of any risk. No fuel or waste oil stains were observed on the ground adjacent to them and no fuel or oil remains in them. No soil samples were collected at the site.

8. POTENTIAL CONTAMINANTS OF CONCERN

There is impact associated with petroleum staining in the workshop. See Section 6.2 above for details. Other contaminants of concern are any metals washing from the pit walls, waste rock piles or underground workings.

9. WATER QUALITY (photos 25-14, 25-6)

Three water samples were collected on the site. Mine drainage water was collected from both the Black Cap and Lucky Queen adits. At the Blackcap adit, water seeps through gravel berm located just outside the portal and down the road at least 50m before seeping back into the ground. Sample 25WQ-A01-01/02 was collected from the water flowing outside the berm. Sample 25WQ-A02-01/02 was collected from water flowing in the mine ditch inside the portal of the Lucky Queen adit. A third sample was also collected from a seep above the Black Cap Road, down slope and roughly 170m southwest of the Lucky Queen adit (25WQ-S01-01/02). Analytical results are attached.

10. RECLAMATION

Very little vegetation is growing back in the disturbed areas.

12. REFERENCES

Minfile #100M001ac

United Keno Hill Mines Limited. 1996. *United Keno Hill Mines Limited – Site Characterization.* Report No. UKH/96/01, prepared by Access Mining Consultants Limited.

United Keno Hill Mines Limited. 1996. *United Keno Hill Mines Limited – Site Characterization, Technical Appendices I-VI.* Report No. UKH/96/01, prepared by Access Mining Consultants Limited.

ATTACHMENT 2: 1999 BLACKCAP/SHEPARD/LUCKY QUEEN ADIT WATER SAMPLES LABORATORY RESULTS						
Sample Number	**Detection Limit**	**Units**	**25 WQ - SO1 -02 Blackcap 18/9/99**	**25 WQ - A01 - 02 Blackcap 18/9/99**	**25 WQ - A01 - 04 Blackcap 18/9/99**	**25 WQ - A02 -02 Lucky Queen Sept17/99**
Site Desciption			**Seep downslope of the site**	**Blackcap Adit drainage**	**Blackcap Adit drainage - Duplicate**	**Lucky Queen Adit drainage**
pH (field)	N/A	pH	7.8	7.3	N/A	6.4
Conductivity (field)	N/A	µS/cm	80	40	N/A	150
pH (Lab)	0.01	pH	6.71	6.29	6.37	7.21
Conductivity (Lab)	0.01	µS/cm	69	38	37	590
Total Alkalinity	5	mg CaCO3/L	16	8	6	129
Chloride	0.25	mg/L	<0.25	<0.25	<0.25	<0.25
Hardness (CaCO3 equiv)	5	mg/L	30.7	12.4	12.5	261
Nitrate-N	0.05	mg/L	0.75	1.3	1.4	0.59
Nitrite-N	0.003	mg/L	0.003	<0.003	0.006	0.003
Sulphate	- 1	mg/L	9.2	4.6	4.7	123
Total Dissolved Solids	5	mg/L	51	34	38	366
Analysis by ICP-USN						
Aluminum	0.0008	mg/L	0.0171	0.0437	0.0426	0.324
Antimony	0.005	mg/L	<0.005	<0.005	<0.005	<0.005
Arsenic	0.01	mg/L	<0.01	<0.01	<0.01	<0.01
Barium	0.00004	mg/L	0.0239	0.00276	0.00289	0.021
Beryllium	0.00001	mg/L	<0.00001	<0.00001	<0.00001	<0.00001
Bismuth	0.0004	mg/L	<0.0004	<0.0004	<0.0004	<0.0004
Boron	0.002	mg/L	<0.002	<0.002	<0.002	<0.002
Cadmium	0.00006	mg/L	0.00023	0.00833	0.00842	0.00272
Calcium	0.002	mg/L	9.03	3.21	3.27	77.2
Chromium	0.00006	mg/L	<0.00006	<0.00006	<0.00006	0.00082
Cobalt	0.00003	mg/L	<0.00003	<0.00003	<0.00003	0.00054
Copper	0.00003	mg/L	0.0003	0.00158	0.00162	0.00381
Iron	0.00001	mg/L	0.023	0.153	0.137	1.06
Lead	0.0003	mg/L	<0.0003	0.0478	0.0437	0.0072
Lithium	0.001	mg/L	0.003	0.002	0.001	0.006
Magnesium	0.0005	mg/L	1.51	0.775	0.777	27.4
Manganese	0.00002	mg/L	0.00192	0.0976	0.0988	0.16
Mercury	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum	0.00007	mg/L	<0.00007	<0.00007	<0.00007	0.00019
Nickel	0.00001	mg/L	0.0006	0.0029	0.0029	0.007
Phosphorus	0.03	mg/L	<0.03	<0.03	<0.03	0.04
Potassium	0.4	mg/L	<0.4	<0.4	<0.4	0.5
Selenium	0.004	mg/L	<0.004	<0.004	<0.004	<0.004
Silicon	0.004	mg/L	2.98	2.64	2.62	3.46
Silver	0.00005	mg/L	<0.00005	0.00491	0.00491	0.00068
Sodium	0.004	mg/L	0.7	1.3	1.3	1.6
Strontium	0.00002	mg/L	0.0398	0.0218	0.0223	0.172
Sulphur	0.008	mg/L	3.19	1.51	1.5	40.1
Thallium	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Titanium	0.00002	mg/L	0.00074	0.00072	0.00068	0.0132
Vanadium	0.00003	mg/L	<0.00003	<0.00003	<0.00003	0.00073
Zinc	0.0002	mg/L	0.0395	0.415	0.425	0.195
Analysis by Hydride AA						
Arsenic	0.0002	mg/L	0.0014	0.0038	0.0031	0.003
Selenium	0.0001	mg/L	<0.0001	0.0002	<0.0001	0.0008

ATTACHMENT 2: 1999 BLACKCAP/SHEPARD/LUCKY QUEEN SOIL SAMPLES

LABORATORY RESULTS

Sample Number	Detection Limit	Units	25TP01-S01	25TP01-S02	25TP04-01	25TP04-02
Site Description						
pH in Soil (1:2 water)						
pH	0.01	pH	6.5	6.2	6.2	6.4
LEPH/HEPH in Soil						
LEPHs10-19	10	mg/kg	1490	7890	440	142
HEPHs19-32	10	mg/kg	15100	3930	116	61
Moisture						
% Moisture		%	3.4	9.1	9	8.6
PAH in Soil						
Naphthalene	0.05	mg/kg	0.07	0.08	<0.05	<0.05
Acenaphthylene	0.05	mg/kg	<0.05	0.06	<0.05	<0.05
Acenaphthene	0.05	mg/kg	<0.05	0.05	<0.05	<0.05
Fluorene	0.05	mg/kg	<0.05	0.25	<0.05	<0.05
Phenanthrene	0.05	mg/kg	0.26	0.68	<0.05	<0.05
Anthracene	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05
Fluoranthene	0.05	mg/kg	0.05	0.13	<0.05	<0.05
Pyrene	0.05	mg/kg	0.24	0.95	<0.05	<0.05
Benzo(a)anthracene	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05
Chrysene	0.05	mg/kg	<0.05	0.11	<0.05	<0.05
Benzo()fluoranthenes	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05
Ideno(1,2,3-c,d)pyrene	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05
Dibenzo(a,h)anthracene	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05
Benzo(g,h,i)perylene	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05
Surrogates						
Nitrobenzene-d5		%	na	99	110	117
2-Fluorobiphenyl		%	85	110	106	104
4-Terphenyl-d14		%	85	66	79	78
VPH in Soil						
VHs6-10	1	mg/kg	100	130	23	8.3
VPHs6-10	1	mg/kg	100	130	23	8.3
BTEX in Soil						
Benzene	0.02	mg/kg	<0.02	0.02	<0.02	<0.02
Toluene	0.02	mg/kg	<0.02	<0.02	<0.02	<0.02
Ethylbenzene	0.02	mg/kg	0.21	0.22	<0.02	<0.02
m,p-Xylene	0.05	mg/kg	<0.05	0.09	<0.05	<0.05
o-Xylene	0.03	mg/kg	0.05	0.85	0.04	<0.03
ICP Semi-Trace Scan - Metals						
Aluminum	5	µg/g wet	25600	15000	25600	23900
Antimony	2	µg/g wet	22	<2	38	47
Arsenic	2	µg/g wet	62	28	148	109
Barium	0.05	µg/g wet	439	283	663	503
Beryllium	0.1	µg/g wet	0.7	0.4	0.9	0.8
Bismuth	5	µg/g wet	<5	<5	<5	<5
Cadmium	0.1	µg/g wet	33.2	5.4	29.8	25.9
Calcium	5	µg/g wet	2130	2680	1670	1020
Chromium	0.5	µg/g wet	40.1	23	39.9	41.5
Cobalt	0.1	µg/g wet	11.1	11	12.4	9.5
Copper	0.5	µg/g wet	55	37.1	138	85.4
Iron	1	µg/g wet	45000	24000	54000	35000
Lead	1	µg/g wet	331	87	790	560
Lithium	0.5	µg/g wet	12.1	12	20.1	13.7
Magnesium	1	µg/g wet	1890	3680	2400	1750
Manganese	0.5	µg/g wet	8730	2130	12100	5880
Mercury	0.01	µg/g wet	0.06	<0.01	0.05	0.01
Molybdenum	1	µg/g wet	4	2	4	3
Nickel	0.2	µg/g wet	33.6	24.5	43.7	31.8
Phosphorus	5	µg/g wet	713	718	700	549
Potassium	20	µg/g wet	5300	2480	5100	4300
Selenium	2	µg/g wet	<2	<2	<2	<2
Silicon	5	µg/g wet	411	223	7	130
Silver	0.5	µg/g wet	26.7	5.3	70.8	60
Sodium	5	µg/g wet	1780	717	1780	1500
Strontium	1	µg/g wet	74	33	67	70
Sulphur	10	µg/g wet	1710	240	290	290
Thorium	1	µg/g wet	<1	2	<1	3
Tin	1	µg/g wet	4	1	3	4
Titanium	0.2	µg/g wet	175	584	298	143
Uranium	5	µg/g wet	<5	<5	6	<5
Vanadium	1	µg/g wet	49	40	55	51
Zinc	0.5	µg/g wet	2000	560	2160	1480
Zirconium	0.1	µg/g wet	26	15.4	24.1	23.3

ATTACHMENT 2: BLACKCAP/SHEPARD/LUCKY QUEEN WASTE ROCK SAMPLES LABORATORY RESULTS							
Site Number	Detection Limit	Units	25WR01-01 - Sept 18/99	25WR02-01 - Sept 18/99	25WR03-01 - Sept 18/99	25WR04-01 - Sept 18/99	25WR05-01 - Sept 18/99
Sample Desciption							
Paste pH (field)	N/A	pH	6.7	6.1	7.1	6.2	7.5
Conductivity (field)	N/A	µS/cm	210	130	610	630	650
pH in Saturated Paste							
pH	0.1	pH	6.7	6.2	6.5	4.7	7
pH in Soil (1:2 water)							
pH	0.01	pH	7.9	7.3	6.9	4.2	7.4
ICP Semi-Trace Scan							
Aluminum	5	µg/g	29600	26500	30100	37900	21700
Antimony	2	µg/g	520	130	58	2	<2
Arsenic	2	µg/g	1140	228	57	76	28
Barium	0.05	µg/g	567	407	405	369	84.2
Beryllium	0.1	µg/g	0.8	0.9	1.2	1.2	0.5
Bismuth	5	µg/g	<5	<5	<5	<5	<5
Cadmium	0.1	µg/g	170	26.7	23.1	6	3.2
Calcium	5	µg/g	663	793	624	1830	21500
Chromium	0.5	µg/g	50.3	51.1	53.1	50.4	20.9
Cobalt	0.1	µg/g	8.1	2.7	9.1	16.7	15.4
Copper	0.5	µg/g	667	150	352	62.3	46.9
Iron	1	µg/g	47000	34000	42000	47000	39000
Lead	1	µg/g	10500	6390	2310	192	122
Lithium	0.5	µg/g	11.8	7.6	22.6	13.6	27.9
Magnesium	1	µg/g	647	648	1460	2690	14200
Manganese	0.5	µg/g	6370	2180	4520	1840	1310
Mercury	0.01	µg/g	1	0.19	0.13	<0.01	<0.01
Molybdenum	1	µg/g	2	2	3	3	8
Nickel	1	µg/g	17.8	11.4	30.3	52.2	45.3
Phosphorus	5	µg/g	1110	766	852	945	1460
Potassium	20	µg/g	9200	8400	7200	6600	3150
Selenium	2	µg/g	<2	<2	<2	<2	<2
Silicon	5	µg/g	303	752	99	678	475
Silver	0.5	µg/g	409	167	81	11.2	8.2
Sodium	5	µg/g	1520	961	1540	1430	102
Strontium	1	µg/g	78	60	90	66	32
Sulphur	10	µg/g	340	480	220	510	14600
Thorium	1	µg/g	4	4	5	6	2
Tin	1	µg/g	7	6	2	1	<1
Titanium	0.2	µg/g	58.3	64.3	33.4	178	35.4
Uranium	5	µg/g	<5	<5	<5	<5	<5
Vanadium	1	µg/g	49	48	56	61	23
Zinc	0.5	µg/g	1680	1260	1550	866	337
Zirconium	0.1	µg/g	22.6	25.1	29.2	32.9	31.9

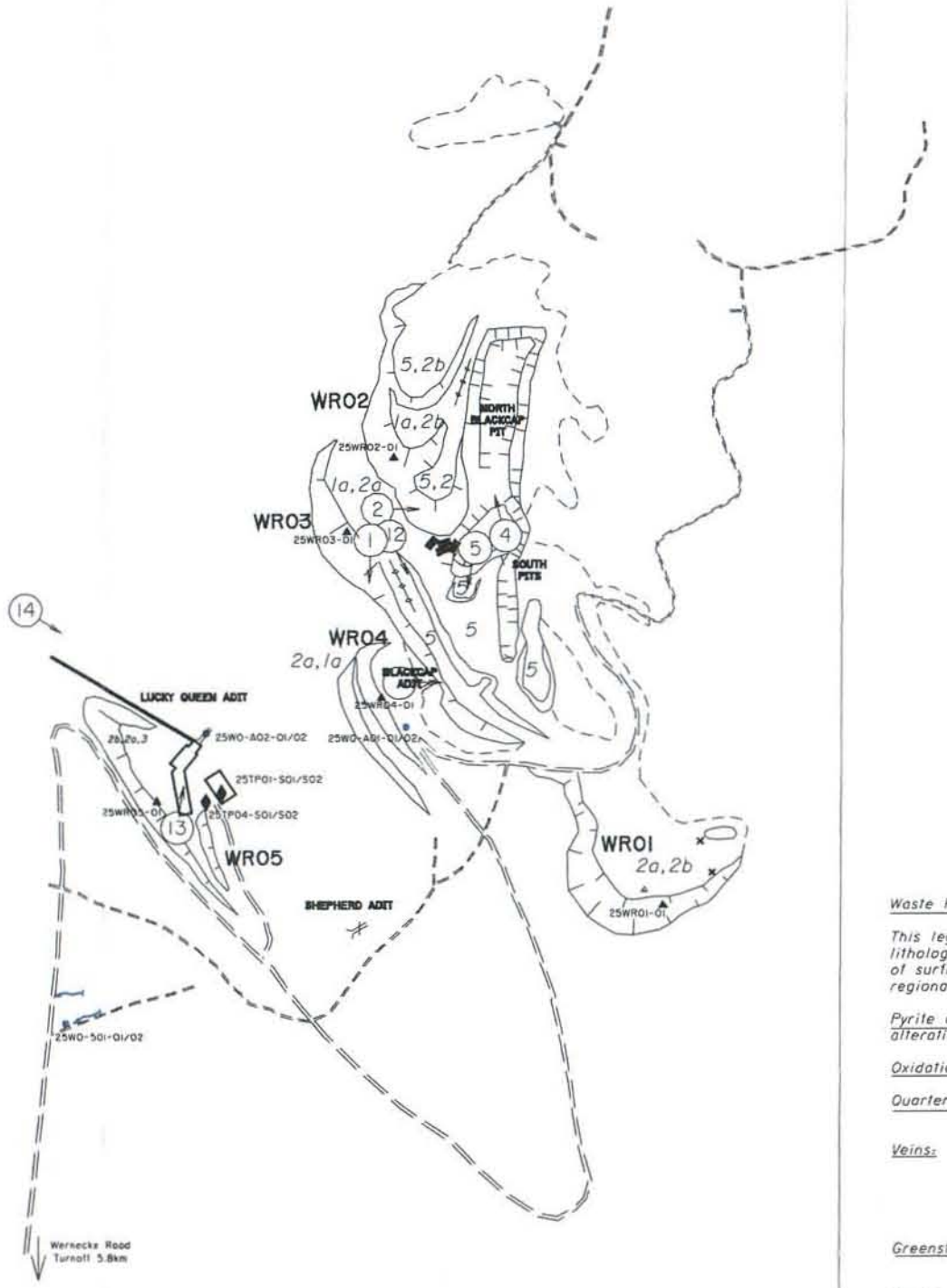
ATTACHMENT 2: 1999 BLACKCAP/SHEPARD/LUCKY QUEEN ADIT WASTE ROCK SAMPLES LABORATORY RESULTS
MODIFIED SOBEK METHOD ACID-BASE ACCOUNTING TEST

SAMPLE	SITE DESCRIPTION	PASTE pH	S(T) %	S(SO4) %	AP	NP	NET NP	NP/AP
25WR01-01 - Sept 18/99		7.5	0.02	0.02	0.0	-0.6	-0.6	---
25WR02-01 - Sept 18/99		7.1	0.03	0.02	0.3	-1.1	-1.4	<0.1
25WR03-01 - Sept 18/99		7.4	0.02	0.01	0.3	-0.8	-1.1	<0.1
25WR04-01 - Sept 18/99		6.2	0.04	0.01	0.9	0.2	-0.7	0.3
25WR05-01 - Sept 18/99		8.2	1.12	0.03	34.1	82.8	48.8	2.4

AP = ACID POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NP = NEUTRALIZATION POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NET NP = NET NEUTRALIZATION POTENTIAL = TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NOTE: WHEN S(T) AND/OR S(SO4) IS REPORTED AS <0.01, IT IS ASSUMED TO BE ZERO FOR THE AP CALCULATION.
N/D = NO DUPLICATE ASSAY. CALCULATIONS ARE BASED ON ASSAY RESULTS OF THE INITIAL SAMPLE.
RE = REPLICATE.

NOTE - A HIGH LEVEL OF SOLUBLE METALS (ESPECIALLY IRON) WERE OBSERVED IN MANY SAMPLES DURING THE ABA TITRATIONS.
SAMPLES WITH A NEGATIVE NET NP SHOULD BE TESTED FOR MOBILE METALS USING STANDARD SHAKE FLASK EXTRACTION TESTS.

- Building (22A: building site present reference*) Indicates Asbestos Material
- 22A Collapsed Building
- Adit
- Collapsed Adit
- Shaft
- Collapsed/Backfilled Shaft
- Mine Rock Dump
- Bedrock Open Pit
- Trench
- Stripped Overburden Stockpile
- Stripped / Disturbed Area
- Outcrop Boundary
- Highway
- Road (gravel, 2 wheel drive)
- Road (gravel, 4X4 accessible)
- Road (inaccessible)
- Trail
- Culvert
- 24501-01 1999 Soil Sample (this study)
- Pre 1999 Soil Sample (other sources)
- 25WR04-01 1999 Waste Rock Sample (this study)
- Pre 1999 Waste Rock Sample (other sources)
- WO-12-06 1999 Water Sample
- Pre 1999 Water Sample
- Tension Cracks
- Mass Movement (note: for Forms: BelleKeno)
- Groundwater Seep
- Surface Water Flow (Stream, Creek, River)
- Lake
- Settling Pond / Water Treatment Pond
- Tailings Dam / Tailings Pond / Mill Tails
- Ponded Water / Trench
- Barrels
- Abandoned Equipment (compressors, ore cars, rails, air and water pipe)
- Mine Rails / Trestle
- Collapsed Trestle
- Solid Waste Disposal Site
- Area of Soil Contamination
- *(6) Transformer Location (number of transformer in brackets)
- Power Line
- Power Line Collapsed
- Aerial Transmission Towers
- 5 Photo Site (arrow shows view direction)
- GPS Survey Location
- Former Building Site (Elsa)



Waste Rock Geological Legend

This legend intended for use as a key to the observed lithological content of the mine dumps and stockpiles of surficial materials investigated. It does not represent regional stratigraphy and no stratigraphic sequence is implied.

Pyrite content as percent; eg. Py 2%. Occurs as an alteration halo adjacent To vein fault structure.

Oxidation: Weak (wOx), moderate (mOx) and intense (iOx).

Quarternary: (5) Undifferentiated, unconsolidated colluvium, glacial till.

Veins: (4a) Quartz veins;
(4b) Quartz-pyrite veins;
(4c) Quartz-siderite *trace galena-sphalerite veins;
(4d) Siderite-quartz *trace galena-sphalerite veins;
(4e) Suphide (galena-sphalerite) *quartz*siderite veins.

Greenstone: (3) Amphibole-chlorite-plagioclase metadiorite or metagabbro.

Quartzite: (2a) Thick bedded, blocky gray quartzite;
(2b) Thin banded, broken, quartzite with carbonaceous phyllite interbeds;
(2c) Calcareous quartzite.

Phyllite: (1a) Broken sericite-chlorite phyllite;
(1b) Carbonaceous phyllite.

0 50 100 150 200

Scale 1:5000

CAD FILE: SITE25.DGN

Public Works And Government Services Canada / Travaux publics et Services gouvernementaux Canada

Architectural & Engineering Services
Western Region

designed by: / conçu par:	date:
drawn by: / dessine par:	C.S. Nov./99
approved by: / approuvé par:	
revisions:	

Drawing title: / Titre du dessin:

BlackCap /Shepherd and SQ Adit Site #25
Site Assessment
Yukon Territory

project no. / no. du projet:	dwg. no. / dessin no.
125-12.01	1 of 1

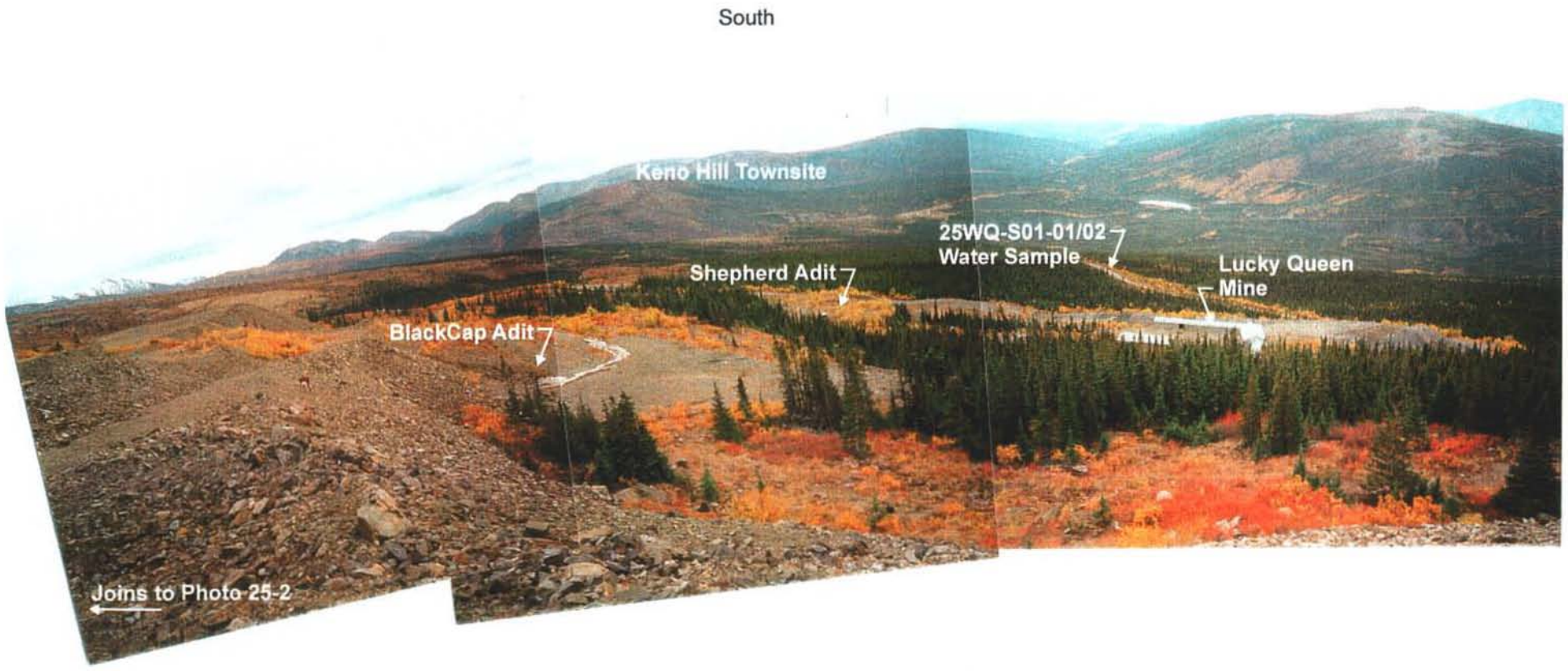
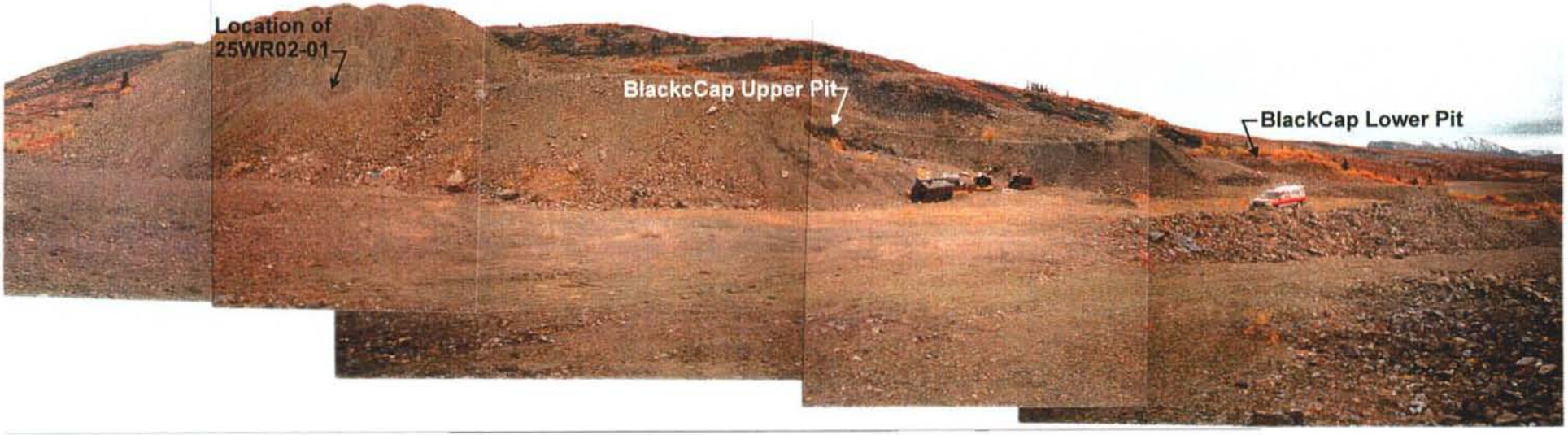


Photo 25-1: Panorama of the Shepherd and Lucky Queen mine sites.

East



Joins to Photo 25-1 →

Photo 25-2 : Panorama of the BlackCap mine site. Note abandoned and burnt compressors.

Photo 25-3: Locked gate at bottom of road limiting access to the Blackcap, Shepherd and Lucky Queen sites.(Azimuth 160^{0})

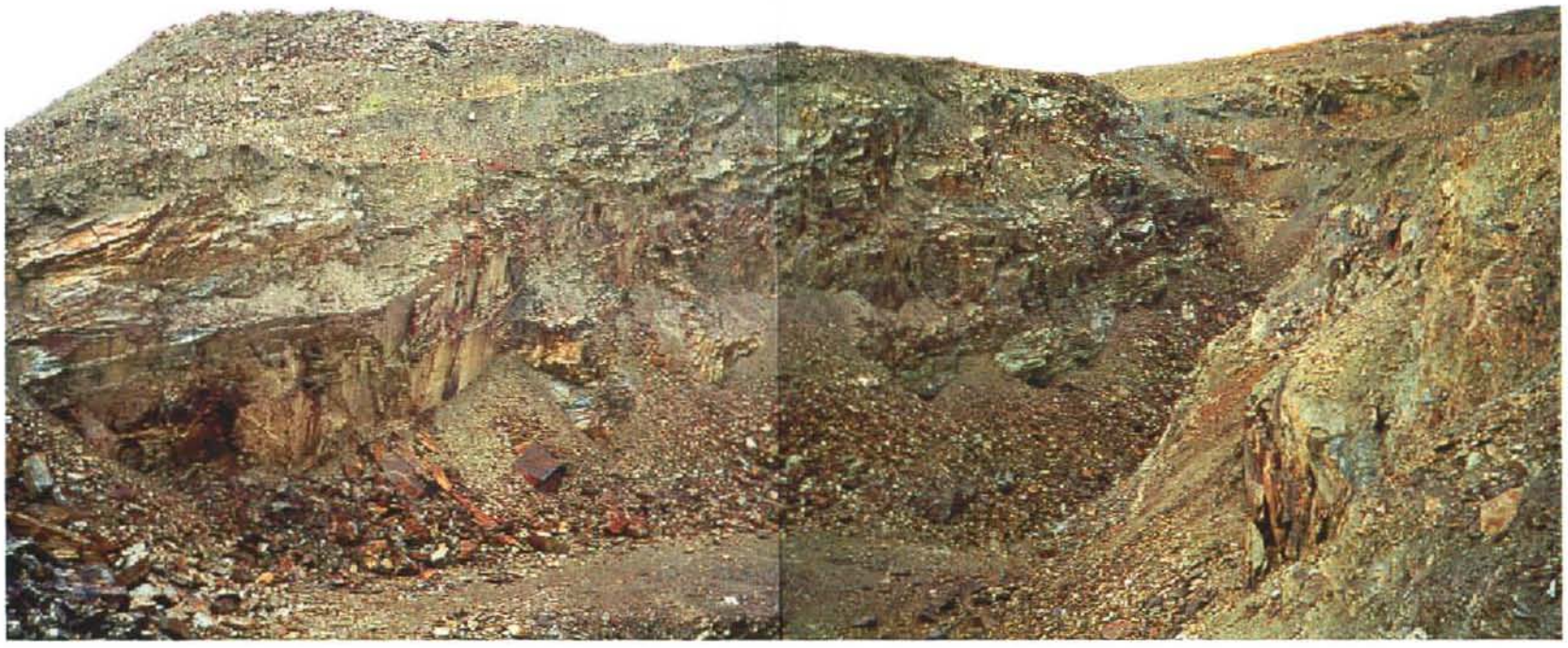


Photo 25-4: Upper Blackcap pit. Note unstable pit walls and recent rock debris at base.(Azimuth 340^{0})

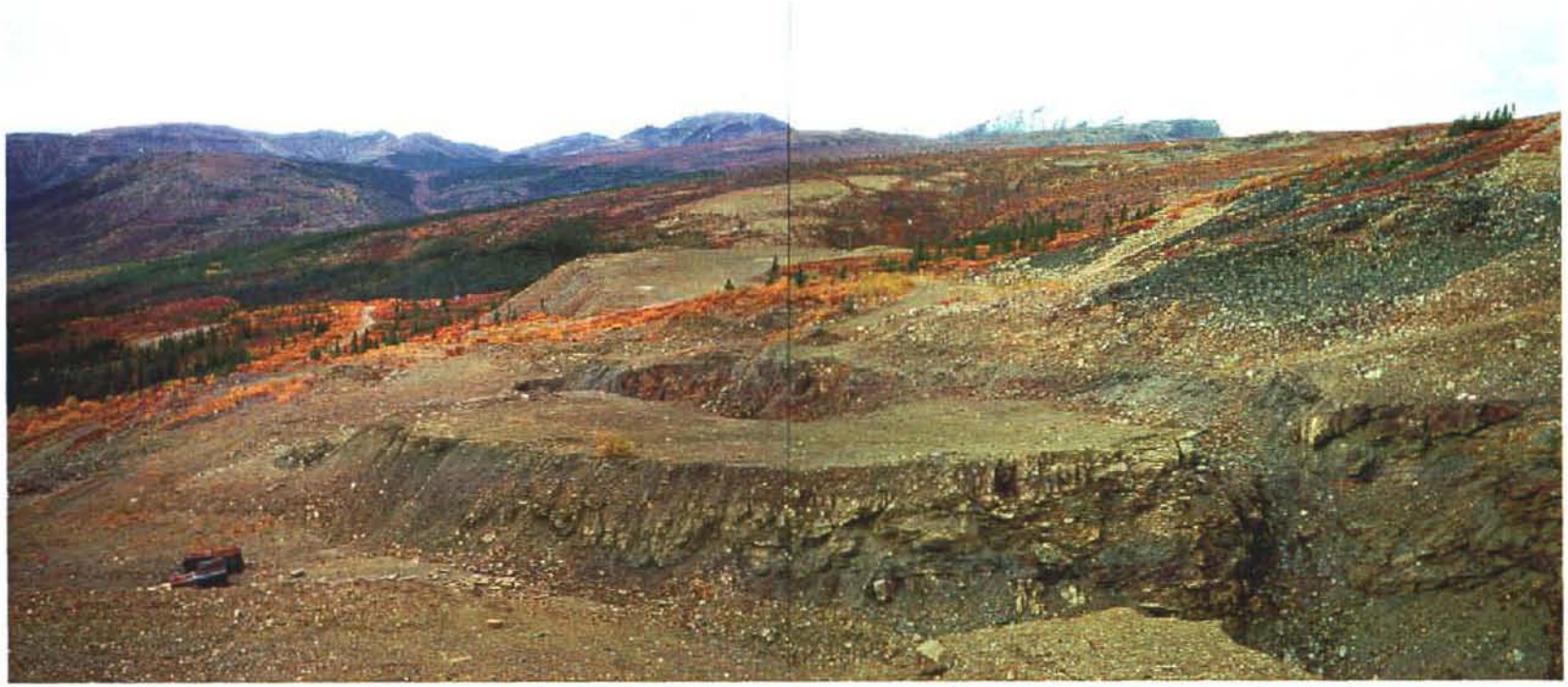


Photo 25-5: Lower Blackcap pits and waste rock pile WR01 in background. (Azimuth 000^{0})

Photo 25-6: Shepherd adit. Note mine drainage damned behind gravel berm.(Azimuth 090°)

Photo 25-7: Lucky Queen load out building and portal structure. Note cribbed portal in foreground and load-out in background. (Azimuth 200°)

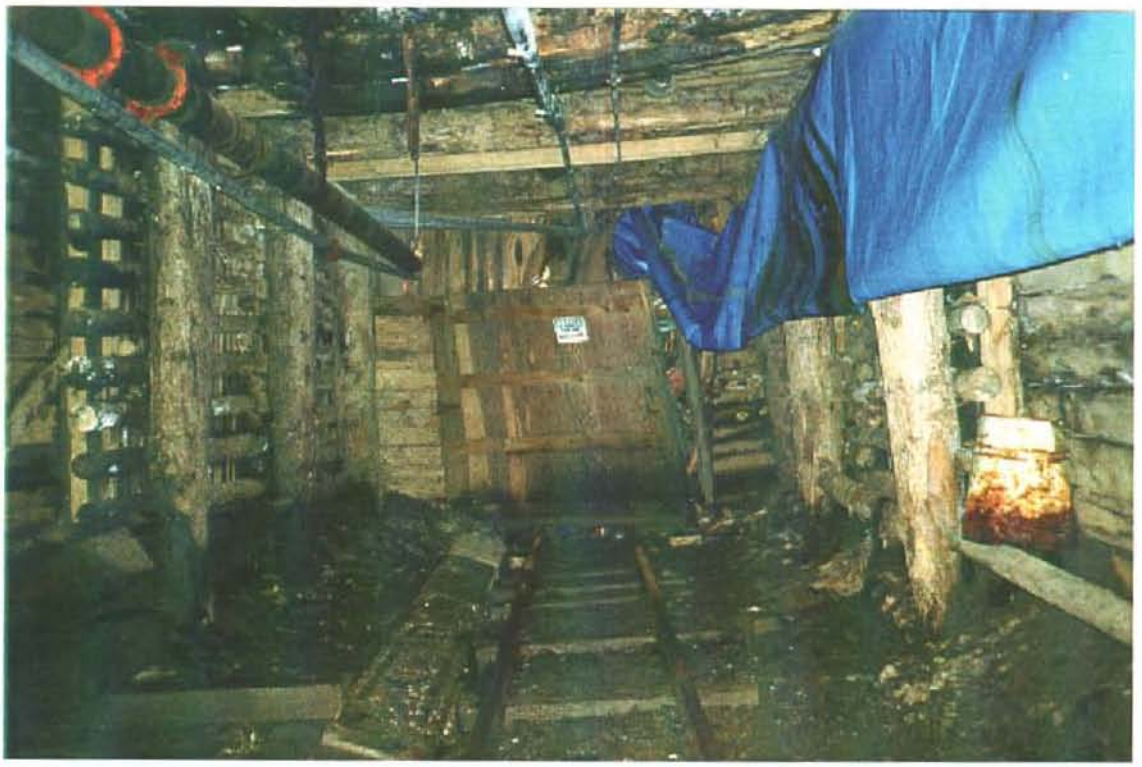


Photo 25-8: Interior of portal. Note drainage ditch to bottom left and partially collapsed door. (Azimuth 060°)

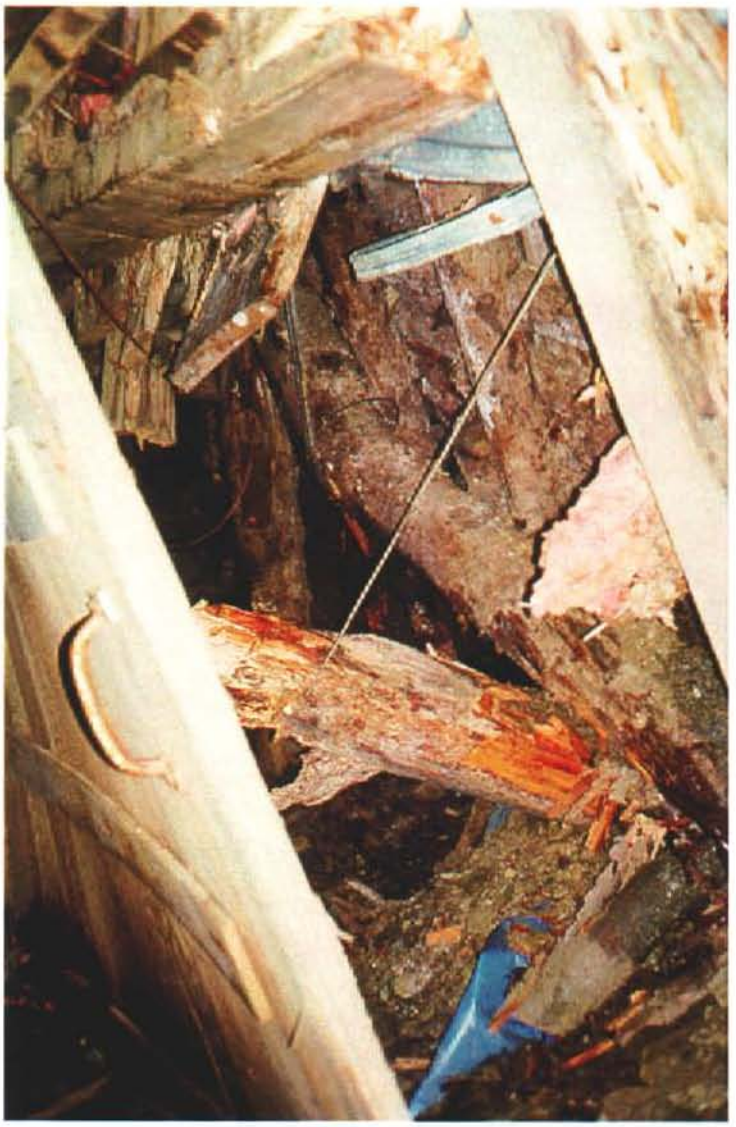


Photo 25-9: Collapsed portal timbers behind door.

Photo 25-10: Waste rock pile WR03 sample (25WR03-01).

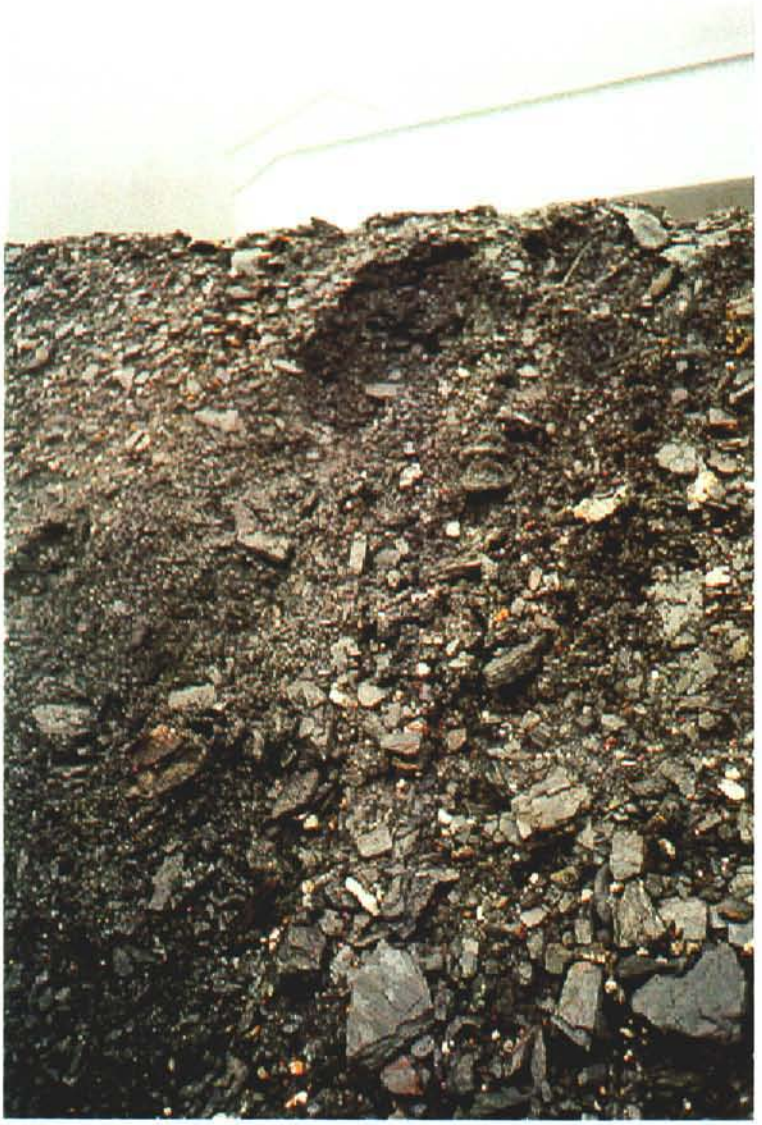


Photo 25-11: Waste rock sample site (25WR05-01) at Lucky Queen waste rock pile WRO5.

Photo 25-12: Tension cracks on edge of waste rock pile. Note slumped edge running along edge to mapper. (Azimuth 180°)

Photo 25-13: Lucky Queen load-out area. Workshop in background to right. (Azimuth 000°)

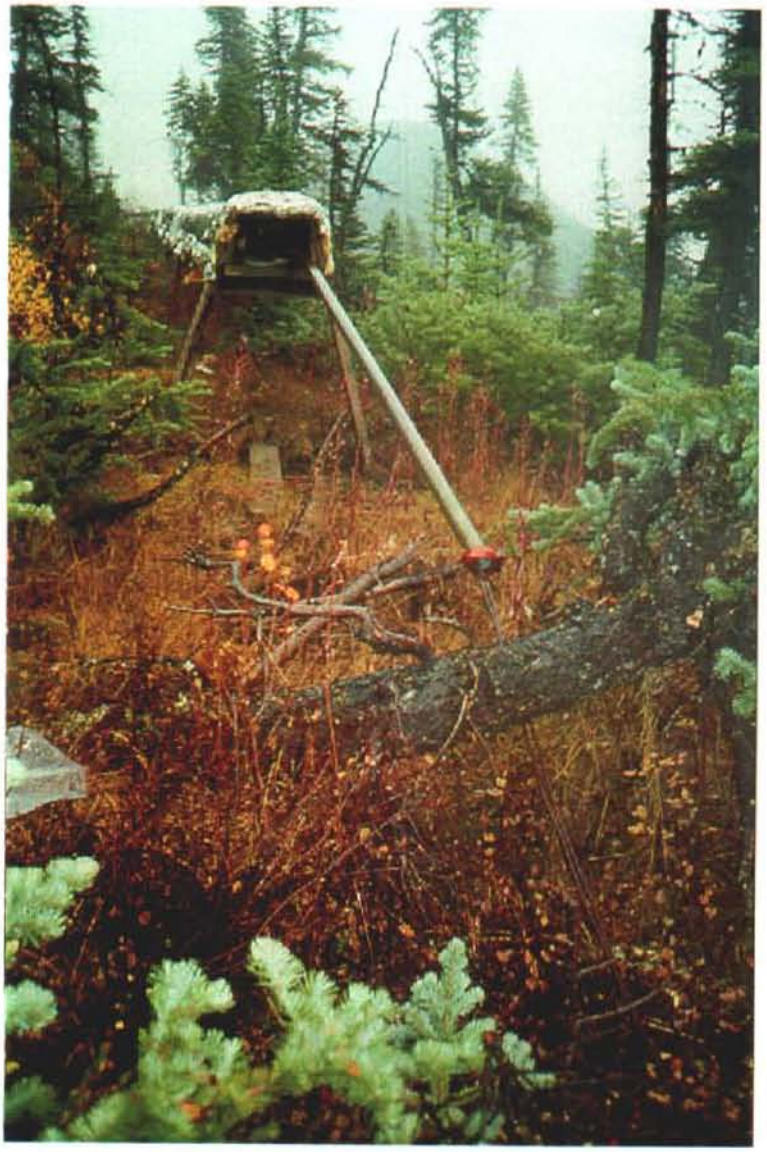


Photo 25-14: Mine drainage flume. Note copper heater coils extending out of pipe. (Azimuth 130°)

Photo 25-15: Interior of workshop bays. Note drum of transmission oil and pails of waste oil in left corner. Test pits located just right of far up-right drum (TP01) and blue pail of solvent near centre (Tp02). Workshop area through door on far wall. (Azimuth 180°)

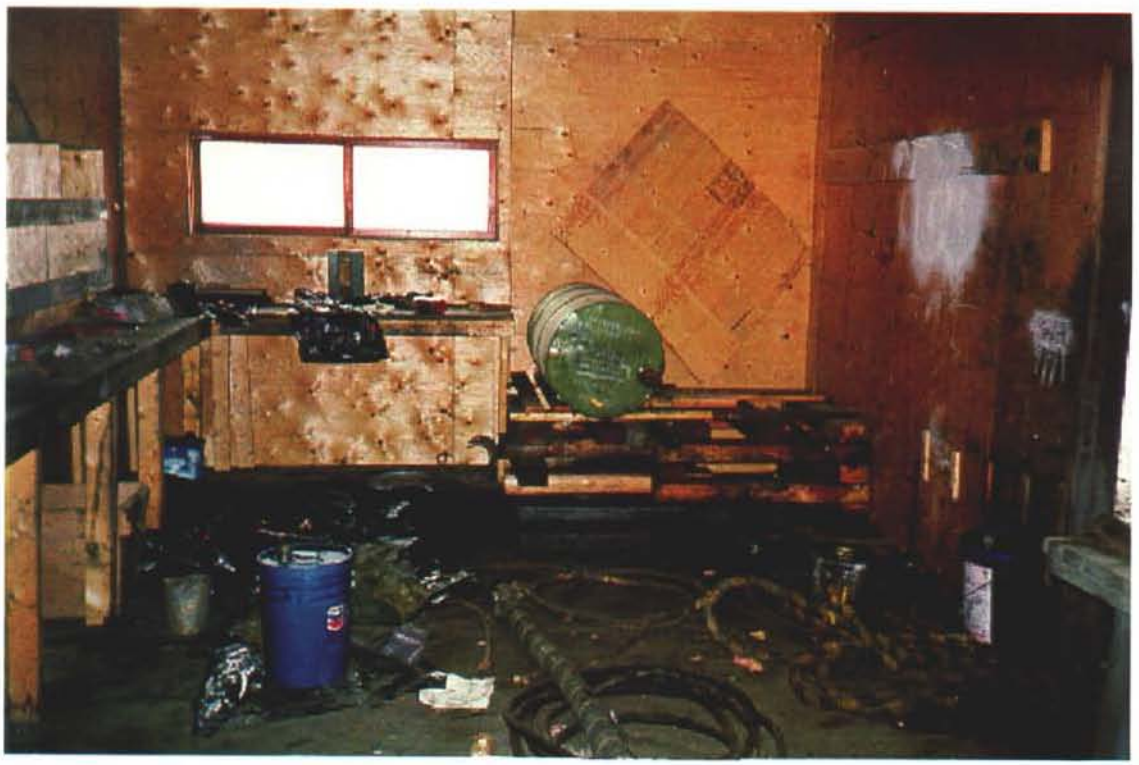


Photo 25-16: Interior of workshop area. Note leaking drum of hydrualic oil and full pan below. (Azimuth 250°)

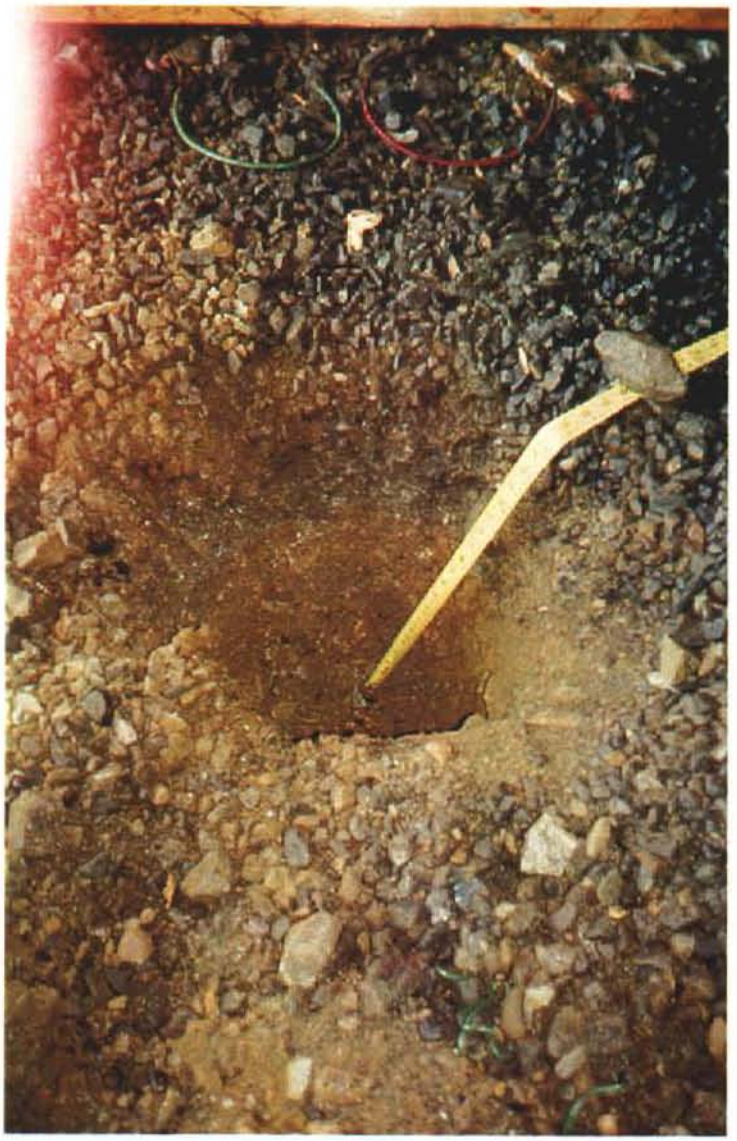


Photo 25-17: Test pit TP01 in Lucky Queen shop.
Note heavy oil stain on surface gravel.

LUCKY QUEEN

SITE #26

MINFILE# 105M001ad

1. LOCATION AND ACCESS

The Lucky Queen site is located on the northwestern slope of Keno Hill at an approximate elevation of 1510m. It is roughly 1.25km east and uphill of the Wernecke Camp/Sadie Ladue Mine site. Approximate UTM co-ordinates are 7092 700m N and 487 700m E. The Silver Queen site is located 7.3km north by road from the Wernecke Road/Keno Mine Road junction in Keno City. Access is gained via the Upper Faro Gulch Trail, a rough two-wheel drive truck road which branches to the east off the Wernecke Road 5.1km north from Keno City.

2. SITE PHYSIOGRAPHY (photos 26-1, 26-2)

The Lucky Queen site area gently slopes down to the northwest. It is located at the upper limit of the subalpine and is vegetated with grasses, willows and a few lone spruce trees. Soil cover is sparse and is composed mostly of residual soils formed by the weathering of the underlying bedrock and from the decomposition of granular till.

Given the aspect of the slope and the elevation, the site is likely underlain by permafrost. According a report prepared by Access in 1996 for United Keno Hills Mines, mine workings on the north slope of Keno Hill intersected permafrost 400 feet below ground surface.

The first significant bottom drainage system is Ladue Creek located roughly 4.8km to the northwest. The surface runoff from the mine site drains towards the northwest before it dissipates into the porous soil cover. No other surface water was observed in the vicinity of the site at the time of inspection.

3. GEOLOGY AND MINERALIZATION

The deposit is characterized by the presence of silver/lead/zinc mineralization (Roots and Murphy, 1992). The host rocks includes Mississippian Keno Hill quartzite, Upper Devonian and Mississippian sedimentary and felsic meta-volcanic rocks.

4. SITE HISTORY

Underground mining from an inclined shaft and from the 50, 100, 200 and 300 levels was undertaken from 1928 to 1932 (level elevations refer to feet below surface). Ore was transported to the Wernecke mill located at the Wernecke site using an aerial tramway. In the 1970s the inclined shaft was rehabilitated down to the 300

level and covered with a building. Between 1984 to 1988, UKHM constructed a 1,737m adit at the 500 level to explore the Lucky Queen vein (for further discussion, see Site #25 report: Blackcap, Shepherd and LQ Adit). Surface bulldozer and excavator stripping around the shaft was undertaken during the late 1980s.

5. MINE DEVELOPMENT (photos 26-1, 26-2)

Mine development at the site consists of the 3 shafts, six main trenches and associated waste rock piles. Site details can be found on Figure 1; see Attachment 1 for site photos.

5.1 Mine Openings and Excavations

There are 3 shafts and six main trenches/pit excavations. One shaft is still open; another has collapsed; the last one has presumably been filled and buried under the waste cover. A few smaller trenches oriented northwest-southeast, are located west of trench #6.

Shaft #1

Shaft #1 was rehabilitated in the 1970s and is still open. A wooden building (for description, see Section 6.1 below; also photo 26-7) has been built to cover the inclined shaft.

Location: The building and shaft are upgradient of the trenches, on the east side of the Lucky Queen Road.

Dimensions (L x W x H): 4m x 3m x 5m

Supports: Large wooden timber structure.

Condition: Sound, safe.

Accessibility: The shaft is enclosed in building 26-A, although access is easily gained through the unsealed ore dump. Inside, the manway and ladders are open and easily accessed.

Shaft #2

Description

Location: The shaft is located between Trench 2 and Trench 3, 40m southwest of Shaft #1.

Dimensions (L x W x H): Not able to determine.

Supports: Wooden log timbers.

Condition: Caved by recent surface trenching work.

Accessibility: Inaccessible.

Trench #1 (photo 26-3)

There is a small pond of water within Trench #1. The back wall is approximately 4 metres high. The depth of the pit was not determined, although it is estimated to be less than 2 metres.

Location: 55m south of the 90° bend in the Lucky Queen Road, 120m south of the building.

Dimensions (L x W x H): 28m x 7.0m x ≥4m (depth not determined.)

Condition: Stable; minor loose rock.

Accessibility: Access to the edge of the trench/pit is easily made on foot, notable the higher upper edge. However it is full of water which limits access inside.

Trench #2 (photo 26-4)

This trench is L-shaped; there is a small L-shaped pond of water within it. There is a large outcrop along the eastern wall. Depth of the water is less than 1 metre.

Location: One arm of the trench is oriented at roughly 010°, the second is at 270°.

Dimensions (L x W x H): 19m x 14m x 1m – 3m

Condition: Stable; minor loose rock.

Accessibility: The trench can be easily accessed by foot. The water limits access inside the trench.

Trench #3

Trench #3 has been excavated in overburden. There is a small pond of water within trench #3 of less than 1 metre.

Location: The trench is oriented at 300°. It is located a few meters to the west of trench #2.

Dimensions (L x W x H): 23m x 9.0m x 1.5m

Condition: Stable.

Accessibility: The trench can be easily accessed by foot.

Trench #4 (photo 26-5)

Trench #4 has been excavated in overburden. There is no surface water within Trench #4. There is a minor, intermittent flow along the bed of the trench.

Location: It is at the same orientation as Trench #3, on the other side of the road.

Dimensions (L x W x H): 46m x 8.0m x 1.5m

Condition: Stable.

Accessibility: The trench can be easily accessed by foot.

Trench #5 (photo 26-6)

Trench #5 is T-shaped. There is no surface water within Trench #5.

Location: It is 130m southwest of the Lucky Queen Road, prior to the road reaching the other trenches and shafts. The top of the "T" is oriented at 315°; the other section is oriented at 220°.

Dimensions (L x W x H): 52m x 5.0m x 1.5m (top part), 25m x 5.0m x 1.5m

Condition: Stable.

Accessibility: The trench can be easily accessed by foot.

Trench #6

There is no surface water within Trench #6.

Location: The trench is oriented at 115°, 30m northeast of the inclined shaft.

Dimensions (L x W x H): 47m x 5m x 1.5m

Condition: Stable.

Accessibility: The trench can be easily accessed by foot.

5.2 Waste Rock Disposal Areas

Waste rock covers much of the Lucky Queen site. For the purposes of this report, the waste rock has been broken down into six individual piles based on composition and association with excavations (refer to Figure 1 and to photos 26-1 and 26-2).

Waste Rock Pile WR-01

The waste rock has been excavated from Trench #5 and is composed at surface of greenstone, phyllite and 50% overburden. Oxidation is minor, limited mostly to the overburden material included in the pile.

Location: The pile is to the west of the powerline, between Trench #5 and Trench #1.

Dimensions (L x W x H): The waste rock pile is irregular in shape with maximum dimensions of 70m in length and 50m wide and an average depth of 2m. The total volume of the pile is roughly 8500m^3.

Sampling: No samples were collected.

Waste Rock Pile WR-02

The waste rock has been excavated from Trench #1 and is composed at surface of graphitic phyllite and 40% overburden. Oxidation is minor, limited mostly to the overburden material included in the pile.

Location: The pile is to the west of Trench #1.

Dimensions (L x W x H): 35m x 35m x 1.5m

Sampling: No samples were collected.

Waste Rock Pile WR-03

Most likely the majority of the waste rock was excavated from Trenches 2 and 3 and Shaft #2. Some waste rock material may have originated in Trenches 1 and 4. The composition of the waste rock at the surface is greenstone, phyllite and 50% overburden. Oxidation is minor. A small seep drains from trench 1 up to 20

metres across waste rock pile WR-03 before it dissipates into the coarse rock. This was sampled (see Section 9 below).

Location: The pile is located west of Trenches 2 and 3, south of Lucky Queen Road.

Dimensions (L x W x H): The waste rock pile is irregular in shape with maximum dimensions of 100m in length, 40m in width and an average depth of 1.5m. The total volume of the pile is roughly 11,425 m^3.

Sampling: No samples were collected.

Waste Rock Pile WR-04

The majority of the waste rock is likely form trench #4 however some of the waste rock may be from Shaft #1. The surface waste rock in the pile is graphitic phyllite with 1-3% veining. Surface water is limited to the trench and pits described above. Surface water drains slowly from the old collapsed shaft into Trench #3, through the coarse rock to Trench #4 and then down the slope off the waste rock piles. This was sampled before it dissipated into the soils down slope (see Section 9 below).

Location: The pile is north of Trench #4; across the road from the building.

Dimensions (L x W x H): The dimensions of the pile are 60m x 45m x 2m; the volume is roughly 5400m^3.

Sampling: No samples were collected.

Waste Rock Pile WR-05

Located between the road leading to shaft #1 and trenches 2 and 3, the waste rock was most likely originated from both these sources. No significant oxidation and no surface water were observed.

Location: It is located immediately south of the road leading to the building and shaft #1.

Dimensions (L x W x H): 45m x 11m x 2.5m

Sampling: No samples were collected.

Waste Rock Pile WR-06

The waste rock was excavated from Shaft #1 and from Trench #6 and the surface rock is greenstone phyllite and 60% overburden. No significant oxidation and no surface water were observed.

Location: Between Shaft #1 and Trench #6 on the east side of Lucky Queen Road.

Dimensions (L x W x H): 30m x 20m x 1.5m

Sampling: No samples were collected.

5.3 Tailings Impoundments

Ore was processed downslope at the Wernecke Camp; no tailings were present on the site.

5.4 Minesite Water Treatment

There is no water treatment facility located at this site.

6. MINE SITE INFRASTRUCTURE

There is one building located at this site. Wooden towers for the aerial tramway extend from the Lucky Queen site down to the Wernecke camp. Power lines extend up the hill to service other sites beyond Lucky Queen. Site details are located on Figure 1: site photos can be found in Attachment 1.

6.1 Building 26A (photo 26-7)

This building was built to protect the entrance to the Shaft #1 and house a generator plant (since removed). The building is in good condition.

Dimensions (L x W x H): 13m x 5.0m x 5m

Location: On the east side of the Lucky Queen Road.

Construction: Wood construction with steel sheet siding and roofing

Paint: None observed

Asbestos: None observed

Foundation: Concrete pillars with wood flooring

Non-Hazardous Contents: Old electrical panel generator plant.

Hazardous Contents: None observed.

6.2 Fuel Storage

No fuel storage tanks or drums were encountered at this site.

6.3 Aerial Tramway

The aerial tramway has some historic and tourism significance

Location: Extends from the Lucky Queen site down to the Wernecke camp.

Fabrication: The towers are constructed with untreated lumber; there are no longer any wires or hardware attached to the towers.

Amount of materials: There are more than 20 towers between the two sites.

Condition: The towers are still in fair condition and pose no immediate safety hazard.

6.4 Milling and Processing Infrastructure

The ore was processed off-site, at the Wernecke camp. There is no milling or processing infrastructure located at Lucky Queen.

6.5 Electrical Equipment

There is a decommissioned power line that runs across the west side of the site and continues further up the hill. One of the power poles located on waste rock pile #1 has collapsed so that the line lies along the ground for roughly 20 metres.

7. SOLID WASTE DUMPS

No solid waste dumps were encountered.

8. POTENTIAL CONTAMINANTS OF CONCERN

No hazardous materials were observed at the site. Potential contaminants of concern are dissolved metals washing from the waste rock piles.

9. WATER QUALITY

There are two minor drainages on site. One drainage drains Trenches 2, 3 and 4 and Shaft #2 and flows across waste rock pile WR-04 at a rate of <1L/s. The drainage dissipate into the natural soils roughly 50 metres down slope of the site. No surface water was observed in Trenches 5 and 6. The other drainage flows at a rate of <0.5L/s from trench 1. The water flows less than 20 metres before it seeps into the coarse rock of waste rock pile WR-03.

Water samples were collected for analysis of pH, conductivity, hardness, acidity, alkalinity, sulphate and total metals. Conductivity and pH values at the sampling sites were measured in the field. Water samples, 26WQ-TR4-01 and 26WQ-TR4-02, were collected from Trench #4. The field pH was 6.6 and the conductivity was 40uS/cm. Water samples, 26WQ-TR1-01 and 26WQ-TR1-02, were collected from Trench #1. The field pH was 6.7 and the conductivity was 30uS/cm.

10. RECLAMATION

No reclamation effort was evident on the Lucky Queen site. No natural reclamation of the site was observed.

11. OTHER INFORMATION AND DATA

Two other reports written on this site. The 1996 United Keno Hill Mines report prepared by Access Consulting Group includes water sampling data for the Lucky Queen adit (pH, sulphate concentration, conductivity and flow) from the years 1990 to 1995. Norecol, Dames and Moore published a report in 1997 for Public Works and Government Services. The site name used in the PWGSC report is "Past Wernecke". The scope of the report includes inspection, surveying and sampling of the site and identification of potential safety hazards and contamination. 25 soil and water samples were collected during the last week in August, 1996 and the laboratory results are included in their report (see Attachments).

12. REFERENCES

United Keno Hill Mines Limited. 1996. *United Keno Hill Mines Limited – Site Characterization.* Report No. UKH/96/01, prepared by Access Mining Consultants Limited.

United Keno Hill Mines Limited. 1996. *United Keno Hill Mines Limited – Site Characterization, Technical Appendices I-VI.* Report No. UKH/96/01, prepared by Access Mining Consultants Limited.

Public Works and Government Services. 1997. *Site Assessment Report, Past Wernecke, Keno Hill, Yukon.* Job No. 20749-013-310, prepared by Norecol, Dames and Moore.

ATTACHMENT 2: 1999 LUCKY QUEEN WATER SAMPLES LABORATORY RESULTS				
Sample Number	**Detection Limit**	**Units**	**26-WQ-TR4-02 Lucky Queen 9/15/99**	**26-WQ-TR1-02 Lucky Queen 9/15/99**
Site Description			Ponded water in the bottom of the north end of Trench #4	Ponded water in the bottom of Trench #1
pH (field)	N/A	pH	6.6	6.7
Conductivity (field)	N/A	µS/cm	40	30
pH (Lab)	0.01	pH	6.6	6.13
Conductivity (Lab)	0.01	µS/cm	22	18
Total Alkalinity	5	mg CaCO3/L	8	<5
Chloride	0.01	mg/L	0.05	0.09
Hardness (CaCO3 equiv)	5	mg/L	6.8	4.9
Nitrate-N	0.05	mg/L	0.42	0.54
Nitrite-N	0.003	mg/L	<0.003	0.003
Sulphate	1	mg/L	4.4	3.3
Total Dissolved Solids	5	mg/L	20	20
Analysis by ICP-USN				
Aluminum	0.0008	mg/L	0.0309	0.0213
Antimony	0.005	mg/L	<0.005	<0.005
Arsenic	0.01	mg/L	<0.01	<0.01
Barium	0.00004	mg/L	0.0197	0.01
Beryllium	0.00001	mg/L	<0.00001	<0.00001
Bismuth	0.0004	mg/L	<0.0004	<0.0004
Boron	0.002	mg/L	<0.002	<0.002
Cadmium	0.00006	mg/L	0.00183	0.0002
Calcium	0.002	mg/L	1.8	1.33
Chromium	0.00006	mg/L	0.00014	0.00024
Cobalt	0.00003	mg/L	0.00029	0.00023
Copper	0.00003	mg/L	0.0017	0.00112
Iron	0.00001	mg/L	0.056	0.017
Lead	0.0003	mg/L	0.182	0.0184
Lithium	0.001	mg/L	<0.001	<0.001
Magnesium	0.0005	mg/L	0.568	0.345
Manganese	0.00002	mg/L	0.0637	0.0329
Mercury	0.0001	mg/L	<0.0001	<0.0001
Molybdenum	0.00007	mg/L	<0.00007	<0.00007
Nickel	0.00001	mg/L	0.0007	<0.00001
Phosphorus	0.03	mg/L	<0.03	<0.03
Potassium	0.4	mg/L	<0.4	<0.4
Selenium	0.004	mg/L	<0.004	<0.004
Silicon	0.004	mg/L	2.14	1.69
Silver	0.00005	mg/L	0.00229	0.00022
Sodium	0.004	mg/L	0.6	0.7
Strontium	0.00002	mg/L	0.00876	0.00654
Sulphur	0.008	mg/L	1.47	1.07
Thallium	0.001	mg/L	<0.001	<0.001
Titanium	0.00002	mg/L	0.00108	0.00032
Vanadium	0.00003	mg/L	<0.00003	<0.00003
Zinc	0.0002	mg/L	0.0997	0.0121
Analysis by Hydride AA				
Arsenic	0.0002	mg/L	0.0002	<0.0002
Selenium	0.0001	mg/L	<0.0001	<0.0001

TABLE 1
PAST WERNECKE SITE
SAMPLE PARAMETERS SUMMARY CHART
PUBLIC WORKS AND GOVERNMENT SERVICES
YUKON ABANDONED MINE SITES - PAST WERNECKE
20749-013-310

Sample Identification	Sample Type	Parameters Analysed					
		PCB	Total Metals	ABA	BTEX/ VPH	LEPH/ HEPH	Conventional Parameters
PWWR1	waste rock			X			
PWWR2	waste rock			X			
PWWR3	waste rock			X			
PWWR4	waste rock			X			
PWWR5	waste rock			X			
PWWR6	waste rock			X			
PWS1	soil		X		X	X	
PWW1	surface water		X				X
PWW2	surface water		X				X
PWW3	surface water		X				X
PWW4	surface water		X				X
PWW5	surface water		X				X

PCB - polychlorinated biphenyls

ABA - acid-base accounting

BTEX/VPH - benzene, toluene, ethylbenzene, xylenes, volatile petroluem hydrocarbons

LEPH/HEPH - light extractable petroleum hydrocarbons / heavy extractable petroleum hydrocarbons

Conventional Parameters - pH, sulphate, total suspended solids

PAH - polycyclic aromatic hydrocarbons

TABLE 2
MODIFIED SOBEK METHOD ACID-BASE ACCOUNTING
PUBLIC WORKS AND GOVERNMENT SERVICES
YUKON ABANDONED MINE SITES - PAST WERNECKE
20749-013-310

Sample No.	Rock Type	Paste pH	S(T) %	S(SO4) %	AP	NP	NET NP	NP/AP
PWWR1	Argillite with abundant quartz veining, iron staining, 1% carbonate, <1% finely disseminated pyrite, blocky cleavage	7.37	0.02	0.02	0.0	2.5	2.5	NA
PWWR2	Argillite with abundant quartz veining, iron staining, 1% carbonate, <1% finely disseminated pyrite, blocky cleavage	6.82	0.11	0.08	0.9	31.1	30.2	33.2
PWWR3	Argillite with abundant quartz veining, iron staining, 1% carbonate, <1% finely disseminated pyrite, blocky cleavage	6.77	0.18	0.04	4.4	4.9	0.5	1.1
PWWR4	Quartzite, with abundant quartz veining, buff to grey, gneissoid appearance, <1% finely disseminated pyrite	7.15	0.02	<0.01	0.5*	1.9	1.5	4.1
PWWR5	Quartzite, with abundant quartz veining, buff to grey, gneissoid appearance, <1% finely disseminated pyrite	6.91	0.11	0.05	1.9	7.6	5.7	4.0
PWWR6	Quartzite, with abundant quartz veining, buff to grey, gneissoid appearance, <1% finely disseminated pyrite	7.24	0.02	<0.01	0.5*	2.1	1.7	4.5

* - A S(SO4) value of 0.005% was used for the AP calculation.
AP = Acid Potential in Tonnes CaCO3 Equivalent per 1000 Tonnes of material.
NP = Neutralization Potential in Tonnes CaCO3 Equivalent per 1000 Tonnes of Material.
NET NP = Net Neutralization Potential = Tonnes CaCO3 Equivalent per 1000 Tonnes of Material.

TABLE 3
CONCENTRATION OF BTEX AND VOLATILE PETROLEUM HYDROCARBONS IN SOIL SAMPLES
PUBLIC WORKS AND GOVERNMENT SERVICES
YUKON ABANDONED MINE SITES - PAST WERNECKE
20749-013-310
ug/g (ppm)

			Benzene	Ethylbenzene	Toluene	Xylenes	Volatile Petroleum Hydrocarbons
CCME	Commercial/Industrial		5.	50.	30.	50 (a)	200 (b)
Sample No.	Location	Depth (m)					
PWS1	Near shaft area	0 - 0.15	<0.5	<0.5	<0.5	<0.5	10.
Method Detection Limit			0.5	0.5	0.5	0.5	10.

CCME - Canadian Council of Ministers of the Environment Interim Canadian Environmental Quality Criteria for Contaminated Sites
< - less than the detection limit indicated
NC - no criteria established
(a) - Criteria for total of m, p and o xylenes.
(b) - British Columbia Criteria for Managing Contaminated Sites, July 1995, New Petroleum Hydrocarbon Criteria, August, 1995
☐ - Greater than CCME commercial/industrial criteria

TABLE 4
CONCENTRATIONS OF LEPH & HEPH IN SOIL SAMPLES
PUBLIC WORKS AND GOVERNMENT SERVICES
YUKON ABANDONED MINE SITES - PAST WERNECKE
20749-013-310
ug/g (ppm)

			LEPH	HEPH
CMCS PHC	Commercial/Industrial		2000.	5000.
Sample No.	Location	Depth (m)		
PWS1	Near shaft building	0 - 0.15	<250.	**19000.**
Method Detection Limit			250.	250.

CMCS PHC - British Columbia Criteria for Managing Contaminated Sites, July 1995,
New Petroleum Hydrocarbon Criteria, August 1995
< - less than the detection limit indicated
NC - no criterion established
☐ - Greater than CMCS PHC criteria for commercial/industrial land use

TABLE 5
CONCENTRATION OF METALS IN SOIL SAMPLES
PUBLIC WORKS AND GOVERNMENT SERVICES
YUKON ABANDONED MINE SITES - PAST WERNECKE
20749-013-310
ug/g (ppm)

			Silver	Arsenic	Boron	Barium	Beryllium	Cadmium	Cobalt	Chromium*	Copper	Mercury	Manganese	Molybdenum	Nickel	Lead	Antimony	Selenium	Tin	Vanadium	Zinc
CCME	Commercial/Industrial		40.	50.	NC	2000.	8.	20.	300.	800.	500.	10.	NC	40.	500.	1000.	40.	10.	300.	NC	1500.
Sample No.	Location	Depth (m)																			
PWS1	Near shaft building	0 - 0.15	<2.	0.47	12.	46.	<1.	18.2	4.	8.	110.	0.19	2290.	<4.	14.	1720.	<10.	<0.5	<5.	11.	1480.
Method Detection Limit			2.	0.05	0.5	0.1	1.	0.25	1.	2.	1.	0.001	0.2	4.	2.	1.	10.	0.5	5.	0.5	1.

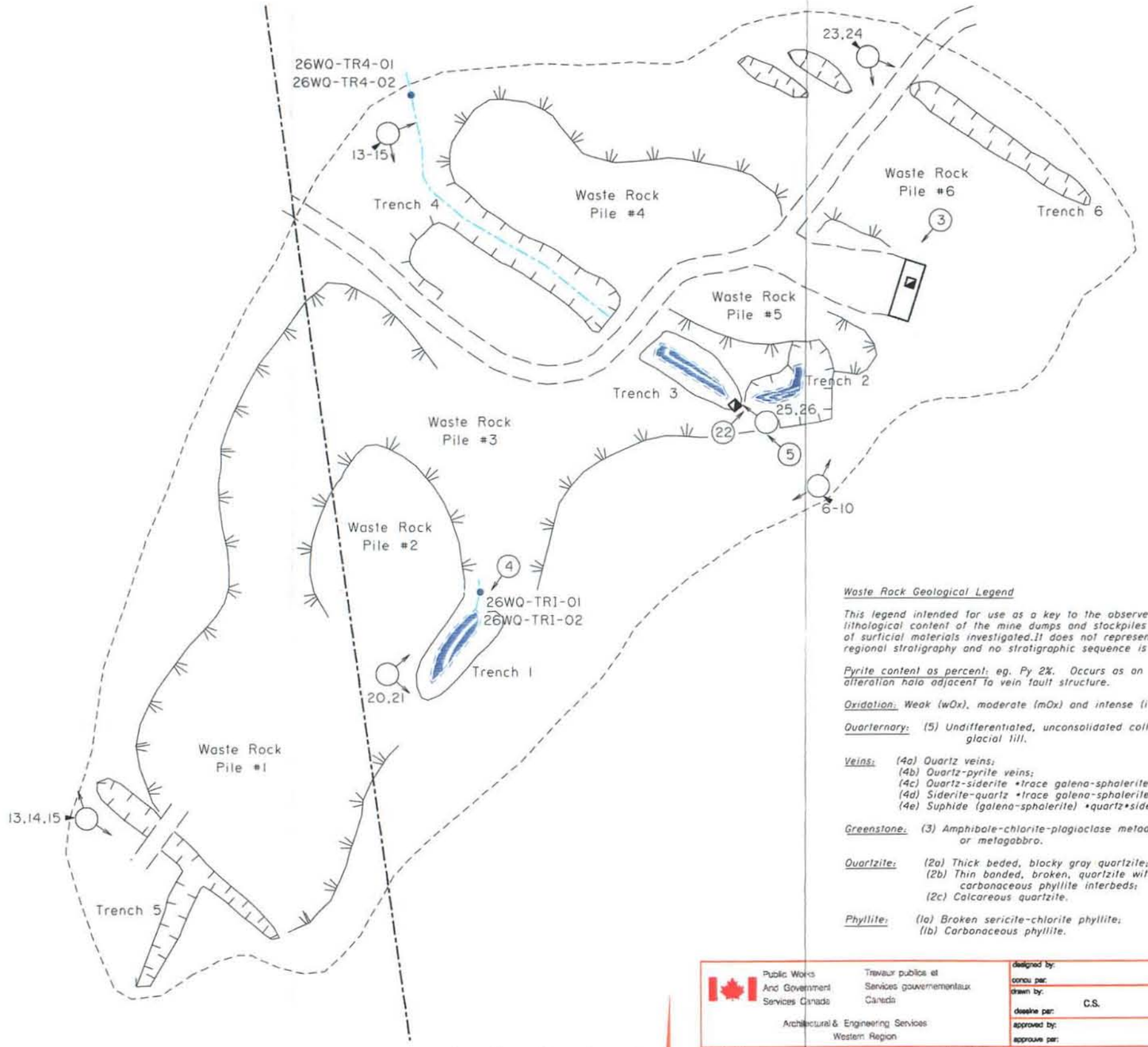
CCME - Canadian Council of Ministers of the Environment Interim Canadian Environmental Quality Criteria for Contaminated Sites
< - less than the detection limit indicated
NC - no criteria established
☐ - Greater than CCME criteria for commercial/industrial land use
* - Total Chromium

TABLE 6
CONCENTRATION OF CONVENTIONAL PARAMETERS AND TOTAL METALS IN SURFACE WATER
PUBLIC WORKS AND GOVERNMENT SERVICES
YUKON ABANDONED MINE SITES - PAST WERNECKE
20749-013-310
ug/L (ppb)

		pH	Total Suspended Solids (mg/L)	Sulphate SO4 (mg/L)	Silver	Aluminum*	Arsenic	Boron	Barium	Beryllium	Cadmium	Cobalt	Chromium	Copper	Iron	Mercury	Manganese	Molybdenum	Nickel	Lead	Selenium	Tin	Vanadium	Zinc
CCME	Freshwater Aquatic Life	6.5-9.0	NC	NC	0.1	5 - 100	50	NC	NC	NC	0.2 - 1.8	NC	2 - 20	2 - 4	300	0.1	100	NC	25 - 150	1 - 7	1	NC	NC	30
Sample	Location																							
PWW1	Midsection of flow through northernmost trench	6.08	<1.	4.6	2.9	<200.	<1.	10.	17.	<3.	1.2	<1.	<1.	2.	<30.	<0.05	55.	<1.	2.	320.	<1.	<1.	<10.	65.
PWW2	Downgradient of PWW1	7.18	10.	4.8	1.8	<200.	<1.	<10.	19.	<3.	1.4	<1.	<1.	<1.	<30.	<0.05	42.	<1.	2.	190.	1.	<1.	<10.	75.
PWW3	Upgradient of PWW1 at source	7.83	<5.	3.5	3.7	<200.	<1.	<10.	18.	<3.	0.8	<1.	<1.	<1.	<30.	<0.05	10.	<1.	<1.	110.	<1.	<1.	<10.	35.
PWW4	At source of water flow at southernmost trench	7.11	<1.	5.	0.2	<200.	<1.	<10.	11.	<3.	0.4	<1.	<1.	<1.	<30.	<0.05	85.	<1.	2.	27.	<1.	<1.	<10.	18.
PWW5	Downgradient of PWW4	7.81	<5.	5.3	<0.1	<200.	<1.	<10.	9.	<3.	0.2	<1.	<1.	<1.	<30.	<0.05	75.	<1.	1.	16.	<1.	<1.	<10.	12.
Method Detection Limit					0.1	200.	1.	10.	1.	3.	0.2	1.	1.	1.	30.	50.	3.	1.	1.	1.	1.	1.	10.	5.

CCME - Canadian Council of Ministers of the Environment Interim Canadian Environmental Quality Criteria for Contaminated Sites
< - less than the detection limit indicated
NC - no criteria established
[ ] - Greater than CCME criteria for freshwater aquatic life
* - Criteria depend on pH or hardness of sample

- Building (22A: building site present reference*) 22A* Indicates Asbestos Material
- 22A Collapsed Building
- Adit
- Collapsed Adit
- Shaft
- Collapsed/Backfilled Shaft
- Mine Rock Dump
- Bedrock Open Pit
- Trench
- Stripped Overburden Stockpile
- Stripped / Disturbed Area
- Outcrop Boundary
- Highway
- Road (gravel, 2 wheel drive)
- Road (gravel, 4X4 accessible)
- Road (inaccessible)
- Trail
- Culvert
- 24501-01 1999 Soil Sample (this study)
- Pre 1999 Soil Sample (other sources)
- 25WR04-01 1999 Waste Rock Sample (this study)
- Pre 1999 Waste Rock Sample (other sources)
- WQ-12-06 1999 Water Sample
- Pre 1999 Water Sample
- Tension Cracks
- Mass Movement (note: for Forms: BelleKeno)
- Groundwater Seep
- Surface Water Flow (Stream, Creek, River)
- Lake
- Settling Pond / Water Treatment Pond
- Tailings Dam / Tailings Pond / Mill Tails
- Ponded Water / Trench
- Barrels
- Abandoned Equipment (compressors, ore cars, rails, air and water pipe)
- Mine Rails / Trestle
- Collapsed Trestle
- Solid Waste Disposal Site
- Area of Soil Contamination
- *(6) Transformer Location (number of transformer in brackets)
- Power Line
- Power Line Collapsed
- Aerial Transmission Towers
- (5) Photo Site (arrow shows view direction)
- GPS Survey Location
- Former Building Site (Elsa)



CAD FILE: SITE26.DGN

Waste Rock Geological Legend

This legend intended for use as a key to the observed lithological content of the mine dumps and stockpiles of surficial materials investigated. It does not represent regional stratigraphy and no stratigraphic sequence is implied.

Pyrite content as percent: eg. Py 2%. Occurs as an alteration halo adjacent to vein fault structure.

Oxidation: Weak (wOx), moderate (mOx) and intense (iOx).

Quarternary: (5) Undifferentiated, unconsolidated colluvium, glacial till.

Veins: (4a) Quartz veins;
(4b) Quartz-pyrite veins;
(4c) Quartz-siderite ±trace galena-sphalerite veins;
(4d) Siderite-quartz ±trace galena-sphalerite veins;
(4e) Suphide (galena-sphalerite) ±quartz±siderite veins.

Greenstone: (3) Amphibole-chlorite-plagioclase metadiorite or metagabbro.

Quartzite: (2a) Thick beded, blocky gray quartzite;
(2b) Thin banded, broken, quartzite with carbonaceous phyllite interbeds;
(2c) Calcareous quartzite.

Phyllite: (1a) Broken sericite-chlorite phyllite;
(1b) Carbonaceous phyllite.

date:

Public Works And Government Services Canada / Travaux publics et Services gouvernementaux Canada

Architectural & Engineering Services
Western Region

designed by: / conçu par:
drawn by: / dessiné par: C.S. Nov./99
approved by: / approuvé par:
revisions:

Drawing title: / Titre du dessin:

Lucky Queen Site #26
Site Assessment
Yukon Territory

project no. / no. du projet: 125-12.01

dwg. no. / dessin no. 1 of 1

Photo 26-1: Panorama of site showing trenches, shaft building and overburden and waste rock dumps.
Note old shaft just left of Trench 3 in foreground and powerline and haulage tram towers in background.

Photo 26-2: Panorama of Lucky Queen site. Note trench 4 drainage to left of centre and downed power pole to far right.

Photo 26-3: Trench 1 sample site (26-WQ-TR01-01/02).
Photo Direction (Azimuth 230°)

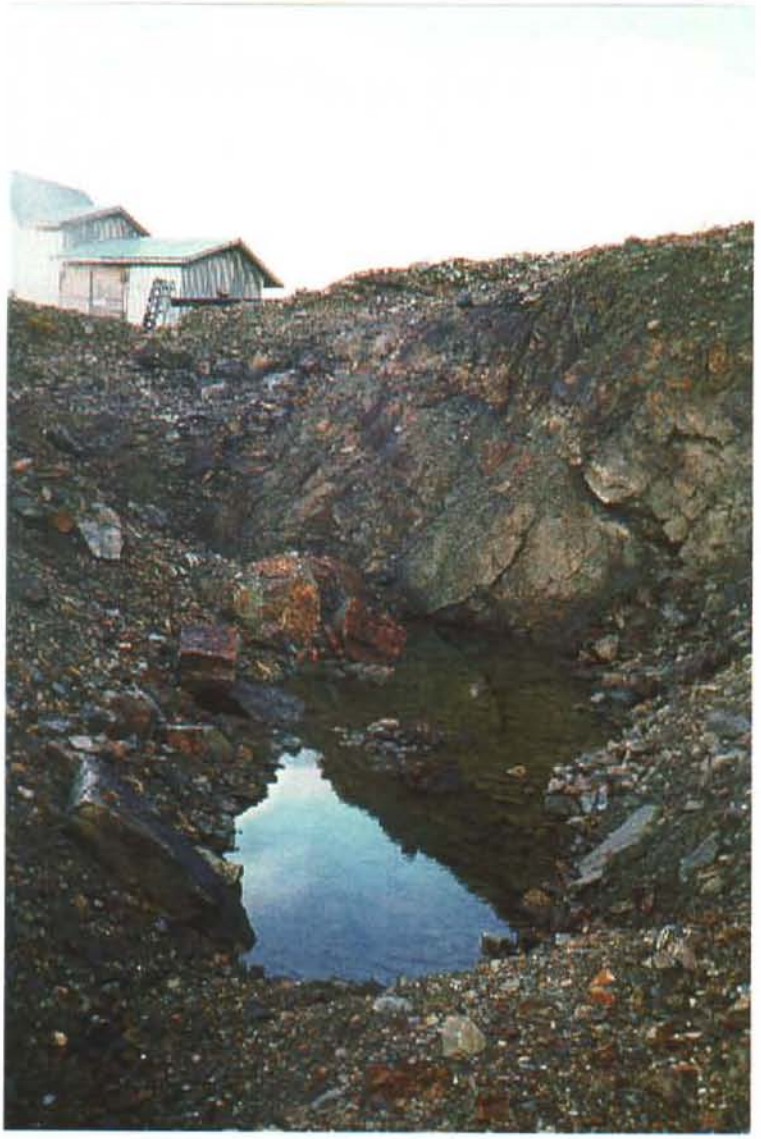


Photo 26-4: Trench 2 with shaft building behind.
(Azimuth 065°)

Photo 26-5: Trench 4 sample site (26-WQ-TR04-01/02).
Note haulage tram tower. (Azimuth 090°)

Photo 26-6: Trench east of shaft building. Note waste rock dump from underground development forming slope at right of photo. Photo Direction (Azimuth 130°)

Photo 26-7: Interior of Lucky Queen headframe building (Bldg. 26-A) showing open manway and boarded shaft opening.

LAKE

SITE# 27

MINFILE# 105M001ac

1. LOCATION AND ACCESS

The Lake exploration mine site is located mid-way down the northwestern slope of Keno Hill at an elevation of 1190m. The site is located approximately 250m west of Gambler Gulch. Access to site is via the Lower Faro Gulch Trail, which follows an overgrown mine road east from the Wernecke Camp. The lake site is located roughly 140m north of a point 650m east from the Wernecke Camp along the Lower Faro gulch Trail. UTM co-ordinates for the site are 7092 700m N and 487 300m E.

2. SITE PHYSIOGRAPHY

The site is on a gentle northeast slope in the Gambler Gulch. Given the site aspect, elevation, and presence of ice in some of the mine workings, the site is likely underlain by permafrost. The surface runoff from the mine site flows northward into Gambler Gulch, a tributary of Keno Ladue River. The area is well vegetated with willows, alders, balsam fir and young spruce trees.

3. GEOLOGY AND MINERALIZATION

Bedrock geology includes schists and phyllites with greenstone lenses. Two parallel quartz-siderite veins, 1 to 2.5m wide, contain galena (PbS), sphalerite ((Zn,Fe)S), freibergite ($(Cu, Fe)_{12}Sb_4S_{13}$), chalcopyrite ($CuFeS_2$) and pyrite (FeS_2).

4. SITE HISTORY

Little is known about the history of the site. Given the age of the second-growth vegetation, the property is believed to have been worked in the 1950s or 1960s. Most of the work on the site centred around a small pit with an inclined shaft. Waste dumps associated with the shaft suggest 50 to 100 metres of underground development. The surrounding area was extensively cleared, with numerous bladed roads and level pads developed.

5. MINE DEVELOPMENT

Mine development encountered at Lake includes two shafts, a collapsed adit and three trenches. The mine workings are referred to as the upper shaft, the main shaft and the lower adit. A possible forth, collapsed mine opening (either a raise or an adit) was also identified near the main shaft. There are four waste rock piles associated with these workings. Site details can be found in Figure 1; site photos can be found in Attachment 1. The main shaft is located at the southwest end of a trench cut more than 3m into bedrock.

5.1 Mine Openings and Excavations

Upper Shaft (photo 27-5)

Developed probably for exploration, the upper shaft was hand-dug 3m into the overburden. The vertical shaft is filled with 2m of water.

Location: Roughly 100m at azimuth 180° from the main shaft, and 70m below Lower Faro Gulch Trail.

Dimensions (L x W x H): 1.5m x 1.0m x 3m

Supports: None.

Condition: Fair; no visible signs of collapse.

Accessibility: The shaft is filled with water and is no longer accessible. The shaft is situated in thick willows and alder with no perimeter barrier protection. Florescent, plastic flagging tape was hung around the opening to mark its location.

Main Shaft (photos 27-1, 27-2)

A series of ladders connects the top of the main shaft headframe to a deck located 3m below ground. The shaft is blocked by ice 4m below ground level. The shaft was excavated at an incline of 80°. Less than 20m of metal air and water lines extend from the shaft to surface.

Location: 105m north from the road.

Dimensions (L x W x H): 3.5m x 2.5m x 8.5m

Supports: The frame is constructed of heavy sawn timbers and planking. A retaining wall constructed out of 2"x 4" timbers supports the walls at the entrance to the shaft.

Condition: The headframe and the retaining walls are weathered but are still in fair condition.

Accessibility: The shaft is filled with ice and is no longer accessible below 4m. The manway opening was nailed shut with available planking.

Main Shaft Area

This collapsed opening likely connected to the underground workings below the main inclined shaft. It is difficult to determine whether it was originally an adit, another shaft or a raise to surface. If it was an adit, it may have provided a track mounted haulway extending from the main shaft to the waste rock dumps.

Location: 10m northeast of the inclined shaft.

Dimensions (L x W x H): The original dimensions could not be determined.

Supports: Some rough wooden timbers protrude from the site.

Condition: Collapsed.

Accessibility: Inaccessible.

Lower Adit (photo 27-3)

The portal to the lower adit is completely collapsed and covered by rock.

Location: 105m northeast of the inclined shaft.

Dimensions (L x W x H):

Supports: Not determined.

Condition: Collapsed

Accessibility: Inaccessible

Trenches

The main shaft is located in an area that appears to have been first trenched by bulldozer. Bulldozer trenches are also located 35m southwest of the main shaft and 30 northwest of the lower adit.

Trench #1

The inclined shaft and the collapsed adit/raise are developed in the bottom of this large trench. Outcrop is exposed along the base of the trench and around the headwall. The walls of the trench have low profiles and are stable.

Location: The trench is oriented at azimuth 040°, 90m northeast of the Faro Gulch Trail.

Dimensions (L x W x H): 50m x 30m x 3m. The base of the trench is only 1.5m wide and 1m deep.

Condition: Stable

Trench #2

Cut by a bulldozer, this trench is wide and shallow with no bedrock exposed. Alder saplings have overgrown the entire trench. No evidence of surface water was observed.

Location: The trench is oriented at azimuth 330°, 35m southwest of trench #1 and the main shaft.

Dimensions (L x W x H): 20m x 4m x 1.0m

Condition: Stable.

Trench #3

Trench 3 is a moderately steep walled, 25m long, cut into bedrock. The trench is partially filled with loose rock and overgrown with alders along the edges and in the middle.

Location: The trench is oriented at azimuth 040°, located 140m northeast of the main shaft.

Dimensions (L x W x H): 25m x 5m x 3m

Condition: Stable.

5.2 Waste Rock Disposal Areas

There are five waste rock disposal areas associated with the underground workings and surface trenching. Waste rock piles #1 to #4 are all associated trench #1 and with the underground workings at the main shaft. Waste rock pile #5 is located outside of the entrance of adit #2. At the time of the site visit, there was no surface water encountered on any of the piles.

Waste rock pile #1

The surface of the waste rock pile is composed of thinly interbedded quartzite and graphitic phyllite with minor pyrite and minor quartz-galena vein material.

Location: The waste rock is deposited along the edges of trench #1, around the inclined shaft. It is likely is from the excavation of trench #1.

Dimensions (L x W x H): 35m x 4m x 1m

Sampling: Waste rock sample 27WR01-01 was collected from near the collapsed adit/raise and sent for Acid-Bas Accounting (ABA) and metals analysis.

Field Test Results: pH 8.2
Conductivity 920 µS/cm

Waste rock piles #2, #3 and #4 (photo 27-4)

This long dump area has been broken down based on shape into three waste rock piles. These piles were formed by end dumping from rail mounted ore cars that transported rock from the underground workings. Observed content of the waste rock piles was predominantly thinly banded quartzite with graphitic phyllite interbeds. There are 0.2-2% disseminated pyrite and trace galena stringers up to 2mm wide within the quartzite and phyllite. These stringers occur parallel and perpendicular to quartz and quartz-siderite-pyrite veins up to 2cm wide. Only 2-5% of the waste rock material is the quartz-siderite-pyrite veining. The waste rock is bi-modal, ranging in size from sand to gravel. No apparent oxidation was observed.

Location: The waste rock piles are oriented at azimuth 100° and are located to the east of trench #1.

Dimensions (L x W x H): Waste Pile #2: 20m x 10m x 1.5m
Waste Pile #3: 35m x 5m x 2m
Waste Pile #4: 12m x 3m x 1m

Sampling: No samples were collected.

Waste rock pile #5

Of similar composition to waste rock piles #2, #3 and #4. The waste rock pile was formed by end dumping from the lower adit opening.

Location: The pile is located outside the entrance to the lower adit.

Dimensions (L x W x H): 8m x 3m x 1m

Sampling: No samples were collected.

5.3 Tailings Impoundments

No ore was processed at this site. No tailings were encountered.

5.4 Minesite Water Treatment

There is no water treatment facility at this site.

6. MINE SITE INFRASTRUCTURE

There are the remains of one building to the southeast of the inclined shaft. Abandoned ore cars are scattered around the back of the building and the remnants of rail and trestle were encountered on waste rock piles #2, #3 and #4. Site details can be found in Figure 1; site photos are located in Attachment 1.

6.1 Building 27A (photo 27-6)

A collapsed steel building frame is located on the site. The steel and wood roof frame structure is intact, however the steel wall supports have collapsed.

Dimensions (L x W x H): 15m x 8m x 3m

Location: 25m southeast of the inclined shaft.

Construction: Steel frame for the roof with wood construction for the walls and roof.

Paint: None observed.

Asbestos: None observed.

Foundation: None.

Non-Hazardous Contents: None

Hazardous Contents: none

6.2 Fuel Storage

No fuel storage areas were encountered. A total of eight empty drums were observed scattered in Trench #2, beside the building 27A and on the south side of waste rock pile #3.

6.3 Rail and Trestle

Location: Collapsed trestle, rails and wood debris were encountered on the south side of waste rock pile #2 and on the east end of waste rock pile #3.

Fabrication: Wooden ties and trestle, steel rail.

Amount of materials: Minor: less than 30 linear metres total of rail total.

Condition: The trestle is completely collapsed and does not pose any risks.

6.4 Milling and Processing Infrastructure

There was no milling or processing done at the Lake site.

6.5 Electrical Equipment

No electrical equipment was encountered at this site.

7. SOLID WASTE DUMPS (photo 27-7)

Waste material found on the site is comprised of old abandoned metal mine equipment.

Location: There is a small waste dump behind the southeast side of Building 27A.

Dimensions (L x W x H): Waste is spread out over a 10m by 7m area.

Drainage: Gambler Gulch.

General composition: 3 ore cars, some old fuel drums and some scrap metal.

Impacted vegetation: Healthy alders grow around the metal debris.

8. POTENTIAL CONTAMINANTS OF CONCERN

No hazardous products were encountered. Potential contaminants of concern include dissolved metals from the waste rock piles.

9. WATER QUALITY

Two water samples were collected from the Lake site. The sample sources had no visible particulates and did not appear to be depositing any sediment.

Sample 27WQ-S01-01/02 was collected from a small stream flowing down slope from the site at a rate of 1L/4sec (visual estimation). The sample was collected from 15m north of the lower adit (adit #2). A water sample was also collected from.

Sample 27WQ-S02-01/02 was collected up-slope of the site from a seep along the Lower Faro Gulch Trail.

10. RECLAMATION

Natural reclamation is well advanced with alders, willows, spruce and balsam fir in most areas around most of the property. Small spruce seedlings have taken hold on waste rock piles #2 and #4 and trench #1.

11. REFERENCES

Minfile #105M001ae

ATTACHMENT 2: 1999 LAKE WATER SAMPLES LABORATORY RESULTS				
Sample Number	**Detection Limit**	**Units**	**27WQS01-02 - Sept 21/99**	**27WQS02-02 - Sept 21/99**
Site Description			Tributary of Gambler Gulch, near Adit #2	Triburary of Gambler Gulch, upstream of mine site
pH (field)	N/A	pH	N/A	N/A
Conductivity (field)	N/A	µS/cm	N/A	N/A
pH (Lab)	0.01	pH	7.65	6.46
Conductivity (Lab)	0.01	µS/cm	335	225
Total Alkalinity	5	mg CaCO3/L	90	10
Chloride	0.25	mg/L	<0.25	<0.25
Hardness (CaCO3 equiv)	5	mg/L	175	100
Nitrate-N	0.05	mg/L	<0.05	<0.05
Nitrite-N	0.003	mg/L	0.007	<0.003
Sulphate	1	mg/L	66.4	86.7
Total Dissolved Solids	5	mg/L	327	153
Analysis by ICP-USN				
Aluminum	0.0008	mg/L	0.0041	1.22
Antimony	0.005	mg/L	<0.005	<0.005
Arsenic	0.01	mg/L	<0.01	<0.01
Barium	0.00004	mg/L	0.0341	0.0709
Beryllium	0.00001	mg/L	<0.00001	<0.00001
Bismuth	0.0004	mg/L	<0.0004	<0.0004
Boron	0.002	mg/L	<0.002	<0.002
Cadmium	0.00006	mg/L	0.00005	0.00014
Calcium	0.002	mg/L	42.7	31.6
Chromium	0.00006	mg/L	<0.00006	0.00241
Cobalt	0.00003	mg/L	<0.00003	0.00127
Copper	0.00003	mg/L	0.00071	0.0108
Iron	0.00001	mg/L	0.009	2.29
Lead	0.0003	mg/L	<0.0003	0.0067
Lithium	0.001	mg/L	0.002	0.002
Magnesium	0.0005	mg/L	13.2	5.39
Manganese	0.00002	mg/L	0.00054	0.0665
Mercury	0.0001	mg/L	<0.0001	<0.0001
Molybdenum	0.00007	mg/L	0.00034	0.00021
Nickel	0.00001	mg/L	0.0002	0.003
Phosphorus	0.03	mg/L	<0.03	0.13
Potassium	0.4	mg/L	<0.4	0.4
Selenium	0.004	mg/L	<0.004	<0.004
Silicon	0.004	mg/L	2.17	3.23
Silver	0.00005	mg/L	<0.00005	<0.00005
Sodium	0.004	mg/L	0.9	0.7
Strontium	0.00002	mg/L	0.104	0.0599
Sulphur	0.008	mg/L	21.9	28.8
Thallium	0.001	mg/L	<0.001	<0.001
Titanium	0.00002	mg/L	<0.00002	0.0403
Vanadium	0.00003	mg/L	<0.00003	0.0035
Zinc	0.0002	mg/L	0.0009	0.0106
Analysis by Hydride AA				
Arsenic	0.0002	mg/L	<0.0002	0.0013
Selenium	0.0001	mg/L	0.0008	0.0008

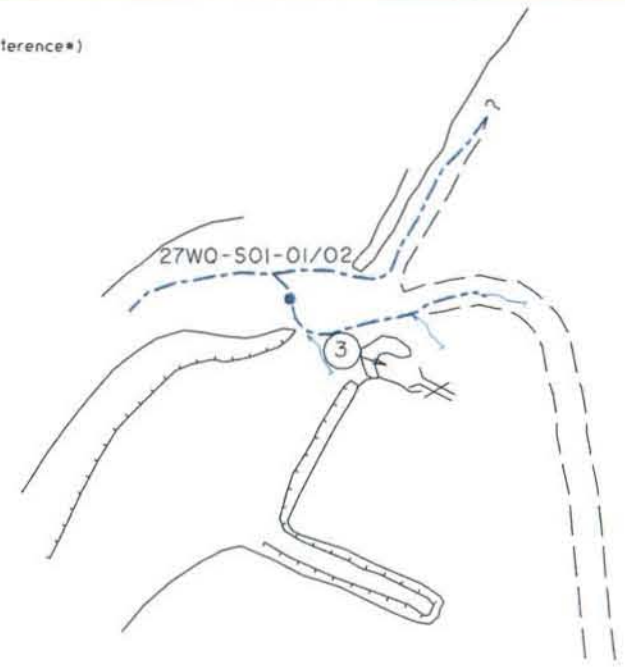
ATTACHMENT 2: 1999 LAKE WASTE ROCK SAMPLES LABORATORY RESULTS			
Sample Number	**Detection Limit**	**Units**	**27WR01-01 - Sept 21/99**
Site Description			Northwest side ofWaste Rock Pile #1
Paste pH (field)	N/A	pH	8.2
Conductivity (field)	N/A	µS/cm	920
pH in Saturated Paste			
pH	0.1	pH	7.5
pH in Soil (1:2 water)			
pH	0.01	pH	7.8
ICP Semi-Trace Scan			
Aluminum	5	µg/g	24900
Antimony	2	µg/g	42
Arsenic	2	µg/g	136
Barium	0.05	µg/g	218
Beryllium	0.1	µg/g	0.3
Bismuth	5	µg/g	<5
Cadmium	0.1	µg/g	46
Calcium	5	µg/g	28900
Chromium	0.5	µg/g	25.2
Cobalt	0.1	µg/g	18.2
Copper	0.5	µg/g	200
Iron	1	µg/g	66000
Lead	1	µg/g	15100
Lithium	0.5	µg/g	4.6
Magnesium	1	µg/g	10700
Manganese	0.5	µg/g	10300
Mercury	0.01	µg/g	0.55
Molybdenum	1	µg/g	5
Nickel	1	µg/g	54.4
Phosphorus	5	µg/g	1100
Potassium	20	µg/g	10400
Selenium	2	µg/g	<2
Silicon	5	µg/g	249
Silver	0.5	µg/g	162
Sodium	5	µg/g	464
Strontium	1	µg/g	26
Sulphur	10	µg/g	17200
Thorium	1	µg/g	<1
Tin	1	µg/g	5
Titanium	0.2	µg/g	85.7
Uranium	5	µg/g	<5
Vanadium	1	µg/g	39
Zinc	0.5	µg/g	4260
Zirconium	0.1	µg/g	18.2

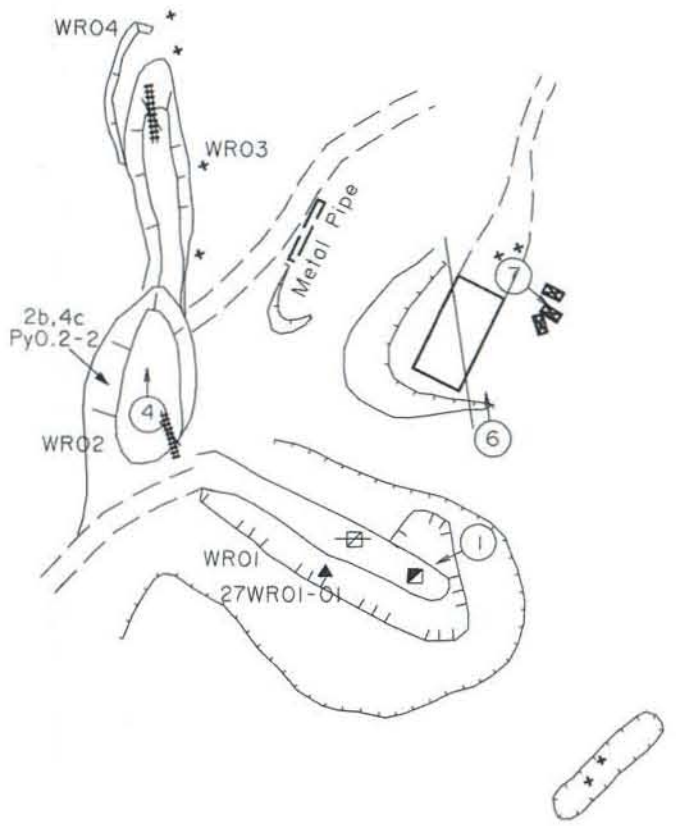
ATTACHMENT 2: 1999 LAKE WASTE ROCK SAMPLES LABORATORY RESULTS MODIFIED SOBEK METHOD ACID-BASE ACCOUNTING TEST								
SAMPLE	**SITE DESCRIPTION**	**PASTE pH**	**S(T) %**	**S(SO4) %**	**AP**	**NP**	**NET NP**	**NP/AP**
27WR01-01 - Sept./99 - Soil	North side of Waste Rock Pile #1	8.5	1.71	<0.01	53.4	145.0	91.6	2.7

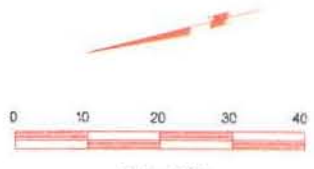
AP = ACID POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NP = NEUTRALIZATION POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NET NP = NET NEUTRALIZATION POTENTIAL = TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NOTE: WHEN S(T) AND/OR S(SO4) IS REPORTED AS <0.01, IT IS ASSUMED TO BE ZERO FOR THE AP CALCULATION.
N/D = NO DUPLICATE ASSAY. CALCULATIONS ARE BASED ON ASSAY RESULTS OF THE INITIAL SAMPLE.
RE = REPLICATE.

NOTE - A HIGH LEVEL OF SOLUBLE METALS (ESPECIALLY IRON) WERE OBSERVED IN MANY SAMPLES DURING THE ABA TITRATIONS.
SAMPLES WITH A NEGATIVE NET NP SHOULD BE TESTED FOR MOBILE METALS USING STANDARD SHAKE FLASK EXTRACTION TESTS.

- Building (22A: building site present reference*) Indicates Asbestos Material
- 22A Collapsed Building
- Adit
- Collapsed Adit
- Shaft
- Collapsed/Backfilled Shaft
- Mine Rock Dump
- Bedrock Open Pit
- Trench
- Stripped Overburden Stockpile
- Stripped / Disturbed Area
- Outcrop Boundary
- Highway
- Road (gravel, 2 wheel drive)
- Road (gravel, 4X4 accessible)
- Road (inaccessible)
- Trail
- Culvert
- 24SOI-01 1999 Soil Sample (this study)
- Pre 1999 Soil Sample (other sources)
- 25WR04-01 1999 Waste Rock Sample (this study)
- Pre 1999 Waste Rock Sample (other sources)
- WQ-12-06 1999 Water Sample
- Pre 1999 Water Sample
- Tension Cracks
- Mass Movement (note: for Forms: BelleKeno)
- Groundwater Seep
- Surface Water Flow (Stream, Creek, River)
- Lake
- Settling Pond / Water Treatment Pond
- Tailings Dam / Tailings Pond / Mill Tails
- Ponded Water / Trench
- Barrels
- Abandoned Equipment (compressors, ore cars, rails, air and water pipe)
- Mine Rails / Trestle
- Collapsed Trestle
- Solid Waste Disposal Site
- Area of Soil Contamination
- *(6) Transformer Location (number of transformer in brackets)
- Power Line
- Power Line Collapsed
- Aerial Transmission Towers
- (5) Photo Site (arrow shows view direction)
- GPS Survey Location
- Former Building Site (Elsa)







CAD FILE: SITE27.DGN

Waste Rock Geological Legend

This legend intended for use as a key to the observed lithological content of the mine dumps and stockpiles of surficial materials investigated. It does not represent regional stratigraphy and no stratigraphic sequence is implied.

Pyrite content as percent: eg. Py 2%. Occurs as an alteration halo adjacent to vein fault structure.

Oxidation: Weak (wOx), moderate (mOx) and intense (iOx).

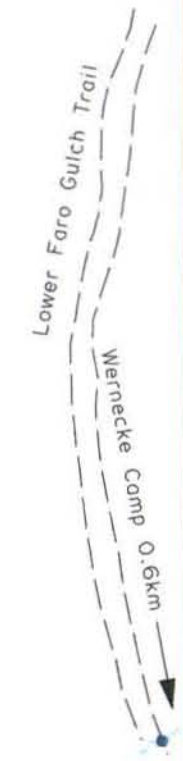
Quarternary: (5) Undifferentiated, unconsolidated colluvium, glacial till.

Veins: (4a) Quartz veins;
(4b) Quartz-pyrite veins;
(4c) Quartz-siderite *trace galena-sphalerite veins;
(4d) Siderite-quartz *trace galena-sphalerite veins;

Greenstone: (3) Amphibole-chlorite-plagioclase metadiorite or metagabbro.

Quartzite: (2a) Thick beded, blocky gray quartzite;
(2b) Thin banded, broken, quartzite with carbonaceous phyllite interbeds;
(2c) Calcareous quartzite.

Phyllite: (1a) Broken sericite-chlorite phyllite;
(1b) Carbonaceous phyllite.



27WQ-SO2-01/02

Public Works And Government Services Canada
Travaux publics et Services gouvernementaux Canada
Architectural & Engineering Services
Western Region

Drawing title / Titre du dessin:
Lake Site #27
Site Assessment
Yukon Territory

designed by / conçu par:
drawn by / dessiné par: C.S. Nov./99
approved by / approuvé par:
revisions:
project no. / no. du projet: 125-12.01
dwg. no. / dessin no.: 1 of 1

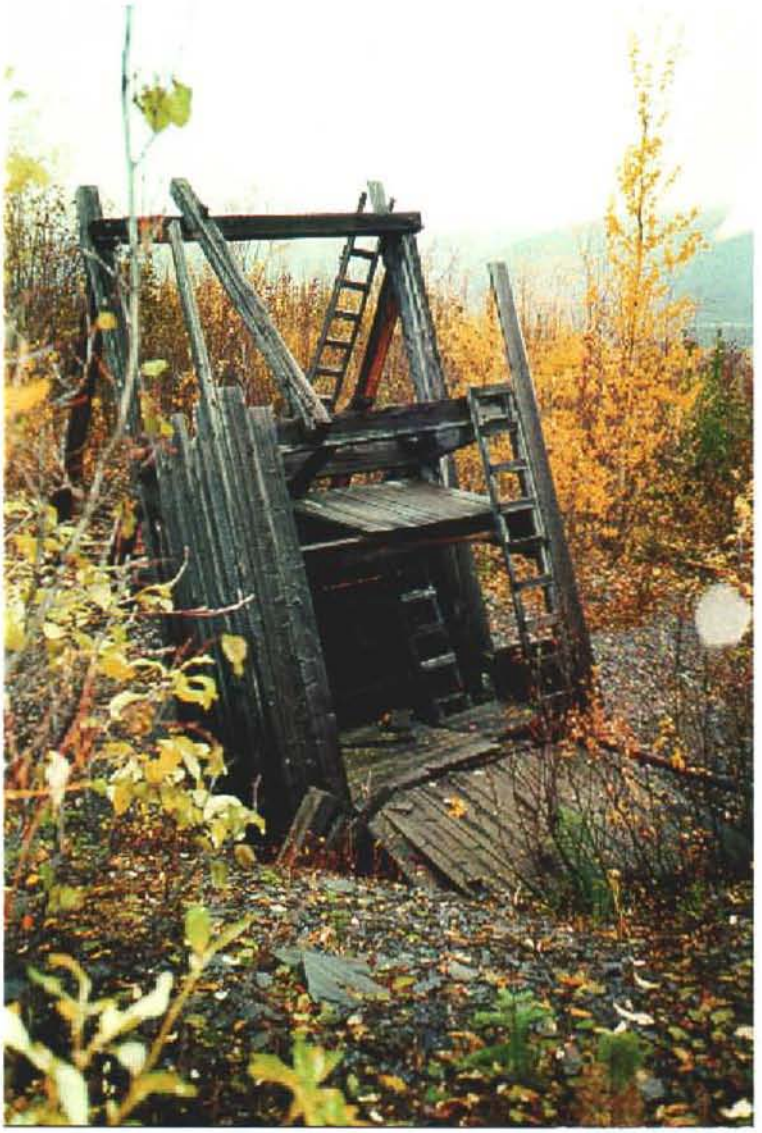


Photo 27-1: Shaft headframe (Bldg. 27-1). (Azimuth 340°)

Photo 27-2: Interior of shaft A01 headframe (Bldg. 27-1).

Photo 27-3: Collapsed adit portal (A02). (Azimuth 220°)

Photo 27-4: Waste rock dump below shaft A01. (Azimuth 110°)

Photo 27-5: Upper shaft hole to left of clipboard (A03). Note leaves covering the surface of standing water.(Azimuth 070°)

Photo 27-6: Collapsed steel building frame (Bldg. 27-2). (Azimuth 120°)

Photo 27-7: Abandoned ore cars. (Azimuth 240^{0})

SHAMROCK (Original Shamrock) (#28)
(MINFILE# 105M 001ah)

1. LOCATION AND ACCESS

The site is located near the summit on the south west side of Keno Hill and is visible from Keno City (Figure 1). The site is accessible by 2 or 4-wheel drive vehicle from Keno City via a gravel road heading west along the face of Keno Hill and continuing on to the summit. The site is positioned at an elevation between 1505 and 1610 m above sea level. The location is given as 63°56'30"N and 135°14"40.0"W. UTM co ordinates are 7090536.905m N 488018.795m E.

2. SITE PHYSIOGRAPHY

The site, consisting of a series of test pits, shafts and adits, drains down the steep southwest talus slope of Keno Hill through a single ravine. A second larger and deeper ravine to the east cuts across the bottom of this ravine forming the west branch of Erickson Gulch. The gulch enters Christal Creek approximately 5 km to the west of the site, approximately 1.5 km north of Christal Lake. It appears that seasonal runoff through the site has resulted in little vegetation growth or soil accumulating near the bottom of the ravine. The entire site is located within an alpine ecosystem above the treeline. Permafrost features were not noted at the site.

3. GEOLOGY AND MINERALIZATION

The area is underlain by massive quartzite with graphitic schist and phyllite. Two major mineralized structures trend northeast through the area. The veins here are very highly oxidized, with almost no sulphides remaining. Mineralization consists of carbonate, cerussite, limonite, malachite and manganese oxide. Galena was noted in an old shaft dump south of the main adit.

4. SITE HISTORY

The original Shamrock mine was developed and mined from 1919 to 1939. A 37 m inclined shaft was sunk with levels at 65 and 110 feet. The 65 level broke out to an adit. Several small adits, shafts and test pits were mined in the area downslope from the Shamrock in this era. In 1953 and 1954 a new adit was driven at the 200 foot level, with further drifting and production. The 200 level adit is still visible. An open pit mine was constructed around the shaft in the period from 1985 to 1989. The open pit was excavated to the upper levels of the mine.

Several deep bulldozer trenches were dug to the southwest of the Original Shamrock in this era. The Shamrock King vein was mined by shallow open pit in 1988 and 1989. This mine lies about 100m east southeast of the Original Shamrock mine (Minfile).

5. MINE DEVELOPMENT

5.1 Mine Openings and Excavations

Mine development consists of the main adit, two secondary adits (not further reported on), a shallow shaft, two open pits (Shamrock & Shamrock King) and a series of shallow trenches at the bottom end of the site. Site details can be found on Figure 1; see Attachment A for site photos.

200 Level Portal (photo 28-3)

Partially collapsed timbered portal. Underground waste dumps with rails are present on both sides of the adit. The adit is located in a gully, and waste from the open pit above has partially covered the adit site. Constructed in 1953.

Location: Below open pit dump.
Dimensions (L x W x H): Approximately 1.5 m x 1.5 m; length unknown.
Supports: Wood timbers.
Condition: Partially collapsed, mostly blocked by open pit waste and debris
Accessibility: Access is possible but difficult, risk of collapse is evident.

Prospect Shaft

Small waste dump (+/- 5 tonnes); constructed pre-1939.

Location: South of 200 level portal.
Dimensions (L x W x H): 1.5 m x 1.5 m; approximately 3 m depth to ice.
Supports: Log timbers; fair condition
Condition: Appears to be stable.
Accessibility: Surrounded by steep, blocky talus slope.

Note: There are several small test pits and minor adits that are totally collapsed in this area. None of these structures appear to be a hazard, and the small waste dumps associated with them indicate very limited depths. The steep talus slopes in this area limit access.

Open Pit – Original Shamrock (photo 28-1)

An open cut with waste dumped at the lower, southwest end. The pit recovered an ore pillar around the shaft.

Location: Top of hill immediately south of main building.
Dimensions (L x W x H): Approximately 100 m x 20 m x 10 m.

Condition: Very steep pit walls appear to be stable.
Accessibility: Very easy road access.

Open Pit – Shamrock King

A shallow open pit with hand-sorted ore. Eight empty barrels and assorted trash were present. The barrels are thought to be for shipping hand-sorted ore.

Location: See site location map.
Dimensions (L x W x H): 150 m x 6 m x 6 m. Waste rock dumps extend around the pit on all sides.
Condition: Generally stable, some waste dump slopes are steep. Low risk.
Accessibility: Very easy road access.

Six Trenches Southwest of Mine (photo 28-4)

Trenches cut across the mineralized structure that hosts the Original Shamrock mine to the northeast. Very little true outcrop is exposed, however subcrop indicates very strongly oxidized, rusty quartzite with minor schist. Veining and mineralization are weak. Manganese oxides are common. The trenches appear to be from the 1980's.

Location: See site location map. Deep bulldozer trenches are approximately 75 m long, with push piles adjacent to the creek gully. The lowest pile crosses the gully, and forms a dyke that has been breached. One trench is present on the east side of the ridge between the two gullies, the rest are on the NW side.
Dimensions (L x W x H): 6 trenches, each about 75 m x 5 m x 5 m.
Condition: The trench sides are steep, with little revegetation. The adjacent, undisturbed gully area is similarly steep, with little vegetation.
Accessibility: Easy access by steep bulldozer trail.

5.2 Waste Rock Disposal Areas

Waste rock pile - #200 level portal (photo 28-2)

Fine-grained underground muck extends along both sides of the gully at the portal elevation. The western dump is mostly covered by open pit waste, and appears to be mostly unmineralized waste rock. The eastern end of the eastern dump is well mineralized material. The waste that would have originally been in front of the portal has been removed by bulldozer and/or flash flood. The site is in a gully that was dry when visited, but bear evidence of considerable flow in the past. Mining debris is widespread below the site. Although some material is well-mineralized, only traces of sulphide were noted. An acidic pH was noted, however the sulphur levels are very low for all samples.

Location: See site location map.
Dimensions (L x W x H): Eastern dump: about 20 x 3 x 3m. Western dump is approximately the same size.
Sampling: two samples were collected; based on field appearance 01 is highly mineralized, and 02 is of weakly mineralized underground material.

Laboratory and field results are provided in Attachment B.

Waste rock pile - ORIGINAL SHAMROCK (photo 28-1)

Overburden and waste rock were pushed downslope from the open cut. The pit drains through the dump, and deep troughs are present on the dump slope. No significant vegetation was noted. The dump toe rests on an underground waste dump at the 200 level.

Location: See site location map. Pit dump has a slope of 38 degrees.
Dimensions (L x W x H): Approximately 50 m x 50 m x 15 m.
Sampling: One sample was collected approximately mid-slope on the waste rock dump.

Laboratory and field results are provided in Attachment B.

Waste rock pile # SHAMROCK KING

Waste piles surround a long shallow pit developed on fairly flat ground. Most of the waste is overburden and barren quartzite and schist. Mineralized material is highly oxidized. There is no drainage apparent in the area, and although dry when visited it appears that water ponds locally in the pit bottom.

Location: See site location map.
Dimensions (L x W x H): 6400 tonnes
Sampling: No samples were collected.

5.3 Tailings Impoundments

There are no tailings impoundments at this site.

5.4 Minesite Water Treatment

There is no minesite water treatment at this site.

6. MINE SITE INFRASTRUCTURE

6.1 Buildings

There are three buildings located at the main site, all on the flat access area above the site. An old demolished shack is also located below the main adit.

Building 28A – Main Site Building (photo 28-5)

Building appeared to have formerly served as both living quarters and office space for site workers. An addition to the rear of the facility was probably used for storage space.

Location: On a branch road from the Keno Hill summit road.
Dimensions (L x W x H): 12 m x 6 m x 6 m with addition of 6 m x 3 m.
Construction: Wood frame; painted plank finished interior; rolled asphalt roof; fibreglass insulation; windows boarded up from inside.
Paint: Only on interior walls.
Asbestos: None observed.
Non-hazardous contents: Bed; minor kitchen utensils; empty pail.
Foundation: None.
Hazardous products: None.
Two small petroleum hydrocarbon-based stains were noted to the east of the building, both with dimensions of 1 m2 or less. A two-inch diameter pipe was noted extending from the building, however its former usage could not be determined. No staining was noted at the pipe end.

Building 28B – Generator Shed (photo 28-6)

Shed consisted only of a wood frame structure directly on grade. A strong petroleum hydrocarbon odour was present in the building.

Location: Approximately 65 m east of main building; also at top of ravine.
Dimensions (L x W x H): 3 m x 5 m x 2 m.
Construction material: Wood frame; no floor.
Paint: None.
Asbestos: None.
Non-hazardous contents: Pipe lengths and lumber.
Foundation: None.
Hazardous products: None.

Building 28C – Collapsed Shed

The shed's former usage is unknown. The building has completely collapsed.

Location: Approximately 50 m east of main building; also at top of ravine.

Dimensions (L x W x H): Collapsed; previously ~2 m x 4 m x 2 m.
Construction material: Wood frame; no floor.
Paint: None.
Asbestos: None.
Non-hazardous contents: None.
Foundation: None.
Hazardous products: None.

Building 28D – Collapsed Shack (photo 28-7)

The shack was formerly used as temporary living quarters (probably summer only). The building has completely collapsed.

Location: Approximately 200 m downhill from the main building.
Dimensions (L x W x H): Collapsed; previously ~3 m x 2.5 m x 2.5 m.
Construction material: Wood frame; no floor; canvas walls.
Paint: None.
Asbestos: None.
Non-hazardous contents: None.
Foundation: None.
Hazardous products: None.

6.2 Fuel Storage

There is currently no fuel stored at the site. A generator shed located to the east of the main site probably formerly contained a fuel storage tank to power the generator. Other former fuel storage locations were probably associated with the main site building, however, little evidence of this capacity remain.

6.3 Rail and Trestle (photo 28-8)

Located at 200 level portal.
Fabrication: Steel rails, about 20 m long. Some wooden trestle remnants. Large volume of timber and steel trash in area.
Amount of materials: 20 m of rail.
Condition: No significant hazard.

6.4 Milling and Processing Infrastructure

There is no milling or processing infrastructure at the site.

6.5 Electrical Equipment

Electrical equipment at the site was limited to an abandoned power line running approximately east-west to the north of the site. No transformers were noted on any of the nearby poles.

7. SOLID WASTE DUMPS

Location & access: approximately 50 m east of main building, near collapsed building and generator building and adjacent to power pole (photo 28-9).

Dimensions (L x W x H): 3 m x 5 m x 7 m
Drainage: waste materials on cobble/boulder surface would ensure that most drainage from area would be subsurface; ravine into Erickson Gulch approximately 500 m from area.
General composition: Approximately 11 newer paint cans, 6 used oil filters, wire, 1 lead-acid battery; evidence of burning.
Impacted vegetation: None noted.
% covered: 0
Sampling: Due to the small size and lack of nearby receptors, the surrounding media was not sampled.

8. POTENTIAL CONTAMINANTS OF CONCERN

8.1 Out-of-Service Transformers

No transformers are present at the site.

8.2 Metals and Hydrocarbons in Soil

Two small areas potentially impacted by hydrocarbons and/or metals were identified at the site.

Soils within the former generator building were stained and strong odours were present in the building. Stained areas, approximately 4 m^2 in total, did not extend out of the building. Soils under the building are very thin or nonexistent with much of the building situated directly on cobble/rock or bedrock. Due to the substrate, excavation was not possible.
Two very small hydrocarbon stains (< 1 m), possibly associated with former waste oil disposal practices, were noted on the east side of the main site building. Soils were found to be very thin or nonexistent and were not sampled. Due to the substrate, excavation was not possible.

8.3 Liquid Hazardous Materials

All barrels present at the site were empty. No liquid hazardous materials were present at the site.

8.4 Solid Hazardous Materials

No solid hazardous materials were identified at the site, with the exception of the small amount of debris noted above in Section 7.0 of this report.

9. WATER QUALITY

A single surface water sample was collected on Erickson Gulch approximately 300 m upstream of the site (28-WQ-Str-CD-01). Flow in the gulch was estimate at > 5 L/sec. Water was pooling in the adit portal and a small amount of water, much less than 1 L/sec, was noted flowing from the adit. This water was sampled (28-WQ-A-CD-01). Water discharging from the open adit disappeared below ground within 3 m of the adit, however, surface flow was again noted approximately 30 m below the bottom test pit at the site. This flow was sampled (28-WQ-Str-CD-02).

Laboratory sample analysis and field data is provided in Attachment B.

10. RECLAMATION

No reclamation appears to have been completed at this site in the past. Natural revegetation has occurred only to a minor extent within the test pits near the bottom of the site and along the slopes of the ravine. Seasonal runoff appears to have limited natural revegetation along the ravine bottom.

11. OTHER SOURCES OF INFORMATION AND DATA

No additional information was identified.

12. REFERENCES AND PERSONAL COMMUNICATIONS

United Keno Hill Mines Limited. 1996. *United Keno Hill Mines Limited – Site Characterization.* Report No. UKH/96/01, prepared by Access Mining Consultants Limited.

United Keno Hill Mines Limited. 1996. *United Keno Hill Mines Limited – Site Characterization, Technical Appendices I-VI.* Report No. UKH/96/01, prepared by Access Mining Consultants Limited.

Table B4. 1999 Water Quality Results, Shamrock Site

Sample Number		Detection Limit	Units	28-WQ-StrCD-01 - 13/09/99	28-WQ-StrCD-02 - 13/09/99	28-WQ-ACD-01 - 13/09/99
Site Description						
pH (field)			pH	7.3	6.9	5.5
Conductivity (field)			µS/cm	-	-	-
pH (Lab)		0.01	pH	7.45	6.3	5.64
Conductivity (Lab)		0.01	µS/cm	105	48	42
Total Alkalinity		5	mg CaCO3/L	31	8	<5
Chloride		0.25	mg/L	<0.25	<0.25	<0.25
Hardness (CaCO3 equiv)		5	mg/L	44	18	9.2
Nitrate-N		0.05	mg/L	0.2	0.45	1.19
Nitrite-N		0.003	mg/L	<0.003	<0.003	0.003
Sulphate		1	mg/L	14.6	11.2	9.2
Total Dissolved Solids		5	mg/L	61	34	30
Analysis by ICP-USN						
	Aluminum	0.0008	mg/L	0.013	0.083	2.86
	Antimony	0.005	mg/L	<0.005	<0.005	0.396
	Arsenic	0.01	mg/L	<0.01	<0.01	0.02
	Barium	0.00004	mg/L	0.0781	0.054	0.273
	Beryllium	0.00001	mg/L	<0.00001	<0.00001	0.0002
	Bismuth	0.0004	mg/L	<0.0004	<0.0004	<0.0004
	Boron	0.002	mg/L	<0.002	<0.002	<0.002
	Cadmium	0.00001	mg/L	0.00006	0.00179	0.0377
	Calcium	0.002	mg/L	14.3	5.74	4.49
	Chromium	0.00006	mg/L	0.00032	0.00014	0.00656
	Cobalt	0.00003	mg/L	<0.00003	<0.00003	0.00673
	Copper	0.00003	mg/L	<0.00003	0.00064	0.116
	Iron	0.00001	mg/L	0.015	0.114	7.56
	Lead	0.0003	mg/L	<0.0003	0.0932	9.93
	Lithium	0.001	mg/L	0.003	0.026	0.003
	Magnesium	0.0005	mg/L	1.84	1	1.09
	Manganese	0.00002	mg/L	0.00221	0.015	1.68
	Mercury	0.0001	mg/L	<0.0001	<0.0001	0.0002
	Molybdenum	0.00007	mg/L	0.00014	<0.00007	0.0006
	Nickel	0.00001	mg/L	<0.00001	<0.00001	0.0107
	Phosphorus	0.03	mg/L	<0.03	<0.03	0.74
	Potassium	0.4	mg/L	<0.4	<0.4	0.6
	Selenium	0.004	mg/L	<0.004	0.005	<0.004
	Silicon	0.004	mg/L	1.91	2.37	4.55
	Silver	0.00005	mg/L	<0.00005	0.00089	0.176
	Sodium	0.4	mg/L	0.6	0.7	0.7
	Strontium	0.00002	mg/L	0.0489	0.0209	0.0237
	Sulphur	0.008	mg/L	5.03	3.96	3.53
	Thallium	0.001	mg/L	<0.001	<0.001	0.001
	Titanium	0.00002	mg/L	<0.00002	0.00188	0.0911
	Vanadium	0.00003	mg/L	<0.00003	0.0001	0.00568
	Zinc	0.0002	mg/L	0.0033	0.0639	0.554
Total Arsenic by Hydride AA						
	Arsenic	0.0002	mg/L	0.0015	0.001	0.022
Total Selenium by Hydride AA						
	Selenium	0.0001	mg/L	0.0004	<0.0001	0.0003

ATTACHMENT B: 1999 SHAMROCK WASTE ROCK SAMPLES LABORATORY RESULTS					
Site Number	**Detection Limit**	**Units**	**28_WR_TPBM_01**	**28_WR_TPBM_02**	**28_WR_TPBM_03**
Sample Desciption			Waste rock pile - 200 Level portal	Waste rock pile - 200 Level portal	Waste rock pile - original Shamrock
Paste pH (field)	N/A	pH	-	-	-
Conductivity (field)	N/A	µS/cm	-	-	-
pH in Saturated Paste					
pH	0.1	pH	5.7	5.3	5.8
pH in Soil (1:2 water)					
pH	0.01	pH	4.5	4.6	5.2
ICP Semi-Trace Scan					
Aluminum	5	µg/g	21400	24500	14200
Antimony	2	µg/g	880	76	720
Arsenic	2	µg/g	1190	610	49
Barium	0.05	µg/g	184	301	447
Beryllium	0.1	µg/g	0.5	0.6	0.4
Bismuth	5	µg/g	5	<5	8
Cadmium	0.1	µg/g	8.5	2.5	20
Calcium	5	µg/g	153	323	988
Chromium	0.5	µg/g	26.1	36	26.4
Cobalt	0.1	µg/g	3.5	2.6	4
Copper	0.5	µg/g	320	130	255
Iron	1	µg/g	28000	19000	38000
Lead	1	µg/g	12200	7450	611000
Lithium	0.5	µg/g	6.5	12	8.6
Magnesium	1	µg/g	203	335	909
Manganese	0.5	µg/g	2310	1370	2780
Mercury	0.01	µg/g	0.86	0.29	0.53
Molybdenum	1	µg/g	2	<1	1
Nickel	1	µg/g	26.1	12.2	11.5
Phosphorus	5	µg/g	1300	998	1740
Potassium	20	µg/g	3610	6700	3550
Selenium	2	µg/g	<2	<2	<2
Silicon	5	µg/g	176	472	848
Silver	0.5	µg/g	159	29.3	80.6
Sodium	5	µg/g	262	435	880
Strontium	1	µg/g	31	50	25
Sulphur	10	µg/g	540	880	640
Thorium	1	µg/g	5	6	4
Tin	1	µg/g	12	10	23
Titanium	0.2	µg/g	18.9	32.7	174
Uranium	5	µg/g	<5	<5	<5
Vanadium	1	µg/g	23	36	27
Zinc	0.5	µg/g	609	361	873
Zirconium	0.1	µg/g	9.7	15.4	17.3

ATTACHMENT 2: 1999 SHAMROCK WASTE ROCK LABORATORY RESULTS
MODIFIED SOBEK METHOD ACID-BASE ACCOUNTING TEST

SAMPLE	SITE DESCRIPTION	PASTE pH	S(T) %	S(SO4) %	AP	NP	NET NP	NP/AP
28_WR_TPBM_01	Waste rock pile - 200 Level portal	6.3	0.03	0.02	0.3	-0.5	-0.8	<0.1
28_WR_TPBM_02	Waste rock pile - 200 Level portal	6.4	0.06	0.04	0.6	0.6	0.0	1.0
28_WR_TPBM_02 RE	Duplicate	-	0.06	0.03	0.9	-	-	-
28_WR_TPBM_03	Waste rock pile - original Shamrock	6.2	0.04	0.03	0.3	1.0	0.7	3.2

AP = ACID POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NP = NEUTRALIZATION POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NET NP = NET NEUTRALIZATION POTENTIAL = TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NOTE: WHEN S(T) AND/OR S(SO4) IS REPORTED AS <0.01, IT IS ASSUMED TO BE ZERO FOR THE AP CALCULATION.
N/D = NO DUPLICATE ASSAY. CALCULATIONS ARE BASED ON ASSAY RESULTS OF THE INITIAL SAMPLE.
RE = REPLICATE.

NOTE - A HIGH LEVEL OF SOLUBLE METALS (ESPECIALLY IRON) WERE OBSERVED IN MANY SAMPLES DURING THE ABA TITRATIONS.
SAMPLES WITH A NEGATIVE NET NP SHOULD BE TESTED FOR MOBILE METALS USING STANDARD SHAKE FLASK EXTRACTION TESTS.

- Building (22A: building site present reference*) Indicates Asbestos Material
- 22A Collapsed Building
- Adit
- Collapsed Adit
- Shaft
- Collapsed/Backfilled Shaft
- Mine Rock Dump
- Bedrock Open Pit
- Trench
- Stripped Overburden Stockpile
- Stripped / Disturbed Area
- Outcrop Boundary
- Highway
- Road (gravel, 2 wheel drive)
- Road (gravel, 4X4 accessible)
- Road (inaccessible)
- Trail
- Culvert
- 24501-01 1999 Soil Sample (this study)
- Pre 1999 Soil Sample (other sources)
- 25WR04-01 1999 Waste Rock Sample (this study)
- Pre 1999 Waste Rock Sample (other sources)
- WO-12-06 1999 Water Sample
- Pre 1999 Water Sample
- Tension Cracks
- Mass Movement (note: for Forms: BelleKeno)
- Groundwater Seep
- Surface Water Flow (Stream, Creek, River)
- Lake
- Settling Pond / Water Treatment Pond
- Tailings Dam / Tailings Pond / Mill Tails
- Ponded Water / Trench
- Barrels
- Abandoned Equipment (compressors, ore cars, rails, air and water pipe)
- Mine Rails / Trestle
- Collapsed Trestle
- Solid Waste Disposal Site
- Area of Soil Contamination
- *(6) Transformer Location (number of transformer in brackets)
- Power Line
- Power Line Collapsed
- Aerial Transmission Towers
- 5 Photo Site (arrow shows view direction)
- GPS Survey Location
- Former Building Site (Elsa)

CAD FILE: site28.dgn

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

Architectural & Engineering Services
Western Region

designed by: / concu par:
drawn by: / dessine par: C.S. Nov. 99
approved by: / approuve par:
revisions:

Drawing title: / Titre du dessin:

Shamrock Site #28
Site Assessment
Yukon Territory

project no. / no. du projet: 125-12.01
dwg. no. / dessin no. 1 of 1

Photo 28-1: Waste rock below open cut at upper end of site. Note deep erosion path.

Photo 28-2: Ravine below adit and associated waste rock piles.

Photo 28-3: Partially open adit entrance.

Photo 28-4: Small test pit at lower end of site.

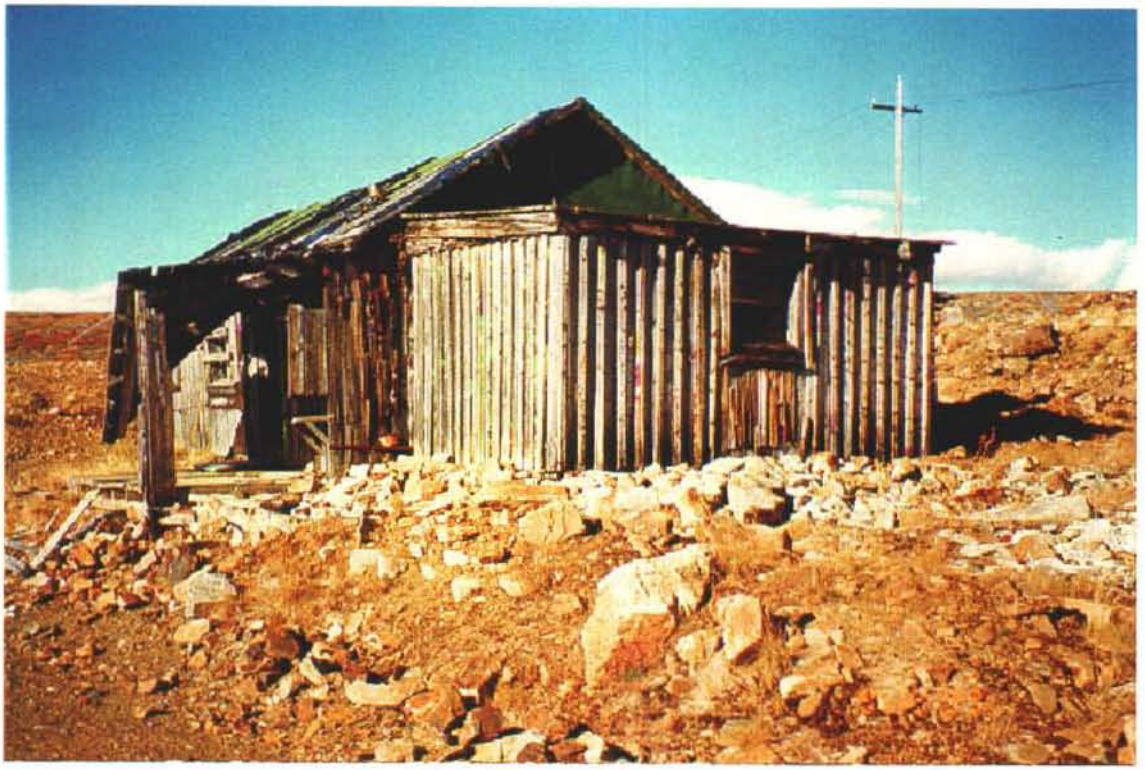


Photo 28-5: Main site living quarters (building 28A).

Photo 28-6: Interior of generator shed (building 28B). Note staining on rock.

Photo 28-7: Remains of collapsed shed (building 28D) at old shaft.

Photo 28-8: Rail and trestle at main adit.

Photo 28-9: Small solid waste dump adjacent to generator shed.

HIGHLANDER (#29)
(MINFILE # 105M 001ai)

1. LOCATION AND ACCESS

The Highlander abandoned mine site is 6 km north-northeast of the community of Keno Hill and 2 km northwest of Keno Summit, at 1370 metres to 1440 metres above sea level (Figure 1). It is located at the approximate UTM co-ordinates 7 092 100m N and 487 900m E. Access to the property is via the Silver Trail Tourism Association's Keno City trail network, Trail Number 4 - Gambler Gulch Trail, and Trail Number 5 - Faro Gulch Trail. An unserviced gravel road, with rough sections, from Keno City provides vehicle access to within 1 km of the site. The last kilometre is a footpath that is suitable for all-terrain vehicles, with minor upgrading.

2. SITE PHYSIOGRAPHY

The site is located on the south side of Gambler Gulch at 1430 metres above sea level. Gambler Gulch is on the north side of Keno Hill. Soil around the site is well-drained and coarsely textured. Highlander is in an area of discontinuous permafrost on a north facing slope. No surface indications of permafrost were observed during the site visit. Vegetation consists of stunted black spruce, a variety of willow (2 to 3 metres high), scrub brush, heather, Hudson Bay tea, a variety of mosses and lichens, black berries, low bush cranberries, fireweed and sedges. The stream in Gambler Gulch runs through dense willow thickets.

Untreated mine water flows from a collapsed adit to Gambler Gulch along a 10-metre channel. All surface water from this site drains into Ladue Creek, which connects an unnamed lake (containing Wernecke tailings) and Gambler Lake.

3. GEOLOGY AND MINERALIZATION

The Highlander site is one of several small abandoned mine sites located within the Keno Hill - Galena Hill mining camps. The commodities of interest at the Highlander site are silver, lead and zinc. The Keno Hill - Galena Hill silver-lead ores occur in erratic shoots and lenses lying in vein-faults that cut fine-bedded to massive quartzite, intercalated greenstone sills and lenses, and various schistose rocks (GSC Paper 68-68, p.21). These rocks are intruded by gabbro and diabase sills.

Mineralization at the Highlander site consists of pyrite, galena, sphalerite, and freibergite in quartzite and siderite gangue (GSC Bulletin 111, p.36.).

4. SITE HISTORY

The Highlander property was likely staked in 1919-1920, following the discovery of the rich No. 9 vein on Keno Hill. Work on the Highlander claim and adjacent claims to 1929 included six open-cuts (most of which sloughed in by 1929), and an inaccessible 8 metre shaft that terminated in a drift, 14.6 metres long (GSC Memoir 284, p.603.). Inaccessible open-cuts and a shaft on the Highlander claim are also described by RW. Boyle (GSC Bulletin 111, p. 35.) after visiting the site between 1953 and 1955.

The buildings appear to have been built between 20 and 40 years ago, and the 10,000 to 15,000 tonnes of waste rock on the site was probably generated at least that long ago. The volume of waste rock indicates that at least 500 metres of underground development occurred at the Highlander site (SRK, 1996).

5. MINE DEVELOPMENT

Mine development at the lower workings includes a collapsed adit, two waste rock piles and a number of wood frame buildings located immediately adjacent to the stream in Gambler Gulch, and a second adit and waste rock complex located to the southwest on the hillside above the stream.Site details can be found on Figure 1; see attachment B for site photos.

5.1 Mine Openings And Excavations

Main Adit (photo 29-6)

Location: Main workings, located at the southeast edge of the lower waste rock piles.

Dimensions (L x W x H): N/A

Supports: N/A

Condition: Adit is collapsed.

Accessibility: Adit is securely sealed.

Upper Adits (photos 29-2,3)

Location: Two, perhaps three, adits or deep open-cuts along western edge of upper waste rock pile.

Dimensions (L x W x H): N/A

Supports: N/A

Condition: Adits are collapsed.

Accessibility: Northernmost adit is partially blocked but still accessible. Other adits are blocked with waste rock

5.2 Waste Rock Disposal Areas

There are three piles of mine rock on the site: two piles on either side of the ore processing shack outside the lower adits and one pile outside the upper adits. Waste rock was sampled in 1996 (SRK, 1997); all samples (with the exception of sample GA/WR/P204 from the upper pile) had NP:AP ratios greater than 6, indicating no acid generation potential. The lone exception was sample GA/WR/P204 which had an NP:AP ratio of 1.8, indicating that the material is potentially acid generating. The pile has been in place for at least 20 years (based on development history, surface vegetation, and the condition of adjacent adits) and is not currently acid generating (paste pH was neutral). There is little to no iron oxide staining on the surface. There is no staining visible at the base of the pile to indicate contaminated seepage or surface runoff, nor were there any signs of impacted vegetation.

A confirmatory rock sample (Highlander-WR-1) was collected near the base of the upper waste rock pile, but was not analyzed.

Upper workings waste rock pile (photo 29-2):

There is less than 5,000 tonnes in the upper waste rock pile. The rock is unsorted and the slopes appear to be stable.

Location: 25m northeast of the three upper adits

Dimensions (L x W x H): 30m x 12m x 4m

Stability: There is no evidence of the waste rock pile slumping. The waste rock pile appears stable.

Lower workings, southeastern waste rock pile (photo 29-11):

Location: 10m west of lower adit

Dimensions (L x W x H): 15m x 10m x 3m

Stability: The edges of the waste rock pile are sloped between 25° and 30° with no evidence of slumping.

Lower workings, northwestern waste rock pile (photo 29-9):

Location: 15m north of lower adit

Dimensions (L x W x H): 45m x 30m x 3m

Stability: The edges of the waste rock pile are sloped between 35° and 40°, following the underlying slope, with no evidence of slumping.

5.3 Tailings Impoundments

No milling was reported at the Highlander site, and no tailings were encountered.

6. MINE SITE INFRASTRUCTURE

Infrastructure at the Highlander site is limited to six wooden buildings (of varying size and condition) and rail infrastructure. Site details can be found on Figure 1; see Attachment A for site photos.

6.1 Buildings

There are six buildings at Highlander, including a cabin and bunkhouse, an ore processing structure, and three small (2m x 2m) wood frame sheds.

Building 29A: Ore processing building (photo 29-8)

Location: 10m northeast of lower adit entrance

Dimensions (L x W x H): 6m x 7m

Construction: three level wood frame, wood siding, and wood roof

Paint: none observed

Asbestos: none observed

Contents: none

Foundation: none

Hazardous products: none

Building 29B: wood frame cabin (photo 29-7)

Location: 30m west of lower adit

Dimensions (L x W x H): 9.5m x 6.5m x 3m

Construction: wood frame and clapboard, 2"x 6" floor, roof, and ceiling joists. partially collapsed porches

Paint: none observed

Asbestos: none observed

Contents: two wooden frame beds, various wooden shelves, large table, and the remnants of a wood burning stove

Foundation: none

Hazardous products: none observed

Building 29C: Wood frame bunkhouse (photo 29-7)

Location: 55m northwest of lower adit

Dimensions (L x W x H): 9.5m x 5.5m x 3m

Construction: wood frame and clapboard, 2"x 6" floor, roof, and ceiling joists; partially collapsed porches

Paint: none observed

Asbestos: none observed

Contents: none

Foundation: none

Hazardous products: none observed

6.2 Fuel Storage

There were no fuel drums or storage tanks encountered at this site.

6.3 Rail Infrastructure

Fabrication: steel rails and ore car

Amount of materials: approximately 10m total length of rail and one ore car

Condition: The rails and ore car are rusted, but pose no safety hazard

6.4 Milling and Processing Infrastructure

An ore processing structure (building 29A) is situated between the two lower waste rock dumps. Processing appears to have been limited to hand segregation of ore into bins; no signs of milling are evident at the Highlander site.

6.5 Electrical Equipment

None noted.

7. SOLID WASTE DUMPS

There were no solid waste dumps observed at this site.

8. POTENTIAL CONTAMINANTS OF CONCERN

8.1 Out-of-Service Transformers

No out-of-service transformers were observed.

8.2 Metals and Hydrocarbons in Soil

Background information and the on-site investigation did not indicate any concerns regarding metals or hydrocarbons in the soil; therefore no soil samples were taken.

8.3 Liquid Hazardous Materials

No liquid hazardous materials were encountered at this site.

8.4 Solid Hazardous Materials

No solid hazardous materials were encountered at this site.

9. WATER QUALITY

Mine water flows from the lower workings adit for a distance of 10m to Gambler Gulch. No discoloration or precipitated oxides were observed in the mine water or discharge stream channel.

Three water quality samples were collected:

1. Highlander-WS-1 (Gambler Gulch, approximately 20m above the confluence with the mine water discharge);
2. Highlander-WS-2 (mine water discharge); and
3. Highlander-WS-3 (Gambler Gulch, approximately 70m downstream from northernmost waste rock pile).

A list of water quality samples, field tests and laboratory results is given in Attachment B.

10. RECLAMATION

Some grass has grown on the sides of the waste rock piles; however, there has otherwise been relatively little disturbance of the site and therefore natural reclamation has been minimal.

11. OTHER SOURCES OF INFORMATION AND DATA

Further information on this site can be found in the SRK (1997) Phase II assessment report. This report provides a detailed discussion of water quality and waste rock analyses from the 1996 field program; these analytical results are also summarized in Attachment B.

12. REFERENCES

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Table B1. 1999 Water Quality Analyses, Highlander Mine Site

Sample Number	Detection Limit	Units	Highlander-WS-1 99/09/16	Highlander-WS-02 15/09/99	Highlander-WS-03 15/09/99
pH (field)	N/A	pH	6.3	6.7	6.3
Conductivity (field)	N/A	µS/cm			
pH (Lab)	0.01	pH	7.34	7.93	7.65
Conductivity (Lab)	0.01	µS/cm	140	350	210
Total Alkalinity	5	mg CaCO3/L	31	105	55
Chloride	0.25	mg/L	<0.25	<0.25	<0.25
Hardness (CaCO3 equiv)	5	mg/L	62.8	170	94.8
Hardness (CaCO3 equiv)	0.1	mg/L			
Nitrate-N	0.05	mg/L	<0.05	0.06	<0.05
Nitrite-N	0.003	mg/L	<0.003	<0.003	<0.003
Sulphate	1	mg/L	38.5	65.2	44
Total Dissolved Solids	5	mg/L	91	230	134
Analysis by ICP-USN					
Aluminum	0.0008	mg/L	0.0046	0.049	0.0147
Antimony	0.005	mg/L	<0.005	<0.005	<0.005
Arsenic	0.01	mg/L	<0.01	<0.01	<0.01
Cadmium	0.00006	mg/L	0.00014	0.000076	0.000064
Calcium	0.002	mg/L	21.1	48.6	28
Chromium	0.00006	mg/L	<0.00006	0.00032	0.0004
Cobalt	0.00003	mg/L	<0.00003	0.00024	<0.00003
Copper	0.00003	mg/L	<0.00003	0.00239	0.00137
Iron	0.00001	mg/L	0.033	0.172	0.01
Lead	0.0003	mg/L	<0.0003	0.001	<0.0003
Mercury	0.0001	mg/L	<0.0001	<0.0001	<0.0001
Molybdenum	0.00007	mg/L	0.00022	0.00104	0.00077
Nickel	0.00001	mg/L	<0.00001	0.0005	<0.00001
Phosphorus	0.03	mg/L	<0.03	<0.03	<0.03
Potassium	0.4	mg/L	<0.4	<0.4	<0.4
Selenium	0.004	mg/L	0.004	<0.004	0.007
Silicon	0.004	mg/L	1.64	2.13	1.74
Silver	0.00005	mg/L	<0.00005	<0.00005	<0.00005
Sodium	0.004	mg/L	0.7	1	0.7
Strontium	0.00002	mg/L	0.0727	0.142	0.0873
Sulphur	0.008	mg/L	12.9	20.3	13.7
Thallium	0.001	mg/L	<0.001	<0.001	<0.001
Titanium	0.00002	mg/L	<0.00002	0.00062	0.00039
Vanadium	0.00003	mg/L	<0.00003	<0.00003	<0.00003
Zinc	0.0002	mg/L	0.0047	0.0067	0.005
Analysis by Hydride AA					
Arsenic	0.0002	mg/L	<0.0002	0.0009	0.0006

Table B2. Highlander 1996 Water Quality Results

Table B2. Highlander 1996 Water Quality Results

Sample ID Sampling date	GA/WQ/Str 004 18 Sept 1996	GA/WQ/Str 005 18 Sept 1996	GA/WQ/S 101 1 Sept 1996
Physical Tests			
Conductivity	36	186	282
(umhos/cm)	13.1	85.3	135
Hardness (as CaC03)	6.52	7.53	7.79
pH			
Dissolved Anions			
Acidity (as CaCO3)	6.1	1.0	1.0
Alkalinity - Total (as	7.1	49.4	94.4
CaCO3) Sulphate (as	8.3	42.4	52.2
S04)			
Total Metals			
Aluminum T-Al	0.008	0.246	0.044
Arsenic T-As	0.0001	0.0002	0.0018
Barium T-Ba	0.02	0.02	<0.01
Beryllium T-Be	<0.005	<0.005	<0.005
Boron T-B	<0.1	<0.1	<0.1
Cadmium T-Cd	<0.0002	<0.0002	<0.0002
Calcium T-Ca	3.52	25.9	39
Chromium T-Cr	<0.001	<0.001	<0.001
Cobalt T-Co	<0.02	<0.02	<0.02
Copper T-Cu	<0.001	<0.001	0.001
Iron T-Fe	<0.03	<0.03	0.15
Lead T-Pb	<0.001	<0.001	0.003
Lithium T-Li	<0.02	0.03	<0.02
Magnesium T-Mg	1.06	4.97	9.12
Manganese T-Mn	<0.005	<0.005	0.012
Mercury T-Hg	<0.00005	<0.00005	<0.00005
Molybdenum T-Mo	<0.03	<0.03	<0.03
Nickel T-Ni	<0.02	<0.02	<0.02
Selenium T-Se	0.0006	0.0006	0.0008
Silver T-Ag	<0.0001	<0.0001	<0.0001
Sodium T-NA	<2	<2	<2
Vanadium T-V	<0.03	<0.03	<0.03
Zinc T-Zn	0.009	<0.005	0.006

Table B3. Highlander 1996 Waste Rock Test Results

Parameter	Units	GA/WR/P204	GA/WR/P205	GA/WR/P206	GA/WR/P207
Field Paste	pH	6.12	8.33	8.96	8.66
Field Cond		10	90	50	80
ps/cm		6.68	7.83	8.47	8.46
Lab Paste	pH	0.11	0.71	0.30	0.70
		0.05	0.18	0.17	0.16
Total Sulfur	%				
Sulfate	%				
AP		1.9	16.6	4.1	16.9
NP		3.4	111.3	103.9	109.0
NET NP		1.6	94.7	99.8	92.1
NP/AP		1.8	6.7	25.6	6.5
Aluminum	%	0.70	0.70	1.70	0.90
Antimony	ppm	715	14	< 1	7
Arsenic	ppm	< 1	87	165	101
Barium	ppm	123	37	53	51
Beryllium	ppm	<0. 1	<0. 1	<0.1	<0.1
Bismuth	ppm	13	< 1	< 1	< 1
Cadmium	ppm	39.7	<0. 1	<0.1	<0.1
Calcium	%	0.24	2.99	3.69	3.62
Chromium	ppm	52	45	95	50
Cobalt	ppm	25	27	23	20
Copper	ppm	980	39	137	56
Gallium	ppm	< 1	< 1	< 1	<1
Iron	%	3.13	6.66	3.56	3.93
Lead	ppm	572	633	398	122
Lithium	ppm	3	10	25	15
Magnesium	%	0.21	1.55	2.06	1.31
Manganese	ppm	6730	>10000	1816	3675
Molybdenum	ppm	13	21	11	14
Nickel	ppm	52	119	62	60
Potassium	%	0.11	0.11	0.06	0.11
Phosphate	ppm	970	570	350	950
Silver	ppm	>200	6.7	4.7	3.3
Sodium	%	<0.01	<0.01	<0.01	0.01
Strontium	ppm	14	12	20	31
Thorium	ppm	< 1	< 1	< 1	< 1
Tin	ppm	4	10	6	5
Titanium	%	<0.01	<0.01	<0.01	<0.01
Tungsten	ppm	12	< 1	3	< 1
Uranium	ppm	< 1	< 1	< 1	< 1
Vanadium		15.9	24.5	52.0	26.4
ppm		4545	1465	1760	459
Zinc					
ppm					

AP = Acid Potential in tonnes CaC03 equivalent per 100 tonnes of material
NP = Neutralization Potential in tonnes CaC03 equivalent per 1000 tonnes of material
Net NP = Net Neutralization Potential = tonnes CaC03 equivalent per 1000 tonnes of material

- Building (22A: building site present reference*) Indicates Asbestos Material
- 22A — Collapsed Building
- Adit
- Collapsed Adit
- Shaft
- Collapsed/Backfilled Shaft
- Mine Rock Dump
- Bedrock Open Pit
- Trench
- Stripped Overburden Stockpile
- Stripped / Disturbed Area
- Outcrop Boundary
- Highway
- Road (gravel, 2 wheel drive)
- Road (gravel, 4X4 accessible)
- Road (inaccessible)
- Trail
- Culvert
- 24501-01 — 1999 Soil Sample (this study)
- Pre 1999 Soil Sample (other sources)
- 25WR04-01 — 1999 Waste Rock Sample (this study)
- Pre 1999 Waste Rock Sample (other sources)
- WQ-12-06 — 1999 Water Sample
- Pre 1999 Water Sample
- Tension Cracks
- Mass Movement (note: for Forms: BelleKeno)
- Groundwater Seep
- Surface Water Flow (Stream, Creek, River)
- Lake
- Settling Pond / Water Treatment Pond
- Tailings Dam / Tailings Pond / Mill Tails
- Ponded Water / Trench
- Barrels
- Abandoned Equipment (compressors, ore cars, rails, air and water pipe)
- Mine Rails / Trestle
- Collapsed Trestle
- Solid Waste Disposal Site
- Area of Soil Contamination
- *(6) — Transformer Location (number of transformer in brackets)
- Power Line
- Power Line Collapsed
- Aerial Transmission Towers
- (5) — Photo Site (arrow shows view direction)
- GPS Survey Location
- Former Building Site (Elsa)

CAD FILE: SITE29.DGN

Waste Rock Geological Legend

This legend intended for use as a key to the observed lithological content of the mine dumps and stockpiles of surficial materials investigated. It does not represent regional stratigraphy and no stratigraphic sequence is implied.

Pyrite content as percent: eg. Py 2%. Occurs as an alteration halo adjacent to vein fault structure.

Oxidation: Weak (wOx), moderate (mOx) and intense (iOx).

Quarternary: (5) Undifferentiated, unconsolidated colluvium, glacial till.

Veins: (4a) Quartz veins;
(4b) Quartz-pyrite veins;
(4c) Quartz-siderite •trace galena-sphalerite veins;
(4d) Siderite-quartz •trace galena-sphalerite veins;
(4e) Suphide (galena-sphalerite) •quartz•siderite veins.

Greenstone: (3) Amphibole-chlorite-plagioclase metadiorite or metagabbro.

Quartzite: (2a) Thick bedded, blocky gray quartzite;
(2b) Thin banded, broken, quartzite with carbonaceous phyllite interbeds;
(2c) Calcareous quartzite.

Phyllite: (1a) Broken sericite-chlorite phyllite;
(1b) Carbonaceous phyllite.

date:

Public Works And Government Services Canada / Travaux publics et Services gouvernementaux Canada

Architectural & Engineering Services
Western Region

designed by:
concu par:
drawn by: C.S. Nov./99
dessine par:
approved by:
approuve par:
revisions:

Drawing title: / Titre du dessin:

Highlander Site #29
Site Assessment
Yukon Territory

project no. / no. du projet: 125-12.01

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

Photo 29-1: Panorama of upper Highlander area showing both older hand/excavator trenches and more recent cat trenches.

Photo 29-2: Northern partlycollapsed adit, upper workings.

Photo 29-3: Lower workings waste rock piles, bunkhouse and ore processing building viewed to northeast of upper workings.

Photo 29-4: Upper workings waste rock piles.

Photo 29-5: Collaopsed adit, lower workings."

Photo 29-6: Bunkhouse and cabin, looking northwest.

Photo 29-7: Ore processing building.

Photo 29-9: Interior of ore processing building.

CUB AND BUNNY (#30)
(MINFILE# 105M 001aj)

1. LOCATION AND ACCESS

The Cub and Bunny site on the northeast facing slope of Faro Gulch. It is about 1.5 km northwest of the Keno Summit. The site can be accessed on foot from the Upper Faro Gulch Trail. The Upper Faro Gulch Trail is the continuation of the Lucky Queen Road, which intersects the Wernecke Road near the Wernecke town site. These roads can be driven in a four-wheel drive vehicle. The site is about a 7.5 km drive out of Keno City. The Cub and Bunny site consists of a large trench (Trench 1) and a pit (Pit 1) located about 300 m apart. The UTM coordinates for the trench are 7092120 m N 488780 m E. The UTM coordinates for the pit are 7091880 m N 488600 m E. The elevation of the site ranges from 1375 m to 1500 m.

2. SITE PHYSIOGRAPHY

Trench 1 at the Cub and Bunny site lies on a plateau below the Upper Faro Gulch Trail to the north (photo 30-1). Pit 1 lies just north of the trail at the top of a hill sloping northeast towards the trench and Faro Gulch. Surface water drainage runs down this slope towards Faro Gulch.

3. GEOLOGY AND MINERALIZATION

The major rock types observed at the Cub and Bunny site included grey biotite quartz phyllite and greenstone. Quartz siderite veining with disseminated fine-grained galena were evident in Pit 1. Traces of disseminated fine-grained pyrite were found in Trench 1. The minfile reports the presence of two parallel vein faults at the site. The western vein is reported to be hosted in greenstone and contain siderite, galena, freibergite and sphalerite; the eastern vein is reported to be hosted in sercite schist and graphitic phyllite (photo 30-3).

4. SITE HISTORY

The minfile reports that the Cub and Bunny site was developed at some time prior to 1962. The minfile refers to an adit located on the western vein. It is possible that Pit 1 is either the location for a proposed adit or the location of an adit which is now concealed. The minfile also reports that bulldozer trenching occurred on the eastern vein.

5. MINE DEVELOPMENT

5.1 Mine Openings and Excavations

Pit 1 (photo 30-4)

Location: 100 m north of Upper Faro Gulch Trail, 1 km east of Lucky Queen site

Dimensions: 35 m x 5-10 m x 3 m
Condition: stable – 20% revegetated
Access: by foot from Upper Faro Gulch Trail

Trench 1 (photo 30-2)

Location: 300 m NW of Pit 1

Dimensions: 110 m x 2-4 m x 2 m – longitudinal bearing AZ 338
Condition: stable – 40% revegetated
Access: by foot from Upper Faro Gulch Trail

5.2 Waste Rock Disposal Areas

Pit 1 waste rock pile

A waste rock pile is located at the north end of Pit 1. The pile is 15 m long, 10 m wide and 3 m high. It consists mainly of broken rock and overburden with pieces up to 40 cm. 30% of the material has weakly rusted surfaces. The rusting is likely to be caused by ferro-magnesium minerals in greenstone. The paste pH of an undocumented rock sample taken of the waste rock pile was 8.0. The paste conductivity was 3.6 µS/cm. There is some natural reclamation of the waste rock pile the by moss and small shrubs.

Trench 1 waste rock pile

A pile of waste rock from Trench 1 was bulldozed to the northwest end of the trench. It is a mixture of grey biotite quartz phyllite and overburden. This waste rock pile is mostly revegetated and its boundaries are hard to determine.

5.3 Tailings Impoundments

No tailings were observed at the Cub and Bunny site.

5.4 Minesite Water Treatment

No water treatment occurs at the Cub and Bunny site.

6. MINE SITE INFRASTRUCTURE

No infrastructure was observed at the Cub and Bunny site

7. SOLID WASTE DUMPS

No solid waste dumps were observed at the Cub and Bunny site.

8. POTENTIAL CONTAMINANTS OF CONCERN

No potential contaminants of concern were observed at the Cub and Bunny site.

9. WATER QUALITY

There was no surface water observed at the Cub and Bunny site. Surface water runoff from the area drains towards Faro Gulch.

No water quality samples were taken.

10. RECLAMATION

There is significant reclamation of the Cub and Bunny site by natural vegetation. Revegetation was observed at Pit 1 and at Trench 1. There have been no known reclamation measures carried out by past or present operators of the site.

Photo 30-1: View of trench at Cub and Bunny site (Trench1) from above

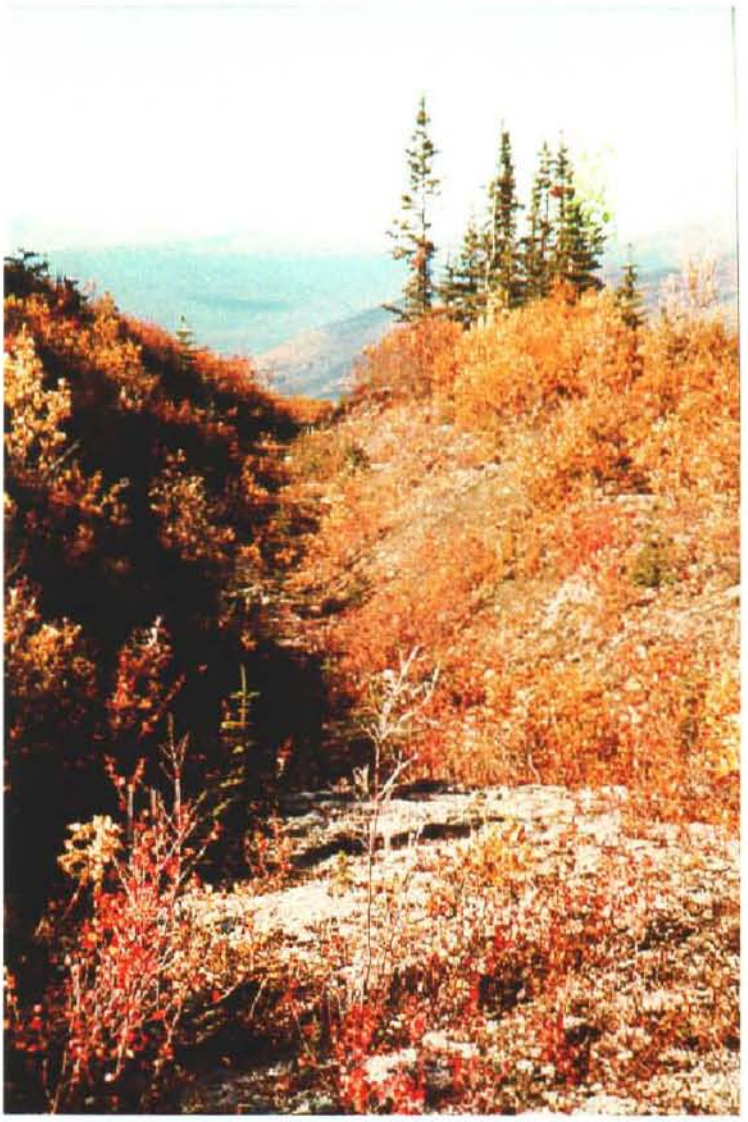


Photo 30-2: View along length of Trench1. (Azimuth 338°)

Photo 30-3: Exposed rock and soil inside of Trench1

Photo 30-4: View of Pit1 at Cub and Bunny site.

STONE

SITE# 31

MINFILE# 105M001ak

1. LOCATION AND ACCESS

The Stone mine site is located in Faro Gulch, 2.3 km north of Keno Summit at 1220m to 1340m elevation. UTM co-ordinates for the site are 7092 500m N and 488 800m E. Access by foot is possible along the Lower Faro Gulch Trail which starts at the Sadie Ladue site, 3 km to the west. Except for one building, the site is located to the south of this trail.

2. SITE PHYSIOGRAPHY (photo 31-1)

The Stone site is located on a moderately steep north-facing slope on Keno Hill, and is likely underlain by permafrost. The site and surrounding area is thickly vegetated with willows, alders, and spruce trees as well as shrubs. The ground is covered with a blanket of moss and decaying leaves. Surface runoff from the mine site flows northward via a small tributary of Faro Gulch, eventually joining the Keno Ladue River 3.1km to the north. The tributary of Faro Gulch starts 65m downslope of the lower adit and flows northward 300m before joining Faro Gulch. Site photos are located in Attachment 1.

3. GEOLOGY AND MINERALIZATION

The bedrock geology is a carbonaceous phyllite, a graphitic phyllite and a siliceous phyllite with greenstone interbeds. A cross-cutting quartz-siderite vein, up to 3m wide, contains galena (PbS), sphalerite ((Zn,Fe)S), freibergite ($(Cu, Fe)_{12}Sb_4S_{13}$) and chalcopyrite ($CuFeS_2$).

4. SITE HISTORY

Prior to 1952, two adits were excavated on the property. During this period, 135 tonnes at 3919 g/t silver and 30.3% lead were shipped from the site to Wernecke or Elsa for processing. In 1952, a third adit was driven between two of the earlier adits.

5. MINE DEVELOPMENT

There are three adits on the property and all three were inspected during the site visit. The airphoto indicates possible activity below the road, but this was not investigated. Waste rock piles are located outside the three adits. Site details can be found in Figure 1; site photos are in Attachment 1.

5.1 Mine Openings and Excavations

The three adits are in a line running northeast southwest at different elevations.

Upper Adit (photo 31-2)

All that remains of the upper adit portal is some collapsed rocks and broken timbers at the bottom of a talus slope.

Location: The upper adit is located 280m southeast of the Lower Faro Gulch Trail at an elevation of 1340m.

Dimensions (L x W x H): The portal has collapsed and the original dimensions are unknown.

Supports: The portal was originally supported by timber.

Condition: The portal has collapsed.

Accessibility: The adit cannot be accessed.

Middle Adit (photo 31-4)

The rock and timbers supporting the portal have collapsed, leaving a small 1m by 1m opening that is blocked by ice. There is a building immediately to the west of the adit (discussed in Section 6 below).

Location: The middle adit is located 160m southeast of the Lower Faro Gulch Trail at an elevation of 1280m.

Dimensions (L x W x H): The portal has collapsed and the original dimensions are unknown.

Supports: The portal was originally supported by timber and rock.

Condition: The portal has collapsed.

Accessibility: The adit cannot be accessed.

Lower Adit (photo 31-6)

A shallow depression full of coarse, angular talus material and willows is all that remains of the lower adit. The portal and supporting structures are no longer visible.

Location: The lower adit is located 30m southeast of the Lower Faro Gulch Trail at an elevation of 1230m.

Dimensions (L x W x H): The portal has collapsed and the original dimensions are unknown.

Supports: The original support structure could not be located.

Condition: The portal has collapsed, the area is stable.

Accessibility: The adit cannot be accessed.

5.2 Waste Rock Disposal Areas

There are three waste rock disposal areas located outside each of the three adits.

Waste rock pile #1 (photo 31-3)

The waste rock pile appears to have formed by end dumping from the upper adit opening. A 50cm test pit was excavated from the east side of the waste rock pile. The waste rock is bi-modal with 50% fines, 35% 2mm to 2cm and 15% 2cm to 30cm. Four distinct layers based on colour and oxidation were identified. The surface layer (0-3cm) is moderately oxidized green-brown phyllite and greenstone with 3-8% siderite-sphalerite vein.

The next layer (3-5cm) is a yellow-green oxidized layer. From 5-15cm, there is a green-brown oxidized layer. Below this (15-50cm), is a green-yellow unoxidized material with 27-30cm of dark gray graphitic shear material. There was no surface water or seeps flowing through the rock pile.

Location: The waste rock pile starts immediately outside of the upper adit and continues 45m downslope.

Dimensions (L x W x H): 40m x 20m x 5m

Sampling: Sample 31WR01-01 was collected from the test pit and analyzed. The field paste pH was 8.5 and the conductivity was 40uS/cm.

Waste rock pile #2 (photo 31-5)

The waste rock pile appears to have formed by end dumping from the middle adit opening. A 30cm test pit was excavated from the middle of the pile. The waste rock in the pit appeared uniform and is composed of dark gray graphitic phyllite with 2-5% quartz-siderite veinlets and vugs. The waste rock is bi-modal with 50% fines (<2mm); 40% 2mm-5cm, and 10% greater than 5cm. There was no surface water or seeps flowing through the rock pile.

Location: The waste rock pile starts immediately outside of the middle adit and continues 50m downslope.

Dimensions (L x W x H): 60m x 50m x 8m

Sampling: Sample 31WR01-01 was collected from the test pit and sent for Acid-Base Accounting (ABA) and metals analysis. The field paste pH was 8.5 and the conductivity was 40µS/cm.

Waste rock pile #3

The waste rock pile likely formed by end dumping from the lower adit opening. The waste rock is composed of large angular blocks of greenstone and lesser dark gray graphitic phyllite. There was no surface water or seeps flowing through the rock pile.

Location: The waste rock pile starts immediately outside of the lower adit and continues 15m downslope.

Dimensions (L x W x H): 15m x 6m x 2m

Sampling: Sample 31WR02-01 was collected from the test pit and sent for Acid-Base Accounting (ABA) and metals analysis. The field paste pH was 8.4 and the conductivity was 120µS/cm.

5.3 Tailings Impoundments

No ore was processed at the site; no tailings were encountered.

5.4 Minesite Water Treatment

There is no water treatment facility located at this site.

6. MINE SITE INFRASTRUCTURE

There are four buildings associated with the property. A small volume of rail was encountered near the middle adit. Site details are located on Figure 1: site photos can be found in Attachment 1.

6.1 Buildings

There are two buildings located near the middle adit (Buildings 31-A and 31-B). Two more buildings are next to the Lower Faro Gulch Trail, 380m northwest of the Lower adit.

Building 31-A: Dry Building (photo 31-7)

Dimensions (L x W x H): 7.3m x 4.3m x 3.0m

Location: The building is located 60m to the northwest of and at the same elevation as the middle adit.

Construction: The entire building, frame, roof, floor and sides are constructed with wood. The floors are rotting but the rest of the building is moderately sound. The exterior of the building is painted white.

Asbestos: None observed

Non-Hazardous Contents: Two 45-gallon drums, empty.

Hazardous Contents: None.

Building 31-B

Dimensions (L x W x H): 4.5m x 3m x 3.0m

Location: Immediately east of the entrance to the middle adit.

Construction: The building was constructed with a wood frame and aluminum siding. The building has almost completely collapsed.

Asbestos: none observed

Non-Hazardous Contents: none

Hazardous Contents: none

The frames of both Building 31-C and 31-D appear to have been removed; the roofing and siding material for the buildings is all that is left.

Building 31-C (see Photo 31-8)

Dimensions (L x W x H): Building material is spread out over a 24m x 15m area.

Location: North of the Lower Faro Gulch Trail, 380m northwest of the Lower Adit.

Construction: The roof and wall panel are likely constructed with an asbestos-containing material.

Asbestos: Suspect that the roof and wall board contain asbestos.

Non-Hazardous Contents: none

Hazardous Contents: none

Building 31-D

Dimensions (L x W x H): Building material is spread out over a 20m by 15m area.

Location: South of the Lower Faro Gulch Trail, 380m northwest of the lower adit.

Construction: Wood construction.

Asbestos: None observed.

Non-Hazardous Contents: several empty crushed drums (semi-buried).

Hazardous Contents: none

6.2 Fuel Storage

No fuel storage areas were encountered on the Stone site.

6.3 Rail and Trestle

Location: Some demolished rail noted by the middle adit.

Fabrication: Steel with wooden rail ties.

Amount of materials: Roughly 15 cubic metres of demolished rail line.

Condition: Safe and overgrown.

6.4 Milling and Processing Infrastructure

No milling or processing was done at this site.

6.5 Electrical Equipment

No electrical equipment was encountered.

7. SOLID WASTE DUMPS

There is no one location where solid waste was dumped. Empty fuel drums were found outside of Building 31-C and assorted steel debris (rails, piping) were dumped around the middle adit and waste rock dump.

8. POTENTIAL CONTAMINANTS OF CONCERN

No hazardous waste was encountered at the site. Potential contaminants of concern include any metals washing from the waste rock piles.

9. WATER QUALITY

Surface runoff from the mine site flows northward into a small, unnamed tributary of Faro Gulch. Two samples were collected downstream of the mine site to be tested for routine water quality and metals. Sample 31WQ01-01/02 was collected from Faro Gulch, just upstream of the small tributary. Sample 31WQ02-01/02 is from the small tributary.

Field Test Results

Sample 31WQ01-01/02	pH: 8.1	Conductivity: 310 µS/cm
Sample 31WQ02-01/02	pH: 8.3	Conductivity: 350 µS/cm

10. RECLAMATION

Natural revegetation of mostly alders has occurred in most of the disturbed areas.

11. REFERENCES

Minfile #105M001ak

ATTACHMENT 2: 1999 STONE WATER SAMPLES LABORATORY RESULTS				
Sample Number	**Detection Limit**	**Units**	**31-WQ01-01 - Stone - Sept 14/99**	**31-WQ02-02 - Stone - Sept 14/99**
Site Description			Faro Gulch upstream of tributary	Faro Gulch tributary downstream of mine site
pH (field)	N/A	pH	8.1	8.3
Conductivity (field)	N/A	µS/cm	310	350
pH (Lab)	0.01	pH	7.76	8
Conductivity (Lab)	0.01	µS/cm	370	500
Total Alkalinity	5	mg CaCO3/L	49	129
Chloride	2.5	mg/L	<0.25	<0.25
Hardness (CaCO3 equiv)	5	mg/L	181	261
Nitrate-N	0.05	mg/L	<0.05	0.47
Nitrite-N	0.003	mg/L	<0.003	<0.003
Sulphate	1	mg/L	120	113
Total Dissolved Solids	5	mg/L	246	332
Analysis by ICP-USN				
Aluminum	0.0008	mg/L	0.02	0.0096
Antimony	0.005	mg/L	<0.005	<0.005
Arsenic	0.01	mg/L	<0.01	<0.01
Barium	0.00004	mg/L	0.0357	0.0254
Beryllium	0.00001	mg/L	<0.00001	<0.00001
Bismuth	0.0004	mg/L	<0.0004	<0.0004
Boron	0.002	mg/L	<0.002	<0.002
Cadmium	0.00006	mg/L	0.00158	0.000018
Calcium	0.002	mg/L	48.6	70.8
Chromium	0.00006	mg/L	0.00027	0.00019
Cobalt	0.00003	mg/L	0.00011	<0.00003
Copper	0.00003	mg/L	0.0014	0.00198
Iron	0.00001	mg/L	0.059	0.008
Lead	0.0003	mg/L	0.0115	<0.0003
Lithium	0.001	mg/L	<0.001	0.002
Magnesium	0.0005	mg/L	11.7	16.8
Manganese	0.00002	mg/L	0.0543	0.00093
Mercury	0.0001	mg/L	<0.0001	<0.0001
Molybdenum	0.00007	mg/L	0.00044	0.00044
Nickel	0.00001	mg/L	0.0014	<0.00001
Phosphorus	0.03	mg/L	<0.03	<0.03
Potassium	0.4	mg/L	<0.4	<0.4
Selenium	0.004	mg/L	0.009	<0.004
Silicon	0.004	mg/L	1.75	1.66
Silver	0.00005	mg/L	<0.00005	<0.00005
Sodium	0.004	mg/L	0.7	0.5
Strontium	0.00002	mg/L	0.178	0.145
Sulphur	0.008	mg/L	39.8	36.8
Thallium	0.001	mg/L	<0.001	<0.001
Titanium	0.00002	mg/L	0.00041	<0.00002
Vanadium	0.00003	mg/L	<0.00003	<0.00003
Zinc	0.0002	mg/L	0.14	0.0016
Analysis by Hydride AA				
Arsenic	0.0002	mg/L	0.0008	0.0007
Selenium	0.0001	mg/L	<0.0001	<0.0001

ATTACHMENT 2: 1999 STONE WASTE ROCK SAMPLES LABORATORY RESULTS				
Sample Number	**Detection Limit**	**Units**	**31WR01-01 - Sept 14/99**	**31WR02-01 - Sept 14/99**
Site Description			Upper Level Adit waste rock pile (#1)	Middle Level Adit waste rock pile (#2)
Paste pH (field)	N/A	pH	8.5	8.4
Conductivity (field)	N/A	µS/cm	40	120
pH in Saturated Paste				
pH	0.1	pH	7.9	7.8
pH in Soil (1:2 water)				
pH	0.01	pH	8.1	8.3
ICP Semi-Trace Scan				
Aluminum	5	µg/g	14500	29400
Antimony	2	µg/g	<2	<2
Arsenic	2	µg/g	64	48
Barium	0.05	µg/g	88.6	226
Beryllium	0.1	µg/g	0.2	0.7
Bismuth	5	µg/g	<5	<5
Cadmium	0.1	µg/g	2.7	20.2
Calcium	5	µg/g	71300	33200
Chromium	0.5	µg/g	9.3	26.5
Cobalt	0.1	µg/g	18.4	10.2
Copper	0.5	µg/g	35	13
Iron	1	µg/g	66000	24000
Lead	1	µg/g	70	147
Lithium	0.5	µg/g	7.8	3.5
Magnesium	1	µg/g	18000	7450
Manganese	0.5	µg/g	11600	3650
Mercury	0.01	µg/g	3.5	<0.01
Molybdenum	1	µg/g	1	2
Nickel	1	µg/g	32.6	29.4
Phosphorus	5	µg/g	684	950
Potassium	20	µg/g	4480	12700
Selenium	2	µg/g	<2	<2
Silicon	5	µg/g	692	979
Silver	0.5	µg/g	9.9	1.9
Sodium	5	µg/g	55	329
Strontium	1	µg/g	9	14
Sulphur	10	µg/g	2100	4630
Thorium	1	µg/g	<1	<1
Tin	1	µg/g	<1	1
Titanium	0.2	µg/g	39.7	140
Uranium	5	µg/g	<5	<5
Vanadium	1	µg/g	43	36
Zinc	0.5	µg/g	345	1760
Zirconium	0.1	µg/g	11.8	20.8

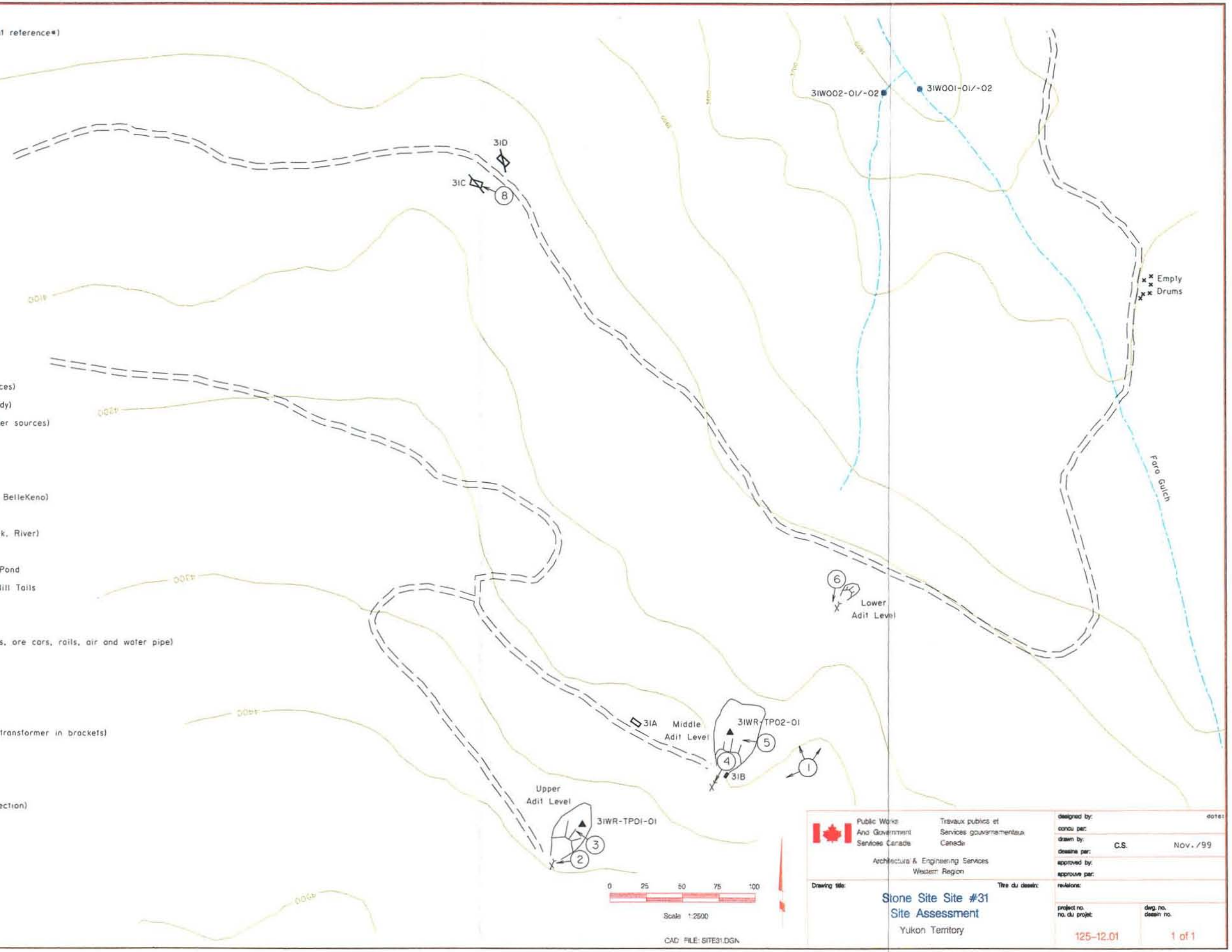
ATTACHMENT 2: 1999 STONE WASTE ROCK SAMPLES LABORATORY RESULTS
MODIFIED SOBEK METHOD ACID-BASE ACCOUNTING TEST

SAMPLE	SITE DESCRIPTION	PASTE pH	S(T) %	S(SO4) %	AP	NP	NET NP	NP/AP
31WR01-01 - Sept./99 - Soil	Upper Level Adit waste rock pile (#1)	8.8	0.20	<0.01	6.3	196.5	190.3	31.4
31WR02-01 - Sept./99 - Soil	Middle Level Adit waste rock pile (#2)	8.8	0.56	<0.01	17.5	137.8	120.3	7.9
31WR02-01 - Sept./99 - Soil RE	Middle Level Adit waste rock pile (#2): Duplicate	-	0.54	<0.01	16.9	-	-	-

AP = ACID POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NP = NEUTRALIZATION POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NET NP = NET NEUTRALIZATION POTENTIAL = TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NOTE: WHEN S(T) AND/OR S(SO4) IS REPORTED AS <0.01, IT IS ASSUMED TO BE ZERO FOR THE AP CALCULATION.
N/D = NO DUPLICATE ASSAY. CALCULATIONS ARE BASED ON ASSAY RESULTS OF THE INITIAL SAMPLE.
RE = REPLICATE.

NOTE - A HIGH LEVEL OF SOLUBLE METALS (ESPECIALLY IRON) WERE OBSERVED IN MANY SAMPLES DURING THE ABA TITRATIONS.
SAMPLES WITH A NEGATIVE NET NP SHOULD BE TESTED FOR MOBILE METALS USING STANDARD SHAKE FLASK EXTRACTION TESTS.

- 22A* Building (22A: building site present reference*) Indicates Asbestos Material
- 22A Collapsed Building
- Adit
- Collapsed Adit
- Shaft
- Collapsed/Backfilled Shaft
- Mine Rock Dump
- Bedrock Open Pit
- Trench
- Stripped Overburden Stockpile
- Stripped / Disturbed Area
- Outcrop Boundary
- Highway
- Road (gravel, 2 wheel drive)
- Road (gravel, 4X4 accessible)
- Road (inaccessible)
- Trail
- Culvert
- 24501-01 1999 Soil Sample (this study)
- Pre 1999 Soil Sample (other sources)
- 25WR04-01 1999 Waste Rock Sample (this study)
- Pre 1999 Waste Rock Sample (other sources)
- WO-12-06 1999 Water Sample
- Pre 1999 Water Sample
- Tension Cracks
- Mass Movement (note: for Forms: BelleKeno)
- Groundwater Seep
- Surface Water Flow (Stream, Creek, River)
- Lake
- Settling Pond / Water Treatment Pond
- Tailings Dam / Tailings Pond / Mill Tails
- Ponded Water / Trench
- Barrels
- Abandoned Equipment (compressors, ore cars, rails, air and water pipe)
- Mine Rails / Trestle
- Collapsed Trestle
- Solid Waste Disposal Site
- Area of Soil Contamination
- *(6) Transformer Location (number of transformer in brackets)
- Power Line
- Power Line Collapsed
- Aerial Transmission Towers
- 5 Photo Site (arrow shows view direction)
- GPS Survey Location
- Former Building Site (Elsa)



CAD FILE: SITE31.DGN

Public Works And Government Services Canada / Travaux publics et Services gouvernementaux Canada

Architectural & Engineering Services
Western Region

Drawing title: / Titre du dessin:

Stone Site Site #31
Site Assessment
Yukon Territory

designed by: / conçu par:		date:
drawn by: / dessiné par:	C.S.	Nov./99
approved by: / approuvé par:		
revisions:		
project no. / no. du projet:	125-12.01	dwg. no. / dessin no. 1 of 1

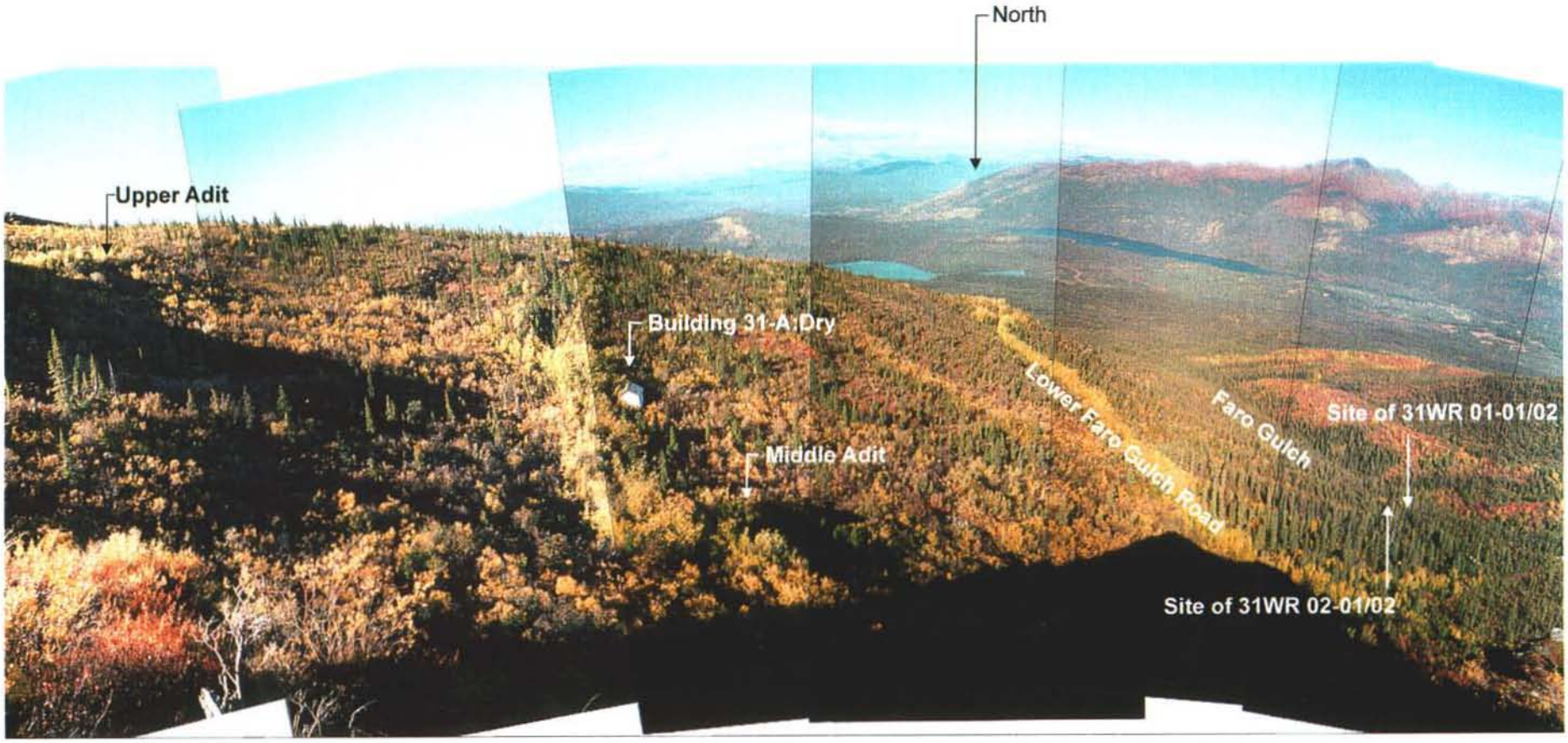


Photo 31-1: Panorama of Stone site.

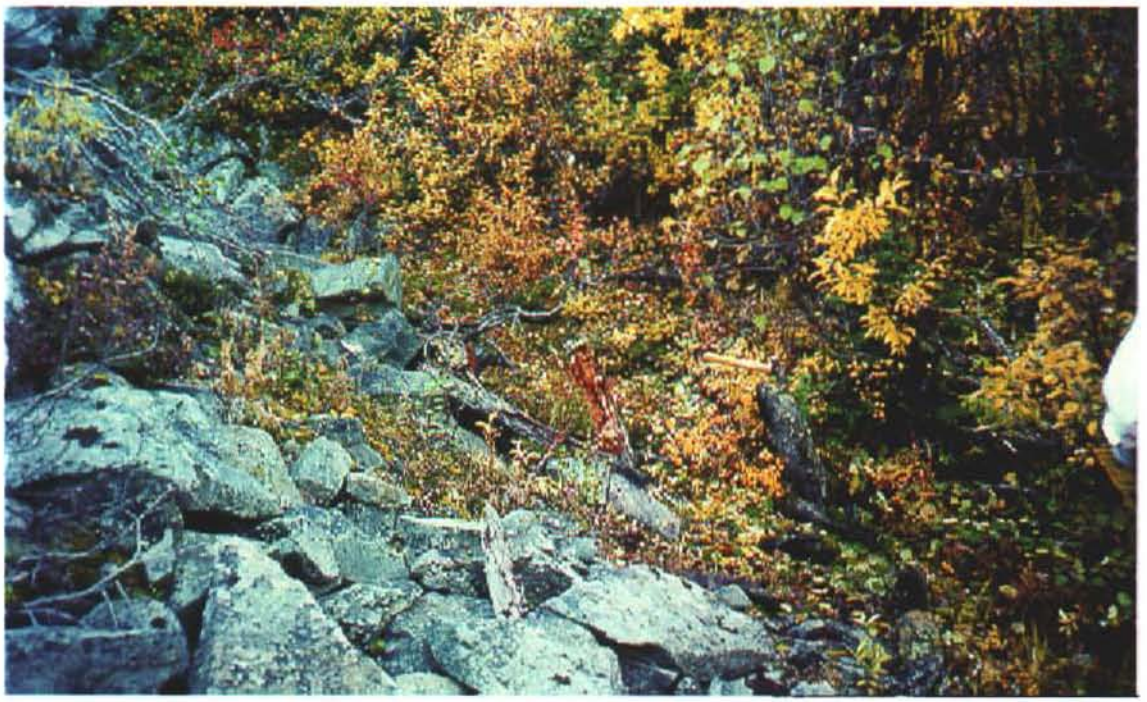


Photo 31-2: Collapsed upper adit portal. Note hammer in old portal timbers.
Photo Direction (Azimuth 230°)

Photo 31-3: Upper adit level waste rock dump.
Photo Direction (Azimuth 300°)

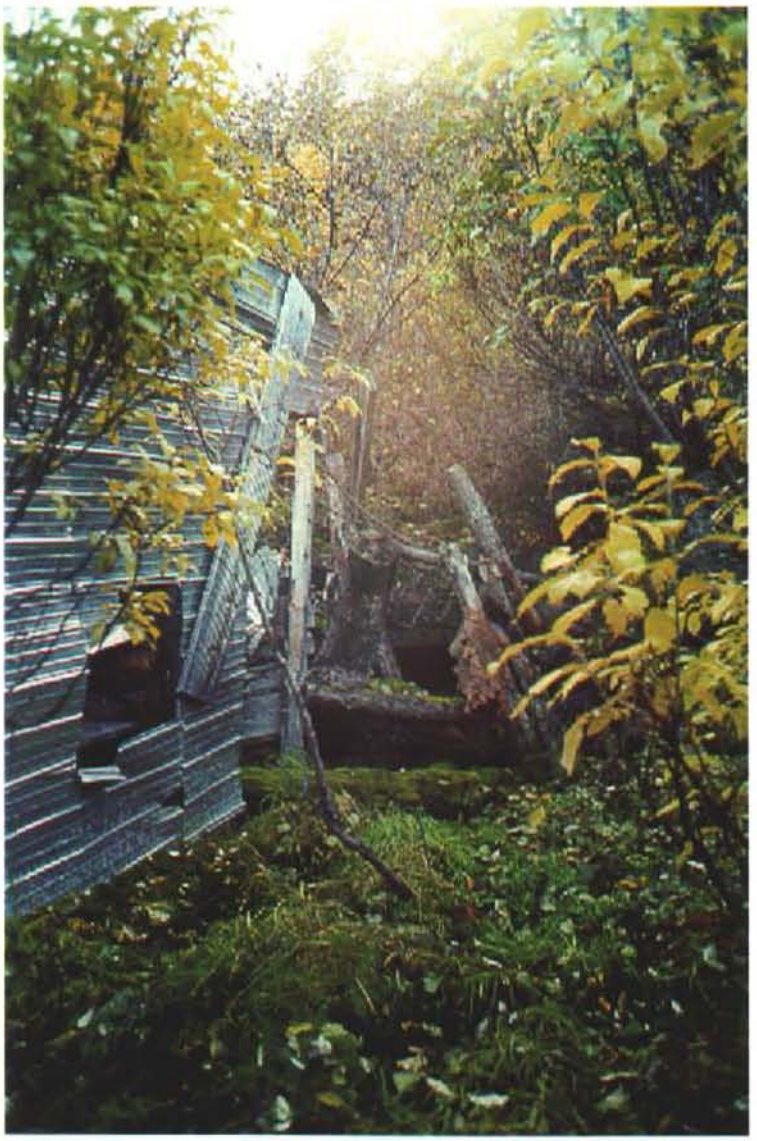


Photo 31-4: Collapsed middle adit portal and storage shed (Bldg. 31-B). Note damp ground from mine seepage.
(Azimuth 160°)

Photo 31-5: Middle adit level waste rock dump with mine dry in background.
Photo Direction (Azimuth 270°)

Photo 31-6: Collapsed lower adit portal.
Photo Direction (Azimuth 032°)

Photo 31-7: Interior of dry (Bldg 31-A) showing rafters, wallboard and water tanks for shower and sauna.

Photo 31-8: Demolished buildings (Bldgs. 31-C, D) along road west of Stone. Note discarded asbestos containing siding at right and in background held by field personnel. at depth in pit and abundant siderite vein cobbles.
Photo Direction (Azimuth 290°)

KENO 700, PORCUPINE, AND COMSTOCK

SITE #32

105M 001an, at & 105M 008

This report describes the field investigation of parts of the Keno No. 9 System, including the Keno 200 and 700 levels, the Porcupine Open Pit, and the Comstock 150 and 200 levels. Investigations of the Shamrock J18 Vein Raise, No. 3 Vein Open Pit and Adit, No. 9 Vein Open Pit, Faro Gulch Portal, the Keno No 4 trenches and Upper Adit and the No. 5 Vein trenches are reported in a separate report (site #36). The sites of the Keno No. 1 Vein Adits, Keno No. 4 and 5 Shafts, Keno No. 6 Vein and No. 2 Vein Shafts, Keno No. 5 Vein Adit, and Keno No. 12 Vein Adit were not investigated.

1. LOCATION AND ACCESS

The sites described in this report are spread southeast of Keno Summit on Keno Hill between 1,440m and 1,650m asl. They occur across a broad, relatively gentle slope above Hope Gulch. Access to Keno No. 9 is east along the Keno 700 Road from Keno City. A map showing the relative locations of the workings is provided in Map 32-1.

	MinFile	UTM North	UTM East	Elevation
Keno 700 Level	105M001at	7,089,350m	490,250m	1,440m
Keno 200 Level	105M001an	7,089,825m	489,550m	1,615m
Porcupine Pit	105M001an	7,089,850m	489,850m	1,605m
Comstock 150 & 200	105M008	7,089,900m	490,100m	1,645m

2. SITE PHYSIOGRAPHY

The Keno No. 9 System (including Keno 200 and 700, Porcupine, and Comstock 150 and 200) of mine sites is situated along a broad and gentle southeast-facing slope which converges and drains down into Hope Gulch approximately 800 m further to the southeast (Map 32-1). From here, Hope Gulch drains into Lightening Creek further to the south. The sites occur well above the treeline, located in sub-alpine to alpine tundra terrain, with characteristic shrub vegetation and soils. Raised frost-heave areas, polygons and the high altitude suggest the presence of continuous permafrost in the area (Photo 32-

1). The mine system was recorded as being in permafrost at the 400 level from the summit.

3. GEOLOGY AND MINERALIZATION (from original minfile)

The host rock geology consists of Keno Hill Quartzite, graphitic schist, quartz sericite schist and greenstone. Veins in the host rock consist of breccia and sheeted types, hosted by the quartzite and greenstone. These are highly oxidized near the surface to galena, limonite, beudantite, jarosites, cerussite, anglesite, manganese oxides and oxidized siderite, freibergite and sphalerite nodules, with some native silver. Siderite, galena, sphalerite and freibergite are found lower in the mine system. Total production from the mine system to date is 257,241 tonnes consisting of 1517 g/t silver, 10.6% lead and 3.7% zinc.

4. SITE HISTORY (from original minfile)

Current claims in the area include Keno, Roulette, Rico, Minto, Pinochle, Porcupine, Wolverine etc. and are owned by United Keno Hill Mines Ltd. (UKHM). The land tenure is leased quartz claims, in addition to surface leases at the Wolverine claim (at Keno 700), F.B. 16735, UKHM 010; and the old Keno Summit townsite, 000007. Operations began with UKHM starting in 1919, during which the No. 9 mine was developed and worked to the 300 level using shafts and adits, followed by an incline shaft below 300. By 1924, two more shafts were added including the No. 3 vein, which was developed with a 50 m shaft at levels 30 (adit), 75, and 150; and No. 12 vein with a 107 m adit. Three additional adits, totaling 158 m, were also developed at No. 1 vein in the 1920's. Prior to 1930, a 15 m shaft, 61 m adit and 49 m drift were developed at the Porcupine claim. Bulldozing along the vein at No. 6 was conducted between 1948 to 1949 and a 13 m shaft was sunk and 5 m drift in 1952 during which some ore was mined. In 1954, two adits at the 150 and 275 levels were conducted at Comstock Porcupine. The Keno 200 level adit was developed in 1956 with a 416 m crosscut and 100 m drift. Between 1958 and 1982, activities included the development of the 700 level adit, connection and further development of the levels, an internal shaft from the 700 to 1075 level and a vent raised from the 400 level. Porcupine Pit was excavated in 1977 leaving a 3000 tonne dump; the earlier shaft and adit from the late 1920's were destroyed. Reported adit waste dumps include Keno 700 – 25,000 tonnes, Comstock 275 – 2,800 tonnes, and Keno 200 – 13,250 tonnes. More recently the Keno 700 adit has been subject to ice plug damming

resulting in erosion of the waste dump from periodic release of the plug. The adit is also draining through a culvert under the waste dump. Future mining is planned by UKHM for the No. 18 vein.

5. MINE DEVELOPMENT

5.1. Mine Openings and Excavations

Adits/Shafts/Portals

Keno 700 Adit (Photo 32-2)

Description: Portal is enclosed in plywood housing with reinforced metal aluminum roofing; deep melt water occurs on the eroding portal floor. There is a rail car on the track inside the shack.

Location: Located in the centre of Keno 700 building site (Building 7, Map Figures 32-1 and 32-2) on the Wolverine claim

Dimensions (L x W x H): portal opening - ? m x 2 m x 2.5 m

Supports: railway tie wood supports along inner portal walls in relatively good condition, but beginning to rot.

Condition: structure appears to be stable

Accessibility: Inaccessible. A locked fence blocks the main adit entrance, but entry can be gained from a open side door. A large ice plug blocks a majority of the portal opening.

Keno 200 Adit (Photo 32-3)

Description: Portal is enclosed in plywood housing with tar paper siding and roofing, a portion of which has blown off the top. A rail car was found on the track within the shack in front of the portal opening (Photo 32-4). Some equipment, mostly ties and metal parts, was also stored along the inside of the shack.

Location: Located at Keno 200 (Map Figures 32-1 and 32-3) north of Keno 700, west of the road of the same name.

Dimensions (L x W x H): portal - 1.5 m W x 2 m H

Supports: log reinforced walls at portal entrance (see Photo 32-4)

Condition: stable near portal entrance; however, some wall collapse observed 3 m into adit (see Photo 32-4)

Accessibility: Entry can be gained from an open two-sided door at the front

Comstock 150 Adit (Photos 32-5, 32-6)

Description: Portal is enclosed in on the north-west side of two-roomed wood plank housing with reinforced aluminum metal roof; a portion of the reinforcing has been blown off. Access door to other room has been removed. This second room consists of a small office with a wood floor, electrical supply, switch box and an old desk. A small vent shaft enclosed in a stable wood housing, with an aluminum metal reinforced roof and hand ladder occurs at the 100 level just above this adit (Photo 32-6).

Location: Located at Comstock 150 (Map Figures 32-1 and 32-4) northeast of Keno 700, near the east end of the road of the same name.

Dimensions (L x W x H): portal - ? m x 1.5 m x 2 m

Supports: log reinforced walls at portal entrance

Condition: appears to be stable near portal entrance, shack is shifting but solid

Accessibility: Access door to the adit has been sealed but partially damaged (see Photo 32-5).

Comstock 200 Adit – (Photo 32-7)

Description: Portal is enclosed in plywood housing with aluminum-reinforced siding and roof; a portion of the roof has been blown off. The floor of the adit shack consists of soft mud.

Location: Located at Comstock 200 (Map Figures 32-1 and 32-5) northeast of Keno 700, near the east end of the road of the same name, and directly below Comstock 150.

Dimensions (L x W x H): portal - 1.5 m W x 2 m H

Supports: plywood and log reinforced walls at portal entrance, still in good condition

Condition: appears to be stable near portal entrance, shack is shifting but solid

Accessibility: The main access door to the adit has been locked; however, access can be gained through a second smaller door on the west side of the adit shack.

Porcupine Pit Portal (Photo 32-8)

Description: The location has been overgrown by natural vegetation. An old empty drum is situated near its entrance, in addition to a smaller barrel with a spigot at the north end of the adit.

Location: Located along the west side of Porcupine Pit (Map Figures 32-1 and 32-6) north of Keno 700, along the north side of the road of the same name.

Dimensions (L x W x H): portal - 30 m x 2 m x 1.5 m

Supports: although most of the portal has collapsed, the walls were apparently reinforced using logs.

Condition: unstable near portal entrance; majority of remainder of adit has caved in

Accessibility: Portal is blocked by wood planks and has collapsed along a majority of its length. A vertical shaft occurs further along the adit approximately 30 m into the pit; the opening, which is exposed, has been caved in with large boulders.

Open Pits

Porcupine Pit (Photo 32-9)

Description: large circular pit dug into the slope to the north of Keno 700 Road; sides are moderately steep to gently-sloping. Vegetation has begun to establish along the sides of the pit which have eroded over the years

Location: along north side of Keno 700 Road

Dimensions (L x W x H): 50 m x 60 m x 25 m

Condition: sides of pit appear to be eroding, but partially stabilized through natural re-colonization by vegetation

Trenches

No apparent trenches in the Keno No. 9 System; many of the exploration sites were undoubtedly developed in some capacity.

5.2. Waste Rock Disposal Areas

Keno 700 Waste Rock (Photo 32-10)

General Description: Large mound upon which the current campsite is located. Area has been eroded downslope as the result of erosion and catastrophic release of seep water from the Keno 700 Adit ice plug. Most of the regular adit seepage flows through a culvert in the waste pile which daylights near the upper edge flowing down towards Ray Gulch. This drainage and the steep incline make the slopes of the pile highly unstable and has resulted in erosion downslope forming a large outwash area towards Ray Gulch. Waste rock pile is direct result of mining activities from the portal, some of which is overburden. Landfilling activities have also occurred in the waste rock at the northeast end of the pile, where exposed debris resulting from erosion was observed. An inspection of the waste rock piles suggests that very little ore grade material is contained in the pile,

minor quantities of galena and sphalerite was documented throughout the pile. However, the majority of the waste rock pile appears to be associated with host rock material with very little evidence to suggest sulphide rich rock content. No evidence of staining or physical evidence of Acid Rock Drainage was documented at the site. The waste rock pile is located on a steep, well drained slope and is comprised of coarse rock material. Although water drainage from the adit flows through the waste rock pile, the pile does not appear to retain large volumes of water.

Location: Located underneath and southeast of the Keno 700 camp site (Map Figure 32-2).

Dimensions (L x W x H): 200 m x 60 m x 50 m at top; however portions of pile have eroded downslope into an outwash area for a few hundred metres; total mass is estimated at ~ 25,000 t

Sampling: Two samples were previously taken by United Keno Mines Ltd. at the top of the waste pile along the southeast edge in 1995 (95-UKHKD01 and 95-UKHKD02, Map Figure 32-2). These results are reproduced below.

Sample	Paste pH	S (tot.) %	S (SO_4) %	AP kg $CaCO_3$/tonne	NP	Net NP kg $CaCO_3$/t	NP/AP
95UKHKD01	8.03	1.03	0.16	27.19	47.00	19.8	1.7
95UKHKD01	8.22	0.45	0.16	9.06	10.94	1.9	1.2

One sample of waste rock (99-32-WR-01 – Map Figure 32-2) was taken during the current investigation at the top of the waste pile to the south west of the adit entrance. Results of the 1999 sampling indicated similar results to the 1995 sampling event with a paste pH of 7.9 and an NP/AP ratio of 1.9. The acid-base accounting tests and other chemical results are provided in attachment 2.

Keno 200 Waste Rock (Photo 32-11)

General Description: Large mound, mixed with overburden upon which the Keno 200 adit and loading infrastructure is located. The area is relatively high and dry; no evidence of surface adit seepage drainage was observed. Some evidence of erosion has occurred along the south edge of the pile by the loading trestle, where an erosion scree was observed An inspection of the waste rock pile indicated no staining or indications of acid rock drainage. The waste rock appeared to be well drained with no evidence of seepage that would suggest saturated conditions within the pile. No evidence of sulphide rich

rock was documented in the waste pile. However, the upper 0.15 metres of the pile had a distinctive green colour to it when compared to the waste rock comprising the lower portions of the pile. The rock type appeared to consist primarily of host rock, not ore containing material.

Location: Located underneath and south of the Keno 200 adit (Map Figure 32-2).

Dimensions (L x W x H): 150 m x 25 m x 15 m; total mass is estimated at ~ 13,250 t

Sampling: Two waste rock samples were collected during the current investigation including one (99-32-WR-02, Map Figure 32-3) at a 15 cm depth in the green horizon of the pile (upper 0.15 metres) and the second from the weather horizon (99-32-WR-05, Map Figure 32-3) (lower portions of the pile). The acid-base accounting tests and other chemical results are provided in attachment 2.

Comstock 150 Waste Rock (Photo 32-12)

General Description: Small mound, mixed with overburden upon which the Comstock 150 adit and loading infrastructure is located. The area is relatively high and dry; no evidence of surface adit seepage drainage was observed. The sides of the waste rock pile have been stabilized and reinforced by wood planks and logs (see Photo 32-23). A second, smaller pile (~ 15 m L x 4 m wide x 1.5 m high was situated to the south of the site and the truck-loading trestle waste rock was composed of brown loose shale and overburden material. The waste pile appeared to contain a high percentage of sandy overburden. An inspection of the waste pile did not indicate any seepage faces or saturated conditions that would indicate saturated conditions at the site. The waste pile is located on a steep slope and is comprised of well-drained coarse granular material. No physical indications of acid rock drainage were documented at the subject site.

Location: Located underneath and south of the Comstock 150 adit site (Map Figure 32-4).

Dimensions (L x W x H): 50 m x 30 m x 7 m.

Sampling: One waste rock sample was collected during the current investigation (99-32-WR-01, Map Figure 32-4). The acid-base accounting test and other chemical results are provided in attachment 2.

Comstock 200 Waste Rock (Photo 32-12)

General Description: Small mound, mixed with overburden upon which the Comstock 200 adit and loading infrastructure is located. The area is relatively high and dry; no

evidence of surface adit seepage drainage was observed. The waste rock associated with the Comstock 200 adit contains a high percentage of sandy overburden. In addition, the waste rock contains a brown-black shale loosely consolidated with no apparent sulphide content. No visible evidence of Acid Rock Drainage was documented during the site visit.

Location: Located underneath and south of the Comstock 200 adit site (Map Figure 32-5).

Dimensions (L x W x H): 30 m x 25 m x 15 m; mass estimated at 2,800 tonnes.

Sampling: One waste rock sample (99-32-WR-04, Map Figure 32-5) was collected during the current investigation. The acid-base accounting tests and other chemical results are provided in attachment 2.

5.3. Tailings Impoundments

Tailings Dams

No apparent dams; all mined material was shipped to Elsa for processing.

Tailing Ponds

No apparent tailings ponds; all mined material was shipped to Elsa for processing.

5.4. Minesite Water Treatment

No apparent treatment facilities; all mined material was shipped to Elsa for processing.

6. MINE SITE INFRASTRUCTURE

6.1. Buildings

Keno 700 Site

Buildings at this site included accommodations, mess hall, offices and associated physical plant facilities in support of the operations. A layout of the site buildings and their relative locations is provided in Map Figure 32-2. These are described in more detail below. A description of the Keno 700 adit shack is provided above in Section 5.1.

Building 32-A (Photo 32-13)

The mess hall and kitchen operations buildings (1&2) consisted of wood construction (15 m W x 30 m L) with a reinforced aluminum metal roof and exterior asbestos-board insulation siding. . A sample from the northwest exterior wall of the building (sample 99-

32-AS-01) confirmed the presence of asbestos; these results are presented in Attachment 2. The back end of an old metal freezer truck was attached to an extension at the back (north-west) side of the building and used for cold food storage. The mess hall building itself was stable; however, the exterior wooden access stairs and deck were rotting and extremely unsafe. Non-hazardous contents consisted of a full complement of kitchen equipment including stoves, sinks and domestic debris. A paint sample (99-32-PS-01) was taken from the interior wall at the south end of the building; this was archived, but not analyzed. The second building (2) to the northeast was likely used by the cooking staff and consisted of a shower stall, old mattress and other associated domestic debris. No hazardous materials were apparent within either of the two buildings.

Building 32-B (Photo 32-14)

An old bunkhouse building (3) located to the southwest of building 32-A was originally of wood construction, but the walls were dismantled leaving only portions of the flooring and plumbing in place. It is likely that portions of the removed material were used to construct the current bunkhouse (32-C, building 4). The wood materials at the site were in a state of decay. Non-hazardous materials below the floor boards consisted of old bedsprings, an old empty drum and pieces of domestic debris. No hazardous materials were apparent around or below the remaining building structure.

Building 32-C

The current bunkhouse building (4) was located northwest of the mess hall and was of similar wood and metal construction (30 m L x 6 m wide) to the mess hall (32-A). including interior paint and exterior asbestos-board insulation siding. A sample from the southwest exterior wall of the building (sample 99-32-AS-02) confirmed the presence of asbestos; these results are presented in Attachment 2. The building itself was stable; however the wooden stairs leading up to the building from the mess hall were collapsed. Evidence of an old trailer site was observed beyond the southwest end of the building, including some remaining pieces of floor piping. The interior of the bunkhouse consisted of a series of rooms with a common social area including pool table and TV room. Non-hazardous debris was scattered throughout and included mattresses, bedsprings, wood furniture and personal artifacts. No hazardous materials were apparent within the building.

Building 32-D (Photo 32-15)

The manager's accommodation building (5) and storage sheds (5A) located northwest of the current bunkhouse (32-C) consisted of wood construction (8 m L x 5 m W) with fibre-glass insulation and a reinforced aluminum metal roof. The building was self-contained, in good condition and stable. The interior was painted and consisted of a kitchen (with stove), full bathroom, living/dining room and two bedrooms. Non-hazardous debris consisted of small amounts of domestic debris, but the interior was otherwise clean for the most part. No hazardous materials were apparent within the building.

Building 32-E (Photo 32-16)

The garage building (6) and fallen rail car building (6A) were located near the top edge of the waste rock pile. The garage was of solid wood construction (8 m L x 3 m W x 6 m H) with aluminum metal reinforced roofing and siding, and a wood floor covered in a thin layer of dirt. Although quite stable, the garage was beginning to erode down the side of the waste rock pile. The rail car building (6A) consisting of wood construction with shingle material roof, had already succumbed to erosion and fallen over the side of the pile. The garage was empty but contained an oil stain within the surface dirt of the floor (soil sample 99-32-SS-09). The results of the chemical analysis are provided in Attachment 2. No hazardous materials were apparent within either building.

Building 32-F (Photo 32-17)

Post office, mud room/shower and ambulance garage building (8) was located just northeast of the Keno 700 adit and consisted of wood construction (20m L x 12 m W) with an aluminum metal reinforced roof and insulation board siding. The building was in sturdy condition. Non-hazardous materials within the building included pipes, wood debris, furniture and personal artifacts. No hazardous materials were apparent within either of the sections of the building.

Building 32-G (Photo 32-18)

The generator shack and oil storage building (9) for the site were located just northwest of the ambulance garage (32-F) and consisted of wood construction (28 m L x 7 m W) with aluminum metal reinforced roofing, and concrete flooring. The building was relatively stable; however, faults and cracks were noted in the concrete flooring. Two

diesel generators were found inside in addition to a workshop with equipment pieces, a fuel tank in the southwest corner, drums of hydraulic oil and kerosene (2 x 45 gal.), and hydrocarbon staining on the floor leading outside to the southeast. Soil samples were collected in the large hydrocarbon stain outside the shack at surface (99-32-SS-01), 0.7 m depth (SS-01D) and in drainage from the area (SS-02). The results of the hydrocarbon analysis for these samples are provided in Attachment 2. Three samples were collected from the drums of hydrocarbon products, including 99-32-DS-1 (205 L Chevron barrel containing a green fluid), DS-2 (barrel containing a 4:1 gasoline water mixture) and DS-3 (20 L pail containing hydraulic oil). There were archived, but not analyzed. Aside from hydrocarbon, no hazardous materials were apparent within the building.

Building 32-H (Photo 32-19)

The drill equipment shop building (10), just southeast of the generator shack, was of wood construction (4 m W x 5 m L) with an aluminum metal reinforced roof and wood flooring. The building structure was unstable and was beginning to slip into the erosion channel immediately to the southeast; wood struts had been placed under the shack to support it. Drill casings were stored in a rack next to the structure, which was otherwise empty with the exception of some wooden table stands. Some casings were also scattered on the ground to the northwest of the building. No hazardous materials were apparent in or around the building.

Building 32-I (Photo 32-19)

The mining/geologists office building (11) was situated just next (northwest) to 32-H. This building was of wood construction with insulation board siding, an aluminum metal reinforced roof which had been blown off, and wood flooring. The structure was on the verge of collapse and sliding down into the erosion channel to the southeast. Aside from some wooden support tables, the interior was empty; however, two 45-gallon drums of hydraulic oil and kerosene were noted by the casing storage rack next to the structure. Some heavy oil staining was also noted on the wood flooring of the shack. Aside from hydrocarbon containers, no hazardous materials were apparent in or around the building.

Building 32-J (Photo 32-20)

Boiler room and water supply building (12), located just east of 32-I, was of wood construction (12 m L x 12 m W) with a combination of aluminum metal reinforced, and

shingle roofing; and concrete flooring. The building was relatively stable; however, the blocks of concrete flooring were beginning to shift against one another. The main boiler within the southwest end of the building was in eroded condition and contained exposed insulation material. Samples collected from the floor (99-32-AS-04) and boiler (AS-03) tested negative for asbestos; the results are presented in Attachment 2. The boiler was connected to a network of heat pipes in utility conduits leading to the other serviced buildings on site. Two large water/filtration tanks, a smaller boiler and pressure tanks were located in the northeast end of the building which were also heavily corroded. Non-hazardous debris within the building included old chlorine buckets, 45 gallon fuel drum (one quarter full), insulation material and (2) bags of sand. No hazardous materials were apparent in or around the building.

Keno 200 Buildings

No buildings, aside from adit shack described above in Section 5.1

Comstock 150 Buildings

No buildings, aside from adit shack and vent shaft described above in Section 5.1 and a small outhouse along a utility conduit at the east side of the site. The outhouse was beginning to shift and slide down the slope to the south.

Comstock 200 Buildings (Photo 32-21)

Building 32-K

In addition to the adit shack, described above in Section 5.1, a maintenance building of wood (4 m W x 7 m L) construction with aluminum metal reinforced roofing and siding, and concrete flooring was located to the southeast of the adit. The building was stable with the exception of some minor damage to the interior wall. No materials were noted inside the structure; however, some wood and metal siding debris was observed next to the building. No hazardous materials were apparent in or around the building.

Porcupine Site Buildings

No buildings present.

6.2. Fuel Storage

Keno 700

No apparent fuel storage facilities; aside from a fuel tank situated between the ambulance shed (32-F) and the generator shack (32-G), and barrels of hydrocarbon product noted above in some of the buildings.

No fuel storage facilitates were apparent at any of the other sites investigated in the Keno No. 9 System (i.e., Keno 200, Comstock 150 or 200, or Porcupine).

6.3. Rail and Trestle

Keno 700 Rail (Photo 32-22)

This rail, composed of steel rails on wooden ties, extended south from the Keno 700 adit and continued southeast along the top edge of the waste rock pile terminating at an wood-constructed trestle used to load ore into trucks at the southeast end of the site. The total length of the track was approximately 100m and was relatively intact with the exception of a small portion which collapsed with erosion along the top edge of the waste rock pile by the garage building. The wall of the waste rock pile underneath the trestle were reinforced with wood planks, but were beginning to show signs of buckling.

Keno 200 Rail (see Photo 32-11)

The steel rail on wooden ties extended south from the adit and continued west, terminating along a wood constructed truck-loading trestle for ore along the top edge of the waste rock pile. The total length of the track was approximately 84 m and was relatively intact posing no particular safety hazard. The wall of the waste rock pile below the trestle, however, was not secured and was eroding forming a scree slope. An older abandoned trestle composed of wood was located further along to the east side of the site. The rails were no longer associated with this structure which had become exposed by waste rock erosion and was beginning to collapse.

Comstock 150 Rail (Photo 32-23)

This rail extended south from the adit and continued east terminating along a wood-constructed loading vessel at the south end of the site, along the edge of the main waste rock pile. The rail was comprised of steel on wooden ties and extended for approximately

25 m. This rail was in good condition and the trestle, below which the waste rock pile wall was reinforced by wooden planks and logs, was relatively stable.

Comstock 200 Rail (Photo 32-12)

The rail, composed of steel on wooden ties, extended south from the adit shack and continued southwest terminating along a wood-constructed loading trestle at the south end of the site. Two other portions of the rail included a track extending southeast from the adit to the rail car maintenance shed, and a section extending northeast directly from the trestle and used as a loading queue for rail cars. The total length is approximately 65 m and the rail is in good condition throughout its length. Although the trestle structure itself is in relatively stable condition, a portion of the waste rock pile wall below is not reinforced and is beginning to erode, forming a small scree slope.

Porcupine Site Rail

No rails or trestle were found at this site.

6.4. Milling and Processing Infrastructure

No processing facilities present as mined materials were taken to Elsa for processing.

6.5. Electrical Equipment

No in-service electrical equipment apparent at any of the sites; see Section 8.1 below.

7. SOLID WASTE DUMPS

Keno 700 (Photo 32-24)

A large volume of landfill material has been incorporated into the waste rock pile at the northeast end of the site. The slope of the pile has become eroded at this point exposing a large amount of debris up to 3 m in thickness including drums, wood, plastics, cables, rail ties, rubber hose, culverts, old boiler, drill rods and other materials. Although none of the observed material appeared to be hazardous, the exposed surface was extremely unstable and in an eminent state of collapse. One soil sample (99-32-SS-08) was collected in the drainage just below this area and analyzed for contaminants; the results of the analyses are provided in Attachment 2. In addition to this and materials noted around the

buildings, wood and metal debris was also observed along the slope and outwash area below the waste rock pile to the southeast of the site.

Keno 200

No apparent waste dumps; however, limited amounts of debris scattered over site including a pile of old rusted rail cars near the Keno 200 adit, wood debris and an old transformer (see Section 8.1 below).

Comstock 150

No apparent waste dumps; however, wood debris (rail ties, core tables) scattered along damaged wooden utility conduit at north edge of site and a pile of metal debris (casings) near the Comstock 150 adit.

Comstock 200

No apparent waste dumps; however, wood and metal debris (logs, casings, rail ties, wood core tables, aluminum siding) scattered along damaged wooden utility conduit at northeast edge of site.

Porcupine Site

No apparent waste dumps; however, a couple of empty drums and a pail were noted along the portal.

8. POTENTIAL CONTAMINANTS OF CONCERN

8.1. Out of Service Transformers

Keno 700 (Photo 32-25)

Twin single-phase transformers just to the northwest of the site manufactured by Supreme Power Supplies Ltd., serial numbers 72181 and 72180, weight core & coils 2250 lbs. (4560 lbs. total), volume 125 imp. gallons. The transformers were in relatively good condition and mounted on heavy wooden planks; however, some leakage was observed from the spigot valves. Two samples of fluid (99-32-TR-01 and TR-02) were taken from the spigot valve of each of the transformers. Soil samples (99-32-SS-12 and SS-13) were also taken from the soil surface below the wooden boards of the transformers, in addition to two other locations below raised transformer tower platforms,

including one just to the south of the transformers (99-32-SS-11) north of the site, and the other just southeast of the mining manager's house (99-32-SS-10. The results of the analysis for PCBs in both the transformer oil and the soil samples are presented in Attachment 2.

Keno 200 (Photo 32-26)

A single Permalex transformer, west of the Keno 200 adit, manufactured by General Electric, serial number 606238, volume 11 gallons. The transformer had fallen from a raised wooden transformer tower platform and the top of the housing had been removed. No fluid was present inside the unit. A field duplicate soil sample (99-32-SS-14 and 15) was taken below the raised transformer platform. The result of the analysis for PCBs in this soil sample is presented in Attachment 2.

Aside from electrical lines, lights and switch-boxes, no transformers (out-of-service, or otherwise) were apparent at any of the other sites investigated (i.e., Comstock 150 or 200, or Porcupine).

8.2. Metals and Hydrocarbons in Soil

Keno 700

Samples taken from the hydrocarbon spill by the generator shack (99-32-SS-01, SS-01D, and SS-02), below the landfill (SS-08) and the transformer sites (SS-10, SS-11, and SS-12/13), and the garage floor (SS-09) have been noted in earlier sections. A surface and depth sample (SS-06 and SS-07, respectively) were also obtained in another large hydrocarbon stain noted on the slope between the geologist office (32-I) and the boiler building (32-J) (see Photo 32-18). Three samples were also obtained for hydrocarbon analysis in the erosion channel including SS-03, a soil profile obtained below an engine drop/oil change platform (Photo 32-27) and a pair of field duplicates (SS-06/07) collected further to the northeast in the drainage channel. The analytical results for these samples are provided in Attachment 2.

Aside from the field duplicate sample (99-32-SS-14/15) collected below the fallen transformer at Keno 200; no evidence of any significant staining, spills, or odours was observed at the other sites (i.e., Comstock 150 or 200, or Porcupine).

8.3. Liquid Hazardous Materials

Aside from transformer fluid samples and hydrocarbon products at Keno 700 and/or Keno 200 discussed in earlier sections, no liquid hazardous materials were apparent at any of the Keno No. 9 System sites investigated.

8.4. Solid Hazardous Materials

None apparent at any of the Keno No. 9 System sites investigated.

9. WATER QUALITY

Keno 700 Adit Seepage and Drainage

The Keno 700 adit drains an extremely large expanse of underground workings of which many are up to 70 years old (UKHM, 1996). Water samples were taken in seepage at the entrance to the Keno 700 adit (99-32-WQ-01, see Photo 32-2), below the end of the drainage culvert through the waste rock pile exposed and damaged by erosion (WQ-02, Photo 32-28) and in the receiving stream at the bottom of the outwash area a few hundred metres below the site (WQ-03, Photo 32-29). The results of the geochemical analyses for these samples are presented in Attachment 2.

Keno 200 Adit Seepage

One water sample was taken in seepage at the entrance to the Keno 200 adit (99-32-WQ-04, see Photo 32-4); no additional samples were obtained due to the high and dry topography and lack of any apparent surface drainage. The results of the geochemical analyses for these samples are presented in Attachment 2.

No water samples were taken at any of the other sites investigated (i.e., Comstock 150 or 200, or Porcupine due to the high and dry topography of the areas and distances from any observable water courses.

10. RECLAMATION

No revegetation has occurred at the any of the sites at this point due to the sub-alpine wind-swept conditions of this area, recent disturbance, and surface drainage and resulting erosion in the case of the Keno 700 adit site (see Photos 32-1 to 32-29). No evidence of any reclamation measures at any of the Keno No. 9 System sites investigated.

11. OTHER INFORMATION AND DATA

United Keno Hill Mines Ltd. (UKHM, 1996) conducted a study of the Keno 700 adit site including discharges and water chemistry. The report noted that the drainage water chemistry of this site shows more variability over the year than do most other stations in the area. Since the adit is frozen for half the year, the variability has been attributed to freeze/thaw cycles, producing pure water and concentrating contaminants into the surrounding drainage water during freezing. Values for pH were found to be alkaline reaching up to 8 over the summer period. Sulphate concentrations and conductivity were determined to be considerably lower (about half) than those observed at Galena Hill. Zinc was determined to be the metal of note, with lesser contributions from cadmium and arsenic. The metal levels were reported to be consistent with measurements in Hope Gulch and metal leaching, rather than acid mine drainage, was the main geochemical issue at Keno 700. The report concluded that although the data collected was limited to periodic sampling over two years, the load balance results suggested that there was very little, if any, additional contaminant loading to Hope Gulch from the Keno No. 9 System waste dumps. A water chemistry table from the UKHM report (1996) is provided below.

Station	Flow (m^3/s)	SO_4	Zn (total)	Zn (diss.)	As(total)	Ca (total)
Keno 700	0.0022	150	0.89	0.83	0.05	110
Hope Gulch	0.0062	87	0.23	0.23	<0.02	44.5

All units in mg/L unless specified otherwise

12. REFERENCES AND PERSONAL COMMUNICATIONS

Dunn, William (1999) pers. comm.

United Keno Hill Mines Ltd. (1996) Report No. UKH/96/01 Site Characterization. Produced by Access Mining Consultants Ltd.

ATTACHMENT 2: 1999 KENO VALEY MINE SITE WATER SAMPLES
LABORATORY RESULTS

Sample Number	Detection Limit	Units	99-32-WQ-01 Sept. 15/99	99-32-WQ-02 Sept. 15/99	99-32-WQ-03 Sept. 15/99	99-32-WQ-04 Sept. 15/99	99-32-WQ-05 Sept. 15/99
Site Desciption			Keno 700 seep/melt water from adit	Keno 700 adit drainage below culvert	Keno 700 drainage in stream below site	Keno 200 seep/melt water from adit	Field duplicate of WQ-04
Temperature (field)	N/A	oC			2.3		
pH (field)	N/A	pH	7.3		6.9	4.75	
Conductivity (field)	N/A	µS/cm	6.05		190	1601	
pH (Lab)	0.01	pH	7.88	8.08	7.19	5.06	5.02
Conductivity (Lab)	0.01	µS/cm	580	570	185	1550	1550
Total Alkalinity	5	mg CaCO3/L	140	140	41	<5	<5
Chloride	0.25	mg/L	<0.25	<0.25	<0.25	na	na
Chloride	0.5	mg/L	na	na	na	<0.5	<0.5
Hardness (CaCO3 equiv)	5	mg/L	329	333	94.5	1100	1070
Nitrate-N	0.05	mg/L	0.48	0.47	0.25	na	na
Nitrate-N	0.1	mg/L	na	na	na	<0.1	<0.1
Nitrite-N	0.003	mg/L	0.003	0.003	0.003	<0.003	<0.003
Sulphate	1	mg/L	158	168	51.3	950	990
Total Dissolved Solids	5	mg/L	378	398	128	1360	1340
Analysis by ICP-USN							
Aluminum	0.0008	mg/L	0.0032	0.0012	0.0191	4.52	1.5
Antimony	0.005	mg/L	<0.005	0.007	<0.005	<0.005	<0.005
Arsenic	0.01	mg/L	0.03	0.03	0.02	0.05	<0.01
Barium	0.00004	mg/L	0.0126	0.0123	0.0607	0.0811	0.0221
Beryllium	0.00001	mg/L	<0.00001	<0.00001	<0.00001	0.00016	<0.00001
Bismuth	0.0004	mg/L	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Boron	0.002	mg/L	<0.002	<0.002	<0.002	0.007	<0.002
Cadmium	0.00006	mg/L	0.0253	0.0183	0.00261	0.00329	0.00313
Calcium	0.002	mg/L	96.3	98.6	25.5	340	344
Chromium	0.00006	mg/L	0.00013	0.00014	0.0002	0.00539	0.00063
Cobalt	0.00003	mg/L	<0.00003	<0.00003	<0.00003	0.00298	0.00162
Copper	0.00005	mg/L	0.00286	0.00129	0.00137	0.0242	0.00673
Iron	0.00001	mg/L	0.011	0.025	0.065	13.6	5.76
Lead	0.0003	mg/L	0.0018	0.005	0.0115	0.0394	0.0079
Lithium	0.001	mg/L	0.004	0.003	<0.001	0.024	0.02
Magnesium	0.0005	mg/L	11.9	12.6	3.97	23.2	23.1
Manganese	0.00002	mg/L	0.0688	0.00084	0.00951	0.281	0.237
Mercury	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum	0.00007	mg/L	0.00071	0.00088	0.00019	0.00169	0.00013
Nickel	0.00001	mg/L	0.0074	0.006	0.0022	0.0442	0.0381
Phosphorus	0.03	mg/L	<0.03	<0.03	<0.03	0.59	0.07
Potassium	0.4	mg/L	<0.4	<0.4	<0.4	0.8	<0.4
Selenium	0.004	mg/L	0.005	<0.004	<0.004	<0.004	<0.004
Silicon	0.004	mg/L	2.88	2.73	2.05	8.18	5.13
Silver	0.00005	mg/L	<0.00005	<0.00005	0.00017	0.00054	<0.00005
Sodium	0.004	mg/L	1.7	1.7	0.7	1.1	1
Strontium	0.00002	mg/L	0.215	0.218	0.0795	0.388	0.384
Sulphur	0.008	mg/L	49.1	53.8	16.2	319	310
Thallium	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	0.00002	mg/L	<0.00002	<0.00002	0.00074	0.0558	0.00453
Vanadium	0.00003	mg/L	<0.00003	<0.00003	<0.00003	0.00648	0.00037
Zinc	0.0002	mg/L	1.75	1.27	0.222	0.078	0.0592
Analysis by Hydride AA							
Arsenic	0.0002	mg/L	0.0266	0.0201	0.0112	0.05	0.0114
Selenium	0.0001	mg/L	0.0002	<0.0001	0.0002	0.0057	0.0004

ATTACHMENT 2: 1999 KENO VALLEY MINE SITE SOIL SAMPLES LABORATORY RESULTS						
Sample Number	**Detection Limit**	**Units**	**99-32-SS-01 - 99/09/15**	**99-32-SS-02 - 99/09/15**	**99-32-SS-03 - 99/09/15**	**99-32-SS-04 - 99/09/15**
Site Description			Keno 700 - Surface hydrocarbon stain by generator building	Keno 700 - Depth sample (0.7 m) of SS-01	Keno 700 - Edge of visible drainage path from hydrocarbon stain	Keno 700 - Profile of hydrocarbon staining by engine drop
pH in Saturated Paste						
pH	0.1	pH	na	na	na	6.5
pH in Soil (1:2 water)						
pH	0.01	pH	na	na	na	6.57
LEPH/HEPH in Soil						
LEPHs10-19	10	mg/kg	8460	na	na	na
HEPHs19-32	10	mg/kg	58100	na	na	na
EPH in Soil						
EPHs10-19	10	mg/kg	na	2530	3600	na
EPHs19-32	10	mg/kg	na	9990	12000	na
Moisture						
% Moisture		%	9.6	7.53	8.95	na
PAH in Soil						
Naphthalene	0.05	mg/kg	<0.5	na	na	na
Acenaphthylene	0.05	mg/kg	<0.5	na	na	na
Acenaphthene	0.05	mg/kg	<0.5	na	na	na
Fluorene	0.05	mg/kg	<0.5	na	na	na
Phenanthrene	0.05	mg/kg	<0.5	na	na	na
Anthracene	0.05	mg/kg	<0.5	na	na	na
Fluoranthene	0.05	mg/kg	<0.5	na	na	na
Pyrene	0.05	mg/kg	<0.5	na	na	na
Benzo(a)anthracene	0.05	mg/kg	<0.5	na	na	na
Chrysene	0.05	mg/kg	<0.5	na	na	na
Benzo()fluoranthenes	0.05	mg/kg	<0.5	na	na	na
Benzo(a)pyrene	0.05	mg/kg	<0.5	na	na	na
Ideno(1,2,3-c,d)pyrene	0.05	mg/kg	<0.5	na	na	na
Dibenzo(a,h)anthracene	0.05	mg/kg	<0.5	na	na	na
Benzo(g,h,i)perylene	0.05	mg/kg	<0.5	na	na	na
ICP Semi-Trace Scan - Metals						
Aluminum	5	µg/g wet	na	na	na	20100
Antimony	2	µg/g wet	na	na	na	800
Arsenic	2	µg/g wet	na	na	na	730
Barium	0.05	µg/g wet	na	na	na	403
Beryllium	0.1	µg/g wet	na	na	na	0.3
Bismuth	5	µg/g wet	na	na	na	<5
Cadmium	0.1	µg/g wet	na	na	na	223
Calcium	5	µg/g wet	na	na	na	12100
Chromium	0.5	µg/g wet	na	na	na	25.7
Cobalt	0.1	µg/g wet	na	na	na	16.5
Copper	0.5	µg/g wet	na	na	na	550
Iron	1	µg/g wet	na	na	na	52000
Lead	1	µg/g wet	na	na	na	19500
Lithium	0.5	µg/g wet	na	na	na	15.9
Magnesium	1	µg/g wet	na	na	na	4580
Manganese	0.5	µg/g wet	na	na	na	7740
Mercury	0.01	µg/g wet	na	na	na	0.9
Molybdenum	1	µg/g wet	na	na	na	4
Nickel	0.2	µg/g wet	na	na	na	26.7
Phosphorus	5	µg/g wet	na	na	na	561
Potassium	20	µg/g wet	na	na	na	7000
Selenium	2	µg/g wet	na	na	na	<2
Silicon	5	µg/g wet	na	na	na	7270
Silver	0.5	µg/g wet	na	na	na	925
Sodium	5	µg/g wet	na	na	na	1250
Strontium	1	µg/g wet	na	na	na	38
Sulphur	10	µg/g wet	na	na	na	24200
Thorium	1	µg/g wet	na	na	na	<1
Tin	1	µg/g wet	na	na	na	9
Titanium	0.2	µg/g wet	na	na	na	365
Uranium	5	µg/g wet	na	na	na	<5
Vanadium	1	µg/g wet	na	na	na	37
Zinc	0.5	µg/g wet	na	na	na	15200
Zirconium	0.1	µg/g wet	na	na	na	15.9

ATTACHMENT 2: 1999 KENO VALLEY MINE SITE SOIL SAMPLES LABORATORY RESULTS						
Sample Number	**Detection Limit**	**Units**	**99-32-SS-05 - 99/09/15**	**99-32-SS-06 - 99/09/15**	**99-32-SS-07 - 99/09/15**	**99-32-SS-08 - 99/09/15**
Site Description			Keno 700 - Field duplicate of SS-04	Keno 700 - Large stain on slope between buildings	Keno 700 - Depth (0.7 m) sample of SS-06	Keno 700 - Toe of exposed landfill debris in waste rock
pH in Saturated Paste						
pH	0.1	pH	6.8	na	na	6.9
pH in Soil (1:2 water)						
pH	0.01	pH	6.74	na	na	6.98
LEPH/HEPH in Soil						
LEPHs10-19	10	mg/kg	na	2630C	na	na
HEPHs19-32	10	mg/kg	na	4410C	na	na
EPH in Soil						
EPHs10-19	10	mg/kg	na	na	6300	na
EPHs19-32	10	mg/kg	na	na	3000	na
Moisture						
% Moisture		%	na	26	9.97	na
PAH in Soil						
Naphthalene	0.05	mg/kg	na	<0.5	na	na
Acenaphthylene	0.05	mg/kg	na	<0.5	na	na
Acenaphthene	0.05	mg/kg	na	<0.5	na	na
Fluorene	0.05	mg/kg	na	<0.5	na	na
Phenanthrene	0.05	mg/kg	na	<0.5	na	na
Anthracene	0.05	mg/kg	na	<0.5	na	na
Fluoranthene	0.05	mg/kg	na	<0.5	na	na
Pyrene	0.05	mg/kg	na	<0.5	na	na
Benzo(a)anthracene	0.05	mg/kg	na	<0.5	na	na
Chrysene	0.05	mg/kg	na	<0.5	na	na
Benzo()fluoranthenes	0.05	mg/kg	na	<0.5	na	na
Benzo(a)pyrene	0.05	mg/kg	na	<0.5	na	na
Ideno(1,2,3-c,d)pyrene	0.05	mg/kg	na	<0.5	na	na
Dibenzo(a,h)anthracene	0.05	mg/kg	na	<0.5	na	na
Benzo(g,h,i)perylene	0.05	mg/kg	na	<0.5	na	na
PCBs in Soil						
Total PCBs	0.1	mg/kg	na	na	na	<0.1
ICP Semi-Trace Scan - Metals						
Aluminum	5	µg/g wet	2210C	na	na	2090C
Antimony	2	µg/g wet	120	na	na	77
Arsenic	2	µg/g wet	600	na	na	1840
Barium	0.05	µg/g wet	406	na	na	356
Beryllium	0.1	µg/g wet	0.4	na	na	0.3
Bismuth	5	µg/g wet	<5	na	na	<5
Cadmium	0.1	µg/g wet	214	na	na	91.8
Calcium	5	µg/g wet	1700C	na	na	7250
Chromium	0.5	µg/g wet	34.4	na	na	23.8
Cobalt	0.1	µg/g wet	15.6	na	na	14.4
Copper	0.5	µg/g wet	146	na	na	90.5
Iron	1	µg/g wet	4600C	na	na	5800C
Lead	1	µg/g wet	1670C	na	na	1250C
Lithium	0.5	µg/g wet	16.4	na	na	19.9
Magnesium	1	µg/g wet	4790	na	na	4820
Manganese	0.5	µg/g wet	6730	na	na	8900
Mercury	0.01	µg/g wet	0.3	na	na	0.31
Molybdenum	1	µg/g wet	3	na	na	3
Nickel	0.2	µg/g wet	24.7	na	na	26
Phosphorus	5	µg/g wet	520	na	na	699
Potassium	20	µg/g wet	7800	na	na	6300
Selenium	2	µg/g wet	<2	na	na	<2
Silicon	5	µg/g wet	6680	na	na	5270
Silver	0.5	µg/g wet	138	na	na	81.3
Sodium	5	µg/g wet	1450	na	na	1310
Strontium	1	µg/g wet	45	na	na	31
Sulphur	10	µg/g wet	2020C	na	na	1610C
Thorium	1	µg/g wet	<1	na	na	<1
Tin	1	µg/g wet	8	na	na	6
Titanium	0.2	µg/g wet	390	na	na	527
Uranium	5	µg/g wet	<5	na	na	<5
Vanadium	1	µg/g wet	43	na	na	45
Zinc	0.5	µg/g wet	1720C	na	na	9090
Zirconium	0.1	µg/g wet	16.5	na	na	14.3

ATTACHMENT 2: 1999 KENO VALLEY MINE SITE SOIL SAMPLES LABORATORY RESULTS						
Sample Number	**Detection Limit**	**Units**	**99-32-SS-09 - 99/09/15**	**99-32-SS-10 - 99/09/15**	**99-32-SS-11 - 99/09/15**	**99-32-SS-12 - 99/09/15**
Site Description			Keno 700 - hydrocarbon stain on dirt floor of maintenance garage	Keno 700 - below transformer tower by mining manage residence	Keno 700 - below capacitor tower NW of site	Keno 700 - below 2 transformers NW of site
PCBs in Soil						
Total PCBs	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1

ATTACHMENT 2: 1999 KENO VALLEY MINE SITE SOIL SAMPLES LABORATORY RESULTS						
Sample Number	**Detection Limit**	**Units**	**99-32-SS-13 - 99/09/15**	**99-32-SS-14 - 99/09/15**	**99-32-SS-15 - 99/09/15**	
Site Description			Keno 700 - Field duplicate of SS-12	Keno 200 - below tower with toppled transformer	Keno 200 - Field duplicate of SS-14	
EPH in Soil						
EPHs10-19	10	mg/kg	na	na	1000	
EPHs19-32	10	mg/kg	na	na	1100	
Moisture						
% Moisture		%	na	na	7.5	
PCBs in Soil						
Total PCBs	0.1	mg/kg	<0.1	0.9	na	

ATTACHMENT 2: 1999 KENO VALLEY MINE SITE WASTE ROCK SAMPLES LABORATORY RESULTS
MODIFIED SOBEK METHOD ACID-BASE ACCOUNTING TEST

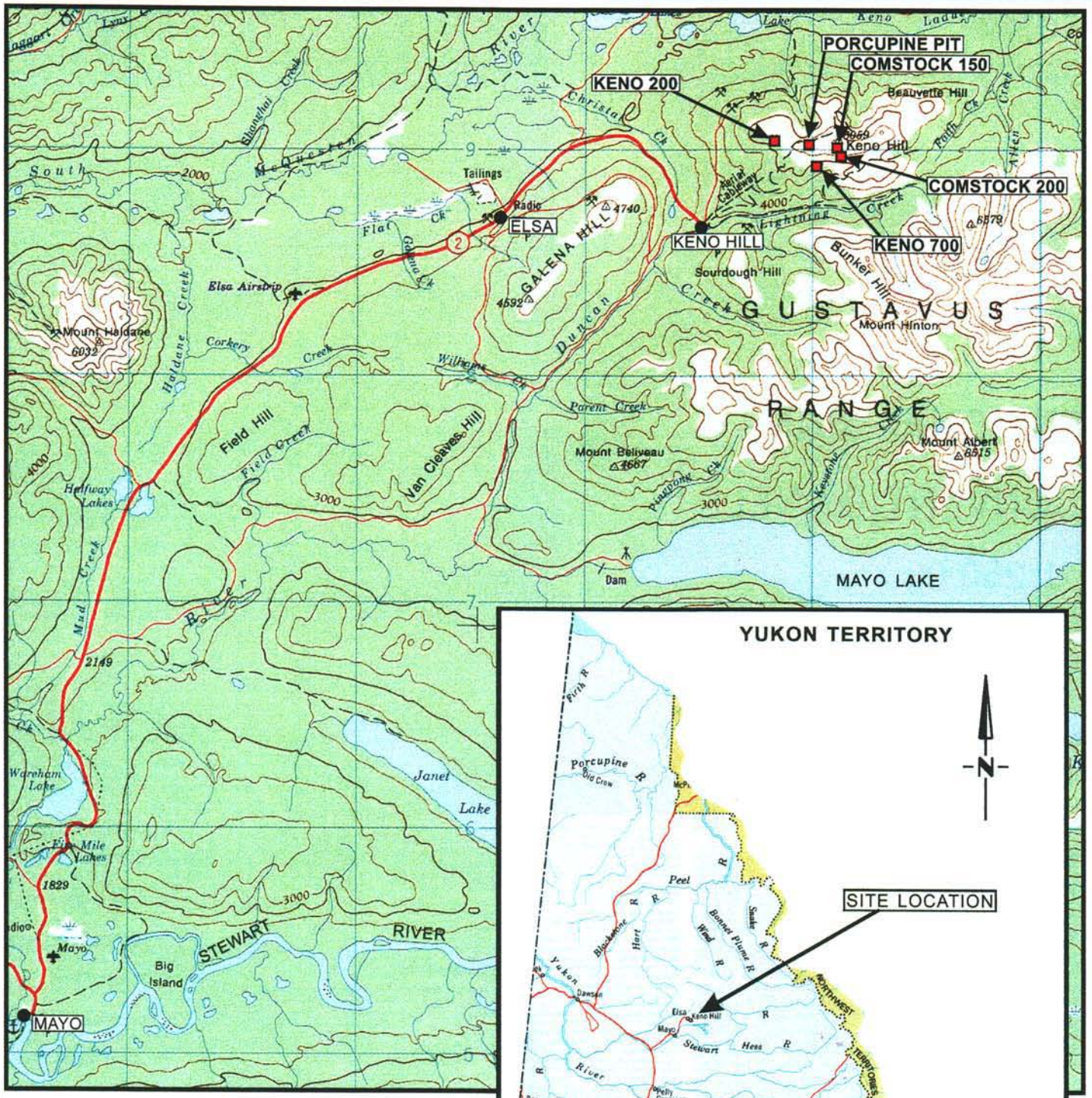
SAMPLE	SITE DESCRIPTION	PASTE pH	S(T) %	S(SO4) %	AP	NP	NET NP	NP/AP
99-32-WR-01 - Sept 15/99	Comstock 150 - Waste Rock	6.7	0.45	0.16	9.1	17.6	8.6	1.9
99-32-WR-02 - Sept 15/99	Keno 200 (6' depth) Green Horizon	8.3	0.19	0.01	5.6	68.6	63	12.2
99-32-WR-03 - Sept 15/99	Keno 700	7.9	0.29	0.02	8.4	15.8	7.3	1.9
99-32-WR-04 - Sept 15/99	Comstock 275	7.9	0.37	0.18	5.9	13.5	7.6	2.3
99-32-WR-05 - Sept 15/99	Keno 200 - Weathered Horizon	8.1	0.27	0.04	7.2	85.3	78.1	11.9

AP = ACID POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NP = NEUTRALIZATION POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NET NP = NET NEUTRALIZATION POTENTIAL = TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NOTE: WHEN S(T) AND/OR S(SO4) IS REPORTED AS <0.01, IT IS ASSUMED TO BE ZERO FOR THE AP CALCULATION.
N/D = NO DUPLICATE ASSAY. CALCULATIONS ARE BASED ON ASSAY RESULTS OF THE INITIAL SAMPLE.
RE = REPLICATE.

NOTE - A HIGH LEVEL OF SOLUBLE METALS (ESPECIÀLLY IRON) WERE OBSERVED IN MANY SAMPLES DURING THE ABA TITRATIONS.
SAMPLES WITH A NEGATIVE NET NP SHOULD BE TESTED FOR MOBILE METALS USING STANDARD SHAKE FLASK EXTRACTION TESTS.

ATTACHMENT 2: 1999 KENO VALEY MINE SITE WATER SAMPLES LABORATORY RESULTS						
Sample Number	**Detection Limit**	**Units**	**99-32-TR1 - Transformer Fluid**	**99-32-TR2 - Transformer Fluid**		
Site Desciption			Transformer 1 - Serial 72181	Transformer 2 - Serial 72180		

ATTACHMENT 2: 1999 KENO MINE SITE ASBESTOS SAMPLES LABORATORY RESULTS							
Site Number	**Detection Limit**	**Units**		**99-32-AS-01 - 15/09/99 - Insulation**	**99-32-AS-02 - 15/09/99 - Insulation**	**99-32-AS-03 - 15/09/99 - Insulation**	**99-32-AS-04 - 15/09/99 - Insulation**
Sample Desciption				Building 1 (mess hall) on NE exterior wall	Building 4 (bunkhouse) on S exterior wall	Building 12 (boiler shack) from pile on floor	Building 12 (boiler shack) from side of main boiler
Approximate % fibrous asbestos and most similar type	-	%		60-80% chrysotile	60-80% chrysotile	None observed	None observed



LOCATION MAP
(LOCATIONS ARE APPROXIMATE)

SCALE
0 10
kilometers

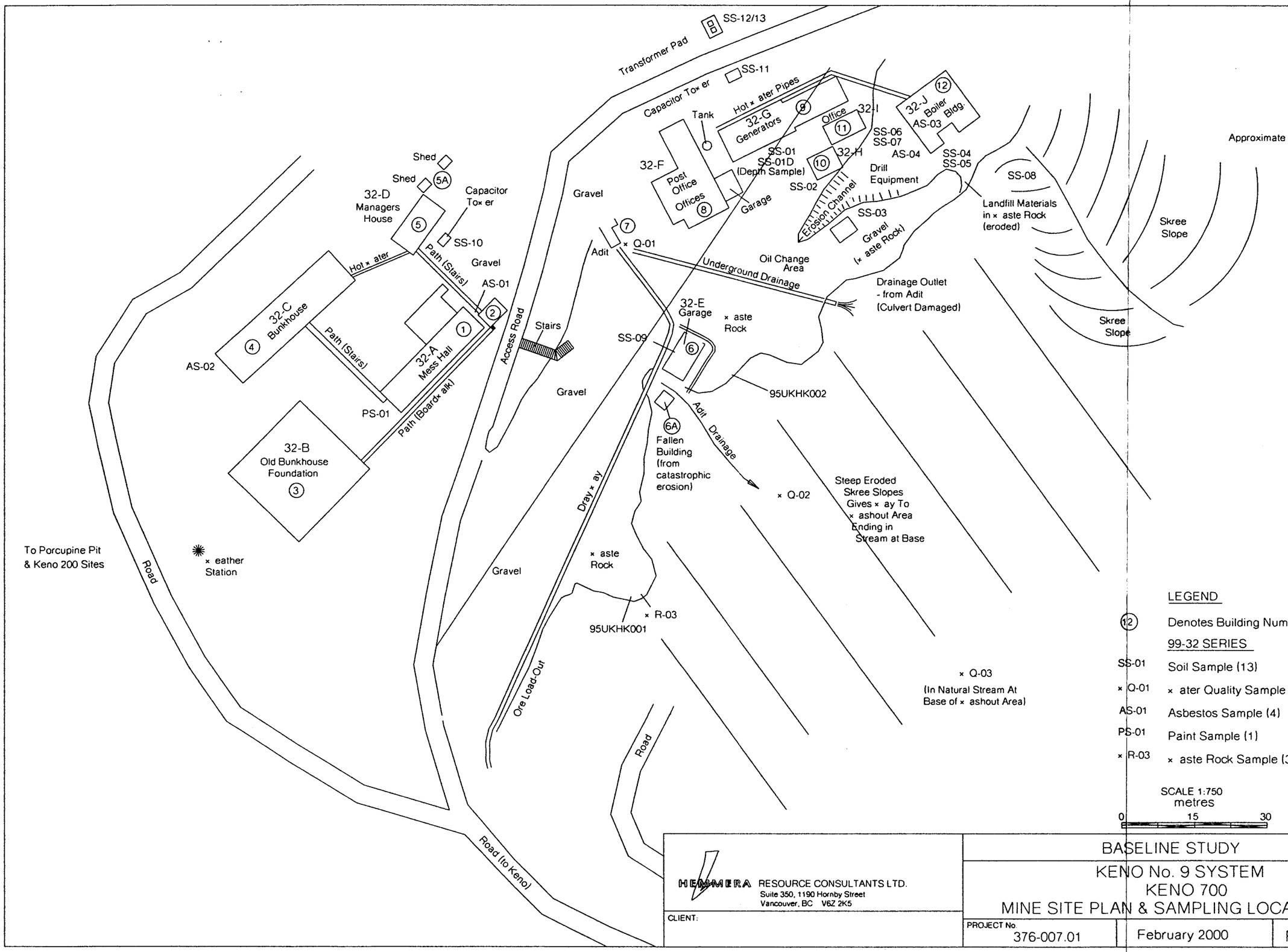
ROYAL ROADS UNIVERSITY &
HEMMERA RESOURCE CONSULTANTS LTD.
Suite 350, 1190 Hornby Street
Vancouver, B.C. V6Z 2K5

CLIENT:
PUBLIC WORKS and GOVERNMENT SERVICES CANADA

BASELINE STUDY

KENO No. 9 SYSTEM SITES LOCATION MAP

PROJECT No.		
376-007.01	February 2000	Figure 32-1



LEGEND

(12) Denotes Building Number in Notes

99-32 SERIES

SS-01 Soil Sample (13)

× Q-01 × ater Quality Sample (3)

AS-01 Asbestos Sample (4)

PS-01 Paint Sample (1)

× R-03 × aste Rock Sample (3)

SCALE 1:750
metres
0 15 30

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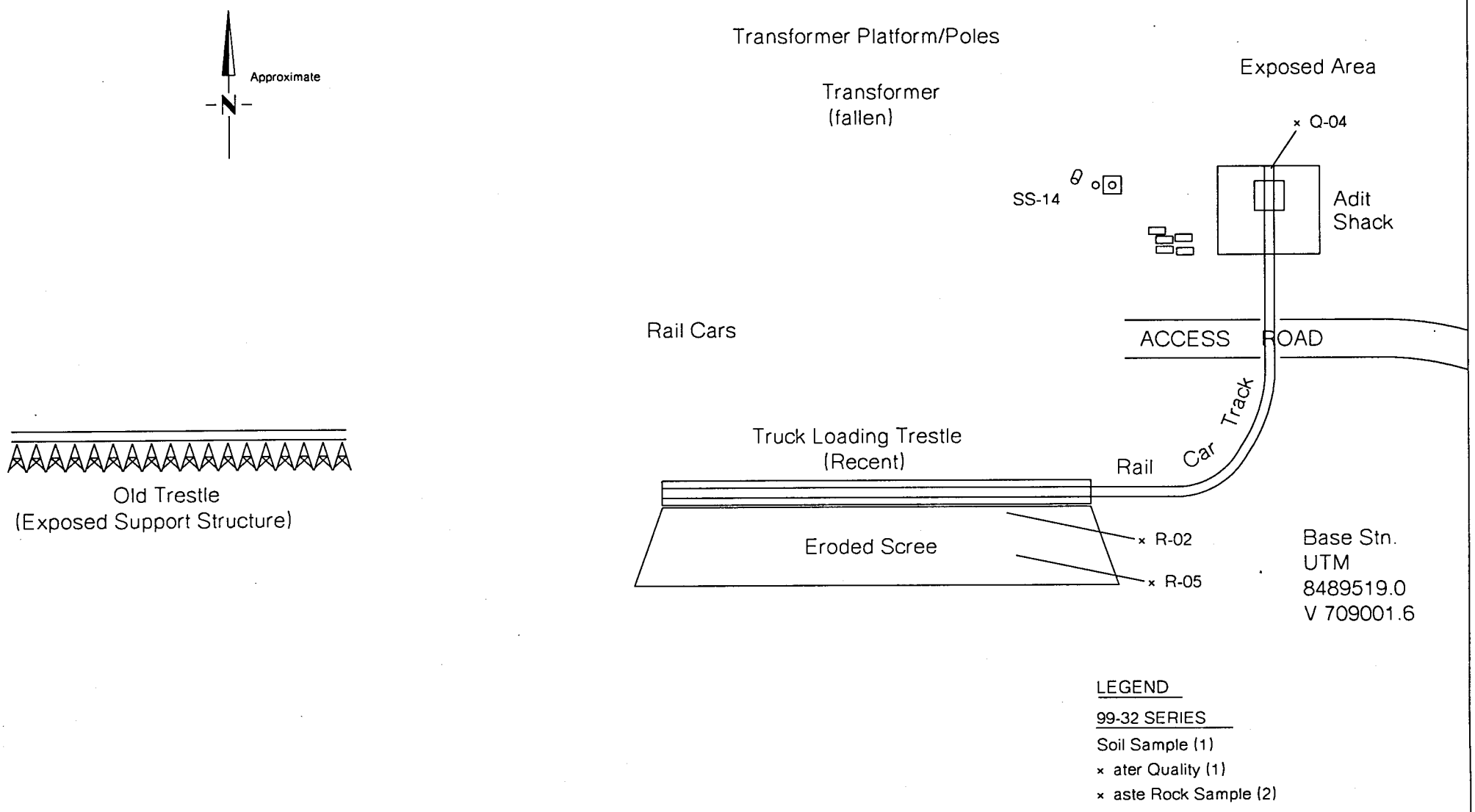
CLIENT:

BASELINE STUDY

KENO No. 9 SYSTEM
KENO 700
MINE SITE PLAN & SAMPLING LOCATIONS

PROJECT No. 376-007.01 | February 2000 | FIGURE 32-2



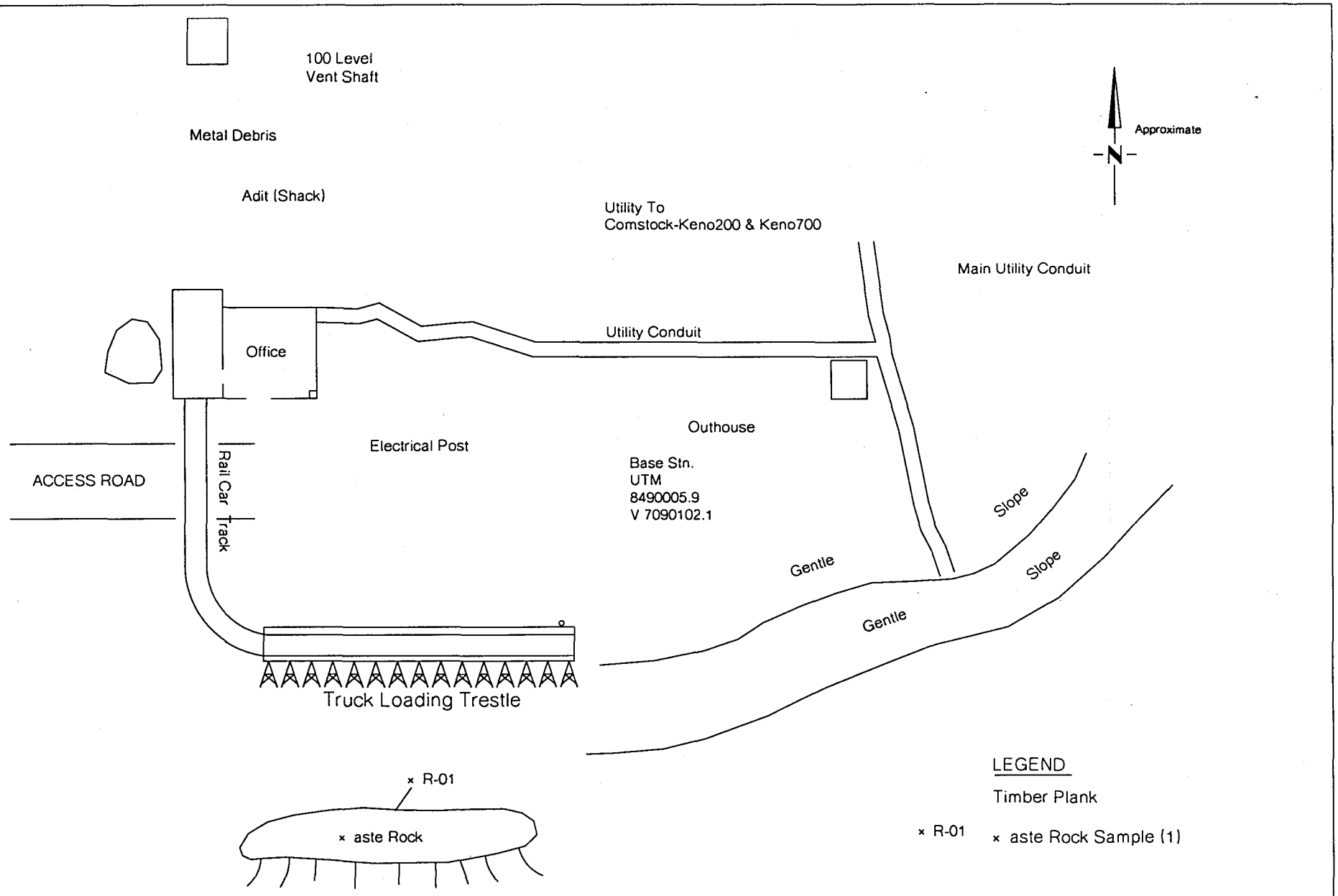
HEMMERA RESOURCE CONSULTANTS LTD.
Suite 350, 1190 Hornby Street
Vancouver, BC V6Z 2K5

CLIENT:

BASELINE STUDY

KENO No. 9 SYSTEM
KENO 200 ADIT SITE & SAMPLING LOCATIONS

PROJECT No.		
376-007.01/Keno200	February 2000	FIGURE 32-3



SCALE 1:250 (Approximate)
metres
0 5 10

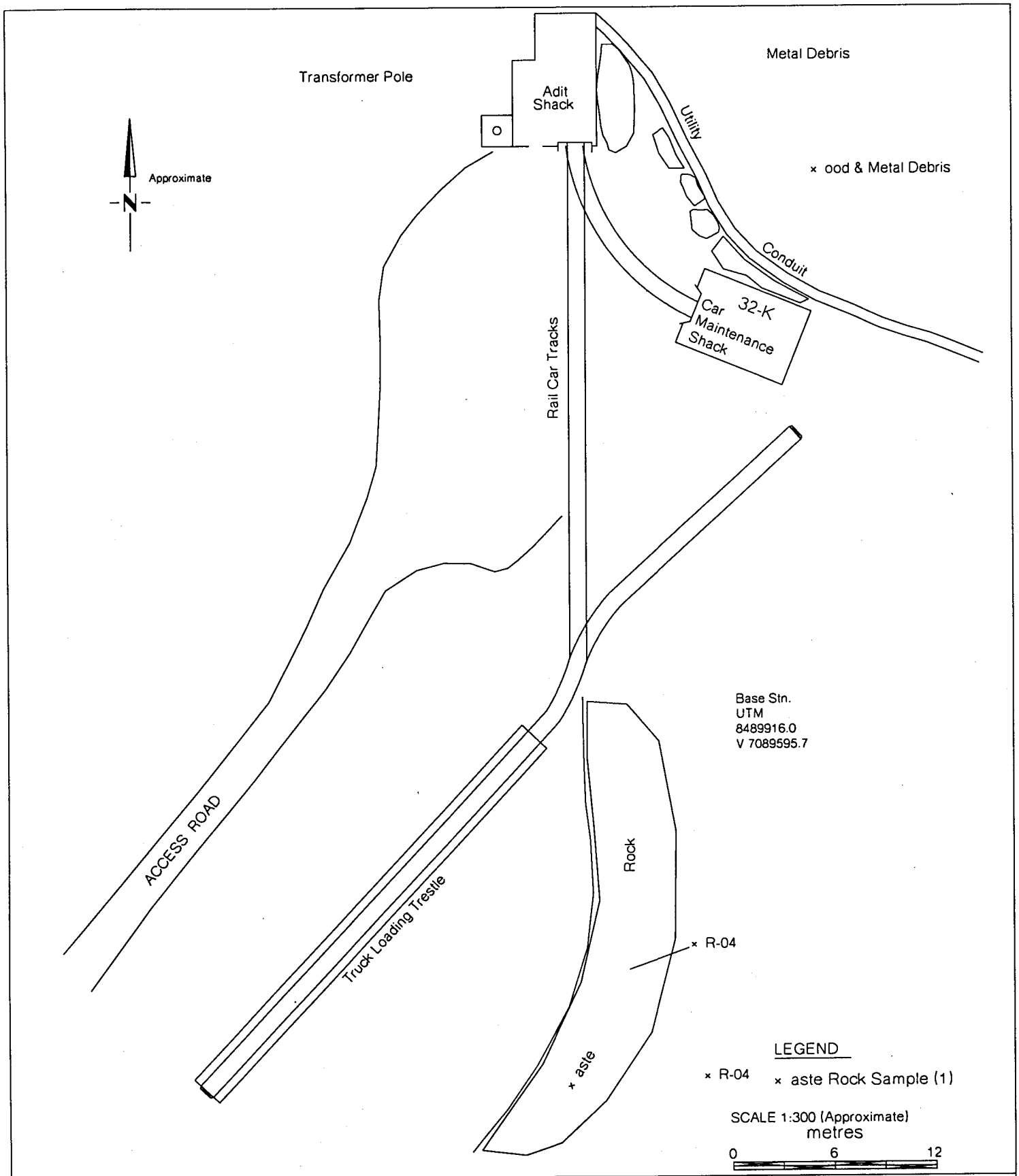
HEMMERA RESOURCE CONSULTANTS LTD.
Suite 350, 1190 Hornby Street
Vancouver, BC V6Z 2K5

CLIENT: .

BASELINE STUDY

KENO No. 9 SYSTEM
COMSTOCK 150 LEVEL SITE

PROJECT No.		
376-007.01/Com150	February 2000	FIGURE 32-4



HEMMERA RESOURCE CONSULTANTS LTD.
Suite 350, 1190 Hornby Street
Vancouver, BC V6Z 2K5

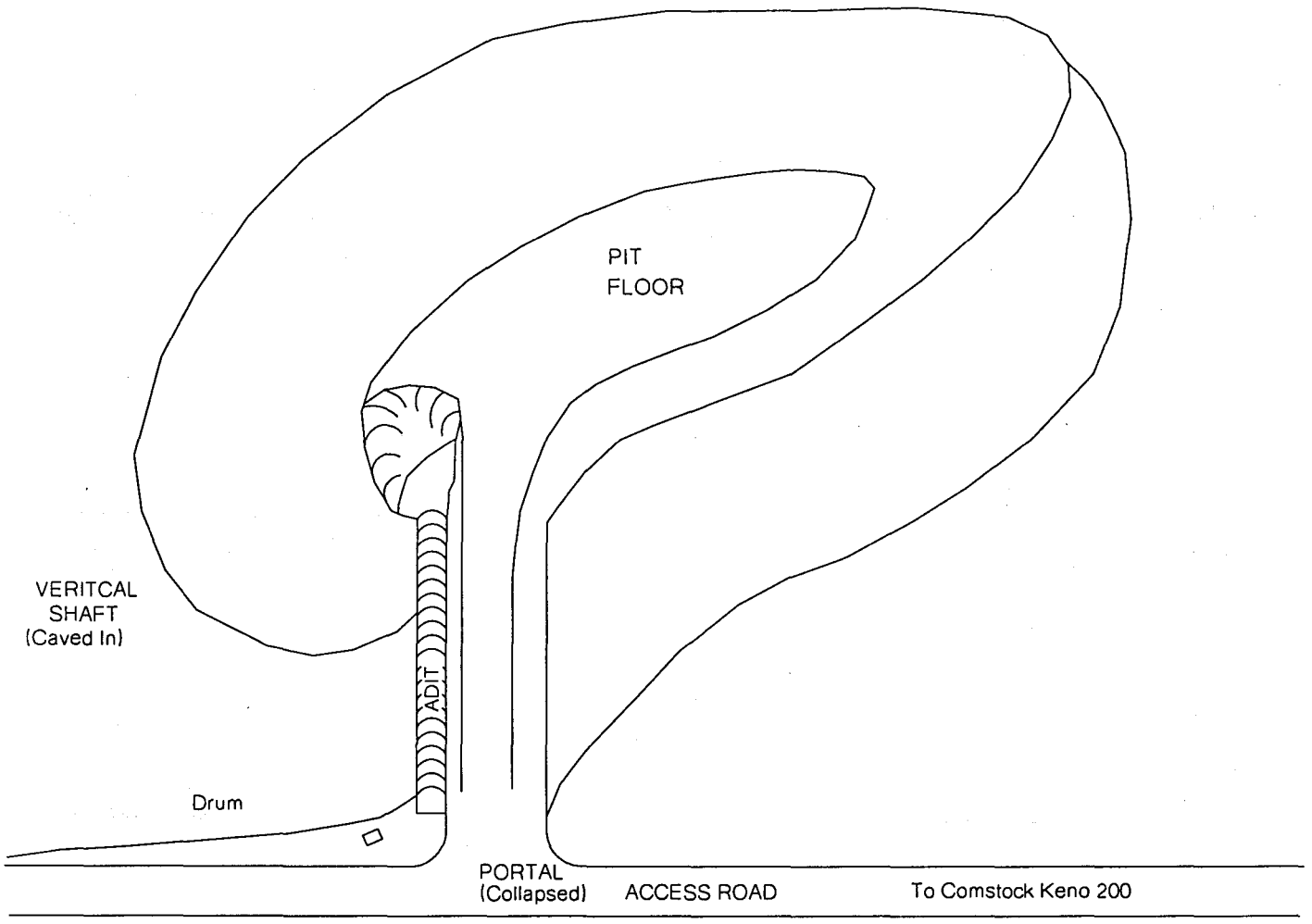
CLIENT:

BASELINE STUDY

KENO No. 9 SYSTEM
COMSTOCK LEVEL 200 SITE

PROJECT No.		
376-007.01/CK200	February 2000	FIGURE 32-5

Approximate



NOTE: No samples taken.

SCALE 1:500 (Approximate)
metres
0 10 20

HEMMERA RESOURCE CONSULTANTS LTD. Suite 350, 1190 Hornby Street Vancouver, BC V6Z 2K5	BASELINE STUDY
	KENO No. 9 SYSTEM PORCUPINE PIT
CLIENT:	PROJECT No. 376-007.01/Porcupine | February 2000 | FIGURE 32-6

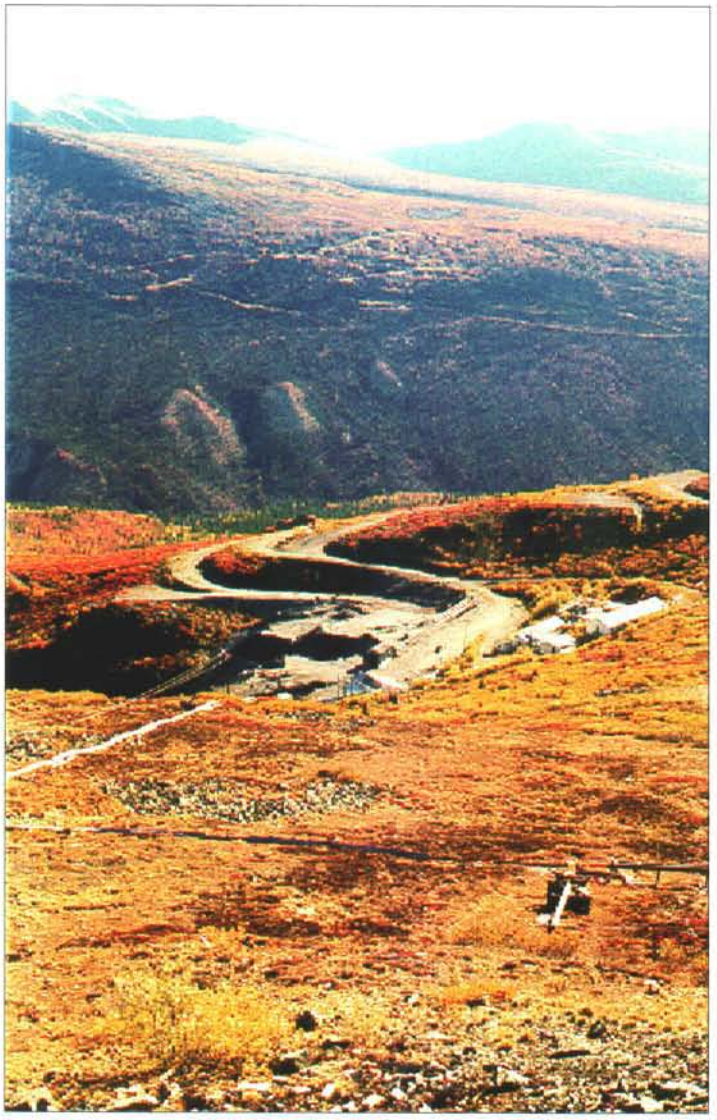


Photo 32-1 : Keno 700. Looking down on site from mountain to the S. (at Comstock-Keno 200).

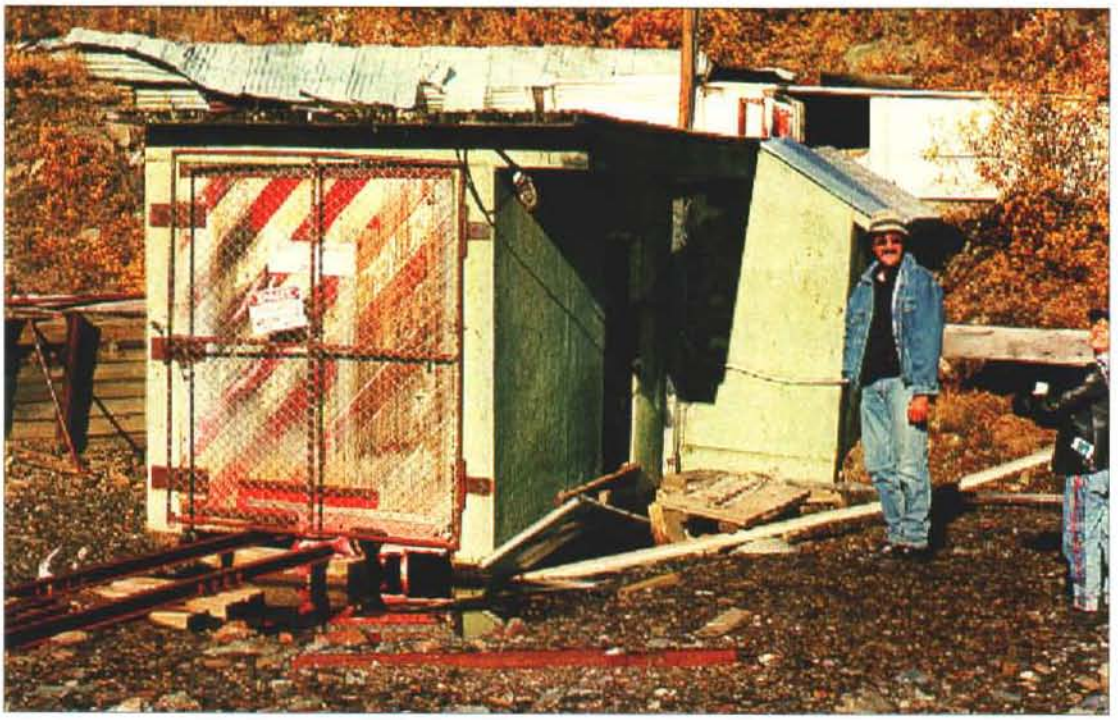


Photo 32-2 : Keno 700. Mine adit shed (building 7) looking N.W.

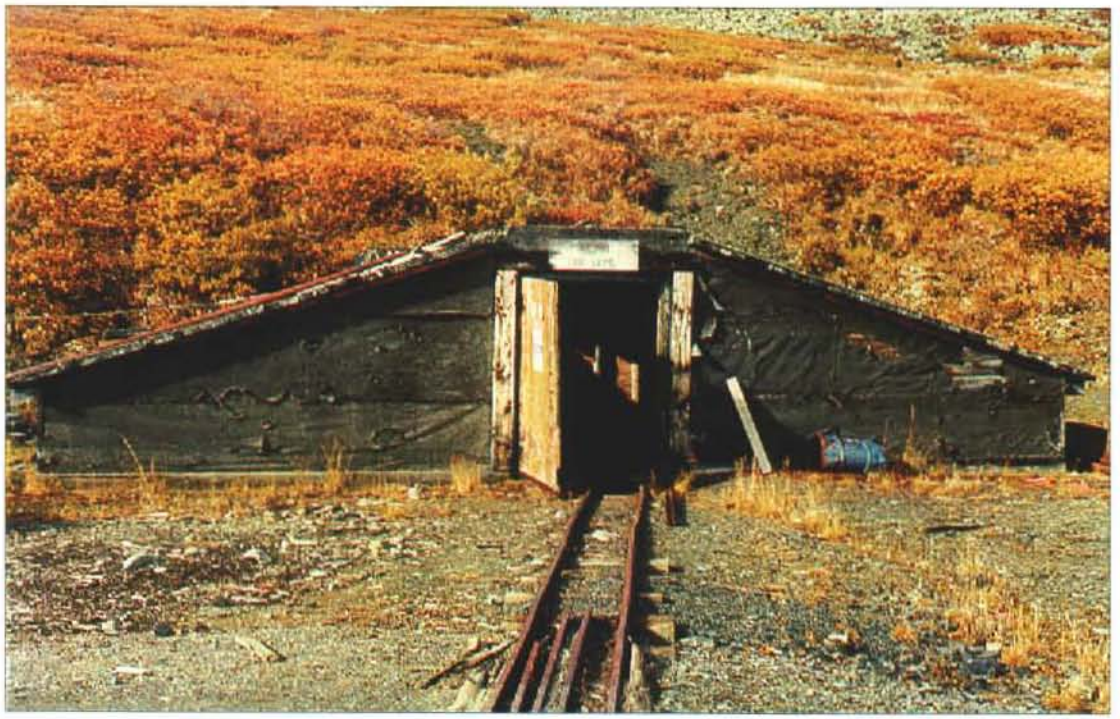


Photo 32.3 : Keno 200. Adit shack looking W.

Photo 32-4 : Keno 200. Mine adit water sample.

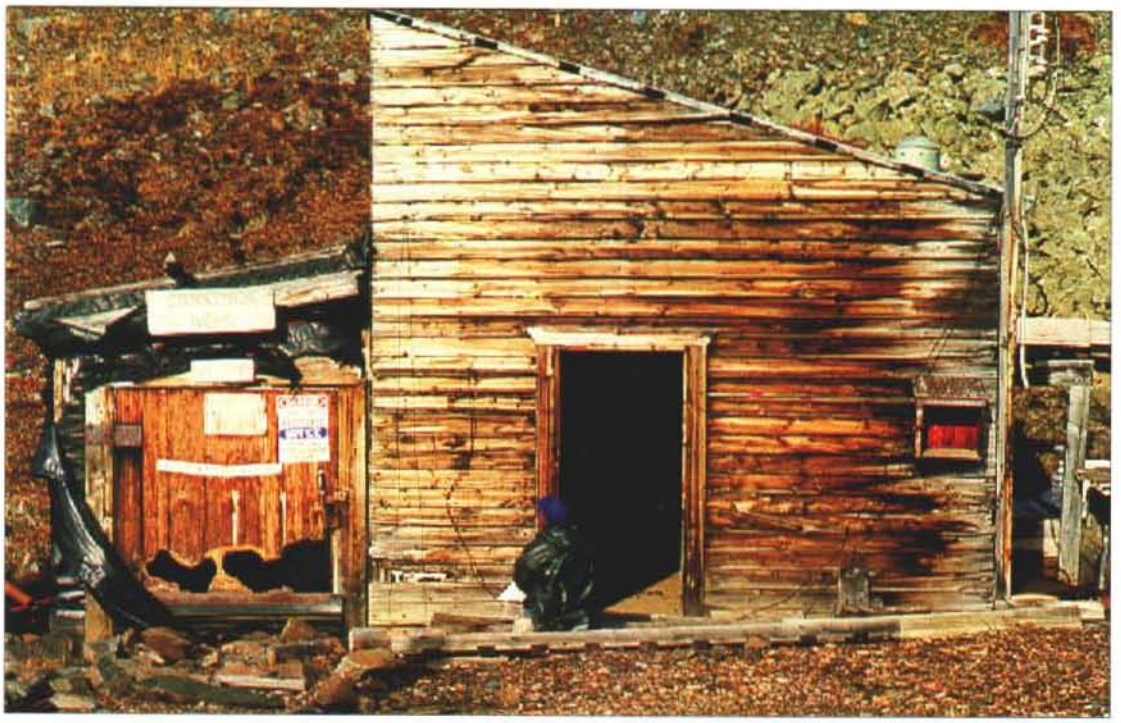


Photo 32-5 : Comstock-Keno 150. Adit Shack (looking N.).

Photo 32-6 : Comstock-Keno. Vent shaft shack above site (looking N.E.).

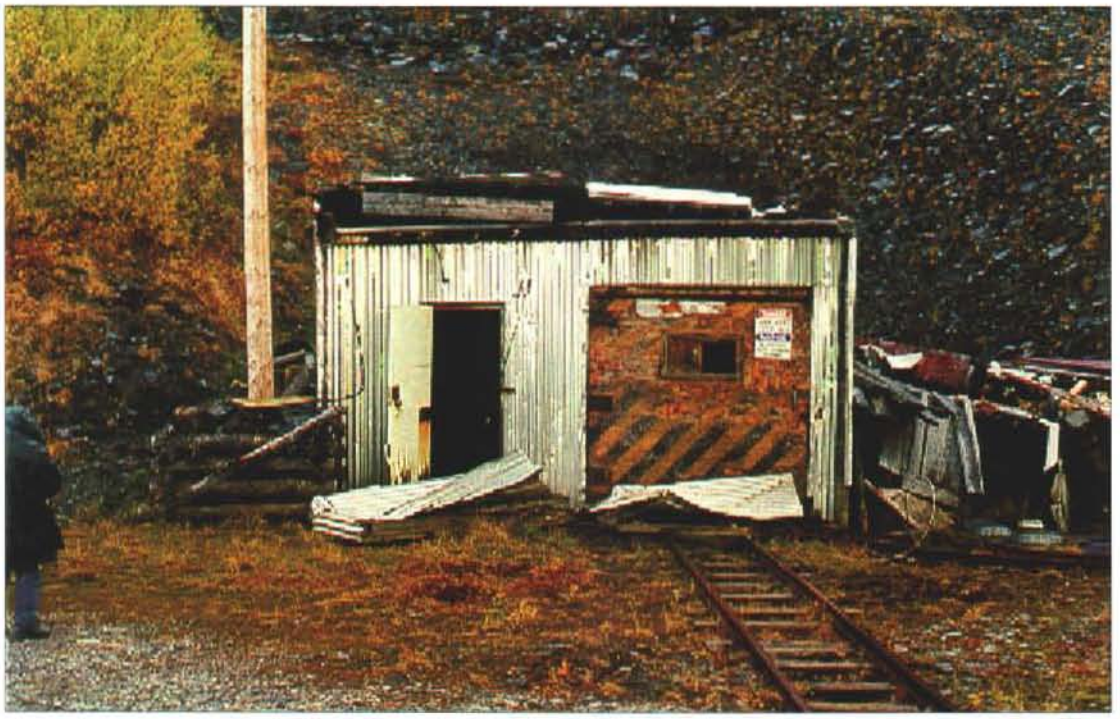


Photo 32-7 : Comstock-Keno 200. Adit entrance (looking N.E.)

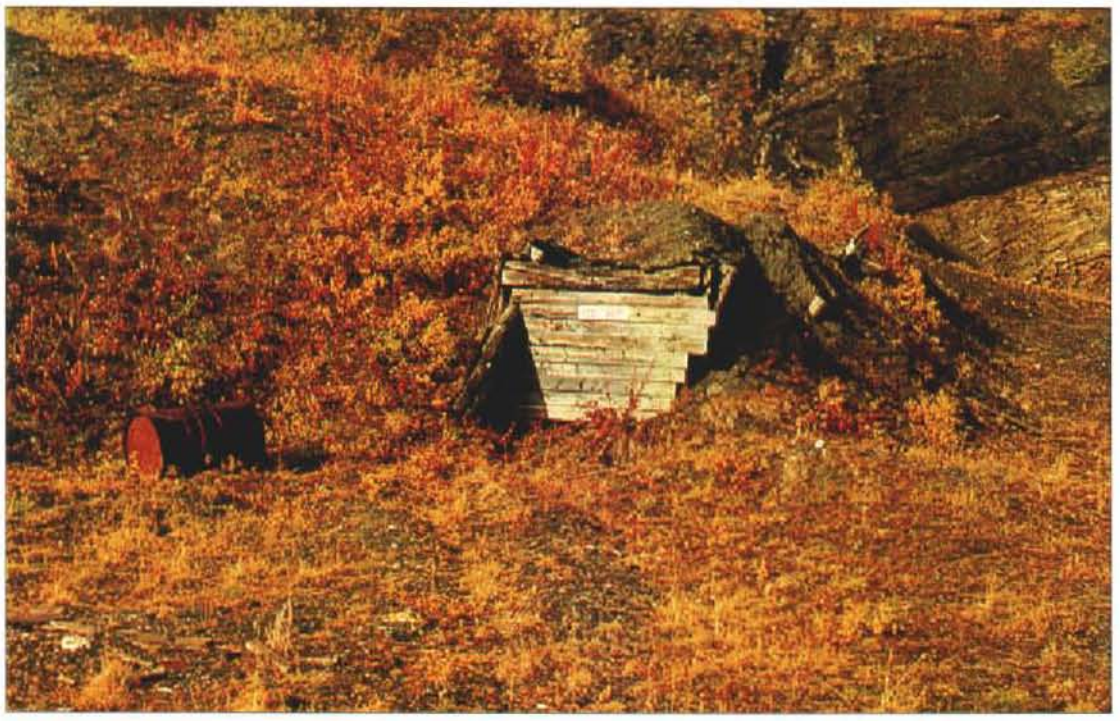


Photo 32-8 : Porcupine Adit looking N.W.

Photo 32-9 : Porcupine Adit Pit looking E.

Photo 32-10 : Keno 700. Site looking N.

Photo 32-11 : Keno 200. Old trestle to S.W. of site looking N.E.

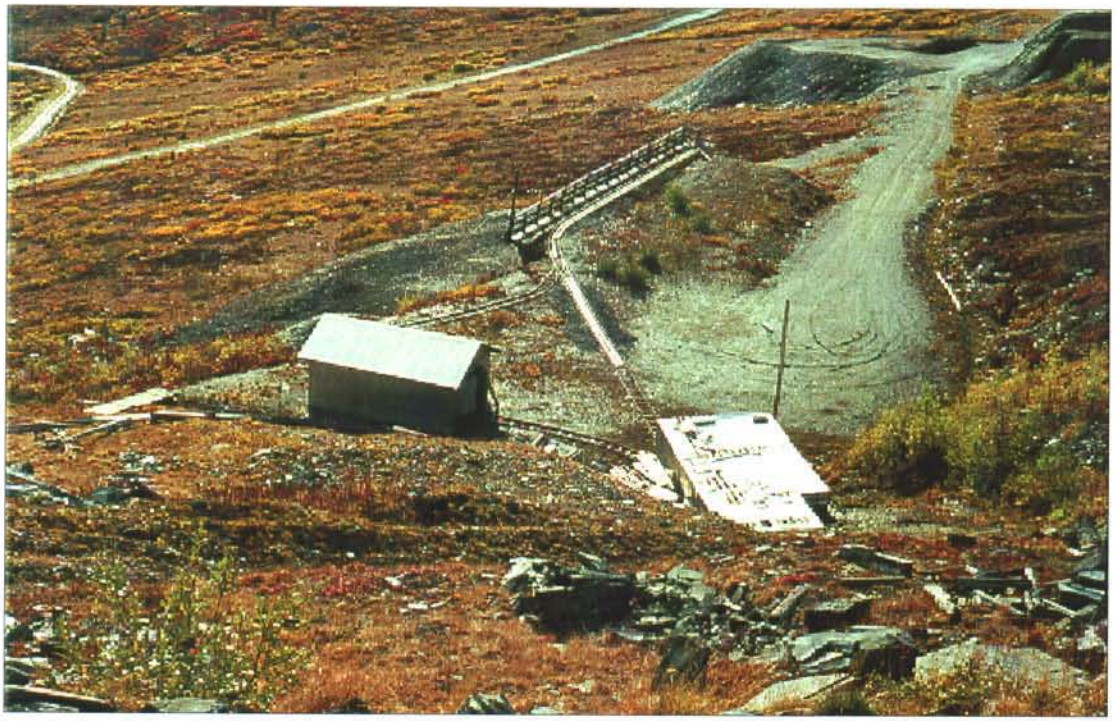


Photo 32-12 : Looking downslope (S) to Comstock-Keno 200 (from Comstock-Keno 150).

Photo 32-13 : Keno 700. Mess hall facing south (building 2).

Photo 32-14 : Keno 700. Old bunkhouse site (building 3) looking north.

Photo 32-15 : Keno 700. Mining manager's residence looking N.W. (Building 5).

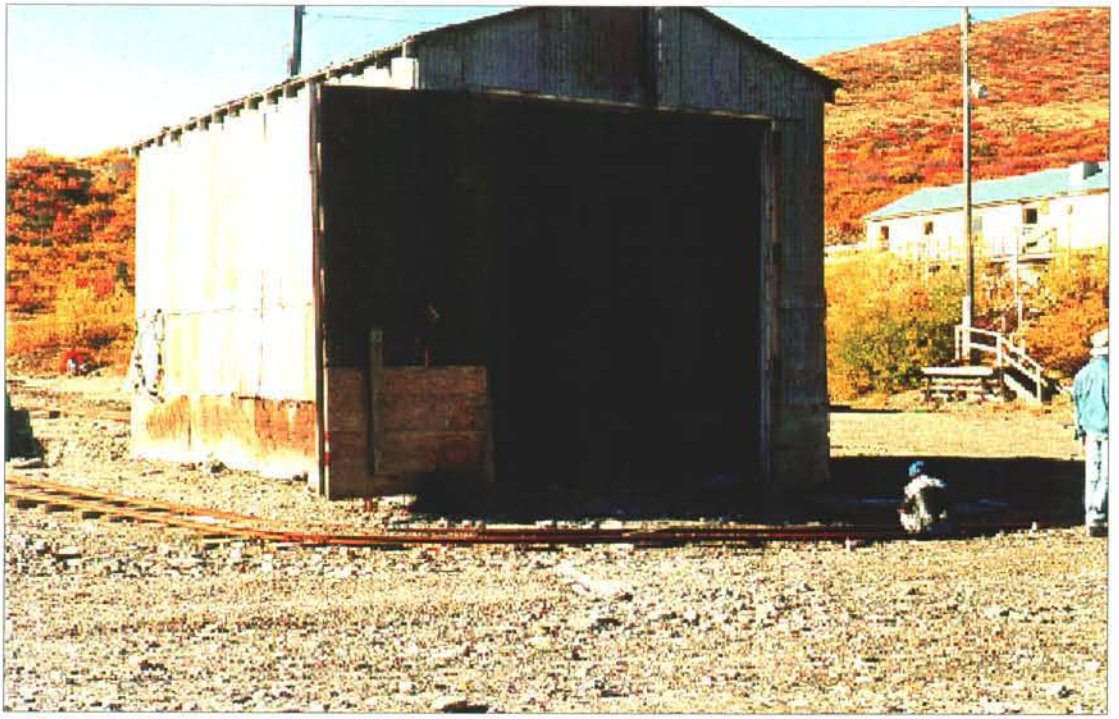


Photo 32-16 : Keno 700. Vehicle maintenance shed (building 6) looking S.W.

Photo 32-17 : Keno 700. Mud room, office & ambulance garage (building 8) looking west.

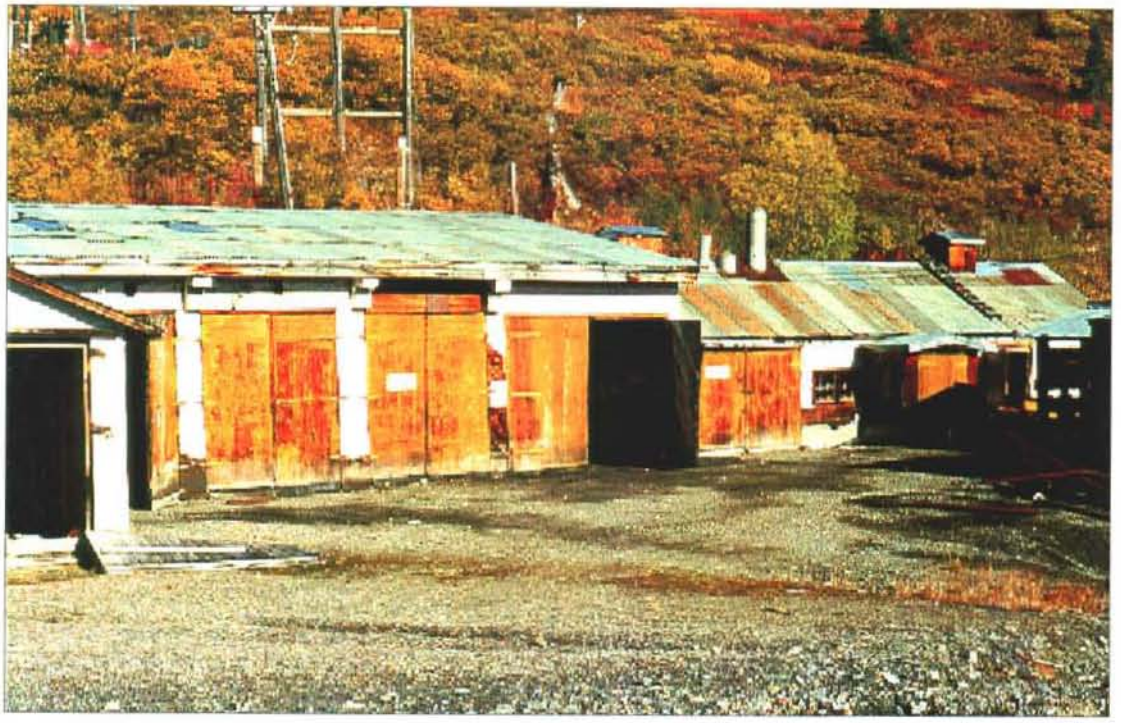


Photo 32-18 : Keno 700. Generator shack (building 9) looking north - oil staining in front.

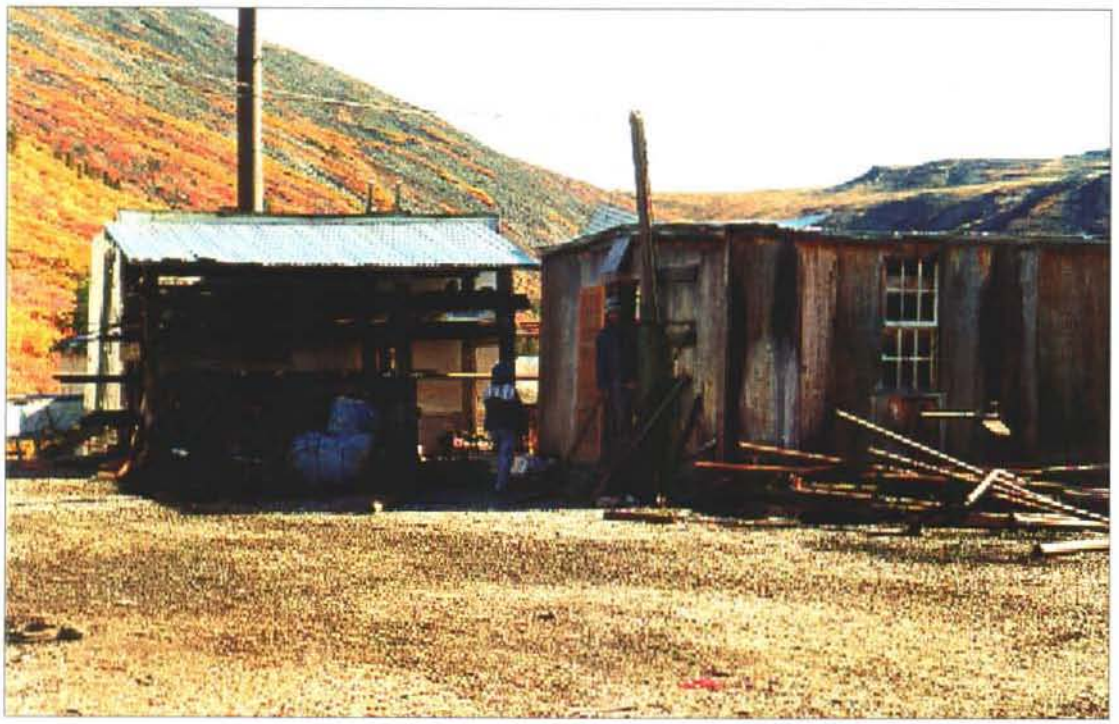


Photo 32-19 : Keno 700. Paint shed (building 10) looking E.

Photo 32-20 : Keno 700. Boiler shack / filter plant (building 12) looking N.E.

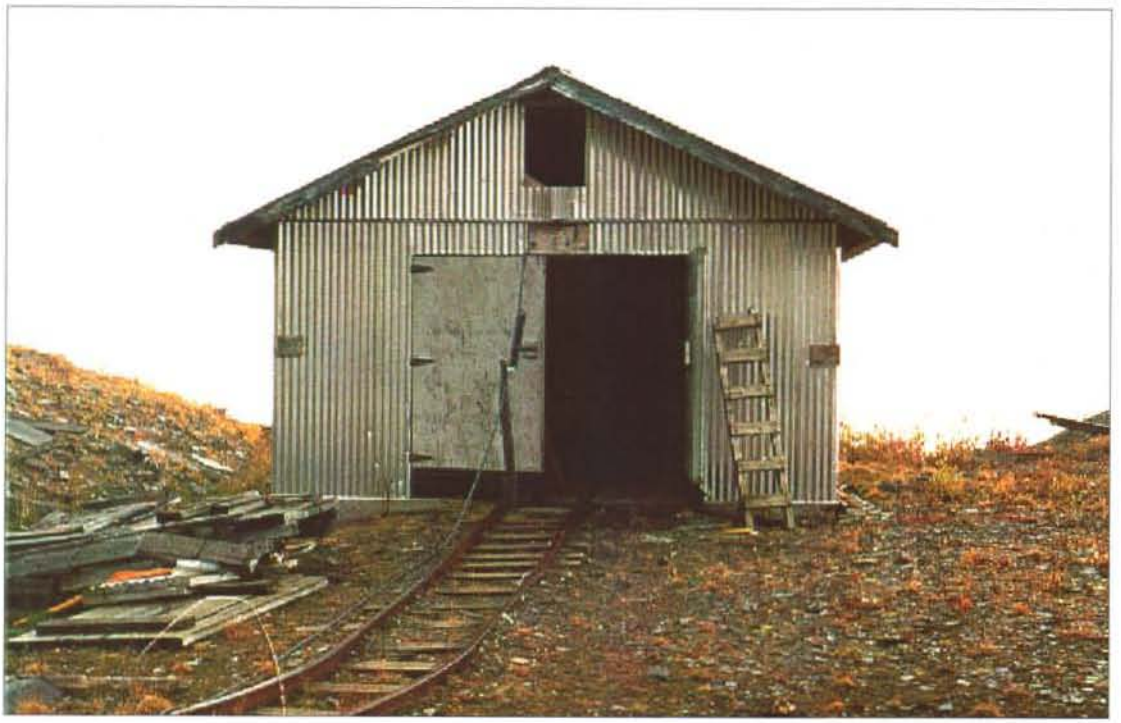


Photo 32-21 : Comstock-Keno200. Maintenance building looking E.

Photo 32-22 : Keno 700. Truck loading trestle at S. end of site.

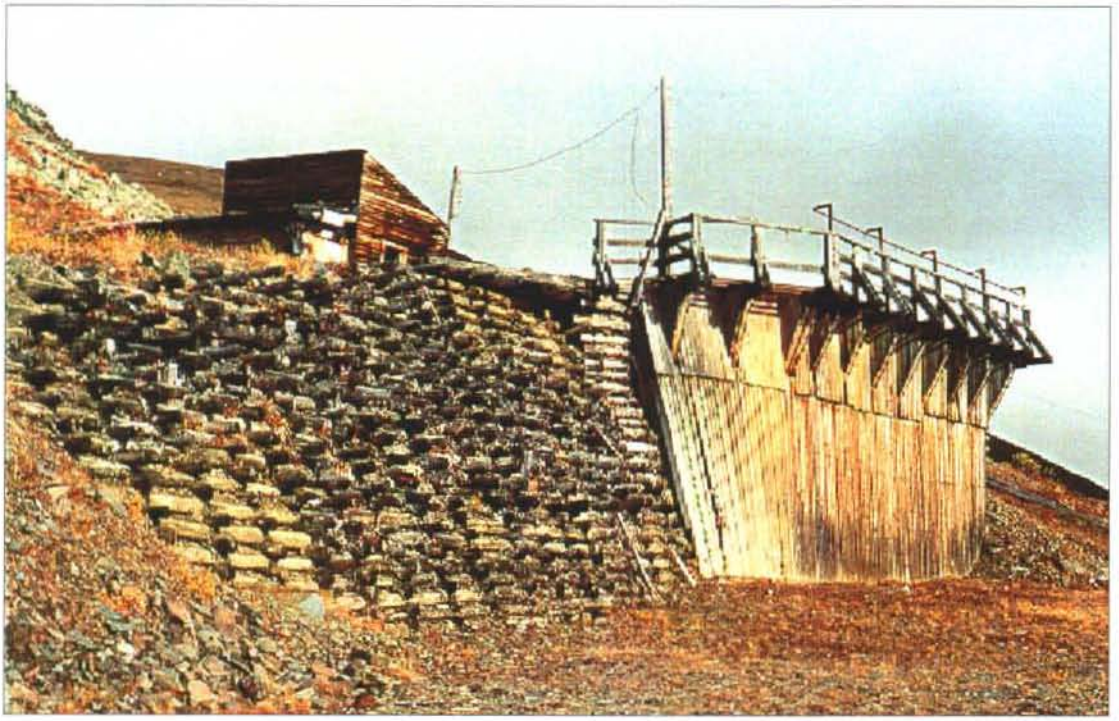


Photo 32-23 : Comstock-Keno 150. Adit shack & truck-loading trestle.

Photo 32-24 : Keno 700. Landfill exposed debris looking upslope & S.W.
(N.E. side of waste-rock pile).

Photo 32-25 : Keno 700. Transformer site looking N.E.

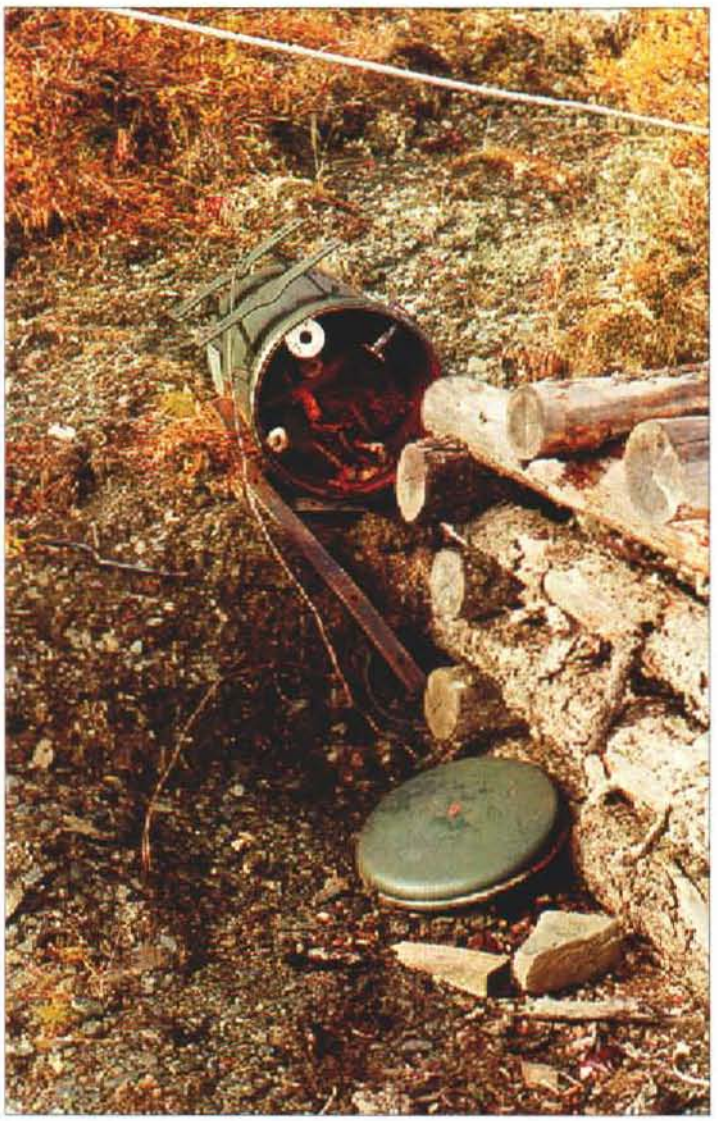


Photo 32-26 : Keno 200. Fallen capacitor / transformer by tower.

Photo 32-27 : Keno 700. Engine shop platform (feature 1) looking S.E. from erosion channel.

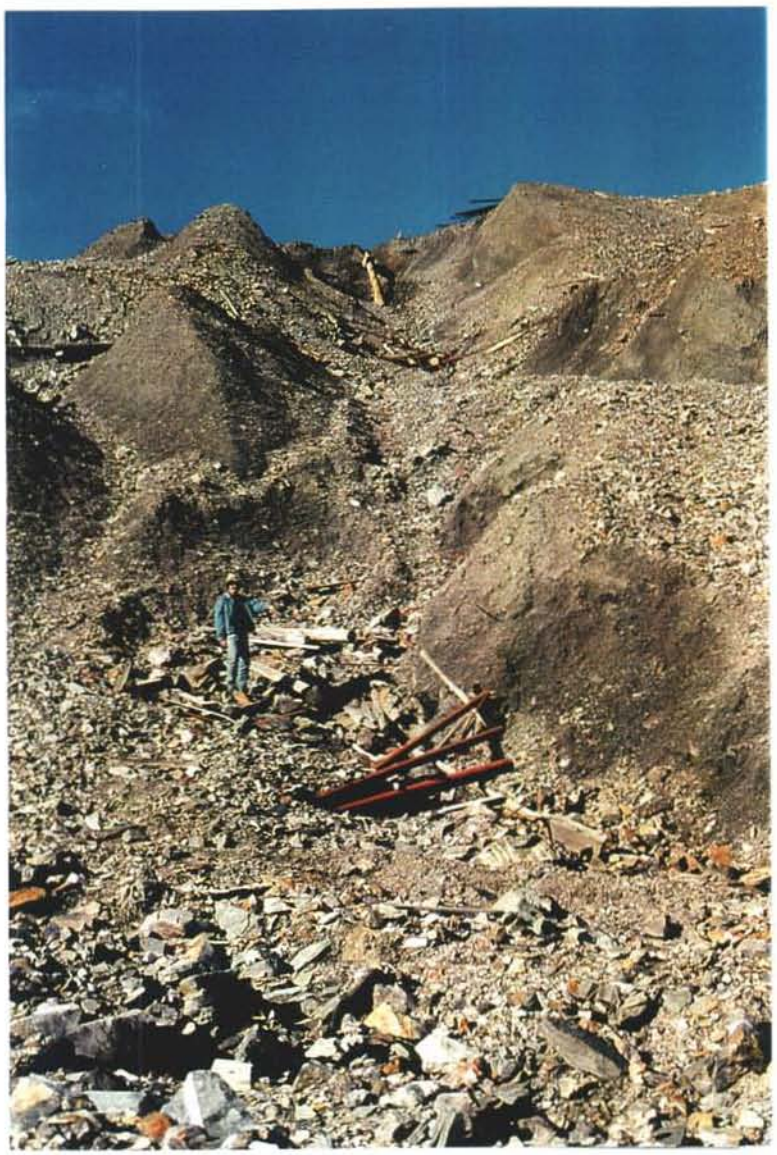


Photo 32-28 : Keno 700. Waste-rock pile outwash area looking W. Adit culvert at top.

Photo 32-29 : Stream below outwash area.

MAIN FAULT & NABOB

Site # 33

MINFILE # 105M 001aq

1. LOCATION AND ACCESS

The Main Fault & Nabob site is located on the north face of Keno Hill, approximately 0.75km northwest of Monument Hill, adjacent to Keno No. 9 System. Four-wheel drive access is possible via the Silver Basin Gulch Trail, roughly 1km southeast of the Keno Hill Signpost. Approximate UTM co-ordinates for the site are 7 090 640m N and 490 150m E (Latitude: 63° 56'41" N and Longitude 135° 12'00" W).

2. SITE PHYSIOGRAPHY

The site is located at an elevation of 5600ft (1710m), between the Keno and Monument Hill summits, on a gently sloping north-northwest slope of Keno Hill. The site is well above the treeline, in sub-alpine to alpine vegetation which is dominated by shrubs and grasses. The site is underlain by permafrost. Surface runoff at the site flows into Faro Gulch, located 600m to the north, a tributary of the Keno Ladue River.

3. GEOLOGY AND MINERALIZATION

The Main Fault and Nabob adit dump contains Keno Hill Quartzite with a vein material consisting of quartz, with weak oxidized siderite, limonite, and minor galena.

Trench #2 follows the Main Fault for approximately 70m along strike. The vein fault in the trench is a breccia quartzite with weak quartz and oxidized siderite containing trace amounts of galena. The vein breccia is also reported to contain limonite, anglesite, cerussite and minor sulphides.

The other three trenches are in bedrock or in near bedrock Keno Hill Quartzite float.

4. SITE HISTORY

It is reported that in the 1920's and adit, pits, crosscut and drift were excavated. An environmental survey done in 1999 revealed an adit, a shaft and four (4) bulldozer trenches.

5. MINE DEVELOPMENT

There is one adit, one shaft and four trenches and their associated waste rock piles located at the Main Fault and Nabob site. No ore was processed at the site and no tailings were encountered. There is no wastewater treatment

facility at this site. Site details can be found on Figure 1; site photos are located in Attachment 1 and laboratory results from the sampling are in Attachment 2.

5.1 Mine Openings and Excavations

Main Fault Shaft (photo 33-1)

At the west end of Trench #2 is an old collapsed prospect shaft located on the Main Fault.

Dimensions (L x W x H): 1.5m x 1.5m x unknown

Supports: The collar is supported by log cribbing.

Condition: The shaft has collapsed at surface.

Accessibility: A ladder going down the shaft is still in place, however since the shaft has collapsed the shaft can no longer be accessed.

Main Fault and Nabob Adit (photo 33-2)

The adit is located on the west side of Silver Basin Gulch Trail, 150m north of the shaft. The portal has collapsed.

Dimensions (L x W x H): The original dimensions of the portal are estimated to be roughly 1.5m by 1.5m. The length of the adit is unknown.

Supports: The portal was supported with log cribbing.

Condition: The portal and the first 5m (up to the road) of the adit have collapsed. The portal is filled with broken log cribbing and large boulders. No evidence of further stability problems was observed, the road above the adit did not appear to be slumping.

Accessibility: The adit can no longer be accessed.

Trench #1

Trench #1 is located on the west side of the road at the northeast end of the site. The trench is oriented at 310°.

Dimensions (L x W x H): 62m x 3-8m x 2.5m

Condition: The trench walls are gently sloped and do not pose any stability concerns.

Accessibility: The trench is easily accessed.

Trench #2

Trench #2 is located on the east side of Silver Basin Gulch Trail 150m south of the Main Fault and Nabob Adit. The trench is parallel to the road and is oriented at 057°. The Main Fault shaft is located at the southwest end of the trench. At the time of the site visit, a small trickle of water was seeping from mid-way along the eastern trench wall and flowing for a couple of meters before seeping back into the ground.

Dimensions (L x W x H): 72m x 2-8m x 1.5m

Condition: The trench walls are moderately sloped and do not pose any stability concerns. A small depression observed in the base of the trench could indicate a partial collapse in the Nabob adit below.

Accessibility: The trench is easily accessed.

Trench #3

Trench #3 is located 60m to the south of Trench #2. The trench is oriented at 228°. There are a few small test pits dug at the base of the trench.

Dimensions (L x W x H): 35m x 2-8m x 1.5m

Condition: The trench walls are gently sloped and composed of predominantly blocky talus. They do not pose any stability concerns.

Accessibility: The trench is easily accessed.

Trench #4

Trench #4 is excavated from near the southern end of Trench #2 to the midpoint of Trench #3. The trench is oriented at 340°.

Dimensions (L x W x H): 59m x 2-8m x 1m

Condition: The trench walls are gently sloped and do not pose any stability concerns.

Accessibility: The trench is easily accessed.

5.2 Waste Rock Disposal Areas

Waste rock from the trenches was composed primarily of overburden and quartzite. The waste rock was piled along the sides and ends of the trenches.

There is a waste rock pile measuring 20m by 5m by 3m is located roughly 25m from the portal of the Main Fault and Nabob Adit. Three trestles are still in place on the pile. The surface composition of the pile is Keno Hill Quartzite with quartz veining. The quartz veining contains weakly oxidized siderite, limonite and minor galena. There is no vegetation growing on the pile. No surface water was observed at or near the pile. A sample (Nabob-Waste Rock-Sept.15/99) was collected for analysis. The field paste pH was 5.6 and the conductivity was 10µS/cm.

6. MINE SITE INFRASTRUCTURE

There is an old house and an outhouse located at the site. There is some dismantled rail and trestle near the Main Fault and Nabob Adit. No fuel storage areas, electrical equipment or any milling or processing infrastructure was encountered at this site.

5.1 Buildings

Building 33A (photo 33-3)

There is an old house located on the Silver Basin Gulch Trail at the edge of the cirque, 200m southwest of the trenches. Three additions were built on to the original 5m by 5m log cabin. Most of the asbestos tar paper cladding that covered the exterior walls has fallen off and is scattered around the building. The roof is mostly covered in sheets of asphalt shingling, with one small section, now collapsed, roofed with corrugated tin. No hazardous products were encountered inside of the building.

Building 33B

There is a wooden outhouse located near the Main Fault and Nabob Adit.

5.2 Rail and Trestle

Steel rail and wooden ties extended northwest from the Main Fault and Nabob Adit to the top of the waste rock pile. The rail was dismantled and left scattered in the area between the adit and the waste rock pile. Three trestles are still in place on top of the waste rock pile. An old ore cart was encountered at the base of the pile.

7. SOLID WASTE DUMPS

Two areas of solid waste were encountered at the site, one is near the entrance of the Main Fault and Nabob Adit and the second is near the old house.

Solid Waste Dump #1

The dump is located between the Main Fault and Nabob Adit and the waste rock pile. Material observed in the dump includes corrugated iron sheeting, empty fuel drum, two 1ft by 4ft air tanks and roughly 6.5m^3 of wood waste.

Solid Waste Dump #2

The dump is located near the old house, on the opposite side of the Silver Basin Gulch Trail. Roughly 20m^3 of the waste is asbestos asphalt wall and roofing material, 3m^3 of household debris such as glass, cans and wood, and 15 batteries for miners lamps that have leached.

8. POTENTIAL CONTAMINANTS OF CONCERN

Potential contaminants of concern include acid leaching from the miner's lamp batteries and any metals washing from the waste rock piles.

9. WATER QUALITY

There is a small trickle of water that at approximately the mid-point of Trench #2, the water disappears into a shallow depression. This may be the surface expression of collapsed underground workings.

10. RECLAMATION

No revegetation has occurred at the site at this point likely due to the sub-alpine wind-swept conditions of this area. No reclamation measures have been undertaken at this site.

11. REFERENCES AND PERSONAL COMMUNICATIONS

Minfile #105M 001aq

ATTACHMENT 2: 1999 MAIN FAULT AND NABOB WASTE ROCK SAMPLES LABORATORY RESULTS			
Site Number	Detection Limit	Units	Nabob - Waste Rock - Sept 15/99
Sample Desciption			Composite sample from the waste rock pile outside of the Nabob Adit
Paste pH (field)	N/A	pH	5.6
Conductivity (field)	N/A	µS/cm	10
pH in Saturated Paste			
pH	0.1	pH	6.2
pH in Soil (1:2 water)			
pH	0.01	pH	6.9
ICP Semi-Trace Scan			
Aluminum	5	µg/g	102000
Antimony	2	µg/g	110
Arsenic	2	µg/g	1300
Barium	0.05	µg/g	227
Beryllium	0.1	µg/g	<0.1
Bismuth	5	µg/g	<5
Cadmium	0.1	µg/g	18.9
Calcium	5	µg/g	172
Chromium	0.5	µg/g	16.1
Cobalt	0.1	µg/g	17.4
Copper	0.5	µg/g	105
Iron	1	µg/g	1100000
Lead	1	µg/g	211000
Lithium	0.5	µg/g	2.7
Magnesium	1	µg/g	140
Manganese	0.5	µg/g	119000
Mercury	0.01	µg/g	<0.01
Molybdenum	1	µg/g	27
Nickel	1	µg/g	40
Phosphorus	5	µg/g	477
Potassium	20	µg/g	3050
Selenium	2	µg/g	<2
Silicon	5	µg/g	554
Silver	0.5	µg/g	1360
Sodium	5	µg/g	264
Strontium	1	µg/g	<1
Sulphur	10	µg/g	<10
Thorium	1	µg/g	<1
Tin	1	µg/g	<1
Titanium	0.2	µg/g	28.5
Uranium	5	µg/g	<5
Vanadium	1	µg/g	7
Zinc	0.5	µg/g	29700
Zirconium	0.1	µg/g	11.7

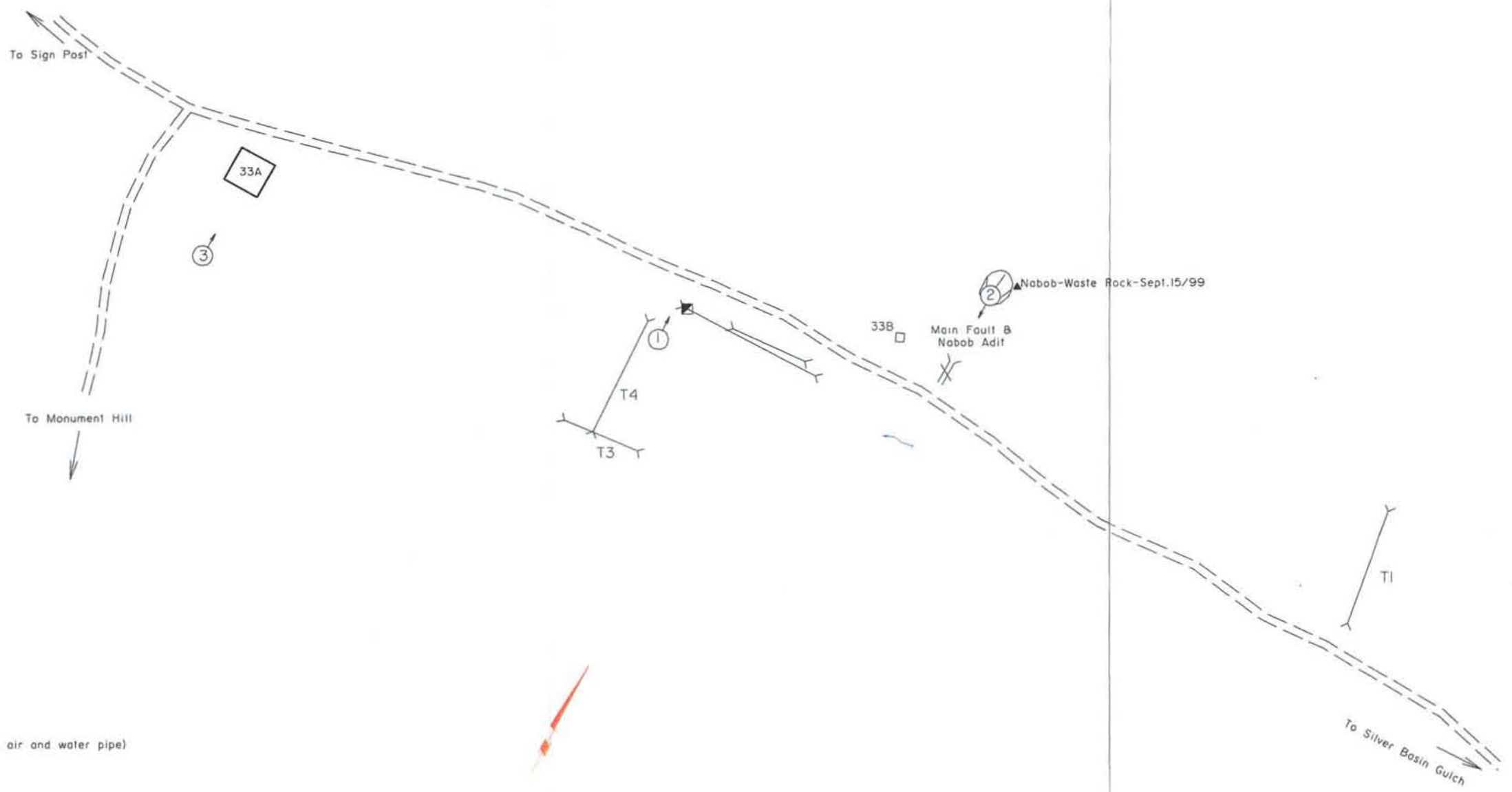
ATTACHMENT 2: 1999 MAIN FAULT AND NABOB WASTE ROCK LABORATORY RESULTS
MODIFIED SOBEK METHOD ACID-BASE ACCOUNTING TEST

SAMPLE	SITE DESCRIPTION	PASTE pH	S(T) %	S(SO4) %	AP	NP	NET NP	NP/AP
Nabob - Waste Rock - Sept.15/99	Composite sample from the waste rock pile outside of the Nabob Adit	7.3	0.02	0.03	-0.3	2.1	2.4	<0.1

AP = ACID POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NP = NEUTRALIZATION POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NET NP = NET NEUTRALIZATION POTENTIAL = TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NOTE: WHEN S(T) AND/OR S(SO4) IS REPORTED AS <0.01, IT IS ASSUMED TO BE ZERO FOR THE AP CALCULATION.
N/D = NO DUPLICATE ASSAY. CALCULATIONS ARE BASED ON ASSAY RESULTS OF THE INITIAL SAMPLE.
RE = REPLICATE.

NOTE - A HIGH LEVEL OF SOLUBLE METALS (ESPECIALLY IRON) WERE OBSERVED IN MANY SAMPLES DURING THE ABA TITRATIONS.
SAMPLES WITH A NEGATIVE NET NP SHOULD BE TESTED FOR MOBILE METALS USING STANDARD SHAKE FLASK EXTRACTION TESTS.

- Building (22A: building site present reference*) Indicates Asbestos Material (22A*)
- Collapsed Building (22A)
- Adit
- Collapsed Adit
- Shaft
- Collapsed/Backfilled Shaft
- Mine Rock Dump
- Bedrock Open Pit
- Trench
- Stripped Overburden Stockpile
- Stripped / Disturbed Area
- Outcrop Boundary
- Highway
- Road (gravel, 2 wheel drive)
- Road (gravel, 4X4 accessible)
- Road (inaccessible)
- Trail
- Culvert
- 24501-01 1999 Soil Sample (this study)
- Pre 1999 Soil Sample (other sources)
- 25WR04-01 1999 Waste Rock Sample (this study)
- Pre 1999 Waste Rock Sample (other sources)
- WO-12-06 1999 Water Sample
- Pre 1999 Water Sample
- Tension Cracks
- Mass Movement (note: for Forms: BelleKeno)
- Groundwater Seep
- Surface Water Flow (Stream, Creek, River)
- Lake
- Settling Pond / Water Treatment Pond
- Tailings Dam / Tailings Pond / Mill Tails
- Ponded Water / Trench
- Barrels
- Abandoned Equipment (compressors, ore cars, rails, air and water pipe)
- Mine Rails / Trestle
- Collapsed Trestle
- Solid Waste Disposal Site
- Area of Soil Contamination
- *(6) Transformer Location (number of transformer in brackets)
- Power Line
- Power Line Collapsed
- Aerial Transmission Towers
- (5) Photo Site (arrow shows view direction)
- GPS Survey Location
- Former Building Site (Elsa)



0 25 50 75 100

Scale 1:2000

Traced From Air Photo NW95030-62

CAD FILE: SITE33.DGN

Public Works And Government Services Canada / Travaux publics et Services gouvernementaux Canada

Architectural & Engineering Services
Western Region

Drawing title: / Titre du dessin:

Main Fualt & Nabob Site #33
Site Assessment
Yukon Territory

designed by: / conçu par:		date:
drawn by: / dessiné par:	C.S.	Nov./99
approved by: / approuvé par:		
revisions:		
project no. / no. du projet:	125-12.01	dwg. no. / dessin no. 1 of 1

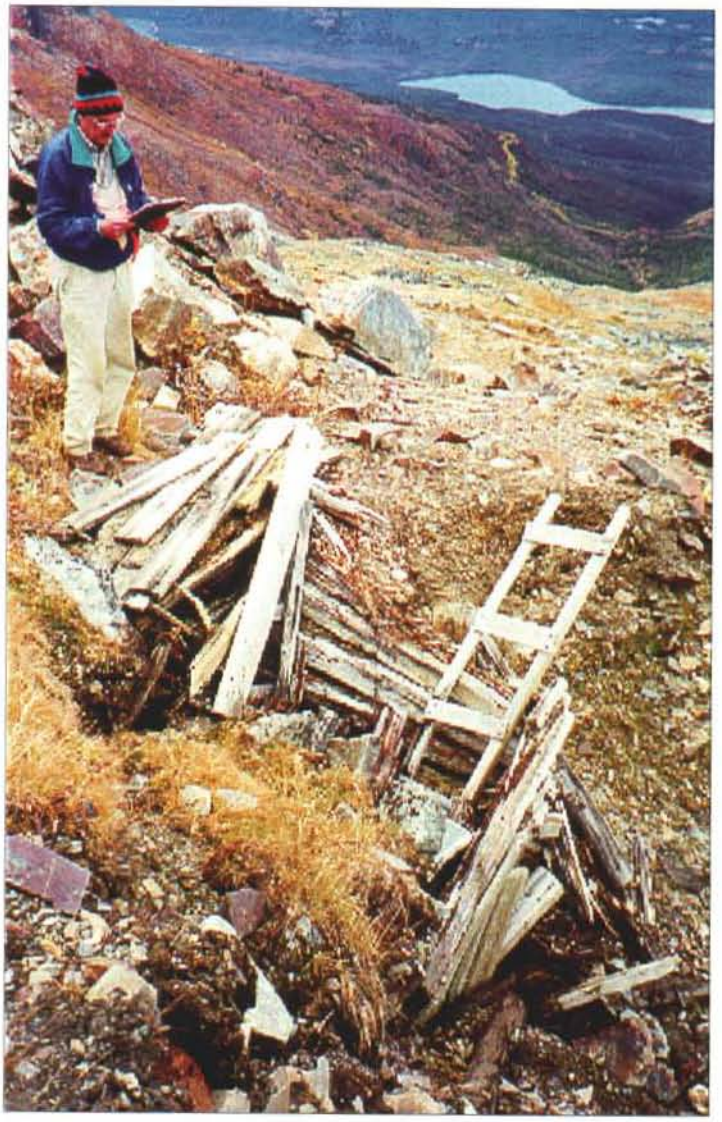


Photo 33-1 : Main Fault and Nabob. View of the Main Fault shaft, Gambler Lake is in the background. (Azimuth330°)

Photo 33-2 : Main Fault and Nabob. Collapsed Main Fault -Nabob Adit, truck is on Silver Basin Gulch Trail. (Azimuth150°)

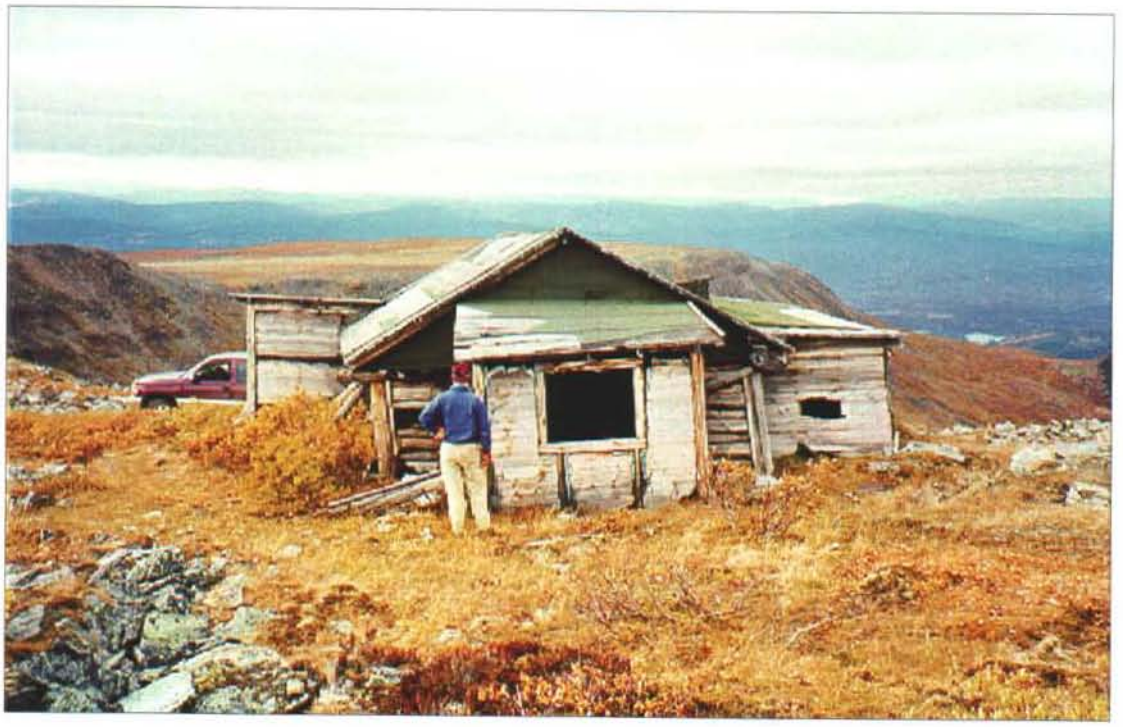


Photo 33-3 : Main Fault and Nabob Old log house on the south side of the Silver Basin Gulch Trail. (Azimuth335°)

LAKE VIEW

SITE #34

MINFILE# 105M001ar

1. LOCATION AND ACCESS

Lake View is located in the cirque at the headwaters of Faro Gulch on the north slope of Keno Hill. The site is at an elevation of roughly 1460m. Approximate UTM co-ordinates are 7091 100m N and 489 000m E. The site is a 300m hike past the end of the Upper Faro Gulch Trail, a deactivated road that begins at the Lucky Queen site. Four-wheel drive access is possible along the first 1.6 km of the Faro Gulch Trail.

2. SITE PHYSIOGRAPHY (Photo 34-1)

The Lake View site is located along the rib of a rocky east-west ridge. Coarse talus is common throughout the site and soils are poorly developed. Permafrost is considered very likely. The mine site is vegetated with subalpine herbaceous plants, grasses and shrubs(willow). A variety of moss and lichens grow on the talus. Surface water from the site drains northward into the Faro Gulch, a tributary of the Keno Ladue River. No surface water was observed on the site.

3. GEOLOGY AND MINERALIZATION

The host rocks are the Earn Group schist and phyllite with greenstone lenses. A discontinuous quartz vein with minor siderite, galena, freibergite and sphalerite is reported (Minfile #105M 001ar).

4. SITE HISTORY

Nothing is known of the site history. Work dating from the 1930s included minor hand trenching, although an adit is reported. A bulldozer trench was cut at the base of the site in the 1980s.

5. MINE DEVELOPMENT

Development work on the Lake View site is very limited. Two trenches and a bedrock cut were encountered. No ore was produced or processed on the site. There are no tailings or treatment facilities on the site.

5.1 Mine Openings and Excavations

No adit was found on the site. All the trenches are easily accessed by foot. A bedrock cut made where the vein is exposed at the lip of the ridge may represent the collar of an abandoned portal (described below as Trench #4).

Trench #1

Trench #1 is a cat trench developed into bedrock in the 1980s as part of the work conducted on the Gambler site (site #73).

Location: At the base of the ridge.

Dimensions: 15m long x 3m wide x 2m deep

Condition: Good.

Trench #2 (Photo 34-2)

Trench #2 is was hand dug in overburden consisting of colluvial soils composed of up to 70% coarse talus material.

Location: 30m up the ridge, roughly 20m south of the edge of the ridge.

Dimensions: 10m long x 2m wide x 1.5m deep

Condition: Good; partially slumped in.

Trench #3/Open Cut (Photo 34-3)

This location is more of a small open cut excavated into the exposed bedrock lip of the ridge.

Location: On cliff edge of ridge, roughly 80m east along ridge from Trench #1.

Dimensions: 5m long x 2m wide x 1m deep

Condition: Good; difficult to access.

5.2 Waste Rock Disposal Areas

Waste rock disposal areas are limited to small piles of overburden from trenching and were not investigated separately. No waste rock samples were collected.

6. MINE SITE INFRASTRUCTURE

The only mine site infrastructure at the site is a single building. There are no fuel storage areas, rail or trestle structures, milling, processing or electrical facilities.

Building 34-A: Cabin (Photo 34-4)

Dimensions: Building material is spread out over a 20m by 15m area.

Location: End of the Upper Faro Gulch Trail, 70m north of the Trench #1.

Construction: Wood frame construction with metal roof.

Asbestos: None observed.

Contents: No investigated.

7. SOLID WASTE DUMPS

No solid waste dumps were observed at the site.

8. POTENTIAL CONTAMINANTS OF CONCERN

No potential contaminants were observed on the site.

9. WATER QUALITY

Two water samples were collected on along the creek below the site in Faro Gulch as part of work done on the adjacent Gambler (site #73) and Keno No.9 System (site 36) sites. Samples were also collected in 1996 by PWGSC at the same locations. These samples and field analysis results are presented in Table 1. See Gambler report (site #73) for sample result details.

Table 1: 1996 and 1999 Field Data for Surface Water Sampling

1996 Sample No.	1999 Sample No.	Location	1996 Flow	1999 Flow	1996 pH	1999 pH	1996 Cond. (µS/cm)	1999 Cond. (µS/cm)
GAWQ/Str002	73WQ-Str02-01/-02	Faro Gulch 400m below camp.	2 L/s	2 L/min	8	8.2	440	340
GAWQ/Str003	9Vein(S1)@Waste-Rock-09/18/99	Faro Gulch, upstream of mine and waste rock area	4 L/s	N/A	7	6.2	840	500

10. RECLAMATION

The pre-1980 Lake View workings have begun to revegetate naturally. Trench #1 remains barren.

11. REFERENCES

Minfile #105M001ar

Public Works and Government Services Canada. 1997. *Phase II Environmental Assessment of the Gambler Abandoned Mine Site.* Report No. P118401, prepared by Steffen Robertson and Kirsten Inc.

ATTACHMENT 2: 1999 LAKE VIEW WATER SAMPLES LABORATORY RESULTS					
Sample Number	**Detection Limit**	**Units**	**Nine Vain (S1) @ Waste Rock - 09/18/99**	**Nine Vain (S2) @ Waste Rock - 09/18/99**	**73WQ-Str02-01/02 - Gambler - 16/09/99**
Site Description			Faro Gulch, upstream of site drainage	Faro Gulch, upstream of site drainage (duplicate)	Faro Gulch, downstream of site
pH (field)	na	pH			8.2
Conductivity (field)	na	µS/cm			340
pH (Lab)	0.01	pH	7.2	7.17	7.24
Conductivity (Lab)	0.01	µS/cm	570	570	360
Total Alkalinity	5	mg CaCO3/L	21	14	25
Chloride	0.25	mg/L	<0.25	<0.25	<0.25
Hardness (CaCO3 equiv)	5	mg/L	294	298	158
Nitrate-N	0.05	mg/L	0.35	0.32	0.3
Nitrite-N	0.003	mg/L	0.003	<0.003	<0.003
Sulphate	1	mg/L	256	244	137
Total Dissolved Solids	5	mg/L	402	402	249
Analysis by ICP-USN					
Aluminum	0.0008	mg/L	0.347	1.04	0.0371
Antimony	0.005	mg/L	<0.005	0.017	<0.005
Arsenic	0.01	mg/L	0.02	0.03	<0.01
Barium	0.00004	mg/L	0.0558	0.0593	0.027
Beryllium	0.00001	mg/L	<0.00001	<0.00001	<0.00001
Bismuth	0.0004	mg/L	<0.0004	<0.0004	<0.0004
Boron	0.002	mg/L	<0.002	0.003	<0.002
Cadmium	0.00006	mg/L	0.033	0.0347	0.00659
Calcium	0.002	mg/L	78.9	80.2	42.6
Chromium	0.00006	mg/L	0.00128	0.00103	0.00031
Cobalt	0.00003	mg/L	0.00346	0.0077	0.00061
Copper	0.00003	mg/L	0.0218	0.0388	0.00193
Iron	0.00001	mg/L	2.85	12.4	0.152
Lead	0.0003	mg/L	1.09	2.36	0.019
Lithium	0.001	mg/L	0.01	0.011	<0.001
Magnesium	0.0005	mg/L	21	22.3	12.7
Manganese	0.00002	mg/L	0.87	2.41	0.364
Mercury	0.0001	mg/L	<0.0001	<0.0001	<0.0001
Molybdenum	0.00007	mg/L	0.00028	0.00096	0.00012
Nickel	0.00001	mg/L	0.039	0.0496	0.0109
Phosphorus	0.03	mg/L	0.61	0.85	<0.03
Potassium	0.4	mg/L	<0.4	0.6	<0.4
Selenium	0.004	mg/L	<0.004	<0.004	<0.004
Silicon	0.004	mg/L	1.64	2.58	1.53
Silver	0.00005	mg/L	0.00244	0.0107	0.00014
Sodium	0.004	mg/L	0.8	0.8	0.5
Strontium	0.00002	mg/L	0.208	0.214	0.12
Sulphur	0.008	mg/L	82.3	82.3	44
Thallium	0.001	mg/L	<0.001	0.003	<0.001
Titanium	0.00002	mg/L	0.00272	0.0129	0.00066
Vanadium	0.00003	mg/L	0.00057	0.00174	<0.00003
Zinc	0.0002	mg/L	1.32	1.48	0.551
Analysis by Hydide AA					
Arsenic	0.0002	mg/L	0.0166	0.026	0.0008
Selenium	0.0001	mg/L	0.0004	0.0008	0.0002

Photo 34-1: Overview of Lakeview site showing both recent and historic trenching activity. (Azimuth 100°)

Photo 34-2: Lakeview trench site. (Azimuth 310°)

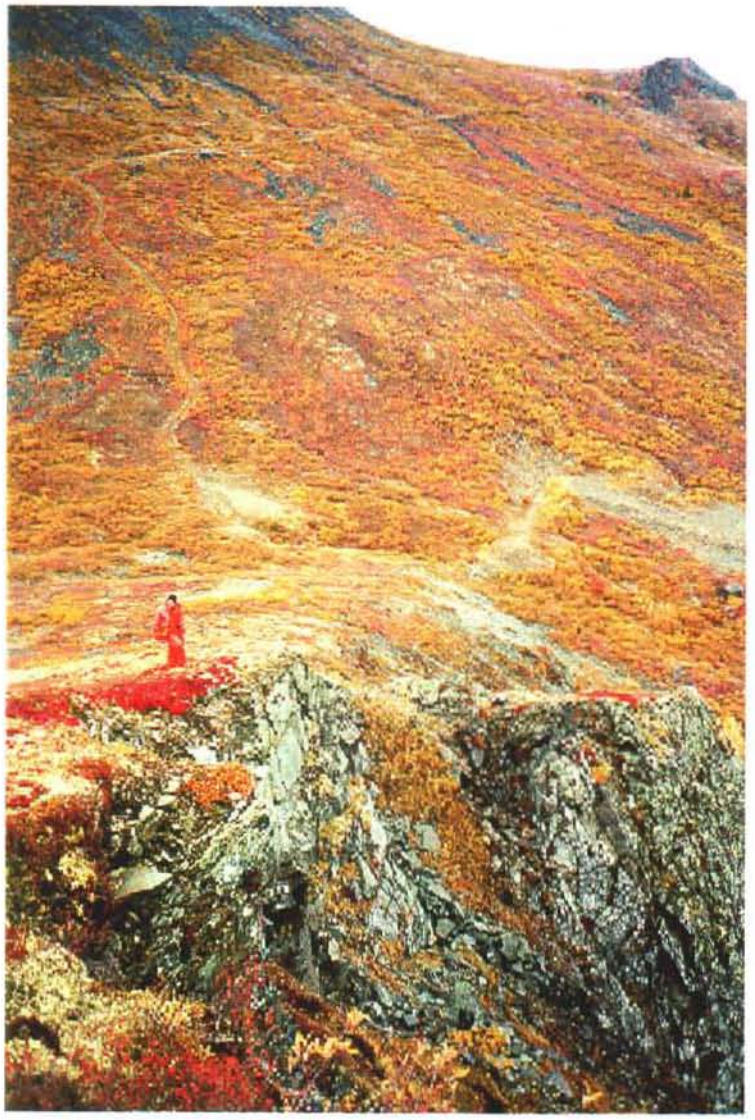


Photo 34-3: Lakeview trench cut located 10m right of sampler.
(Azimuth 280°)

Photo 34-4: Lakeview building (Bldg. 34-A). (Azimuth 280°)

NABOB #2

SITE #35

MINFILE # 105M 001as

1. LOCATION AND ACCESS

Nabob #2 is located on the north side of Keno Hill, approximately 2km northwest of the Monument Hill summit. Four-wheel drive access is possible via an unnamed trail that branches off Silver Basin Gulch Trail, roughly 2km from the Signpost. It is located at the approximate UTM co-ordinates 7 092 100m N and 489 900m E. (Latitude: 65° 57' 37" N and Longitude 135° 12' 09" W).

2. SITE PHYSIOGRAPHY

The site is located above treeline at an elevation of 4900ft (1490m) on a level plain. The vegetation at the site is mainly small shrubs, grass and moss. Surface runoff from the site flows 500m to the west into Faro Gulch, a tributary of the Keno Ladue River. Given the aspect and elevation, the site is presumably underlain by permafrost.

3. GEOLOGY AND MINERALIZATION

The old shaft, collapsed approximately 1m from the surface / collar is in greenstone. The waste rock pile beside the shaft has oxidized siderite with occasional small pods of crystalline and gneissic galena.

The bulldozer trench, approximately 65m to the southeast, cut greenstone with an irregular weak vein containing quartz and fresh to oxidized siderite.

4. SITE HISTORY

Three or more shafts and a bulldozer trench of unknown ages were excavated at the site.

5. MINE DEVELOPMENT

One old shaft and a bulldozer trench were visited. No ore was processed at the site and no tailings were encountered. There is no wastewater treatment facility at the site. Site photos are located in Attachment 1 and laboratory results for sampling are in Attachment 2.

5.1 Mine Openings and Excavations

Shaft #1 (photo 35-1)

The 1.5m by 1.5m shaft is collapsed about 1m below surface. The log cribbing which supported the collar has broken and fallen into the shaft. There is a large windless above the shaft opening.

Trench #1 (photo 35-2)

The bulldozer trench is excavated in greenstone with an irregular weak vein containing quartz and fresh to oxidized siderite. It is located approximately 65m to the southeast of the shaft.

Dimensions (L x W x H): 15m x 4mx 2m

Condition: The trench is shallow and poses no stability concerns.

5.2 Waste Rock Disposal Areas (photo 35-2)

There are roughly $160m^3$ of waste rock outside of the shaft. The waste rock is composed of greenstone and oxidized siderite with small pods of crystalline and gneissic galena. There was no surface water flowing over the waste rock at the time of the site visit. A sample (Nabob #2-Waste Rock-Sept.18/99) was collected for laboratory analysis. The field paste pH was 7.8 and the conductivity was 100µS/cm.

6. MINE SITE INFRASTRUCTURE

There are the remains of a log cabin. No other mine site infrastructure was encountered.

6.1 Building 35A (photo 35-3)

The remains of an old log cabin are located near the shaft. The building has completely collapsed.

Dimensions (L x W x H): 4m x 3m x 0.4m (current height)

Asbestos: No asbestos was observed.

Non-Hazardous Contents: There is an empty fuel drum and an old stove at the cabin site.

Hazardous Contents: No hazardous contents were observed.

6.2 Fuel Storage

There is one empty fuel drum by the cabin.

7. SOLID WASTE DUMPS

There are no solid waste dumps at the site.

8. POTENTIAL CONTAMINANTS OF CONCERN

No hazardous waste was encountered. Potential contaminants of concern include any metals washing from the waste rock pile.

9. WATER QUALITY

There was no surface water at the site.

10. RECLAMATION

There is no vegetation growing on the waste rock pile. The trench has some grass growing in it.

11. REFERENCES AND PERSONAL COMMUNICATIONS

Minfile #105M 001as

ATTACHMENT 2: 1999 NABOB #2 WASTE ROCK LABORATORY RESULTS			
Site Number	**Detection Limit**	**Units**	**Nabob 2 - Waste Rock Sept 18/99**
Sample Desciption			Collected from waste rock from the Nabob #2 shaft.
Paste pH (field)	N/A	pH	7.8
Conductivity (field)	N/A	µS/cm	100
pH in Saturated Paste			
pH	0.1	pH	7.2
pH in Soil (1:2 water)			
pH	0.01	pH	6.7
ICP Semi-Trace Scan			
Aluminum	5	µg/g	24200
Antimony	2	µg/g	95
Arsenic	2	µg/g	91
Barium	0.05	µg/g	117
Beryllium	0.1	µg/g	<0.1
Bismuth	5	µg/g	<5
Cadmium	0.1	µg/g	762
Calcium	5	µg/g	11500
Chromium	0.5	µg/g	14.6
Cobalt	0.1	µg/g	25.7
Copper	0.5	µg/g	430
Iron	1	µg/g	94000
Lead	1	µg/g	3670
Lithium	0.5	µg/g	15.6
Magnesium	1	µg/g	7130
Manganese	0.5	µg/g	16200
Mercury	0.01	µg/g	2.5
Molybdenum	1	µg/g	6
Nickel	1	µg/g	26.3
Phosphorus	5	µg/g	587
Potassium	20	µg/g	7800
Selenium	2	µg/g	<2
Silicon	5	µg/g	517
Silver	0.5	µg/g	70.7
Sodium	5	µg/g	75
Strontium	1	µg/g	10
Sulphur	10	µg/g	3680
Thorium	1	µg/g	<1
Tin	1	µg/g	2
Titanium	0.2	µg/g	76.6
Uranium	5	µg/g	<5
Vanadium	1	µg/g	120
Zinc	0.5	µg/g	57700
Zirconium	0.1	µg/g	5.2

ATTACHMENT 2: 1999 NABOB #2 WASTE ROCK LABORATORY RESULTS
MODIFIED SOBEK METHOD ACID-BASE ACCOUNTING TEST

SAMPLE	SITE DESCRIPTION	PASTE pH	S(T) %	S(SO4) %	AP	NP	NET NP	NP/AP
Nabob 2 - Waste Rock - Sept.18/99	Collected from waste rock from the Nabob #2 shaft.	8.0	0.56	0.07	15.3	50.3	34.9	3.3

AP = ACID POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NP = NEUTRALIZATION POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NET NP = NET NEUTRALIZATION POTENTIAL = TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NOTE: WHEN S(T) AND/OR S(SO4) IS REPORTED AS <0.01, IT IS ASSUMED TO BE ZERO FOR THE AP CALCULATION.
N/D = NO DUPLICATE ASSAY. CALCULATIONS ARE BASED ON ASSAY RESULTS OF THE INITIAL SAMPLE.
RE = REPLICATE.

NOTE - A HIGH LEVEL OF SOLUBLE METALS (ESPECIALLY IRON) WERE OBSERVED IN MANY SAMPLES DURING THE ABA TITRATIONS.
SAMPLES WITH A NEGATIVE NET NP SHOULD BE TESTED FOR MOBILE METALS USING STANDARD SHAKE FLASK EXTRACTION TESTS.

Photo 35-1 : Nabob #2. View of the collapsed Nabob #2 shaft. (Azimuth 050 ^{o})

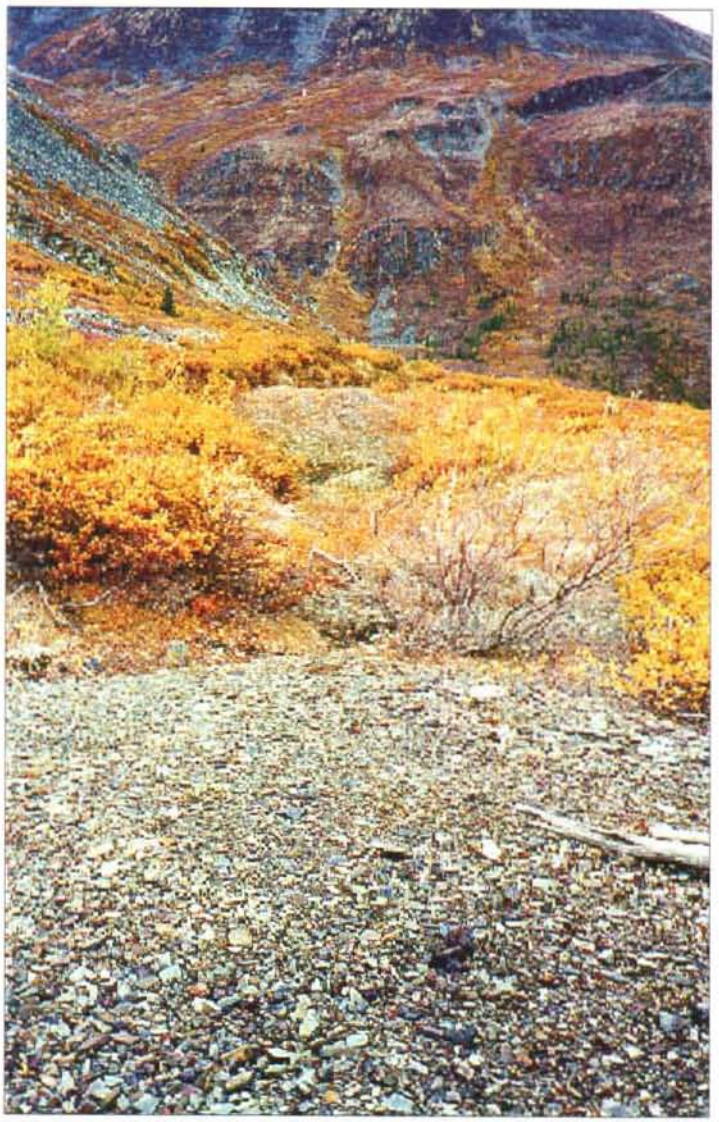


Photo 35-2 : Nabob #2. The waste rock pile from the shaft is in the foreground and Trench #1 is in the background. (Azimuth 230 ^{o})

Photo 35-3 : Nabob #2. Building 35A, an old cabin foundation. (Azimuth 235 ^{o})

KENO No. 9, MAIN FAULT & SHAMROCK J18

SITE #36

MINFILE #105M 001ao, aq & ap(?)

This report describes the field investigation of parts of the Keno No.9 Vein system including the:

- No.9 Vein Open Pit;
- No.3 Vein Open Pit and Adit;
- Shamrock J18 Vein Raise;
- Faro Gulch Portal;
- Keno No.4 and No.5 Vein Adits and Trenches

Investigations of the Keno 200 and 700 levels, the Porcupine Open Pit, and the Comstock 150 and 200 levels are reported separately (site #32). The sites of the Keno No.1 Vein Adits and the No.12 Vein Adit were not investigated.

1. LOCATION AND ACCESS

This site report includes north portions of the Keno No. 9 Vein system. The No. 3 and 9 Vein Open Pits are located on Keno Hill summit at the Signpost, at the end of the Keno Signpost road. The Faro Gulch Portal is approximately 300m east northeast of the Signpost in the cliff forming Faro Gulch cirque and is inaccessible. The No. 4 and 5 Veins, 300m south of the Signpost, cross Keno Hill summit and are accessible on the north end by a bulldozer trail, and on the south by the road from the Keno Signpost to the Keno 200 Adit. The covered raise on the Shamrock J - Keno 18 Vein is approximately 450m west of the Signpost and is reached by a road from the Keno Signpost to the Shamrock Mine. The approximate UTM co-ordinates are 7 090 200m N and 489 300m E.

SITE LOCATIONS

SITE	Minfile	UTM North	UTM East	Elevation
Keno #9 & #3 Pits	105M001ao	7 090 500m	489 550m	1,615m
Shamrock J18	n/a	7 090 625m	489,200m	1,680m
Faro Gulch Portal	105M001aq	7 090 550m	489 700m	1,680m
No 4 & 5 Vein Adits	n/a	7 090 125m	489 300m	1,670m

2. SITE PHYSIOGRAPHY

The site area is spread between elevations of 1,460m to 1,700m on the northern, western and southern facing slopes of Keno Summit. The areas south of the Faro Gulch headwall have very shallow to shallow slopes. The Faro Gulch headwall is a very steep, rocky cliff. All of the workings are above treeline and the area is populated

with sparse grasses, moss and small shrubs. The area is underlain by permafrost conditions that extend to depths of up to 120m. Soils are poorly developed to absent over all of the area. The Faro Gulch Portal is located on a barren rock cliff. Surface runoff for the area drains in three directions: to the north into Faro Gulch, a tributary of the Keno Ladue River; to the west into Erickson Gulch, a tributary of Christal Creek, and; to the south into Charity Gulch and Hope Gulch, tributaries of Lightening Creek. Standing water was present in the No. 3 Vein pit. Surface water runoff from the No. 3 Vein and the No. 9 Vein pits has formed channels in the loose waste rock dump material below the pits in headwall of Faro Gulch.

3. GEOLOGY AND MINERALIZATION

No. 3 Vein & No. 9 Vein Open Pits

The pits are located along the No. 3 and No. 9 Vein structures where they branch off from the east-northeast Main Fault. Both the No. 3 and No. 9 Vein fault structures are up to 30cm wide and strike roughly northeast. Ore shoots up to 0.15m wide of oxidized galena and variable tetrahedrite, sphalerite, siderite, cerussite and anglesite were mined in both open pits. Oxidation intensity reportedly decreased with depth. Both open pits occur along the irregular contact between Earn Group quartz-sericite-chlorite and carbonaceous phyllite and thick-banded Keno Hill quartzite. At the time of our visit, wallrock had sloughed and covered the vein.

Shamrock J18 Vein

The geology at the Shamrock J18 Vein raise was not inspected. The area is mapped as Keno Hill quartzites.

Faro Gulch Portal

The site was not inspected. The area of the collar is mapped as Keno Hill quartzites. The portal was used as an end dump for mine waste rock from the Main Fault Vein and No. 12 Vein on the Keno 200 Level. Waste rock in the waste dump below would likely include a mixture of Earn Group quartz-sericite-chlorite and carbonaceous phyllite, thick-banded Keno Hill quartzite and lesser greenstone.

No. 4 and 5 Vein

At the southwest end of the No. 4 Vein and No. 5 Vein faults, a total of 3 adits were driven. Dump material from the adits is composed of strongly fractured greenstone with minor oxidized siderite and brecciated to fractured greenstone vein material, with moderate to strong fist size pieces of oxidized siderite. No metallic mineralization was seen in either dump.

Another vein was seen at the south end of the Trench L7, where a 5m wide vein consisting of brown soil and fine brecciated greenstone with abundant oxidized siderite was cut. This may be the 5 vein that was explored

by a short adit. Considerable bulldozer trenching has been done in this area and the adit may have been removed. Two stock piles, made up of strong reddish brown soil and fine rock chips - oxidized vein material, may be the adit dump, that have been moved from its original site and repiled.

4. SITE HISTORY

The No. 3 Vein fault was investigated in the early 1920s by a 45.7m shaft and underground development on three levels. A small quantity of ore was mined during this period.

The No. 9 Vein was first developed in the 1920s by shafts, adits, and winze to 450 feet below surface, and drifting on levels to 300 feet below surface. Massive high-grade ore was mined, placed into sacks at the surface and transported to Mayo for shipment by paddle wheeler. Approximately 9,000 tons of disseminated ore remains in the mine.

In approximately 1957, United Keno Hill Mines reopened the mine with a 200 Level and 700 Level Adits, an internal shaft below the 700 Adit, and 8 levels over a vertical distance about 1000 feet. The 200 and 700 Levels were collared on the south slopes of Keno Summit at the 1,640m and 1,430m elevations respectively. In total, 283,557 tons of ore grading 44.26oz / ton silver, 10.62% lead and 3.74% zinc was mined underground on the No. 9 Vein before shut down in the late 1970's.

Small open pits were established on the No. 3 and 9 Veins by Archer, Cathro & Associates Limited during the period 1989-90. The No.3 Open Pit is up to 15m deep and the No. 9 Vein is 30m deep. Both encountered old workings dating from the 1920's that were ice filled. The original No.3 and No.9 Vein Shafts were collapsed and backfilled at this time.

The No.4 Vein was explored by 2 adits and a number of hand trenches in the 1920s, where ore shoots containing a few hundred tons of highly oxidized ore were intersected. No history was available for the No.5-2 or No.5 Vein Adits, although it is likely related to the work completed on the No.4 Vein. The most recent work is bulldozer trenching.

The Shamrock J18 Vein was discovered and mined from the Keno Mine underground workings in the early 1970's. A raise to surface, complete with hoist building, electrical supply lines and shop, was established to provide access for supplies, equipment and miners.

The Faro Gulch Portal was developed by UKHM from a cross cut driven from a drift on the 200 Level Main Fault Vein. It was used for ventilation and to dump waste rock form underground development on the Main Fault Vein and No. 12 Vein. Any ore was transported by tram to the 200 Level Adit dump.

5. MINE DEVELOPMENT

The Keno Mine was developed intermittently over a period of over 70 years. This report describes workings and mine infrastructure developed on the north portion of the mine including: the No. 9 Vein Open Pit; No. 3 Vein Open Pit and Adit; Shamrock J18 Vein Raise; Faro Gulch Portal; the Keno No 4 Trenches and Upper Adit, and; the No. 5 Vein Trenches. There are a number of waste rock piles associated with these workings. Ore was not processed at this site and no tailings were encountered. There is no mine waste water treatment facility at this site.

5.1 Mine Openings and Excavations

Adits/Shafts/Portals

No. 5-2 Vein Adit, Upper and Lower No. 4 Vein Adits (Photo 36-1)

All three of these adits are located just south of the Keno Hill summit, on the No. 5-2 Vein and No.4 Vein structures respectively. The portal timbers of only the No.5-2 Vein Adit were found and are described below. The portals of the No.4 Vein Adits have either collapsed entirely or have been bulldozed. The adits predate and are not connected to the Keno Mine.

Dimensions (L x W x H): unknown

Supports: The portal to the adit was supported by log cribbing.

Condition: The log cribbing has collapsed and there is roughly $2m^3$ of wood debris scattered around the adit.

Accessibility: The adit cannot be accessed.

Shamrock J18 Covered Raise (Photo 36-2)

The raise is located 450m west of the Signpost, on the eastern side of the road leading to the Shamrock site. The building covering the raise is described in Section 6.1 below.

Dimensions (L x W x H): unknown

Condition: The ground around the raise and building covering it are unstable and collapsing. An area of approximately 7m by 10 m has collapsed.

Accessibility: The building can be accessed. The raise and the collapsed area around it have been fenced off.

No. 3 Vein Adit (Photo 36-3)

The excavation of the No. 3 Vein Open Pit exposed an adit from earlier development. An adit was reportedly uncovered in the base of the No.9 Vein Open Pit, but has been recovered by loose rock.

Dimensions (L x W x H): unknown

Condition: The support structure for the adit has been broken up by the later pitting.

Accessibility: The adit cannot be accessed.

Faro Gulch Portal (Photo 36-4)

The portal is located 280m east of the SignPost, on the steep northern face of Keno Hill, within the face of the Faro Gulch cirque. The portal was used as an end dump for waste rock.

Dimensions (L x W x H): (~7m long) x (~2.5m high) x (?).

Supports: The portal is constructed with square set timbers.

Condition: Condition of the portal structure is not known.

Accessibility: The portal is not easily accessed, although hikers could climb up the scree slopes from below.

Open Pits

No. 3 Vein Open Pit (Photos 36-3, 36-5)

To the east of the Signpost is a 'Y-shaped' open pit excavated on the No. 3 Vein. The north end of the pit opens up into the Faro Gulch cirque. There are three ponds at the base of the pit.

Dimensions (L x W x H): 280m x 30m x 12m

Condition: The pit walls were stable at the time of the site visit.

Accessibility: The pit is accessible.

No. 9 Vein Open Pit (Photo 36-6)

The No.9 Vein Open Pit is located roughly 100m east of the No.3 Vein Open Pit. The north end of the pit opens up into the Faro Gulch cirque. The pit is excavated on the No. 9 Vein.

Dimensions (L x W x H): 180m x 30m-60m x 10m-30m

Condition: The boulders at the bottom of the trench likely are from the steep western pit wall. The pit wall is fairly stable but given the boulders at the base, occasional rocks do break off. The eastern wall is a gentler slope and appeared stable at the time of the site visit.

Accessibility: The pit is accessible.

Trenches (Photo 36-7)

Eight trenches were examined extending southwest along the trend of the No. 4 and No. 5 Veins over the Keno Hill Summit from the Signpost. The trenches varied in length from 26m to 70m, in width from 1m to 5m (5m average) and in depth from 1m to 3m. The trench walls appeared stable at the time of the site visit and the trenches could be easily accessed. All the trenches, except Trench L3, were cut by a bulldozer.

5.2 Waste Rock Disposal Areas (Photo 36-4)

There were ten waste rock piles identified during the site visit. Three of the piles are composed of stripped overburden from the trenches along the No.4 and No.5. The composition is predominantly greenstone with minor manganese and siderite, minor quartz vein material. Waste rock from the trenches totals approximately 155m^3. These piles were not individually identified. A total of seven waste rock piles were identified that are associated with underground or open pit mining. These are identified below. Samples were collected and analyzed for Acid-Base Accounting (ABA) and metals from only 5 of the piles (see results attached).

WR-01

Location: No.5-2 Vein Adit

Description: Approximately 50m^3 of brecciated to fractured greenstone with moderately to strongly oxidized siderite. No metallic mineralization was observed.

Sample: No sample was collected.

WR-02

Location: No.4 Vein Lower Adit

Description: Approximately 80m^3 of brecciated to fractured greenstone with moderately to strongly oxidized siderite. No metallic mineralization was observed.

Sample: Keno Hill 9 Vein L3 - Waste Rock - Sept.20/99.

WR-03 & -04

Location: No.5 Vein Adit

Description: Moderately oxidized ore stockpiles of quartzite, schists and siderite-quartz vein material with variable galena, tetrahedrite and pyrite.

Sample: (composite)Keno Hill 9 Vein - Waste Rock - Sept.20/99.

WR-05

Location: No. 3 and No. 9 Vein Open Pits above Faro Gulch cirque rim.

Description: Roughly 1,400m^3 composed of carbonaceous phyllite with up to 5% pyrite fracture filling stripped off the hanging wall of the No. 3 Vein.

Sample: Main Vein WR1&WR2 - Waste Rock- Sept. 20/99);

WR-06

Location: Faro Gulch Portal, dumped down Faro gulch cirque headwall.

Description: Roughly 4,500m^3 composed of chlorite-sericite and carbonaceous schist, thick-banded quartzite and minor greenstone. Located on large scree slopes of similar composition

Sample: Keno Hill 12 Vein – Waste Rock – Sept. 18/99.

WR-07

Location: No. 3 and No. 9 Vein Open Pits and Adits, dumped down Faro gulch cirque headwall.

Description: Over 5,000m^3 composed of pyritic carbonaceous phyllite and thick banded quartzite. Located on large scree slopes of similar composition.

Sample: No sample was collected.

6. MINE SITE INFRASTRUCTURE

A wood frame building covers the Shamrock J18 Raise. A power line extends from Keno to the Raise. No fuel storage areas, milling infrastructure or any rail and trestle were encountered.

6.1 Building 32A (Photos 36-2)

A wood frame building clad in corrugated steel covers Shamrock J18 Raise. Part of the building and the underground workings below it have collapsed and are fenced off.

Dimensions (L x W x H): 15m x 10m x 4m

Paint: No paint was observed.

Asbestos: The interior of the building is clad in a gyprock with asbestos coating.

Foundation: None.

Condition: Half the building is unstable and has partially collapsed into the underground workings below.

Non-Hazardous Contents: There is an electrical panel inside of the building.

Hazardous Contents: No hazardous contents were observed.

6.2 Electrical Equipment (Photo 36-2, 36-8)

There is a power line that roughly follows the Signpost Road and goes from Keno City to the Shamrock J18 Raise Building. One of the poles beside the building has a transformer on it. An electrical panel is present in the Raise Building (Building 36A).

7. SOLID WASTE DUMPS

No solid waste dumps were encountered at this site. Minor scrap metal and wooden timbers were encountered in the Faro Gulch Portal Waste Rock Pile.

8. POTENTIAL CONTAMINANTS OF CONCERN

The transformer on a power pole near the Shamrock J18 Raise Building is suspected of containing PCB's based on its age. Other potential contaminants of concern include any metals washing off the pit or trench walls and from the waste rock piles.

9. WATER QUALITY

A water sample (Nine Vain Keno Hill Above P1&P2 - 09/18/99) was collected from above the two pits. Two water samples (Nine vein Keno Hill P1 and Nine vein Keno Hill P2) were collected from pits #1 and #2, near the cirque rim. A water sample and a duplicate (Nine Vein (S1) @ Waste Rock - 09/18/99 and Nine Vein (S2) @ Waste Rock - 09/18/99 (duplicate)) were collected from the base of Waste Rock Pile WR-07 at the headwaters of creek in Faro Gulch.

10. RECLAMATION

Natural revegetation of the site is very slow due to the lack of suitable soil and the elevation.

11. REFERENCES AND PERSONAL COMMUNICATIONS

Minfile #'s 105M 001ao, 105M 001ap and 105M 001aq

United Keno Hill Mines Ltd. (1996) Report No. UKH/96/01 Site Characterization. Produced by Access Mining Consultants Ltd.

ATTACHMENT 2: 1999 KENO NO. 9 WATER SAMPLES LABORATORY RESULTS					
Sample Number	**Detection Limit**	**Units**	**Nine Vein (S1) @ Waste Rock - 09/18/99**	**Nine Vein (S2) @ Waste Rock - 09/18/99**	**Nine Vein Keno Hill P1 - 09/20/99**
Site Desciption			Water draining from pit #1 into Faro Gulch	duplicate	Ponded water at the base of open pit #1
pH (field)	N/A	pH	6.2	-	7
Conductivity (field)	N/A	µS/cm	500	-	1160
pH (Lab)	0.01	pH	7.2	7.17	7.92
Conductivity (Lab)	0.01	µS/cm	570	570	1150
Total Alkalinity	5	mg CaCO3/L	21	14	111
Chloride	0.25	mg/L	<0.25	<0.25	<0.25
Hardness (CaCO3 equiv)	5	mg/L	294	298	687
Nitrate-N	0.05	mg/L	0.35	0.32	0.54
Nitrite-N	0.003	mg/L	0.003	<0.003	0.003
Sulphate	1	mg/L	256	244	480
Total Dissolved Solids	5	mg/L	402	402	889
Analysis by ICP-USN					
Aluminum	0.0008	mg/L	0.347	1.04	0.0027
Antimony	0.005	mg/L	<0.005	0.017	<0.005
Arsenic	0.01	mg/L	0.02	0.03	<0.01
Barium	0.00004	mg/L	0.0558	0.0593	0.00366
Beryllium	0.00001	mg/L	<0.00001	<0.00001	<0.00001
Bismuth	0.0004	mg/L	<0.0004	<0.0004	<0.0004
Boron	0.002	mg/L	<0.002	0.003	<0.002
Cadmium	0.00006	mg/L	0.033	0.0347	0.00362
Calcium	0.002	mg/L	78.9	80.2	173
Chromium	0.00006	mg/L	0.00128	0.00103	<0.00006
Cobalt	0.00003	mg/L	0.00346	0.0077	<0.00003
Copper	0.00003	mg/L	0.0218	0.0388	0.00062
Iron	0.00001	mg/L	2.85	12.4	0.045
Lead	0.0003	mg/L	1.09	2.36	0.0084
Lithium	0.001	mg/L	0.01	0.011	0.008
Magnesium	0.0005	mg/L	21	22.3	52.1
Manganese	0.00002	mg/L	0.87	2.41	0.00586
Mercury	0.0001	mg/L	<0.0001	<0.0001	<0.0001
Molybdenum	0.00007	mg/L	0.00028	0.00096	0.00226
Nickel	0.00001	mg/L	0.039	0.0496	0.0116
Phosphorus	0.03	mg/L	0.61	0.85	<0.03
Potassium	0.4	mg/L	<0.4	0.6	<0.4
Selenium	0.004	mg/L	<0.004	<0.004	<0.004
Silicon	0.004	mg/L	1.64	2.58	2.34
Silver	0.00005	mg/L	0.00244	0.0107	<0.00005
Sodium	0.004	mg/L	0.8	0.8	2.1
Strontium	0.00002	mg/L	0.208	0.214	0.667
Sulphur	0.008	mg/L	82.3	82.3	161
Thallium	0.001	mg/L	<0.001	0.003	<0.001
Titanium	0.00002	mg/L	0.00272	0.0129	<0.00002
Vanadium	0.00003	mg/L	0.00057	0.00174	<0.00003
Zinc	0.0002	mg/L	1.32	1.48	0.124
Analysis by Hydride AA					
Arsenic	0.0002	mg/L	0.0166	0.026	0.0054
Selenium	0.0001	mg/L	0.0004	0.0008	0.0004

ATTACHMENT 2: 1999 KENO NO. 9 WATER SAMPLES LABORATORY RESULTS				
Sample Number	**Detection Limit**	**Units**	**Nine Vein Keno Hill P2 - 09/20/99**	**Nine Vein Keno Hill Above P1&P2 - 09/18/99**
Site Desciption			Water at the base of Open Pit #2	Water that is upstream of the two open pits
pH (field)	N/A	pH	6.9	6.6
Conductivity (field)	N/A	µS/cm	470	720
pH (Lab)	0.01	pH	7.58	7.08
Conductivity (Lab)	0.01	µS/cm	440	1000
Total Alkalinity	5	mg CaCO3/L	47	146
Chloride	0.25	mg/L	<0.25	<0.25
Hardness (CaCO3 equiv)	5	mg/L	229	589
Nitrate-N	0.05	mg/L	0.18	0.24
Nitrite-N	0.003	mg/L	<0.003	0.004
Sulphate	1	mg/L	158	350
Total Dissolved Solids	5	mg/L	290	724
Analysis by ICP-USN				
Aluminum	0.0008	mg/L	0.398	0.337
Antimony	0.005	mg/L	<0.005	<0.005
Arsenic	0.01	mg/L	<0.01	<0.01
Barium	0.00004	mg/L	0.0141	0.0116
Beryllium	0.00001	mg/L	<0.00001	<0.00001
Bismuth	0.0004	mg/L	<0.0004	<0.0004
Boron	0.002	mg/L	<0.002	<0.002
Cadmium	0.00006	mg/L	0.0033	0.00166
Calcium	0.002	mg/L	62	157
Chromium	0.00006	mg/L	0.00013	0.0006
Cobalt	0.00003	mg/L	0.0001	0.00084
Copper	0.00003	mg/L	0.00197	0.00504
Iron	0.00001	mg/L	0.127	1.33
Lead	0.0003	mg/L	0.0171	0.0217
Lithium	0.001	mg/L	0.005	0.009
Magnesium	0.0005	mg/L	13.5	36.8
Manganese	0.00002	mg/L	0.0141	0.107
Mercury	0.0001	mg/L	<0.0001	<0.0001
Molybdenum	0.00007	mg/L	0.00018	0.00046
Nickel	0.00001	mg/L	0.0052	0.0145
Phosphorus	0.03	mg/L	<0.03	0.04
Potassium	0.4	mg/L	<0.4	<0.4
Selenium	0.004	mg/L	<0.004	0.004
Silicon	0.004	mg/L	2.02	2.94
Silver	0.00005	mg/L	<0.00005	<0.00005
Sodium	0.004	mg/L	0.8	1.4
Strontium	0.00002	mg/L	0.196	0.324
Sulphur	0.008	mg/L	50.2	119
Thallium	0.001	mg/L	<0.001	<0.001
Titanium	0.00002	mg/L	0.00116	0.00827
Vanadium	0.00003	mg/L	<0.00003	0.00046
Zinc	0.0002	mg/L	0.177	0.161
Analysis by Hydride AA				
Arsenic	0.0002	mg/L	0.0013	0.0035
Selenium	0.0001	mg/L	0.0003	0.0001

ATTACHMENT 2: 1999 KENO No. 9 WASTE ROCK SAMPLES LABORATORY RESULTS					
Site Number	**Detection Limit**	**Units**	**Keno Hill 9Vein L3 - Waste Rock - Sept 20/99**	**Keno Hill 9Vein - Waste Rock - Sept 20/99**	**Main Vein WR1&WR2 Waste Rock - Sept 20/99**
Sample Desciption			Waste rock located at trench #3	Waste rock located to the north of the uppermost trench	Waste rock pile between Open Pits #1 and #2
Paste pH (field)	N/A	pH	7.2	7.2	6.6
Conductivity (field)	N/A	µS/cm	1140	720	720
pH in Saturated Paste					
pH	0.1	pH	6.3	7.2	6.8
pH in Soil (1:2 water)					
pH	0.01	pH	6.7	7.1	7.1
ICP Semi-Trace Scan					
Aluminum	5	µg/g	44600	37000	25400
Antimony	2	µg/g	290	<2	520
Arsenic	2	µg/g	91	95	78
Barium	0.05	µg/g	163	578	191
Beryllium	0.1	µg/g	0.7	0.7	<0.1
Bismuth	5	µg/g	<5	<5	<5
Cadmium	0.1	µg/g	838	3.4	766
Calcium	5	µg/g	1830	16900	4310
Chromium	0.5	µg/g	35.2	37.2	48.3
Cobalt	0.1	µg/g	32.9	15.4	28.1
Copper	0.5	µg/g	862	45.9	884
Iron	1	µg/g	150000	41000	99000
Lead	1	µg/g	7100	122	2880
Lithium	0.5	µg/g	311	39.8	47.8
Magnesium	1	µg/g	2990	10900	7230
Manganese	0.5	µg/g	35700	891	24400
Mercury	0.01	µg/g	6	0.01	3
Molybdenum	1	µg/g	11	7	5
Nickel	1	µg/g	55.2	47.8	49.6
Phosphorus	5	µg/g	408	1440	599
Potassium	20	µg/g	8200	10700	5200
Selenium	2	µg/g	<2	<2	<2
Silicon	5	µg/g	489	378	234
Silver	0.5	µg/g	655	1.3	902
Sodium	5	µg/g	58	1360	708
Strontium	1	µg/g	12	91	26
Sulphur	10	µg/g	4300	14000	14600
Thorium	1	µg/g	<1	<1	<1
Tin	1	µg/g	31	2	14
Titanium	0.2	µg/g	64.7	108	498
Uranium	5	µg/g	<5	<5	<5
Vanadium	1	µg/g	170	54	83
Zinc	0.5	µg/g	65900	407	59200
Zirconium	0.1	µg/g	12.2	39.2	17

ATTACHMENT 2: 1999 KENO No. 9 WASTE ROCK LABORATORY RESULTS			
Site Number	**Detection Limit**	**Units**	**Keno Hill 12 Vein - Waste Rock - Sept 18/99**
Sample Desciption			Waste rock plume associated with No. 12 vein workings dumped in Faro Gulch
Paste pH (field)	N/A	pH	7.8
Conductivity (field)	N/A	µS/cm	10
pH in Saturated Paste			
pH	0.1	pH	6.4
pH in Soil (1:2 water)			
pH	0.01	pH	6.7
ICP Semi-Trace Scan			
Aluminum	5	µg/g	8860
Antimony	2	µg/g	13
Arsenic	2	µg/g	91
Barium	0.05	µg/g	104
Beryllium	0.1	µg/g	0.3
Bismuth	5	µg/g	<5
Cadmium	0.1	µg/g	9.5
Calcium	5	µg/g	636
Chromium	0.5	µg/g	19.9
Cobalt	0.1	µg/g	1.4
Copper	0.5	µg/g	11.2
Iron	1	µg/g	13600
Lead	1	µg/g	850
Lithium	0.5	µg/g	9.8
Magnesium	1	µg/g	304
Manganese	0.5	µg/g	1260
Mercury	0.01	µg/g	<0.01
Molybdenum	1	µg/g	<1
Nickel	1	µg/g	7.5
Phosphorus	5	µg/g	416
Potassium	20	µg/g	2630
Selenium	2	µg/g	<2
Silicon	5	µg/g	674
Silver	0.5	µg/g	13.6
Sodium	5	µg/g	363
Strontium	1	µg/g	22
Sulphur	10	µg/g	270
Thorium	1	µg/g	4
Tin	1	µg/g	2
Titanium	0.2	µg/g	19
Uranium	5	µg/g	<5
Vanadium	1	µg/g	16
Zinc	0.5	µg/g	516
Zirconium	0.1	µg/g	7.9

ATTACHMENT 2: 1999 KENO No. 9 WASTE ROCK LABORATORY RESULTS
MODIFIED SOBEK METHOD ACID-BASE ACCOUNTING TEST

SAMPLE	SITE DESCRIPTION	PASTE pH	S(T) %	S(SO4) %	AP	NP	NET NP	NP/AP
Keno Hill 12 Vein - Waste Rock - Sept.18/99	Waste rock plume associated with No. 12 vein workings dumped in Faro Gulch	7.7	0.03	0.01	0.6	3.0	2.4	4.8
Keno Hill 9 Vein L3 - Waste Rock - Sept.20/99	Waste rock located to the north of the uppermost trench	6.9	0.42	0.21	6.6	9.9	3.3	1.5
Keno Hill 9 Vein - Waste Rock - Sept.20/99	Waste rock located to the north of the uppermost trench	8.2	0.92	0.03	27.8	84.8	56.9	3.0
Main Vein WR1&WR2 - Waste Rock - Sept.20/99	Waste rock pile between Open Pits #1 and #2	7.7	1.11	0.06	32.8	62.3	29.4	1.9

AP = ACID POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NP = NEUTRALIZATION POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NET NP = NET NEUTRALIZATION POTENTIAL = TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NOTE: WHEN S(T) AND/OR S(SO4) IS REPORTED AS <0.01, IT IS ASSUMED TO BE ZERO FOR THE AP CALCULATION.
N/D = NO DUPLICATE ASSAY. CALCULATIONS ARE BASED ON ASSAY RESULTS OF THE INITIAL SAMPLE.
RE = REPLICATE.

NOTE - A HIGH LEVEL OF SOLUBLE METALS (ESPECIALLY IRON) WERE OBSERVED IN MANY SAMPLES DURING THE ABA TITRATIONS.
SAMPLES WITH A NEGATIVE NET NP SHOULD BE TESTED FOR MOBILE METALS USING STANDARD SHAKE FLASK EXTRACTION TESTS.

- Building (22A: building site present reference*) Indicates Asbestos Material
- 22A Collapsed Building
- Adit
- Collapsed Adit
- Shaft
- Collapsed/Backfilled Shaft
- Mine Rock Dump
- Bedrock Open Pit
- Trench
- Stripped Overburden Stockpile
- Stripped / Disturbed Area
- Outcrop Boundary
- Highway
- Road (gravel, 2 wheel drive)
- Road (gravel, 4X4 accessible)
- Road (inaccessible)
- Trail
- Culvert
- 24501-01 1999 Soil Sample (this study)
- Pre 1999 Soil Sample (other sources)
- 25WR04-01 1999 Waste Rock Sample (this study)
- Pre 1999 Waste Rock Sample (other sources)
- WQ-12-06 1999 Water Sample
- Pre 1999 Water Sample
- Tension Cracks
- Mass Movement (note: for Forms: BelleKeno)
- Groundwater Seep
- Surface Water Flow (Stream, Creek, River)
- Lake
- Settling Pond / Water Treatment Pond
- Tailings Dam / Tailings Pond / Mill Tails
- Ponded Water / Trench
- Barrels
- Abandoned Equipment (compressors, ore cars, rails, air and water pipe)
- Mine Rails / Tressle
- Collapsed Tressle
- Solid Waste Disposal Site
- Area of Soil Contamination
- *(6) Transformer Location (number of transformer in brackets)
- Power Line
- Power Line Collapsed
- Arial Transmission Towers
- (5) Photo Site (arrow shows view direction)
- GPS Survey Location
- Former Building Site (Elsa)

Shamrock Raised Building 36A

2

Collapsed Underground Mine Workings

5400'

WR-06 Faro Gulch Portal Waste Rock

Faro Gulch Portal/Shed

No.3 Vein Adit

Sign Post

Cirque Rim

NineVeinKenoHillP1-09/20/99

MainVein WR1 & WR2 - Waste Rock-Sept20/99

NineVeinKenoHill P2-09/20/99

WR-05

No.9 Vein Adit

No.9 Vein Pit

No.3 Vein Pit

6

5

NineVeinKenoHill AbovePl BP2-09/20/99

WR -04

WR-03

KenoHill9Vein-WasteRock-Sept/18/99

BLUFF

Trench L8

Trench L7

KNo.5 Vein Trenches

5600'

7

Trench L6

Trench L5

Trench L4

(4 Vein)

Trench L3

5400'

KNo.4 Vein Trenches

Trench L1

LowerNo..4 Vein Adit and WasteRockPile

WR-02

KenoHill 9 VeinL3-WasteRock-Sept20/99

5400'

5-2 Vein Adit

1

Trench L2

0 25 50 75 100

Scale 1:2500

CAD FILE: KEY.DGN

Public Works And Government Services Canada / Travaux publics et Services gouvernementaux Canada

Architectural & Engineering Services
Western Region

Drawing title: / Titre du dessin:

Keno No. 9 System Site #36
Site Assessment
Yukon Territory

designed by: / conçu par:

drawn by: / dessiné par: C.S. Nov. '99

approved by: / approuvé par:

revisions:

project no. / no. du projet: 125-12.01

dwg no. / dessin no. 1 of 1

Photo 36-1 : Keno No.9 Collapsed log timbers mark the location of the No.5-2 Vein Adit. (Azimuth 025°)

Photo 36-2 : Keno No.9 Shamrock J18 Vein Raise Building (36-A). Note collapse of building into failing underground workings and fencing around opening. Also, transformer on power pole in background. (Azimuth 290o).

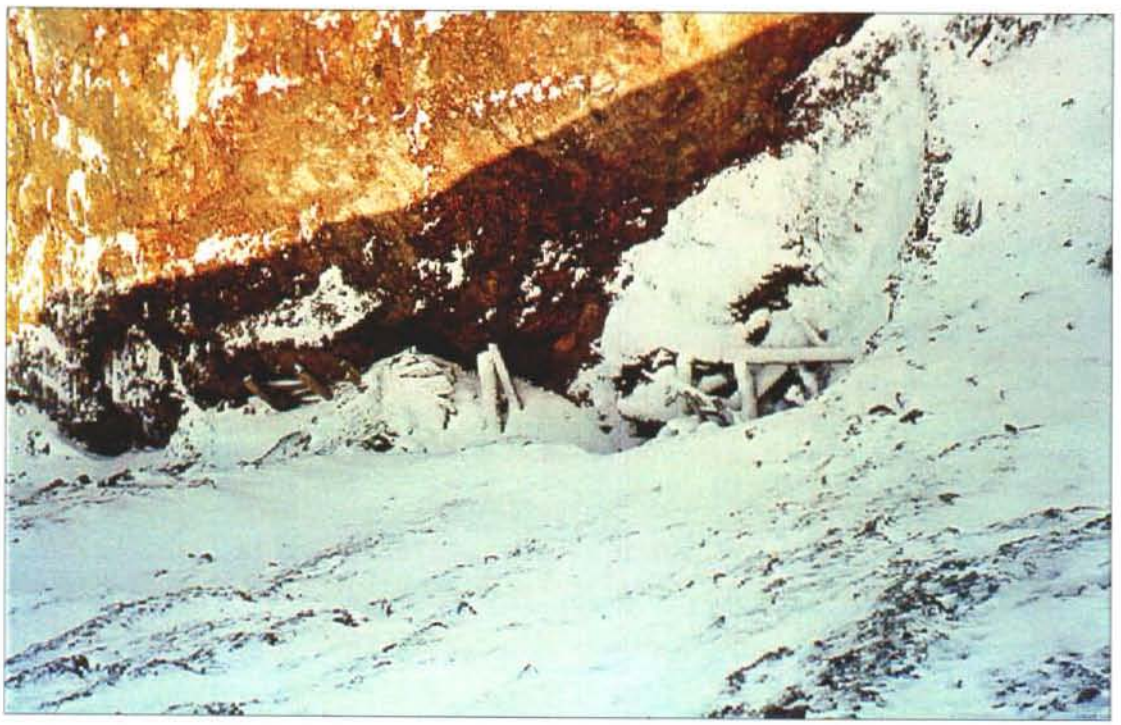


Photo 36-3 : Keno No.9 The log square sets and ladders of the No.3 Vein Adit exposed in the bottom of the No.3 Vein Pit. (Azimuth ~350°)

Photo 36-4 : Keno No.9 Faro Gulch cirque headwall with Faro Gulch Portal / Dump shed visible above person. Cuts along skyline left of person are (from left to right), No. 9 Vein and No.3 Vein Pits. Note waste rock dumps associated with each of the Pits and the Portal. Also note meltwater channels in waste rock from the No.3 and No.9 Vein Pits.

Photo 36-5 : Keno No.9 No.3 Open Pit. Note signpost on the left hand side and two of three ponds present.

Photo 36-6 : Keno No.9 No.9 Vein Open Pit.

Photo 36-7 : Keno No.9 View of Trench L5 located on the No.4 vein. (Azimuth130°)

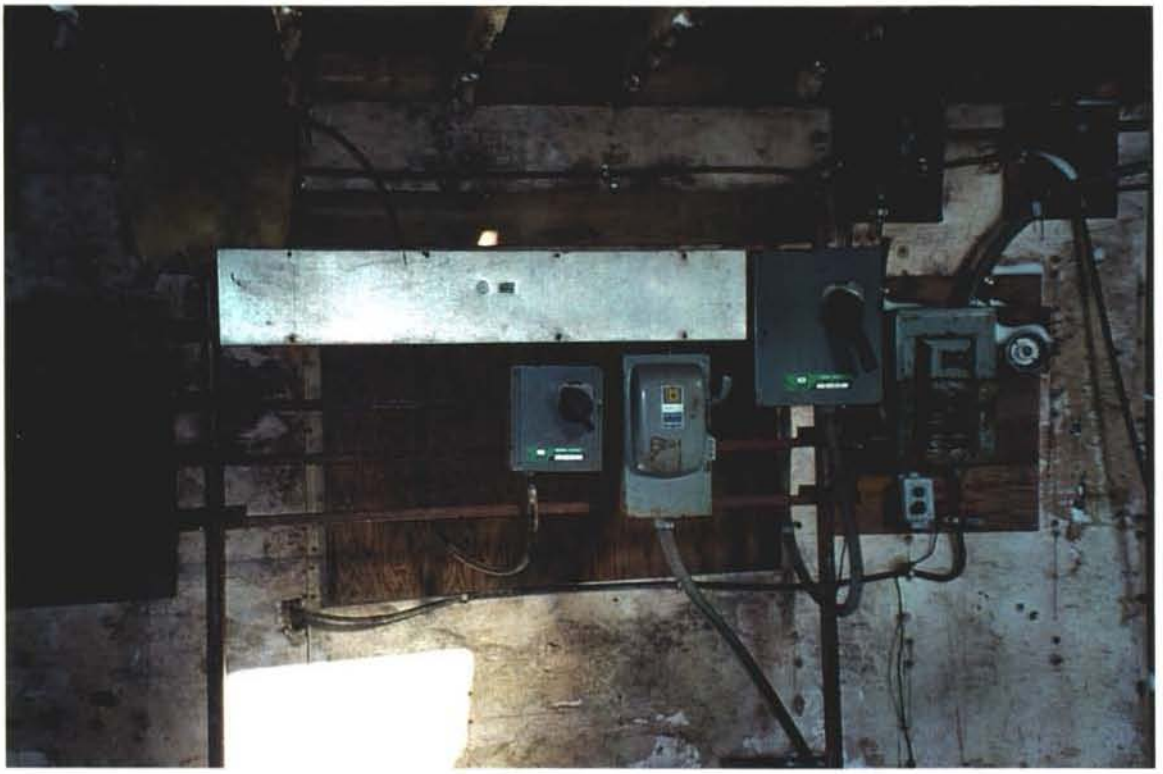


Photo 36-8: Keno No. 9 Electrical panel inside Building 36A.

GOLD HILL NUMBER 2

SITE #37

MINFILE# 105M 001au

1. LOCATION AND ACCESS

Gold Hill Number 2 is located on Keno Hill at an elevation of roughly 5900ft (1800m), 350m west of Monument Hill Summit. Four-wheel drive access is possible via the Monument Hill Trail, which branches off the Silver Basin Gulch Trail about 800m east of the signpost on top of the Keno Hill summit. Approximate UTM co-ordinates for the site are 7 090 400m N and 490 740m E (Latitude 63° 56' 34"N and Longitude 135° 11' 20"W).

2. SITE PHYSIOGRAPHY

Gold Hill Number 2 is on a gentle east-facing slope near the Monument Hill summit. Given the elevation, the area is presumably underlain by permafrost. The site is well above the treeline and the vegetation is dominated by grasses. Surface runoff in the area drains to the north into Faro Gulch, a tributary of Keno Ladue River, located approximately 1km downslope.

3. GEOLOGY AND MINERALIZATION

Most of the trenches are underlain by the Earn Group, a quartz, sericite, chlorite phyllite and carbonaceous phyllite. Three of the trenches had narrow greenstone sills within the Earn Group rocks. Keno Hill Quartzite was observed in one trench and at the discovery shaft. Narrow (<0.10) quartz or quartz-sericite vein faults in place or as near bedrock vein float was seen in six of the twelve trenches. Minor amounts of galena associated with oxidized and fresh siderite was observed in trench #12 and at the Discovery prospect shaft. In trench #10 a 10m section of quartz sericite chlorite phyllite had strong rusty staining. This may represent a weathered vein fault, however no vein material was seen. It probably represents phyllite with above normal amounts of disseminated and fracture pyrite now oxidized to limonite.

4. SITE HISTORY

Exploration work consists of an old shallow shaft, extensive bulldozer trenching and limited diamond drilling undertaken in 1980.

5. MINE DEVELOPMENT

Mine development at the site consists of twelve trenches, one shallow prospecting shaft and associated waste rock piles. No ore was processed at the site and no tailings were encountered. There is no waste water treatment

facility at the site. Site photos can be found in Attachment 1 and laboratory results for sampling are in Attachment 2.

5.1 Mine Openings and Excavations

Gold Hill Number 2/Discovery Shaft (photo 37-1)

At the northeast end, beside the Discovery Showing, of the site is a 1.5m by 1.5m collapsed shaft. Waste and mineralized dump material beside the timbered collapsed discovery shaft suggest it is about 3m deep.

Supports: Log cribbing was used to support the collar of the shaft.

Condition: The log cribbing has rotted and the shaft is collapsed.

Accessibility: The shaft cannot be accessed.

Trenches (photo 37-2)

There are twelve trenches at this site. The trenches are excavated from the Discovery Shaft and to the southwest for roughly a kilometer. The trenches range in size from 15m to 63m in length, 1m to 12m in width and 1m to 8m in depth. The gentle to moderately sloped walls of the trenches do not pose any stability concerns. All of the trenches could be easily accessed.

5.2 Waste Rock Disposal Areas

There is a small waste rock pile of roughly $30m^3$ to the west of the shaft. Fresh fine grained crystalline galena and oxidized sulphides were seen associated with fracture to narrow ponds (<5cm) of fresh and oxidized siderite cutting Keno Hill Quartzite in the prospect shaft dump.

The waste rock piles associated with the trenches are found either at the side or at the end of the trench. The surface composition of the piles consists of primarily overburden and carbonaceous quartz phyllite with minor amounts of quartz veining. None of the trenches had surface or ponded water at the time of the site visit. Strong iron staining in the carbonaceous quartz phyllite was observed in trench #10. A waste rock sample (sample Gold Hill-waste rock) was collected from the trench for laboratory analysis. The field paste pH was 6.8 and the conductivity was 300µS/cm.

6. MINE SITE INFRASTRUCTURE

There are no buildings at the Gold Hill Number 2 site. On the western side of the Monument Hill Trail, there is a 10m x 10m x 2.5m sump (photo 37-3) lined with old style geotextile that was used for holding drill water. A hose leads from the sump to a metal tank at trench #4 (photo 37-4). No other mine site infrastructure was encountered at the site.

7. SOLID WASTE DUMPS

No solid waste dumps were encountered.

8. POTENTIAL CONTAMINANTS OF CONCERN

No hazardous waste was encountered. Potential contaminants of concern include any metals washing from the waste rock piles or the trench walls.

9. WATER QUALITY

There was no water in any of the trenches at the time of the site visit. A lined pond (photo 37-3) is located to the west of the Monument Hill Trail.

10. RECLAMATION

Most of the trenches are overgrown with grass. Some trench walls are still barren of vegetation.

11. REFERENCES

Minfile #105M 001au

ATTACHMENT 2: 1999 GOLD HILL No. 2 WASTE ROCK LABORATORY RESULTS			
Site Number	**Detection Limit**	**Units**	**Gold Hill - Waste Rock - Sept 16/99**
Sample Desciption			Sample from trench #10, from a strongly oxidized carbonaceous quartz phyllite
Paste pH (field)	N/A	pH	6.8
Conductivity (field)	N/A	µS/cm	300
pH in Saturated Paste			
pH	0.1	pH	6.7
pH in Soil (1:2 water)			
pH	0.01	pH	7.1
ICP Semi-Trace Scan			
Aluminum	5	µg/g	21500
Antimony	2	µg/g	6
Arsenic	2	µg/g	71
Barium	0.05	µg/g	1150
Beryllium	0.1	µg/g	0.4
Bismuth	5	µg/g	<5
Cadmium	0.1	µg/g	1.7
Calcium	5	µg/g	1980
Chromium	0.5	µg/g	26.9
Cobalt	0.1	µg/g	41.1
Copper	0.5	µg/g	387
Iron	1	µg/g	36000
Lead	1	µg/g	63
Lithium	0.5	µg/g	41.5
Magnesium	1	µg/g	3860
Manganese	0.5	µg/g	2450
Mercury	0.01	µg/g	0.04
Molybdenum	1	µg/g	5
Nickel	1	µg/g	87.3
Phosphorus	5	µg/g	749
Potassium	20	µg/g	3090
Selenium	2	µg/g	<2
Silicon	5	µg/g	759
Silver	0.5	µg/g	11
Sodium	5	µg/g	478
Strontium	1	µg/g	51
Sulphur	10	µg/g	910
Thorium	1	µg/g	6
Tin	1	µg/g	2
Titanium	0.2	µg/g	125
Uranium	5	µg/g	<5
Vanadium	1	µg/g	31
Zinc	0.5	µg/g	198
Zirconium	0.1	µg/g	26

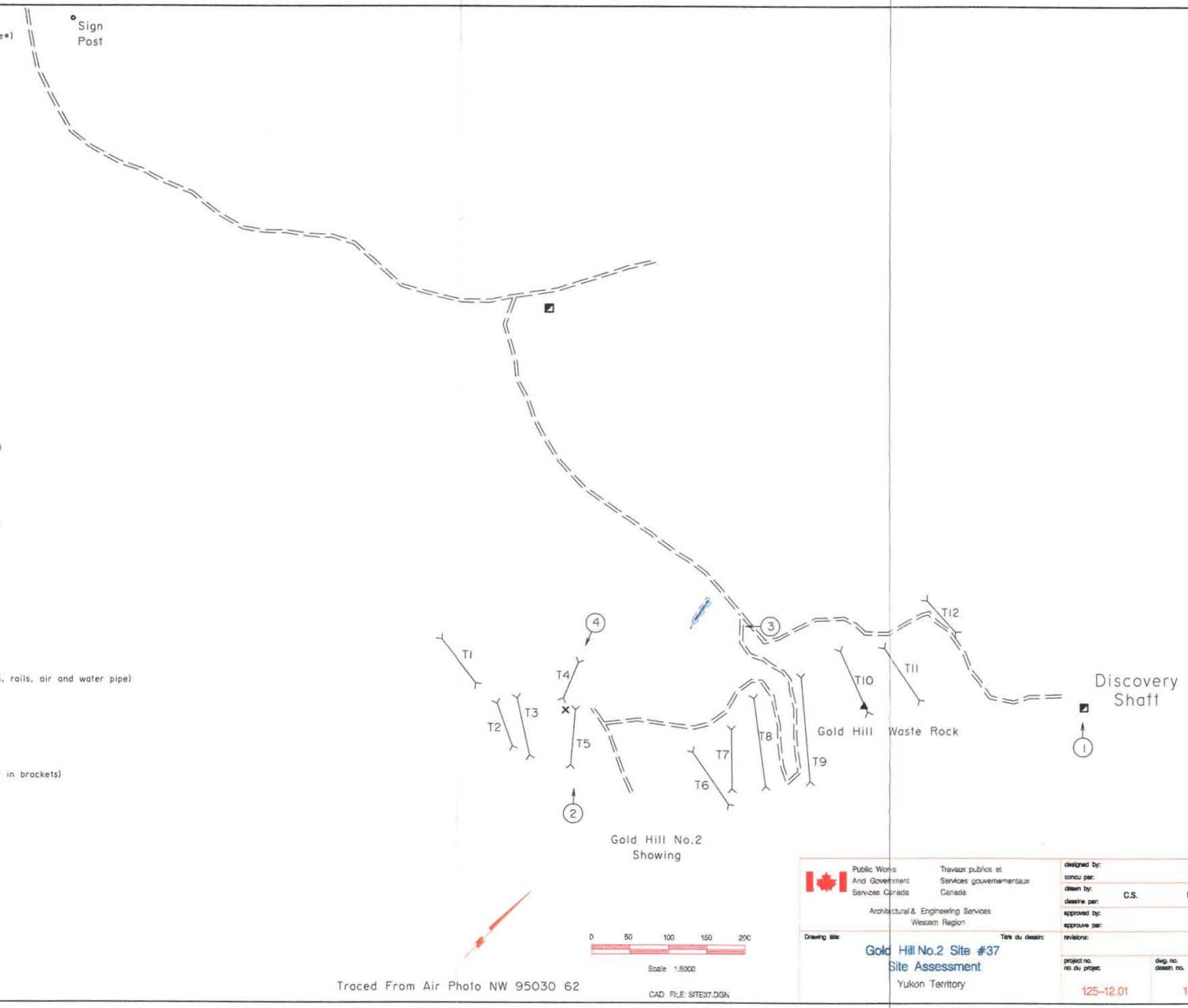
ATTACHMENT 2: 1999 GOLD HILL NUMBER 2 WASTE ROCK LABORATORY RESULTS
MODIFIED SOBEK METHOD ACID-BASE ACCOUNTING TEST

SAMPLE	SITE DESCRIPTION	PASTE pH	S(T) %	S(SO4) %	AP	NP	NET NP	NP/AP
Gold Hill - Waste Rock - Sept.16/99	Sample from trench #10, from a strongly oxidized carbonaceous quartz phyllite	7.5	0.04	0.02	0.6	2.5	1.9	4.0

AP = ACID POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NP = NEUTRALIZATION POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NET NP = NET NEUTRALIZATION POTENTIAL = TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NOTE: WHEN S(T) AND/OR S(SO4) IS REPORTED AS <0.01, IT IS ASSUMED TO BE ZERO FOR THE AP CALCULATION.
N/D = NO DUPLICATE ASSAY. CALCULATIONS ARE BASED ON ASSAY RESULTS OF THE INITIAL SAMPLE.
RE = REPLICATE.

NOTE - A HIGH LEVEL OF SOLUBLE METALS (ESPECIALLY IRON) WERE OBSERVED IN MANY SAMPLES DURING THE ABA TITRATIONS.
SAMPLES WITH A NEGATIVE NET NP SHOULD BE TESTED FOR MOBILE METALS USING STANDARD SHAKE FLASK EXTRACTION TESTS.

- 22A* Building (22A: building site present reference*) Indicates Asbestos Material
- 22A Collapsed Building
- Adit
- Collapsed Adit
- Shaft
- Collapsed/Backfilled Shaft
- Mine Rock Dump
- Bedrock Open Pit
- Trench
- Stripped Overburden Stockpile
- Stripped / Disturbed Area
- Outcrop Boundary
- Highway
- Road (gravel, 2 wheel drive)
- Road (gravel, 4X4 accessible)
- Road (inaccessible)
- Trail
- Culvert
- 24501-01 1999 Soil Sample (this study)
- Pre 1999 Soil Sample (other sources)
- 25WR04-01 1999 Waste Rock Sample (this study)
- Pre 1999 Waste Rock Sample (other sources)
- WO-12-06 1999 Water Sample
- Pre 1999 Water Sample
- Tension Cracks
- Mass Movement (note: for Forms; BelleKeno)
- Groundwater Seep
- Surface Water Flow (Stream, Creek, River)
- Lake
- Settling Pond / Water Treatment Pond
- Tailings Dam / Tailings Pond / Mill Tails
- Ponded Water / Trench
- Barrels
- Abandoned Equipment (compressors, ore cars, rails, air and water pipe)
- Mine Rails / Trestle
- Collapsed Trestle
- Solid Waste Disposal Site
- Area of Soil Contamination
- *(6) Transformer Loaction (number of transformer in brackets)
- Power Line
- Power Line Collapsed
- Aerial Transmission Towers
- (5) Photo Site (arrow shows view direction)
- GPS Survey Location
- Former Building Site (Elsa)



Traced From Air Photo NW 95030 62

CAD FILE: SITE37.DGN

Public Works And Government Services Canada / Travaux publics et Services gouvernementaux Canada

Architectural & Engineering Services
Western Region

Drawing title / Titre du dessin:

Gold Hill No.2 Site #37
Site Assessment
Yukon Territory

designed by: / conçu par:	date /
drawn by: / dessiné par:	C.S. Nov./99
approved by: / approuvé par:	
revisions:	
project no. / no. du projet:	125-12.01
dwg. no. / dessin no.	1 of 1

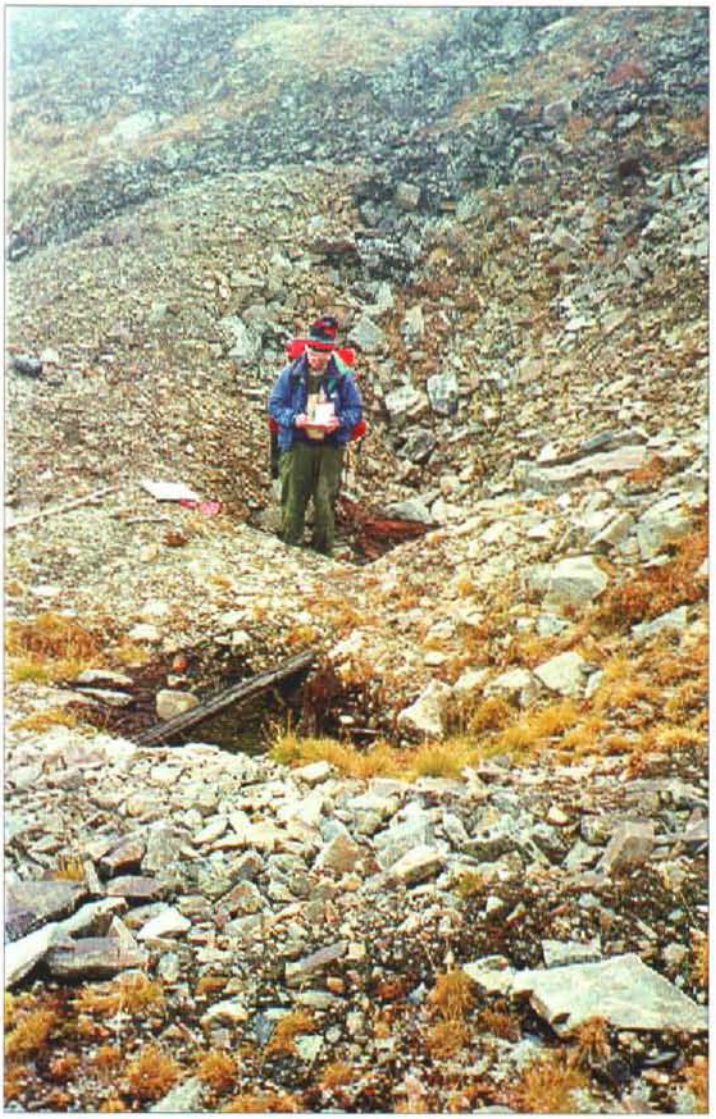


Photo 37-1 : Gold Hill No. 2. View of the Discovery shaft and showing. (Azimuth320°)

Photo 37-2 : Gold Hill No.2. View of Trench #5. (Azimuth340°)

Photo 37-3 : Gold Hill No.2. Lined sump used for holding water for diamond drilling. (Azimuth280°)

Photo 37-4 : Gold Hill No.2. Metal water tank near Trench #4. (Azimuth212°)

FOX

SITE #38

MINFILE#105M 001av

1. LOCATION AND ACCESS

The Fox showing is located on the north side of Keno Hill, approximately 1.5km north-northwest of Monument Hill Summit. Four wheel drive access is possible via the Silver Basin Gulch Trail, approximately 2km from the Keno Hill Signpost. The approximate UTM co-ordinates are 7 091 600m N and 490 650m E (Latitude: 63° 57' 09" N and Longitude: 135° 11'21" W).

2. SITE PHYSIOGRAPHY

The Fox site is situated on a gently sloping knob to the north of Monument Hill. The site is located at 5400ft (1650m), above treeline, and is vegetated with subalpine species, predominantly small shrubs and grasses. Given the altitude, the site is probably underlain by permafrost. Since the site is located on the top of a knob, surface runoff likely drains in three directions: to the west into Faro Gulch, to the north into McKay Gulch and to the east into Silver Basin Gulch. All three gulches are tributaries of the Keno Ladue River.

3. GEOLOGY AND MINERALIZATION

There is vein fault approximately 1m wide and a 2m northeast trending strike length at the north end of Trench #1. The vein fault contains quartz, silicification, minor oxidized siderite as well as pale yellow and black graphitic gouge. Trace amounts of fine-grained crystalline galena are found in siderite filled fractures in the quartzite wallrock of the vein. Wallrock for the vein is a medium banded gray Keno Hill quartzite and limonite. Elsewhere in the trench, Earn Group quartz sericite chlorite and carbonaceous phyllite is exposed. No vein was seen in Trench #2. The trench exposed Keno Hill Quartzite - thin interbanded dark carbonaceous quartzite and quartz carbonaceous phyllite.

4. SITE HISTORY

Three or more shallow prospecting shafts are reported. Only two bulldozer trenches were found at the site. The prospecting shafts were probably remove by the bulldozing.

5. MINE DEVELOPMENT

There are two trenches and associated rock piles at this site. No ore was processed at the site and no tailings were encountered. There is no waste water treatment facility at the site. Site photos can be found in Attachment 1 and laboratory results of the sampling are in Attachment 2.

5.1 Mine Openings and Excavations

Trench #1 (photo 38-1)

Trench 1 is oriented to the north-northwest. There is a 2m quartz vein near the north end. The bottom of the trench is filled with 0.5m of water.

Dimensions (L x W x H): 25m x 4-8 m x 3m

Condition: The trench walls are not steep and appear stable.

Accessibility: The trench is easily accessed.

Trench #2

Trench #2 is located 20m south of trench #1 and is oriented to the east-northeast. This trench is much shallower than trench #1 and was dry at the time of the site visit.

Dimensions (L x W x H): 40m x 1.5-4m x 1m

Condition: The low trench walls pose no stability concerns.

Accessibility: The trench is easily accessed.

5.2 Waste Rock Disposal Areas

Waste Rock was disposed of over a 10m width on both sides of trench #1. The surface material is a mixture of overburden, quartz veining with siderite and graphite gouge material. There was no surface water encountered at the top of the trench however, there is ponded water at the bottom of the trench. A sample of vein material (Fox-waste rock-Sept.18/99) was collected for analysis. The field paste pH was 5.6.

Trench #2 is shallow and mostly in overburden and there no obvious waste rock pile associated it. No surface water was encountered in or near the trench.

6. MINE SITE INFRASTRUCTURE

No buildings or any other mine site infrastructure, such as rail and trestle or electrical equipment, was encountered at this site.

7. SOLID WASTE DUMPS

No solid was dumps were encountered at this site.

8. POTENTIAL CONTAMINANTS OF CONCERN

Four 45-gallon drums were found in trench #1 and three more nearby. All were empty and do not pose any danger of contamination. There were no hazardous products encountered. Potential contaminants of concern include any metals washing from the waste rock piles or from the trench walls.

9. WATER QUALITY

There is a small pond of water measuring 13m in length, 4m wide and averaging 0.5m in depth at the bottom of trench #1. A sample (Fox C1-Fox-15/09/99) was collected for analysis. The field pH was 5.2 and the conductivity was 30μS/cm.

10. RECLAMATION

Very little natural revegetation has occurred in the trenches.

11. REFERENCES AND PERSONAL COMMUNICATIONS

Minfile #105M 001av

ATTACHMENT 2: 1999 FOX WATER SAMPLES LABORATORY RESULTS			
Sample Number	**Detection Limit**	**Units**	**Fox C1 - Fox - 15/09/99**
Site Desciption			Ponded water in trench #2
pH (field)	N/A	pH	5.2
Conductivity (field)	N/A	µS/cm	30
pH (Lab)	0.01	pH	6.76
Conductivity (Lab)	0.01	µS/cm	37
Total Alkalinity	5	mg CaCO3/L	8
Chloride	0.25	mg/L	<0.25
Hardness (CaCO3 equiv)	5	mg/L	na
Nitrate-N	0.05	mg/L	0.1
Nitrite-N	0.003	mg/L	<0.003
Sulphate	0.5	mg/L	7.3
Total Dissolved Solids	5	mg/L	23
Analysis by ICP-USN			
Aluminum	0.0008	mg/L	0.167
Antimony	0.005	mg/L	<0.005
Arsenic	0.01	mg/L	<0.01
Barium	0.00004	mg/L	0.0471
Beryllium	0.00001	mg/L	<0.00001
Bismuth	0.0004	mg/L	<0.0004
Boron	0.002	mg/L	<0.002
Cadmium	0.00006	mg/L	0.00038
Calcium	0.002	mg/L	3.19
Chromium	0.00006	mg/L	0.00047
Cobalt	0.00003	mg/L	<0.00003
Copper	0.00003	mg/L	0.00046
Iron	0.00001	mg/L	0.172
Lead	0.0003	mg/L	0.0176
Lithium	0.001	mg/L	<0.001
Magnesium	0.0005	mg/L	1.21
Manganese	0.00002	mg/L	0.0108
Mercury	0.0001	mg/L	<0.0001
Molybdenum	0.00007	mg/L	<0.00007
Nickel	0.00001	mg/L	<0.00001
Phosphorus	0.03	mg/L	<0.03
Potassium	0.4	mg/L	<0.4
Selenium	0.004	mg/L	<0.004
Silicon	0.004	mg/L	2.29
Silver	0.00005	mg/L	0.00019
Sodium	0.004	mg/L	1
Strontium	0.00002	mg/L	0.0267
Sulphur	0.008	mg/L	2.61
Thallium	0.001	mg/L	<0.001
Titanium	0.00002	mg/L	0.00349
Vanadium	0.00003	mg/L	0.00033
Zinc	0.0002	mg/L	0.0195
Zirconium	0.00004	mg/L	
Analysis by Hydride AA			
Arsenic	0.0002	mg/L	0.002
Selenium	0.0001	mg/L	0.0004

ATTACHMENT 2: 1999 FOX WASTE ROCK LABORATORY RESULTS			
Site Number	**Detection Limit**	**Units**	**Fox - Waste Rock - Sept 18/99**
Sample Desciption			Vein material at the north end of trench #1
Paste pH (field)	N/A	pH	5.6
Conductivity (field)	N/A	µS/cm	-
pH in Saturated Paste			
pH	0.1	pH	5.3
pH in Soil (1:2 water)			
pH	0.01	pH	5.4
ICP Semi-Trace Scan			
Aluminum.	5	µg/g	41300
Antimony	2	µg/g	103
Arsenic	2	µg/g	1000
Barium	0.05	µg/g	839
Beryllium	0.1	µg/g	1
Bismuth	5	µg/g	<5
Cadmium	0.1	µg/g	3
Calcium	5	µg/g	480
Chromium	0.5	µg/g	32.1
Cobalt	0.1	µg/g	1.3
Copper	0.5	µg/g	188
Iron	1	µg/g	45000
Lead	1	µg/g	23300
Lithium	0.5	µg/g	58.1
Magnesium	1	µg/g	1100
Manganese	0.5	µg/g	351
Mercury	0.01	µg/g	4.3
Molybdenum	1	µg/g	2
Nickel	1	µg/g	7.1
Phosphorus	5	µg/g	858
Potassium	20	µg/g	13400
Selenium	2	µg/g	<2
Silicon	5	µg/g	139
Silver	0.5	µg/g	107
Sodium	5	µg/g	493
Strontium	1	µg/g	28
Sulphur	10	µg/g	3570
Thorium	1	µg/g	3
Tin	1	µg/g	16
Titanium	0.2	µg/g	91.7
Uranium	5	µg/g	<5
Vanadium	1	µg/g	49
Zinc	0.5	µg/g	900
Zirconium	0.1	µg/g	28.1

ATTACHMENT 2: 1999 FOX WASTE ROCK LABORATORY RESULTS
MODIFIED SOBEK METHOD ACID-BASE ACCOUNTING TEST

SAMPLE	SITE DESCRIPTION	PASTE pH	S(T) %	S(SO4) %	AP	NP	NET NP	NP/AP
Fox - Waste Rock - Sept.18/99	Vein material at the north end of trench #1	6.0	0.24	0.19	1.6	-1.5	-3.1	<0.1
Fox - Waste Rock - Sept.18/99 RE	Laboratory duplicate	-	0.22	0.18	1.3	-	-	-

AP = ACID POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NP = NEUTRALIZATION POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NET NP = NET NEUTRALIZATION POTENTIAL = TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NOTE: WHEN S(T) AND/OR S(SO4) IS REPORTED AS <0.01, IT IS ASSUMED TO BE ZERO FOR THE AP CALCULATION.
N/D = NO DUPLICATE ASSAY. CALCULATIONS ARE BASED ON ASSAY RESULTS OF THE INITIAL SAMPLE.
RE = REPLICATE.

NOTE - A HIGH LEVEL OF SOLUBLE METALS (ESPECIALLY IRON) WERE OBSERVED IN MANY SAMPLES DURING THE ABA TITRATIONS.
SAMPLES WITH A NEGATIVE NET NP SHOULD BE TESTED FOR MOBILE METALS USING STANDARD SHAKE FLASK EXTRACTION TESTS.

Photo 38-1 : Fox. Water ponded at the base of Trench #1. (Azimuth 020°)

CARIBOU and ALICE

SITE #39

MINFILE# 105M 001ax, aw (105M 062)

1. LOCATION AND ACCESS

The main Caribou showing is approximately 250m southwest of the Caribou Hill summit. The Alice showing is located in the steep walled cirque immediately west of Caribou Hill summit. Access is by the 5.5 km Hope Gulch Trail (possibly suitable for 4x4 vehicles) which leaves the Lightning Creek Road near the mouth of Hope Gulch. The approximate UTM co-ordinates are 7 090 700 m N and 492 900m E (Latitude: 63° 56' 40" N and Longitude: 135° 08' 54" W).

2. SITE PHYSIOGRAPHY

The site is located on a moderate southwest-facing slope, at an elevation of 5800ft (1770m). The site is well above treeline, in alpine tundra terrain with characteristic thin soils, talus, grass and moss. Surface runoff from the site drains 700m to the south into Faith Gulch, a tributary of the Keno Ladue River. Given the elevation and the presence of frost heaved bedrock, the site is presumably underlain by permafrost.

3. GEOLOGY AND MINERALIZATION

The bulldozer trench east of Caribou Hill summit cut a poorly exposed, irregular, approximately 1m wide vein fault containing up to 0.3m wide pods of vein quartz. The vein fault is hosted by thin interbands of carbonaceous phyllite and Keno Hill Quartzite.

The stripping west of Caribou Hill summit exposed a vein fault containing up to 2m wide siderite at the south end and decreasing to <0.3m wide at the rim cirque rim on the north side. Most of the siderite was heavily oxidized, however, occasionally fresh siderite was seen where it sometimes had miner fine tetrahedrite. The wallrock for the vein was think (<0.15m) interbanded, gray phyllite carbonaceous phyllite and Keno Hill quartzite. This vein in this trench is probably the same, or parallel to the vein fault seen in the main Caribou showing.

The main Caribou showing has exposed a vein fault for over 100m in strike length. The vein fault is narrow (<0.10m) to poorly developed at the north end as well as the south end where it splits into two separate diverging veins. Approximately at the middle of the trench, the vein takes an abrupt change in strike and the vein fault has a 2m wide band of oxidized siderite. The narrow vein faults have pods of oxidized siderite. In places, fresh siderite is seen and miner fine disseminated tetrahedrite and galena is on occasion present. The wallrock for the vein fault is thin to medium banded Keno Hill Quartzite and minor carbonaceous phyllite.

The Yukon Mine file reports that lenses of galena, tetrahedrite and sphalerite occur in the vein. No sphalerite was seen in our visit.

4. SITE HISTORY

Between 1920 and 1928 a 13.7m adit and 40.2m of drifting were excavated. During this period, 78.9 tonnes of ore grading 6103 g/t silver and 70% lead was hand mined and shipped from the Caribou Showing. In 1952, a second adit, 8.2m in length, and some bulldozer trenching were excavated. Further bulldozer trenching on a vein was undertaken in 1986.

5. MINE DEVELOPMENT

The Alice adit could not be located. It has probably collapsed and been buried by slide rock from the steep walled cirque. Bulldozer trenching at the Caribou showing and the Caribou Adit were examined. No ore was processed at the site and no tailings were encountered. There is no mine wastewater treatment facility at this site. Site details can be found on Figure 1; site photos are located in Attachment 1 and laboratory results for sampling are in Attachment 2.

5.1 Mine Openings and Excavations

Caribou Adit (photo 39-1)

Surface stripping has exposed part of the adit, at least 10m from the portal. The support structure at the portal of the adit has likely been buried by the bulldozer trenching. The dimensions of the adit could not be determined. There is no evidence of the adit collapsing, however it is difficult to determine since the area around the adit has been extensively worked. The adit cannot be accessed.

Trenches (photo 39-2)

There were four trenches examined. Trench #1 is a single about 65m in length, bulldozer trench located at the rim of the cirque, 50 m east of Caribou Hill summit. Trench #2 is a 30m by 40m area at the rim of the cirque, approximately 100m west of Caribou Hill summit, where the bulldozer has stripped to expose bedrock. There are two trenches near the Caribou Adit. Trench #3 is 67m in length, 4-13m in width and up to 8m high. At the south end of the Trench #3 is Trench #4, measuring 33m in length and 3m wide, which was filled with ponded water at the time of the site visit.

5.2 Waste Rock Disposal Areas

Waste rock from Trenches #1 and #2, and possibly the Alice Adit, was pushed into the Caribou cirque. The volume and composition is unknown. The waste rock from Trenches #3 and #4, and from the adit is located on either side of Trench #3. The waste rock is composed of Keno Hill Quartzite, carbonaceous phyllite and siderite veining with minor fine disseminated tetrahedrite and galena. The waste rock on the west side of the trench is

70m long and up to 30m wide and 8m high. The waste rock on the east side of the trench is 65m long, up to 15m in width and 8m high. Some oxidation in the siderite was observed. A waste rock sample (Site #39-Waste Rock-Sept.14/99) was collected from the southern end of the western pile beside Trench #3. The field paste pH was 6.2 and the conductivity was 30μ S/cm.

6. MINE SITE INFRASTRUCTURE

No mine site infrastructure including buildings, rail and trestle, fuel storage areas and electrical equipment was encountered.

7. SOLID WASTE DUMPS

There were no solid waste dumps observed at this site.

8. POTENTIAL CONTAMINANTS OF CONCERN

No hazardous waste was encountered at the site. Potential contaminants of concern include any metals washing from the trench walls.

9. WATER QUALITY

There is ponded water at the base of Trench #4. A water sample (Site #39-Sample 1-Caribou 13/09/99) was collected for analysis. The field pH was 6.2 and the conductivity was 50μS/cm. No other surface water was encountered at the site.

10. RECLAMATION

Due to the high elevation and sparse vegetation, no revegetation of the disturbed areas has occurred.

11. REFERENCES AND PERSONAL COMMUNICATIONS

Minfile #105M 001aw,x

ATTACHMENT 2: 1999 CARIBOU WATER SAMPLES LABORATORY RESULTS			
Sample Number	**Detection Limit**	**Units**	**Site 39 Sample 1 - Caribou - 13/09/99**
Site Desciption			Collected from ponded water at the eastern end of Trench #4
pH (field)	N/A	pH	6.2
Conductivity (field)	N/A	µS/cm	50
pH (Lab)	0.01	pH	5.87
Conductivity (Lab)	0.01	µS/cm	63
Total Alkalinity	5	mg CaCO3/L	<5
Chloride	0.25	mg/L	<0.25
Hardness (CaCO3 equiv)	5	mg/L	20.7
Nitrate-N	0.05	mg/L	1.14
Nitrite-N	0.003	mg/L	<0.003
Sulphate	0.5	mg/L	18.3
Total Dissolved Solids	5	mg/L	35
Analysis by ICP-USN			
Aluminum	0.0008	mg/L	15
Antimony	0.005	mg/L	0.09
Arsenic	0.01	mg/L	0.29
Barium	0.00004	mg/L	0.26
Beryllium	0.00001	mg/L	0.00046
Bismuth	0.0004	mg/L	<0.0004
Boron	0.002	mg/L	0.011
Cadmium	0.00006	mg/L	0.0448
Calcium	0.002	mg/L	8.82
Chromium	0.00006	mg/L	0.0233
Cobalt	0.00003	mg/L	0.0162
Copper	0.00003	mg/L	0.0678
Iron	0.00001	mg/L	24.5
Lead	0.0003	mg/L	6.24
Lithium	0.001	mg/L	0.017
Magnesium	0.0005	mg/L	6.66
Manganese	0.00002	mg/L	3.62
Mercury	0.0001	mg/L	0.0001
Molybdenum	0.00007	mg/L	0.00056
Nickel	0.00001	mg/L	0.0388
Phosphorus	0.03	mg/L	2.23
Potassium	0.4	mg/L	1.6
Selenium	0.004	mg/L	<0.004
Silicon	0.004	mg/L	15.3
Silver	0.00005	mg/L	0.0779
Sodium	0.004	mg/L	1
Strontium	0.00002	mg/L	0.0861
Sulphur	0.008	mg/L	7.6
Thallium	0.001	mg/L	0.003
Titanium	0.00002	mg/L	0.604
Vanadium	0.00003	mg/L	0.0343
Zinc	0.0002	mg/L	1.78
Analysis by Hydride AA			
Arsenic	0.0002	mg/L	0.54
Selenium	0.0001	mg/L	0.0022

ATTACHMENT 2: 1999 CARIBOU WASTE ROCK LABORATORY RESULTS			
Site Number	**Detection Limit**	**Units**	**Caribou #39 - Waste Rock - Sept 14/99**
Sample Desciption			Collected from the waste rock pile on the west side of Trench #3, at the southern end.
Paste pH (field)	N/A	pH	6.2
Conductivity (field)	N/A	µS/cm	30
pH in Saturated Paste			
pH	0.1	pH	5.6
pH in Soil (1:2 water)			
pH	0.01	pH	6.4
ICP Semi-Trace Scan			
Aluminum	5	µg/g	13900
Antimony	2	µg/g	79
Arsenic	2	µg/g	169
Barium	0.05	µg/g	211
Beryllium	0.1	µg/g	0.4
Bismuth	5	µg/g	<5
Cadmium	0.1	µg/g	8.6
Calcium	5	µg/g	2150
Chromium	0.5	µg/g	21.1
Cobalt	0.1	µg/g	7.2
Copper	0.5	µg/g	62.1
Iron	1	µg/g	28000
Lead	1	µg/g	3210
Lithium	0.5	µg/g	12.5
Magnesium	1	µg/g	2780
Manganese	0.5	µg/g	3160
Mercury	0.01	µg/g	0.21
Molybdenum	1	µg/g	1
Nickel	1	µg/g	23.2
Phosphorus	5	µg/g	649
Potassium	20	µg/g	2850
Selenium	2	µg/g	<2
Silicon	5	µg/g	4010
Silver	0.5	µg/g	27.2
Sodium	5	µg/g	1420
Strontium	1	µg/g	43
Sulphur	10	µg/g	290
Thorium	1	µg/g	4
Tin	1	µg/g	7
Titanium	0.2	µg/g	367
Uranium	5	µg/g	<5
Vanadium	1	µg/g	35
Zinc	0.5	µg/g	520
Zirconium	0.1	µg/g	22.1

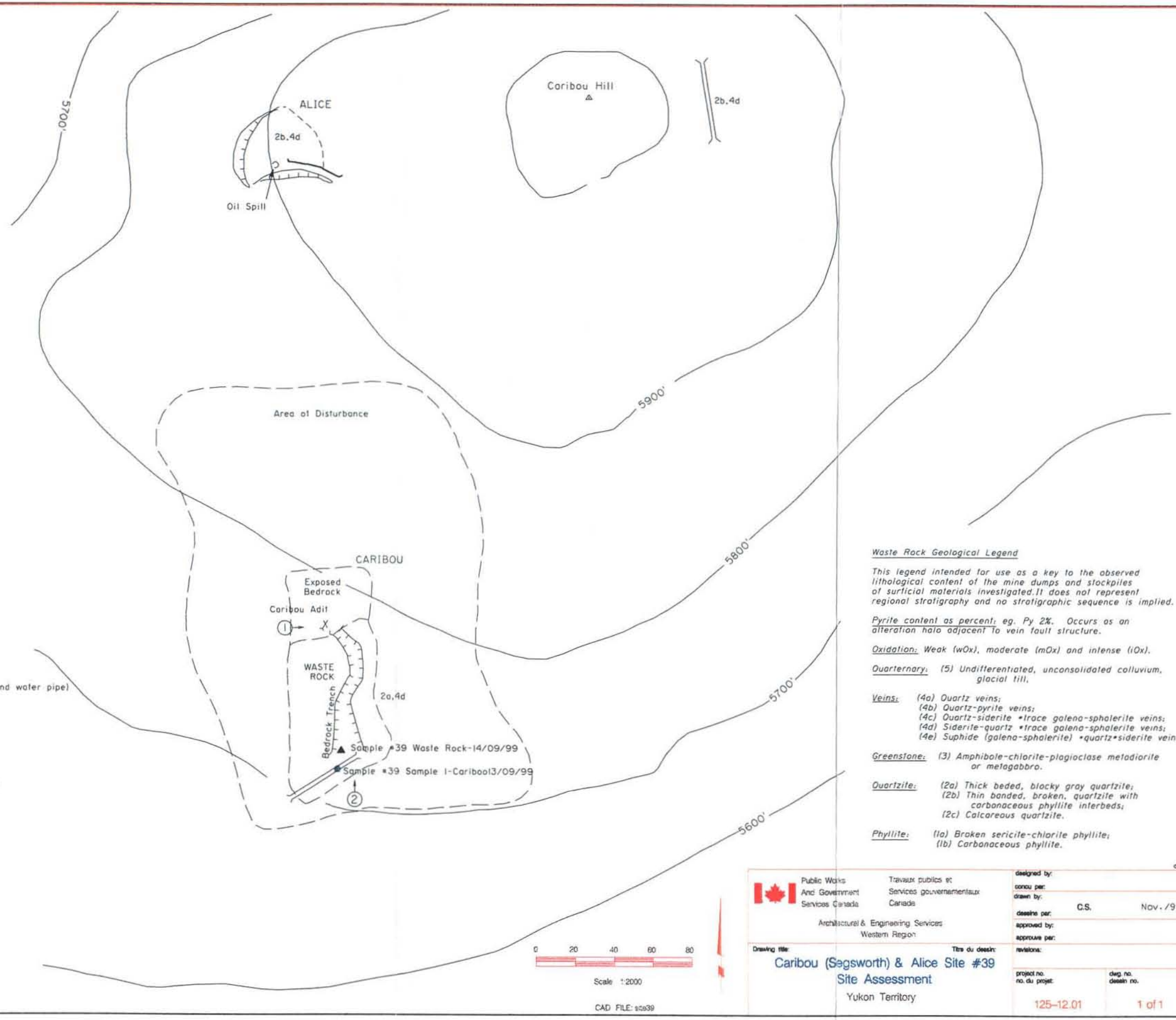
ATTACHMENT 2: 1999 CARIBOU WASTE ROCK LABORATORY RESULTS
MODIFIED SOBEK METHOD ACID-BASE ACCOUNTING TEST

SAMPLE	SITE DESCRIPTION	PASTE pH	S(T) %	S(SO4) %	AP	NP	NET NP	NP/AP
Caribou #39 - Waste Rock - Sept.14/99	Collected from the waste rock pile on the west side of Trench #3, at the southern end.	6.7	<0.01	<0.01	0.0	0.8	0.8	~~~

AP = ACID POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NP = NEUTRALIZATION POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NET NP = NET NEUTRALIZATION POTENTIAL = TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NOTE: WHEN S(T) AND/OR S(SO4) IS REPORTED AS <0.01, IT IS ASSUMED TO BE ZERO FOR THE AP CALCULATION.
N/D = NO DUPLICATE ASSAY. CALCULATIONS ARE BASED ON ASSAY RESULTS OF THE INITIAL SAMPLE.
RE = REPLICATE.

NOTE - A HIGH LEVEL OF SOLUBLE METALS (ESPECIALLY IRON) WERE OBSERVED IN MANY SAMPLES DURING THE ABA TITRATIONS.
SAMPLES WITH A NEGATIVE NET NP SHOULD BE TESTED FOR MOBILE METALS USING STANDARD SHAKE FLASK EXTRACTION TESTS.

- Building (22A: building site present reference*) Indicates Asbestos Material
- 22A Collapsed Building
- Adit
- Collapsed Adit
- Shaft
- Collapsed/Backfilled Shaft
- Mine Rock Dump
- Bedrock Open Pit
- Trench
- Stripped Overburden Stockpile
- Stripped / Disturbed Area
- Outcrop Boundary
- Highway
- Road (gravel, 2 wheel drive)
- Road (gravel, 4X4 accessible)
- Road (inaccessible)
- Trail
- Culvert
- 24501-01 1999 Soil Sample (this study)
- Pre 1999 Soil Sample (other sources)
- 25WR04-01 1999 Waste Rock Sample (this study)
- Pre 1999 Waste Rock Sample (other sources)
- WQ-12-06 1999 Water Sample
- Pre 1999 Water Sample
- Tension Cracks
- Mass Movement (note: for Forms: BelleKeno)
- Groundwater Seep
- Surface Water Flow (Stream, Creek, River)
- Lake
- Settling Pond / Water Treatment Pond
- Tailings Dam / Tailings Pond / Mill Tails
- Ponded Water / Trench
- Barrels
- Abandoned Equipment (compressors, ore cars, rails, air and water pipe)
- Mine Rails / Trestle
- Collapsed Trestle
- Solid Waste Disposal Site
- Area of Soil Contamination
- *(6) Transformer Loaction (number of transformer in brackets)
- Power Line
- Power Line Collapsed
- Aerial Transmission Towers
- 5 Photo Site (arrow shows view direction)
- GPS Survey Location
- Former Building Site (Elsa)



Waste Rock Geological Legend

This legend intended for use as a key to the observed lithological content of the mine dumps and stockpiles of surficial materials investigated. It does not represent regional stratigraphy and no stratigraphic sequence is implied.

Pyrite content as percent: eg. Py 2%. Occurs as an alteration halo adjacent to vein fault structure.

Oxidation: Weak (wOx), moderate (mOx) and intense (iOx).

Quarternary: (5) Undifferentiated, unconsolidated colluvium, glacial till.

Veins: (4a) Quartz veins;
(4b) Quartz-pyrite veins;
(4c) Quartz-siderite ±trace galena-sphalerite veins;
(4d) Siderite-quartz ±trace galena-sphalerite veins;
(4e) Suphide (galena-sphalerite) ±quartz±siderite veins.

Greenstone: (3) Amphibole-chlorite-plagioclase metadiorite or metagabbro.

Quartzite: (2a) Thick beded, blocky gray quartzite;
(2b) Thin banded, broken, quartzite with carbonaceous phyllite interbeds;
(2c) Calcareous quartzite.

Phyllite: (1a) Broken sericite-chlorite phyllite;
(1b) Carbonaceous phyllite.

Public Works And Government Services Canada
Travaux publics et Services gouvernementaux Canada
Architectural & Engineering Services Western Region

Drawing title: Titre du dessin:
Caribou (Segsworth) & Alice Site #39 Site Assessment
Yukon Territory

designed by:	
concu par:	
drawn by:	C.S. Nov./99
dessine par:	
approved by:	
approuve par:	
revisions:	
project no. no. du projet:	125-12.01
dwg. no. dessin no.	1 of 1

Photo 39-1 : Caribou. Caribou adit; portal exposed by bedrock striping. (Azimuth 080 ^{o})

Photo 39-2 : Caribou. View of bedrock trench at Caribou. Note empty plastic pails and water sample site in foreground. (Azimuth ~000 ^{o})

DIVIDE

SITE #40

MINFILE# 105m 001ay

1. LOCATION AND ACCESS

The Divide site is located on the south side of Keno Hill, between Hope and Faith Gulches, approximately 1.5km southwest of Caribou Hill. Access is by a 5km trail (possibly suitable for 4x4 vehicles) that leaves the Lightning Creek Road near the mouth of Hope Gulch. The approximate UTM co-ordinates for Zone 'A' are 7 089 800m N and 492 300m E, for Zone 'B' are 7 089 700m N and 492 750m E, and for Zone 'C' are 7 089 900m N and 493 700m E (Latitude: 63° 57' 15" N and Longitude: 135° 09' 16" W)

2. SITE PHYSIOGRAPHY

The area is located at an elevation of roughly 5300ft (1620m) on a flat to gently rolling plateau to the south of Caribou Hill and Monument Hill. Surface runoff from the site either flows into Hope Gulch or into Faith Gulch. Surface runoff from the stripped areas in the northwest (Zone 'A') flow westward into Hope Gulch, a tributary of Lightening Creek. Surface runoff from the stripped areas in the southeast (Zones 'B' and 'C') flow eastward into Faith Gulch, which eventually joins the Keno Ladue River system. The plateau is above treeline and the vegetation is predominately moss and grasses.

3. GEOLOGY AND MINERALIZATION

The bulldozer trenching was examined in three areas, which for this report will be classified as zones 'A', 'B' and 'C'.

(1) Zone 'A': At the northeast end of zone, four trenches exposed a vein fault, over a 90m strike length. The vein fault, from 0.3m to 1.0m in width, generally had quartz and weak oxidized siderite. No metallic mineralization was seen. The wallrock for the vein fault is Earn Group quartz sericite chlorite and carbonaceous phyllite.

(2) Zone 'B': At the northeast end of the zone, four trenches exposed a vein fault, 0.2m to 1.0m wide, over a 200m strike length. The vein fault had either quartz or oxidized siderite and quartz gangue. Wallrock for this zone is the same as Zone 'A'. No metallic mineralization was seen..

(3) Zone 'C': This long and wide trench has greenstone at the uphill end. Below the greenstone near bedrock float of dark gray Keno Hill Quartzite is seen. No bedrock or float vein fault material was seen.

Bedrock for the Divide trenches is the Earn Group, a quartz-sericite-chlorite phyllite and subordinate carbonaceous phyllite. The phyllites contain up to 3% disseminated and transported limonite along the foliation

and fractures. The veins exposed in some of the trenches are up to a meter wide, generally less than 0.3m and are either quartz with minor oxidized manganiferous siderite or predominately oxidized siderite. No sulphides were observed. The large trench to the southeast (zone 'C') had greenstone and dark carbonaceous Keno Hill Quartzite.

4. SITE HISTORY

Extensive stripping and bulldozer trenching in the area was undertaken prior to 1962.

5. MINE DEVELOPMENT

The area has been extensively stripped and trenched. No ore was processed at the site and no tailings were encountered. There is no wastewater treatment facility at the site.

5.1 Mine Openings and Excavations (photo 40-1)

Bulldozer trenches were examined in three areas, which for this report are referred to as Zones 'A', 'B' and 'C'. Zone 'B' is sub-parallel and approximately 300m south of Zone 'A'. Zone 'C', consisting of a single trench, is located approximately 600m east of Zone 'B'. A total of 17 trenches were observed.

Zone 'A'

There are 9 trenches in zone 'A' all aligned roughly northwest-southeast. The westernmost trench is roughly 100m east of the headwaters to Hope Gulch. The trenches are about 2m in width, 1 to 2.5m in depth and range from 8m to 53m in length. The wallrock in most of the trenches in this zone is phyllite with quartz veining and localized siderite. Minor oxidation staining was observed in the exposed veins. One trench was in overburden. A water sample (Site 40-Divide-trench) was collected from ponded water in trench A3.

Zone 'B' (photo 40-2, 40-3)

There are 13 trenches in zone 'B'. The trenches vary in width from 1 to 4m, in height from 1 to 2.5m and in length from 8 to 100m. All of the trenches were excavated in phyllite containing minor amounts of siderite and quartz veining. Trenches B7 to B10 had ponded water at the bottom.

Zone 'C'

There is one large trench in zone 'C'. It measures 100m in length, 20m wide and 1 to 3m deep.

5.2 Waste Rock Disposal Areas

There are small piles of waste rock comprised of overburden and some bedrock that are deposited to the sides and ends of the trenches. Most of the piles are overgrown with grasses. A sample (Divide-Waste Rock-Sept.14/99) of the wallrock in trench B6 was collected for analysis.

6. MINE SITE INFRASTRUCTURE

There is one building and some scattered fuel drums in the area. No mine site infrastructure such as electrical equipment, rail or trestle was observed.

6.1 Building 40A (photo 40-3)

There is a small wood frame building with a corrugated tin roof located near zone 'A' and roughly 250m east of the headwaters to Hope Gulch. The building has a large wooden cross attached to the top of the roof.

Dimensions (L x W x H): 6m x 6m x 8m

Location: [map/describe]

Paint: none observed

Asbestos: none observed

Foundation: none

Non-Hazardous Contents: none observed

Hazardous Contents: none observed

6.2 Fuel Storage

There were 6 empty fuel drums encountered around Building 40A. One capped 45-gallon drum approximately one quarter full of diesel was encountered in trench B10.

7. SOLID WASTE DUMPS

There were no solid waste dumps observed at this site.

8. POTENTIAL CONTAMINANTS OF CONCERN

There were no hazardous products encountered at this site. Potential contaminants of concern include any metals washing from the trench walls or waste rock piles.

9. WATER QUALITY

Two water samples were collected for analysis. One sample (Site 40-Divide-Trench-Divide) was collected from some ponded water at the bottom of trench A4. The field pH was 7.4 and the conductivity was 10μS/cm. A second sample (Hope-WS-1-13/09/99) was collected from Hope Gulch, 150m downstream from the western edge of Zone 'A' trenching. The field pH was 7.3 and the conductivity was 40μS/cm.

10. RECLAMATION

Almost all of the trenches are at least partially overgrown with grasses and moss.

11. REFERENCES AND PERSONAL COMMUNICATIONS

Minfile #105M 001ay

ATTACHMENT 2: 1999 DIVIDE WATER SAMPLES LABORATORY RESULTS				
Sample Number	**Detection Limit**	**Units**	**Site 40-Divide Trench - Divide - 14/09/99**	**Hope-WS-1 - 13/09/99**
Site Desciption			Collected from some ponded water at the bottom of trench A4.	Collected from Hope Gulch, 150m downstream of the western edge of Zone 'A' trenching.
pH (field)	N/A	pH	7.4	7.3
Conductivity (field)	N/A	µS/cm	10	40
pH (Lab)	0.01	pH	6.69	7.72
Conductivity (Lab)	0.01	µS/cm	53	240
Total Alkalinity	5	mg CaCO3/L	14	43
Chloride	0.25	mg/L	<0.25	<0.25
Hardness (CaCO3 equiv)	5	mg/L	22.7	109
Nitrate-N	0.05	mg/L	0.06	0.16
Nitrite-N	0.003	mg/L	<0.003	<0.003
Sulphate	0.5	mg/L	12.6	68.6
Total Dissolved Solids	5	mg/L	27	152
Analysis by ICP-USN				
Aluminum	0.0008	mg/L	0.0158	0.0176
Antimony	0.005	mg/L	<0.005	<0.005
Arsenic	0.01	mg/L	<0.01	<0.01
Barium	0.00004	mg/L	0.104	0.0455
Beryllium	0.00001	mg/L	<0.00001	<0.00001
Bismuth	0.0004	mg/L	<0.0004	<0.0004
Boron	0.002	mg/L	<0.002	<0.002
Cadmium	0.00006	mg/L	0.00012	0.0038
Calcium	0.002	mg/L	1.28	33.2
Chromium	0.00006	mg/L	<0.00006	0.00029
Cobalt	0.00003	mg/L	<0.00003	<0.00003
Copper	0.00003	mg/L	<0.00003	0.0016
Iron	0.00001	mg/L	0.026	0.005
Lead	0.0003	mg/L	0.0009	0.0021
Lithium	0.001	mg/L	<0.001	0.005
Magnesium	0.0005	mg/L	0.596	5.65
Manganese	0.00002	mg/L	0.00497	0.00072
Mercury	0.0001	mg/L	<0.0001	<0.0001
Molybdenum	0.00007	mg/L	<0.00007	0.00028
Nickel	0.00001	mg/L	<0.00001	0.0473
Phosphorus	0.03	mg/L	<0.03	<0.03
Potassium	0.4	mg/L	<0.4	<0.4
Selenium	0.004	mg/L	<0.004	<0.004
Silicon	0.004	mg/L	2.72	2.31
Silver	0.00005	mg/L	<0.00005	<0.00005
Sodium	0.004	mg/L	0.7	0.8
Strontium	0.00002	mg/L	0.0152	0.103
Sulphur	0.008	mg/L	1.49	22.3
Thallium	0.001	mg/L	<0.001	<0.001
Titanium	0.00002	mg/L	0.00029	<0.00002
Vanadium	0.00003	mg/L	<0.00003	<0.00003
Zinc	0.0002	mg/L	0.007	0.25
Analysis by Hydride AA				
Arsenic	0.0002	mg/L	0.0068	0.0051
Selenium	0.0001	mg/L	<0.0001	0.0002

ATTACHMENT 2: 1999 DIVIDE WASTE ROCK LABORATORY RESULTS			
Site Number	**Detection Limit**	**Units**	**Divide - Waste Rock - Sept 14/99**
Sample Desciption			Sample collected from trench B6
Paste pH (field)	N/A	pH	-
Conductivity (field)	N/A	µS/cm	-
pH in Saturated Paste			
pH	0.1	pH	5.7
pH in Soil (1:2 water)			
pH	0.01	pH	6.2
ICP Semi-Trace Scan			
Aluminum	5	µg/g	4550
Antimony	2	µg/g	2700
Arsenic	2	µg/g	4490
Barium	0.05	µg/g	579
Beryllium	0.1	µg/g	<0.1
Bismuth	5	µg/g	<5
Cadmium	0.1	µg/g	217
Calcium	5	µg/g	61
Chromium	0.5	µg/g	10.3
Cobalt	0.1	µg/g	3.2
Copper	0.5	µg/g	1280
Iron	1	µg/g	300000
Lead	1	µg/g	30700
Lithium	0.5	µg/g	1.7
Magnesium	1	µg/g	232
Manganese	0.5	µg/g	40000
Mercury	0.01	µg/g	3.7
Molybdenum	1	µg/g	8
Nickel	1	µg/g	7.5
Phosphorus	5	µg/g	1400
Potassium	20	µg/g	1070
Selenium	2	µg/g	<2
Silicon	5	µg/g	38
Silver	0.5	µg/g	270
Sodium	5	µg/g	107
Strontium	1	µg/g	<1
Sulphur	10	µg/g	320
Thorium	1	µg/g	20
Tin	1	µg/g	<1
Titanium	0.2	µg/g	15.5
Uranium	5	µg/g	<5
Vanadium	1	µg/g	12
Zinc	0.5	µg/g	9960
Zirconium	0.1	µg/g	12.8

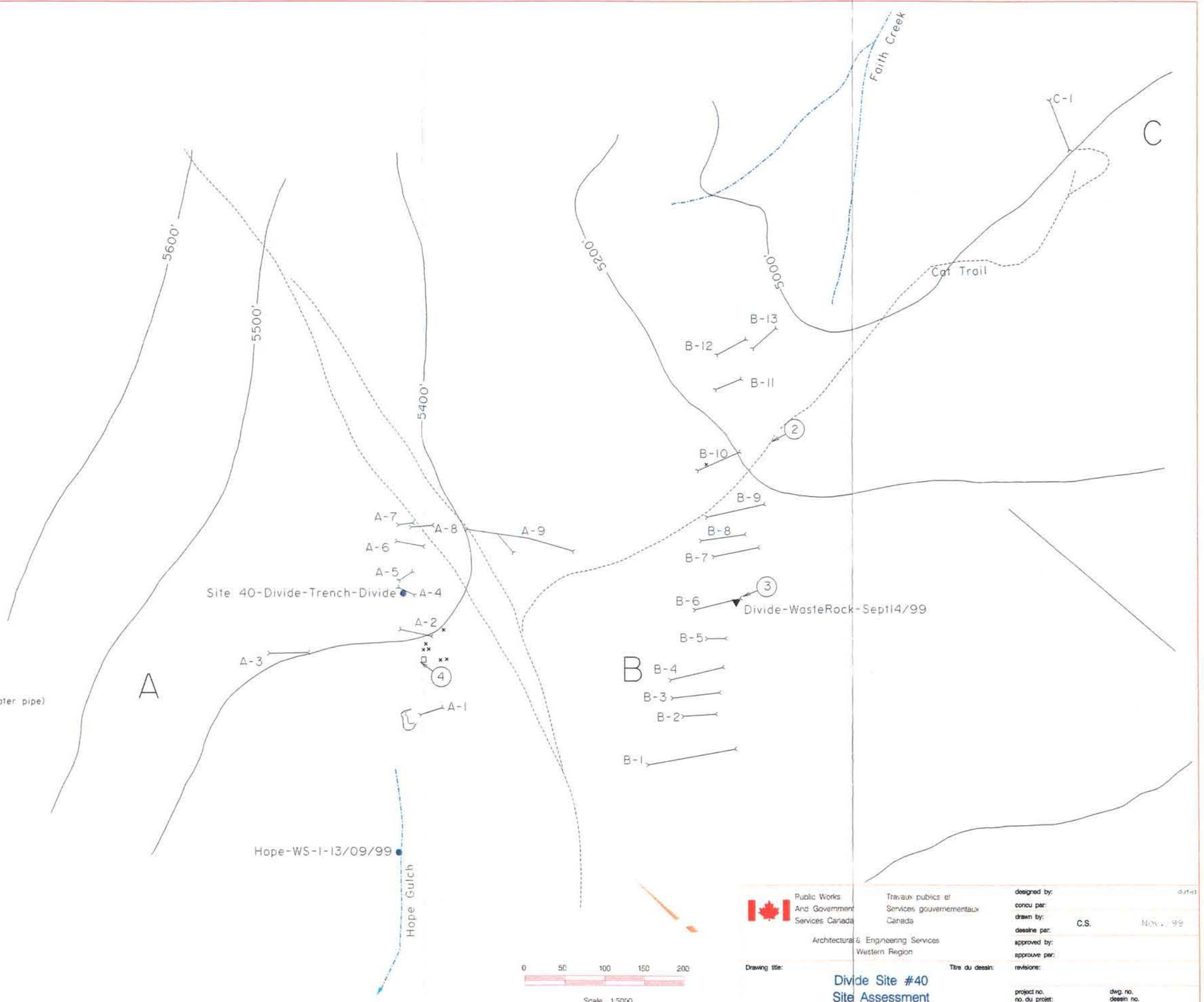
ATTACHMENT 2: 1999 DIVIDE WASTE ROCK LABORATORY RESULTS
MODIFIED SOBEK METHOD ACID-BASE ACCOUNTING TEST

SAMPLE	SITE DESCRIPTION	PASTE pH	S(T) %	S(SO4) %	AP	NP	NET NP	NP/AP
Divide - Waste Rock - Sept.14/99	Sample collected from trench B6	6.3	0.11	0.10	0.3	0.2	-0.1	0.8

AP = ACID POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NP = NEUTRALIZATION POTENTIAL IN TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NET NP = NET NEUTRALIZATION POTENTIAL = TONNES CaCO3 EQUIVALENT PER 1000 TONNES OF MATERIAL.
NOTE: WHEN S(T) AND/OR S(SO4) IS REPORTED AS <0.01, IT IS ASSUMED TO BE ZERO FOR THE AP CALCULATION.
N/D = NO DUPLICATE ASSAY. CALCULATIONS ARE BASED ON ASSAY RESULTS OF THE INITIAL SAMPLE.
RE = REPLICATE.

NOTE - A HIGH LEVEL OF SOLUBLE METALS (ESPECIALLY IRON) WERE OBSERVED IN MANY SAMPLES DURING THE ABA TITRATIONS.
SAMPLES WITH A NEGATIVE NET NP SHOULD BE TESTED FOR MOBILE METALS USING STANDARD SHAKE FLASK EXTRACTION TESTS.

- Building (22A: building site present reference#) / 22A• Indicates Asbestos Material
- 22A Collapsed Building
- Adit
- Collapsed Adit
- Shaft
- Collapsed/Backfilled Shaft
- Mine Rock Dump
- Bedrock Open Pit
- Trench
- Stripped Overburden Stockpile
- Stripped / Disturbed Area
- Outcrop Boundary
- Highway
- Road (gravel, 2 wheel drive)
- Road (gravel, 4X4 accessible)
- Road (inaccessible)
- Trail
- Culvert
- 24501-01 1999 Soil Sample (this study)
- Pre 1999 Soil Sample (other sources)
- 25WR04-01 1999 Waste Rock Sample (this study)
- Pre 1999 Waste Rock Sample (other sources)
- WO-12-06 1999 Water Sample
- Pre 1999 Water Sample
- Tension Cracks
- Mass Movement (note: for Forms: BellieKeno)
- Groundwater Seep
- Surface Water Flow (Stream, Creek, River) (1)
- Lake
- Settling Pond / Water Treatment Pond
- Tailings Dam / Tailings Pond / Mill Tails
- Ponded Water / Trench
- Barrels
- Abandoned Equipment (compressors, ore cars, rails, air and water pipe)
- Mine Rails / Trestle
- Collapsed Trestle
- Solid Waste Disposal Site
- Area of Soil Contamination
- *(6) Transformer Location (number of transformer in brackets)
- Power Line
- Power Line Collapsed
- Aerial Transmission Towers
- (5) Photo Site (arrow shows view direction)
- GPS Survey Location
- Former Building Site (Elsa)



CAD FILE: SITE40.DGN

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

Architectural & Engineering Services
Western Region

Drawing title: / Titre du dessin:

Divide Site #40
Site Assessment
Yukon Territory

designed by: / dessiné par:
concu par:
drawn by: / dessine par: C.S. Nov., 99
approved by: / approuvé par:
revisions:

project no. / no. du projet: 125-12.01
dwg. no. / dessin no. 1 of 1

Photo 40-1 : Divide. View to southeast of trench areas. B (background) and C (foreground) at Divide. Note Building 40A in bottom right. (Azimuth 120 °)

Photo 40-2 : Divide. Trench B10: note ponded water and partially full barrel. (Azimuth 290 °)

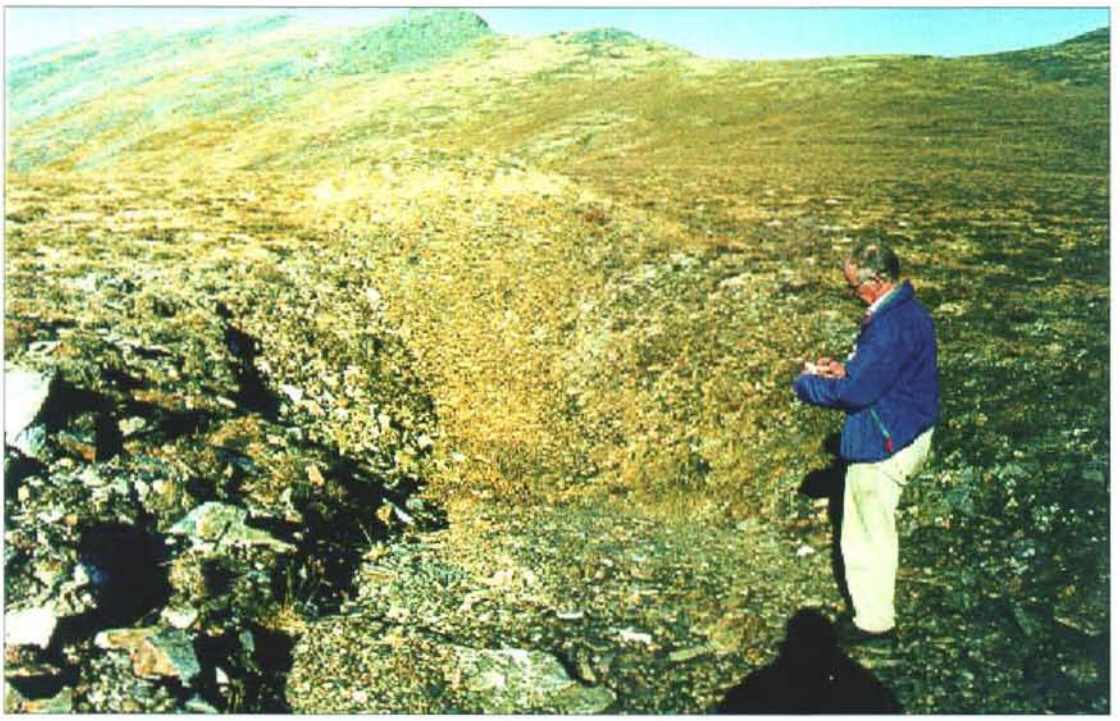


Photo 40-3 : Divide. Trench b6; site of rock sample Divide-Waste Rock - Sept.14/94.
Note building 40A in center background. (Azimuth ~130 °)

Photo 40-4 : Divide. View of Building 40A. (Azimuth ~050 °)