

HECTOR-CALUMET

Site No. 9

MINFILE: 105M 001h,i

1. LOCATION AND ACCESS

The Hector-Calumet mine site is located on the northwest slope of Galena Hill, on the Calumet Road (Site # 9, Figure 1). The Hector adit and loading area are at an elevation of 4100 feet (1250m), and the remaining workings and waste rock piles are at higher elevations. The NTS co-ordinates for the adit are 7 088 300N 480 900E.

From Keno City, the site can be accessed by travelling west along Highway 2 toward Mayo to Elsa, then following the Calumet Road 6.4 km uphill to the Hector-Calumet site.

Alternatively, the site can be reached by taking the Duncan Creek Road south from Keno City 3.8 km, then turning onto the Calumet Back Road and travelling approximately 7.6 km to the Hector-Calumet portal. All roads are gravel and are accessible by 4WD vehicle.

2. SITE PHYSIOGRAPHY

The Hector-Calumet mine site looks northeast over the McQuesten River Valley. The area has a moderately steep slope and is covered by thick moss, bushes and evergreen trees. The site is drained by Sandy Creek and other unnamed creeks, which flow into the McQuesten Valley.

3. GEOLOGY AND MINERALIZATION

Mineralization at the Hector-Calumet site is hosted in massive, thick-bedded Keno Hill Quartzite (Minfile report). There is some graphitic schist and greenstone associated with the deposit. The ore was contained within a siderite, pyrite, galena, sphalerite, freibergite vein. Oxidation extends 400 to 600 feet (122m to 183m) from the surface.

4. SITE HISTORY

The Hector-Calumet Mine was the largest producer in the area and was responsible for just over half of UKHM's total silver production. Extensive underground development and production occurred between 1935 and 1941, and between 1945 and 1972, and the site has more underground workings than any other mine in the district. The main portal at the present

site was constructed in 1957. The total production at Hector-Calumet was 2,468,723 tonnes grading 1212g/t silver, 7.5% lead, and 6.2% zinc (Minfile report). Ore was milled at the Elsa Mill and was transported there by tram. The wooden tram towers are still standing and reportedly the cable is lying on the ground beneath them.

The Calumet C-Structure open pit was excavated in 1981. In 1984-85, the Calumet 1-15 (recovery of the pillars on the #1 and #15 veins), the Calumet 2 (recovery of crown pillars in Hector #1 vein), and the Calumet 4-11 pits were developed. The areas around these pits also show evidence of earlier shallow trenching.

5. MINE DEVELOPMENT

5.1 Mine Openings And Excavations

Excavations at the site consist of the a shaft, the Hector adit, four open pits (Calumet 1-15, Hector, the 4-11 pit and Calumet C-Structure), and several trenches. Locations are shown on Figure 2.

Jock Shaft

Location: In the 4-11 pit area.

Dimensions (L x W x H): 1.5 m x 1.5 m. Shaft appears to be completely collapsed.

Condition: Collapsed

Supports: Wooden.

Accessibility: None.

Hector Adit (Photo 9-1)

Description: Hector adit portal at 400 level.

Location: On the Calumet Road.

Dimensions (L x W x H): 366 m (at least) x 3 m x 3 m

Condition: The adit appears to be stable but could only see to about 5 m.

Supports: Cement portal with wood retaining walls and metal doors. Adit entrance is constructed with wooden beams. There is a metal column has been placed about 1 m into adit, in the center, to support the beams.

Accessibility: The lock is off the doors. Approximately 3 m into the adit, most of the adit is blocked with rock debris to about 0.5 m of the roof.

Calumet 1-15 Pit (Photo 9-2)

Description: Open pit following the Calumet #1 and #15 veins.

Location: Above Hector portal, to the east.

Dimensions (L x W x H): 210 m x 115 m x ~43 m

Condition: The pit has very steep, relatively stable walls, although rock fall is a concern. The pit was dry at the time of the visit.

Accessibility: Can drive to pit and access by foot. There are no fences to limit access to the pit.

Hector Open Pit (Photo 9-3)

Description: Open pit primarily in quartzite with some schist. The tops of the walls are still steep despite erosion into the pit.

Location: Uphill from the Hector portal, to the west of Calumet 1-15 pit.

Dimensions (L x W x H): 100 m x 40 m x 20 m

Condition: The pit walls are steep and relatively stable. Rock fall is a hazard, however. The pit was dry at the time of the visit.

Accessibility: Can drive to pit and access by foot. There are no fences to limit access to the pit.

4-11 Pit

Description: Actually a large stripped area that was later mined selectively using a backhoe. A few small elongated "pits" remain open. These pits are reportedly connected to the underground workings (UKHM, 1996). Pits were mined to access the small crown pillar from the Hector-Calumet 1 vein.

Location: Approximately 200 m to the south-southwest of the Hector Open Pit.

Dimensions: 320m x 10 m x 10 m

Condition: Sides of pit are steep to gentle and are slumping in. There was no water in the pit at the time of the site visit.

Accessibility: Pit is accessible by road and can be accessed by foot.

Calumet C-Structure Pit

Description: Open pit primarily in quartzite with some schist. The pit is really more of a deep trench.

Location: Just off the top of Galena Hill, on the east side.

Dimensions (L x W x H): 100m x 30 m (at widest) x 10 m

Condition: The pit was approximately one third full of water at the time of the visit.

Accessibility: Can drive to pit and access by foot. There are no fences to limit access to the pit.

Trenches

Description: About 12 trenches that are largely overgrown.

Location: On the southwest corner of the mine site.

Dimensions (L x W x H): Range between 60 m to 170 m long. Each is roughly 2.5 m wide and all are shallow.

Condition: Stable. Very overgrown.

Accessibility: Can be reached by 4WD from the cat track that leaves the main Hector-Calumet Mine road near the Jock Shaft.

5.2 Waste Rock Disposal Areas

There are four main waste rock disposal areas at Hector-Calumet. These are described below. Eleven samples of the waste rock were collected by UKHM for the Site Characterisation Report (UKHM, 1996). These sample locations are shown in Figure 2 and the analytical data is listed in Appendix I. No additional waste rock samples were collected during the site visit. No seeps were seen coming from any of the waste rock dumps.

Hector Adit (400) Dump (Photos 9-4 to 9-6)

Location: Outside the Hector portal

Dimensions (L x W x H): 90 m x 60 m x ~40 m (198,000 tons).

General Description: The waste rock was produced from the Hector adit. Surface material is composed primarily of mineralized and unmineralized quartzite vein, abundant siderite, pyrite, galena, and sphalerite. Much of this material shows abundant iron and manganese oxides. There are a couple small puddles of standing water on top of pile. The pile has not begun to revegetate.

There is a zone of impacted vegetation beneath the dump (Photo 9-7) . According to UKHM (1996) this zone results from deposition of silt from mine water released during operation. The report states that there has been no drainage from the Hector 400 adit since mining ceased in October 1972.

There is abundant metal and wood debris on and adjacent to the dump (Photo 9-19). This material is described in Section 6.6 Loading Facilities.

Calumet 1-15 Dump

Location: Uphill from Hector adit, to the east. Adjacent to Calumet 1-15 Pit.

General Description: Waste rock from the Calumet 1-15 Pit was placed in two dumps adjacent to the pit. Dumps are composed mainly of quartzite and graphitic schist country rock (UKHM, 1996). Much of the material on the surface of dump has abundant iron oxide staining, including a large pile of boulders that could be a low-grade ore stockpile. UKHM (1996) also reports slumping and tensions cracks, but these were not seen during this field visit. There appears to be no impact on the vegetation at the base of the dump. A small amount of natural revegetation has taken place on the tops of the rock piles.

Dimensions (L x W x H): 280 m x 90 m x ~40 m (1,000,000 tons)

Hector Open Pit Dump

Location: Uphill from Hector adit, adjacent to Hector Open Pit.

General Description: Rock is from the Hector Open Pit. Pile is composed mainly of quartzite, graphitic schist, and greenstone country rock from the pit (UKHM, 1996). No evidence was seen of impacts on vegetation. A small amount of natural revegetation has taken place on the tops of the rock piles.

Dimensions (L x W x H): 110 m x 60 m x ~15 m (100,000 tons)

4-11 Pit Dump

Location: Uphill from Hector adit, adjacent to the 4-11 pit.

General Description: Rock is from the 4-11 trenching / pit. Pile surrounds the pit and is composed mainly of quartzite, graphitic schist, and greenstone country rock (UKHM, 1996).

Dimensions (L x W x H): Difficult to determine as waste is spread around the 4-11 pit. But waste was estimated at 10,000 tons (UKHM, 1996). More of the 4-11 waste is revegetating than in other areas. This is largely because of the selective mining that took place in this area, little development rock was removed. This means that much of the waste is actually overburden, and contains more fine-grained material in which plants can take hold.

Calumet C-Structure Dump

Location: Just off the top of Galena Hill, on the east side.

General Description: Open pit primarily in quartzite with some schist. The disturbed areas around the pit are beginning to revegetate.

Dimensions (L x W x H): 85 m x 70 m x 5 m (25,000 tons)

5.3 Tailings Impoundments

No ore were processed at the site, and no tailings were encountered.

5.4 Minesite Water Treatment

There was no water treatment being conducted on site at the time of the site visit.

6. MINE SITE INFRASTRUCTURE

6.1 Buildings

Most of the buildings have been removed from the site. However, four small buildings are still standing, and three others that have collapsed or burned down are described below: A significant amount of debris is found in some areas where the buildings have all but disappeared.

Buildings 9A and 9B - Shacks

Dimensions (L x W x H): 1.5 m x 1.5 m x 2 m

Location: Building 9A is approximately 100 m west of the Hector adit and above the Calumet Road. Building 9B is approximately 200 m west of the Hector adit and is below the Calumet Road. Both buildings are west of the hector dump. Building 9B is shown in Photo 9-8, along with the remnant utilidor that connects to the structure. Building 9A is identical.

Construction: Wood frame, white tar paper siding. Both have metals pipes leading to and from them carried in utilidors.

Paint: None observed.

Asbestos: None observed.

Foundation: None.

Non-Hazardous Contents: Wood debris.

Hazardous Contents: None.

Buildings 9C - Bunk House (burned) (Photo 9-9)

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

Location: North side of road leading to the Hector Pit, near junction with the Calumet Road.

Construction: Wood

Paint: None.

Asbestos: None observed..

Foundation: None observed..

Non-Hazardous Contents: metal pipes, sinks

Hazardous Contents: None observed..

Building 9D - Water Storage Tank and Building (Photo 9-10)

Dimensions (L x W x H): 2 m x 2m x 2.5 m

Location: Directly uphill of Hector Adit, on the north side of the road from Hector Adit to the Hector Pit.

Construction: Wood and concrete with metals ties for water tank. Building has tar paper siding and what appears to be fiberglass insulation.

Paint: None observed.

Asbestos: None observed.

Foundation: The building had no foundation. The tank had a large concrete foundation.

Hazardous Contents: None observed.

Non-Hazardous Contents: Associated with the building are the remnants of a large water storage tank. Behind and uphill from the building is a large (5 m diameter) round concrete foundation (Photo 9-11). Upon the concrete and to adjacent to it are approximately 400 m of 3 cm thick steel cable, in segments of about 10 m lengths. These are the stays that held the wooden storage tank together. There is also some wood debris from the collapsed tank and part of the building.

Between the tank and the road are 6 small (1 m x 0.5 m x 0.5 m) ore carriers and 3 ore cart transport bases, and one very large ore bucket (1 m x 1.5 m x 1 m) (Photo 9-12).

6.2 Fuel Storage

No fuel storage areas were encountered on site. Two drums were found near the top of the site. See Section 6.6 Loading Facilities for details.

6.3 Rail and Trestle

Fabrication: Steel

Amount of materials: 16.5 m of two-track of rails at Hector adit.

Condition: In good condition

6.4 Milling and Processing Infrastructure

Assay lab: Located to the east of Building 9B. Dimensions (L x W x H): 2 m x 3 m (collapsed). Brick construction. Metal pipes and rusted ovens remaining (Photo 9-13). No hazardous contents observed.

6.5 Electrical Equipment

Two electrical boxes are located at the loading facility at the Hector Adit. One is probably pre-1930 and the other is more recent. Also, some electrical equipment is associated with the loading facility at the Calumet 1-15 dump (Photo 9-14).

6.6 Loading Facilities

Hector Adit Loading Facility

There are two loading facilities at the road outside the adit, to either side of the Hector dump. The west side of the dump has been buttressed to form a gully (Photo 9-4) where an old tram for transporting ore from the Hector mine to Elsa for processing. The tram towers are wooden and the cable is reportedly lying below the towers (Photo 9-15). The gully contains metal and wood debris (Photo 9-16).

On the east side of the dump, are larger loading structures with more buttressing (Photo 9-17). A coal-fired steam plant built at the loading facility at the Hector adit was used to heat the mine buildings. The concrete foundation for the plant and small pile are still on site, but the building has been removed (Photo 9-18). There is abundant metal and wood debris in this area (Photo 9-19).

The Calumet road shows signs of subsidence near the loading facility. In places, the road material has fallen through the timbers that comprise the loading facility.

Calumet 1-15 Loading Facility

The Calumet 1-15 loading facility includes a wooden buttress, an ore chute, a holding bin, and a conveyor-type structure, and a loading dock.(Photo 9-20). The structure is made of wood, except for some iron cogs that likely ran the conveyor. A small building adjacent to the conveyor holds some electrical equipment (Photo 9-14) and some fiberglass insulation (Photo

9-21). The area above the loading chute has been bull-dozed over so that the source of any ore has been removed.

Hazardous contents include three metal oil barrels are adjacent to the conveyor section of the facility (Photo 9-22). Two are empty and the third is half full of oil and water. There is a small 0.5m²) stain on the ground near the barrels. Also present are 20 empty cans (each 10 cm tall) of Quick Start Fluid on the ground.

Non-hazardous material includes approximately 10 m of metal pipe or rail; small amount of wood, 3 ore carts (1m x 0.5 m x 0.5 m) located on the rock dump (Photo 9-23).

7. SOLID WASTE DUMPS

No solid waste dumps were encountered at the site. However, significant quantities of waste material is present near the waste rock dumps and buildings.

8. POTENTIAL CONTAMINANTS OF CONCERN

Potential contaminants of concern at the Hector-Calumet site include metals washing from the waste rock piles, and one barrel of oil (half full) located at the loading facility at the top of the site.

9. WATER QUALITY

9.1 Surface Water

There was no water flowing from any of the workings at the Hector-Calumet site. It has been reported that the site is drained at Galkeno 900 through a connection with the Galkeno workings (UKHM, 1996). The only surface water encountered at the site was in the Calumet C-Structure pit, which is approximately one third full. The water was clear with silt (likely washed from the pit walls) covering the rocks. There were no plants or algae seen growing in the pit. Results of analyses of a sample collected from this pit are listed in Table 1.

No surface water quality samples were collected in the UKHM 1996 study.

9.2 Ground Water

Three piezometers were installed below the Hector-Calumet Mine site by UKHM in 1996 to monitor any impacts on the shallow groundwater quality from the waste rock piles. These were sampled and analyzed as part of this investigation. Each sample was cloudy and contained some sediment. Samples were filtered in the laboratory. Analytical results are provided in Table 1.

10. RECLAMATION

Most of the buildings at the Calumet townsite have been removed. Some of the site is revegetating naturally with grasses and small bushes (Photos 9-4, 9-9, 9-13). However, the waste rock piles are the slowest to revegetate.

11. 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.

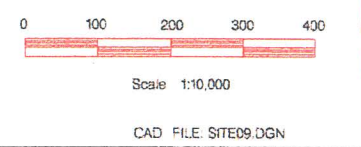
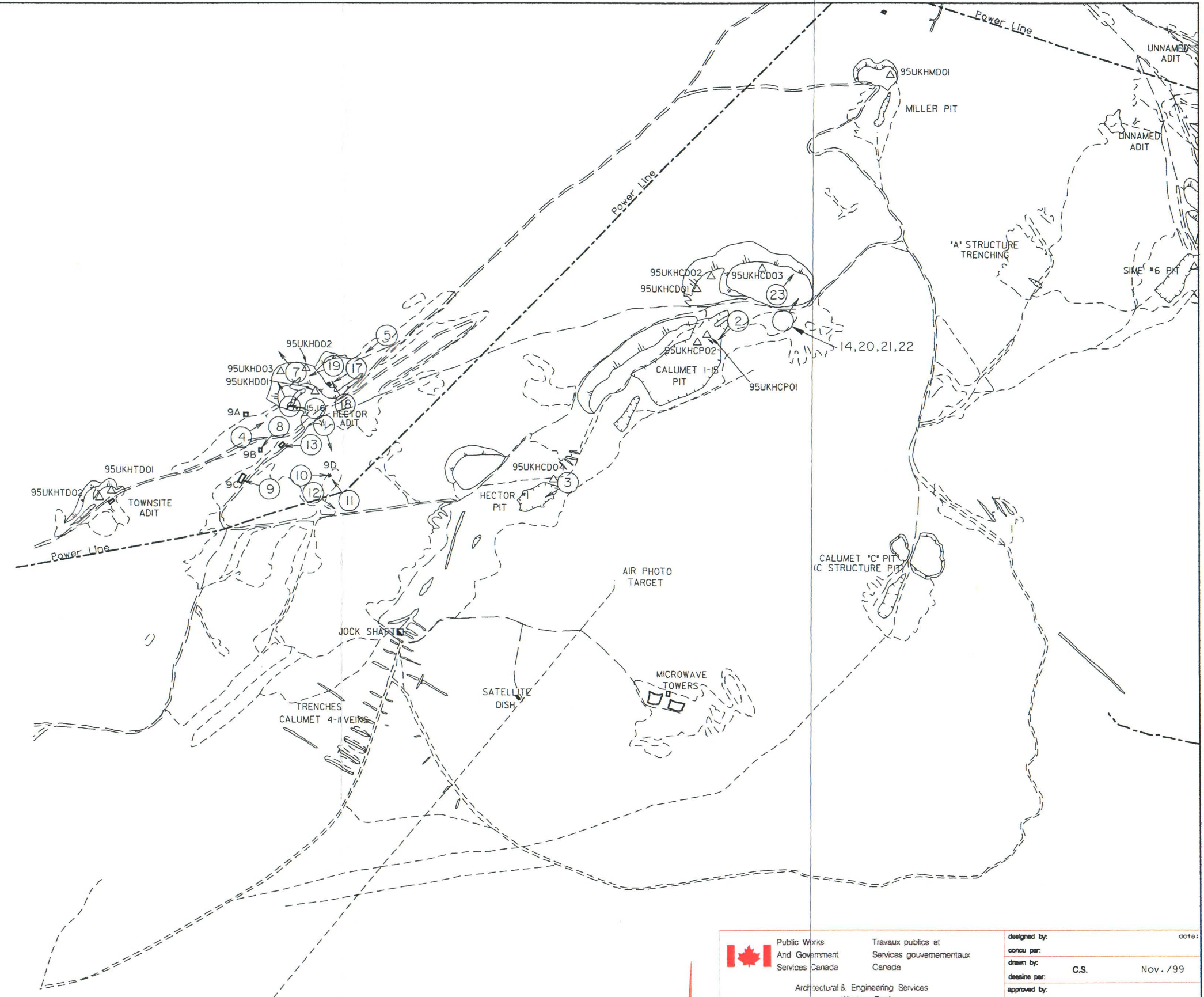
United Keno Hill Mines Limited. 1996. *United Keno Hill Mines Limited – Site Characterization, Technical Appendices I-VI*. Report No. UKH/96/01, prepared by Access Mining Consultants Limited.

Table 1. Water Quality Data

Parameter	Detection Limit	Units	9-01-Water (47711-12)	PIEZ: 95-UK-H-3 (47688-7)	PIEZ: 95-UK-H-2 (47688-8)	PIEZ: 95-UK-H-1 (47688-9)
Field pH			7.9	5.1	6.4	5.2
Field conductivity		µS	22	100	170	170
Aluminum	0.0008	mg/L	0.789	3.59	3.42	6.95
Antimony	0.005	mg/L	<0.005	<0.005	0.005	0.01
Arsenic	0.01	mg/L	<0.01	0.03	0.1	0.04
Barium	0.00004	mg/L	0.0299	0.203	0.286	0.27
Beryllium	0.00001	mg/L	<0.00001	0.00014	0.0001	0.00054
Bismuth	0.0004	mg/L	<0.0004	<0.0004	0.0011	0.0028
Boron	0.002	mg/L	<0.002	0.007	0.057	0.121
Cadmium	0.00006	mg/L	0.00076	0.00227	0.00423	0.0296
Calcium	0.002	mg/L	2.69	16.1	36.8	76.2
Chromium	0.00006	mg/L	0.00182	0.00728	0.00864	0.0132
Cobalt	0.00003	mg/L	0.00024	0.0148	0.0166	0.0181
Copper	0.00003	mg/L	0.00727	0.0178	0.0186	0.0195
Iron	0.00001	mg/L	1.29	19.9	88.6	191
Lead	0.0003	mg/L	0.103	0.0163	0.0174	0.0192
Lithium	0.001	mg/L	0.001	0.004	0.001	0.004
Magnesium	0.0005	mg/L	0.555	5.39	11.6	17.3
Manganese	0.00002	mg/L	0.0152	1.86	5.2	2.74
Molybdenum	0.00007	mg/L	<0.00007	0.00073	0.00351	0.00233
Nickel	0.00001	mg/L	<0.00001	0.0157	0.0147	0.0578
Phosphorus	0.03	mg/L	0.06	0.48	0.91	1.28
Potassium	0.4	mg/L	0.5	1.1	1.2	0.5
Selenium	0.004	mg/L	<0.004	<0.004	<0.004	<0.004
Silicon	0.004	mg/L	3.62	13.6	14	13.8
Silver	0.00005	mg/L	0.00191	0.00067	0.00143	0.00092
Sodium	0.004	mg/L	<0.4	1.4	4.1	2.5
Strontium	0.00002	mg/L	0.4	0.0674	0.107	0.0948
Sulphur	0.008	mg/L	0.278	18.2	3.41	92.7
Thallium	0.001	mg/L	<0.001	<0.001	<0.001	<0.001
Titanium	0.00002	mg/L	0.0159	0.144	0.157	0.191
Vanadium	0.00003	mg/L	0.00189	0.0171	0.0233	0.0386
Zinc	0.0002	mg/L	0.0422	0.0924	0.309	2.65
Zirconium	0.00004	mg/L				
Mercury	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic (hydride AA)	0.0002	mg/L	0.0054	<0.0002	<0.0002	<0.0002
Selenium (hydride AA)	0.0001	mg/L	0.0003	<0.0001	0.0006	<0.0001
Total Alkalinity	5	mg CaCO ₃ /L	9	10	111	<5
Chloride	0.1	mg/L				0.34
Chloride	1	mg/L		<1		
Chloride	2.5	mg/L			<2.5	
Chloride	0.25	mg/L	<0.25			
Electrical Conductivity	0.01	µS/cm	15	170	265	600
Hardness (CaCO ₃ eq)	5	mg/L		66.6	123	279
Nitrate-N	0.05	mg/L	0.07			<0.05
Nitrate-N	0.2	mg/L		<0.2		
Nitrate-N	0.5	mg/L			<0.5	
Nitrite-N	0.003	mg/L	<0.003	<0.003		0.003
Nitrite-N	0.02	mg/L			<0.02	
pH	0.01	pH	6.42	5.22	6.38	3.9
Sulphate	0.5	mg/L	<0.5			
Sulphate	1	mg/L		51	7.1	260
Total Dissolved Solids	5	mg/L	35	139	225	436



- 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)
- W0-12-06 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)



Public Works And Government Services Canada Travaux publics et Services gouvernementaux Canada Architectural & Engineering Services Western Region	designed by: _____ conçu par: _____ drawn by: C.S. dessiné par: _____ approved by: _____ approuvé par: _____ revisions: _____	date: _____ Nov. / 99
	Drawing title: Hector Calumet Site #9 Site Assessment Yukon Territory	Titre du dessin:



Photo 9-1. Hector Adit, showing the buttressing, old rails and debris.



Photo 9-2. Calumet 1-15 Pit, looking southwest.



Photo 9-3. Hector Open Pit, looking southwest.



Photo 9-4. Hector dump, looking northwest. Note old wooden buttresses and debris.



Photo 9-5. Hector dump, looking southwest. Note wooden buttressed and debris. Old steam plant was located at base of buttresses.



Photo 9-6. Portion of the Hector dump, looking north-northwest. This section of the dump appears to have been used as a loading point, or perhaps the waste was quarried at one time to be used as fill.



Photo 9-7. Looking downhill (northwestward) at the vegetation below the Hector dump. Note the impacted vegetation (grey patch left of center in photograph). Whether this results from high sediment content in water discharged during mining, or from runoff and seepage from the waste rock dump, is unclear.



Photo 9-8. Building 9B. Note wooden construction and tar paper siding. Also note metal piping and remnants of insulation that comprises the utilidors.



Photo 9-9. Burned out bunkhouse and wash house.



Photo 9-10. Building adjacent to the water storage tank.



Photo 9-11. Concrete foundation of storage tank with debris from storage tank. Building in the background.



Photo 9-12. Old ore carts located near the water storage tank.



Photo 9-13. Remnants of assay laboratory. Note metal debris and concrete foundation.

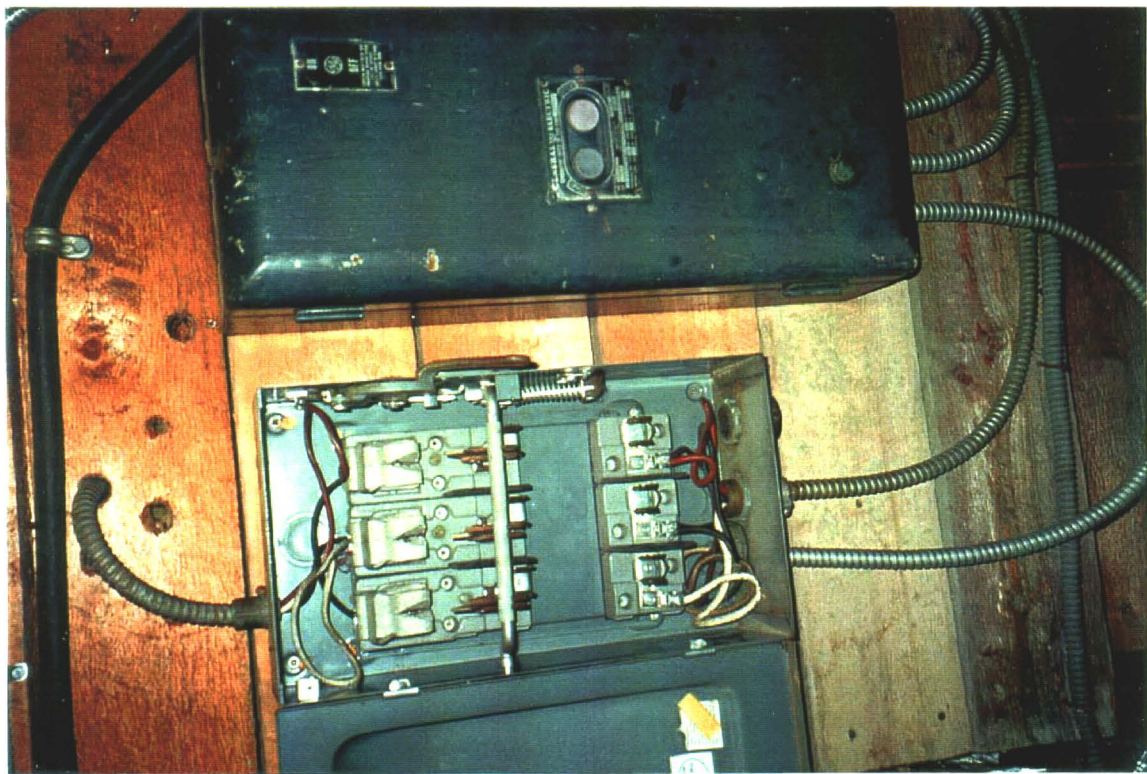


Photo 9-14. Electrical boxes in small shed near loading facility on Calumet 1-15 dump.



Photo 9-15. Old wooden tram towers. Looking west from the Hector dump.



Photo 9-16. Debris in gully adjacent to the Hector dump.



Photo 9-17. Hector dump and loading facility, looking southwest.



Photo 9-18. Coal piles at site of old steam plant. An edge of the concrete foundation of the plant can be seen on the left side of the photograph.



Photo 9-19. Metal and wood debris on the side of the Hector dump.



Photo 9-20. Loading facility on the Calumet 1-15 dump. Note the three barrels

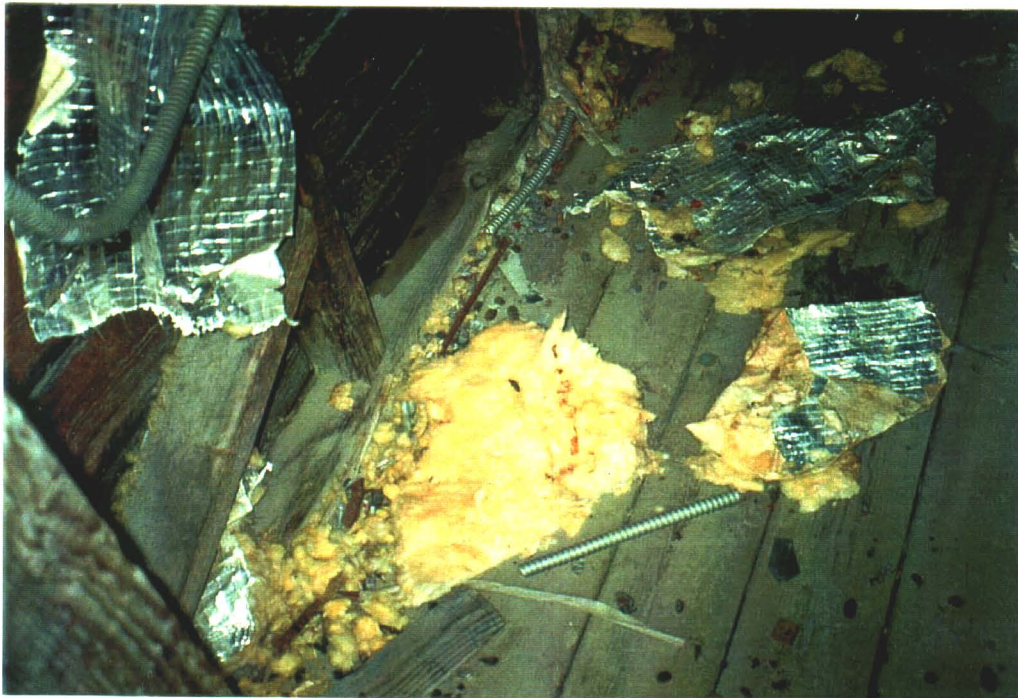


Photo 9-21. Insulation in the electricity shed, adjacent to the conveyor structure at the Loading Facility at the Calumet 1-15 dump.



Photo 9-22. Oil spillage from barrel that is half full of oils and water. The other tow barrels are empty.



Photo 9-23. Old ore carts and debris at the upper loading facility on Calumet 1-15 dump.