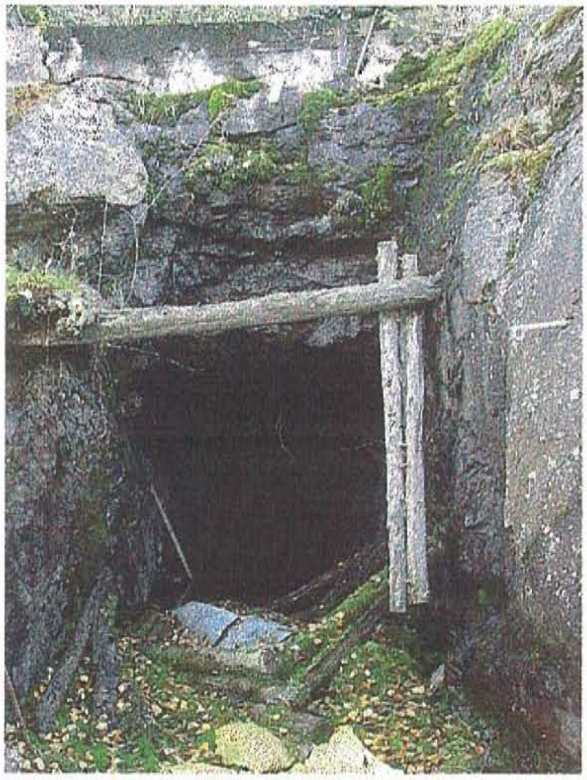
# AN ASSESSMENT OF ABANDONED MINES IN NORTHERN SASKATCHEWAN (YEAR 2)



GULCH MINE ADIT-URANIUM CITY AREA
SEPTEMBER 29, 2001

MAY, 2002

PREPARED FOR:
SASKATCHEWAN ENVIRONMENT

# An Assessment of Abandoned Mines in Northern Saskatchewan

File R3160 May 2002

Prepared for:

Saskatchewan Environment

Prepared by: Clifton Associates Ltd.
on behalf of
P.A.N.S. Joint Venture

# Executive Summary

Northern Saskatchewan contains an abundance of mineral wealth associated with the Canadian Shield. Exploration for minerals in Saskatchewan can be traced back to the early part of the century. Beck (1959) provides a comprehensive description of mineral occurrences in the Precambrian Shield of Northern Saskatchewan and a description of Uranium Deposits (1969) in the Athabasca Region. These reports provide an extensive listing of previous work completed in northern Saskatchewan dating back to 1916. The reports completed by Beck have since been supplemented by numerous studies and research programs aimed at developing the mining industry in Saskatchewan.

Exploration activities and mining operations were not regulated to the extent of present requirements. Exploration sites and mining operations were abandoned with little, if any, regard to environmental protection, public safety or aesthetics. As a result the vast majority of sites (in general, pre 1980's) were abandoned with no closure activities. Many of the sites have since deteriorated through natural degradation processes and vandalism, leaving in some cases, severe public safety hazards and possible long term environmental concerns.

In the late 1980's, Saskatchewan Environment and Public Safety (a predecessor to Saskatchewan Environment), established the 'Abandoned Mines Remedial Action Program'. The program identified the abandoned mining operations in Saskatchewan, including all 'hard rock' mines in the north and coal mines in the south. Many of the abandoned coal mines had severe public safety hazards with large numbers of people living nearby. As a result, coal mines were prioritized in terms of remedial action requirements. Abandoned mines in the north were also inspected as resources permitted. However, many of the northern mines were not inspected when the program was terminated in the early 1990's due to budget constraints.

A proposal for funding to establish an Abandoned Mines Assessment Program was approved under the Province of Saskatchewan's Centenary Fund in July, 2000. The purpose of the program is to complete the assessments of the northern sites and prioritize the sites based on public safety and environmental concerns. The prioritization is a risk based assessment of the sites in which those sites that present the most severe public safety and/or environmental concerns are ranked highest.

The assessment program began in 2000 (Year 1). Several sites in the Uranium City, La Ronge and Creighton regions were inspected and assessed. In 2001 (Year 2), the program continued with attempts to assess all remaining abandoned uranium mines that were not assessed in Year 1. In addition, some gold and base metal sites in the Uranium City and La Ronge regions were assessed.

This report provides a detailed description of the Year 2 assessment activities. It is anticipated that additional sites in the Creighton region will be completed in 2002 (Year 3). Upon completion of the program, it is expected that all abandoned mines and exploration sites in northern Saskatchewan that pose potential environmental/public safety concerns will have been assessed. This risk based approach identifies and prioritizes the sites in terms of most hazardous to least hazardous.

An ownership review was completed to determine the status of claims or leases on the areas that contain the abandoned sites. The ownership review was completed through a search of the Saskatchewan Industry and Resources 'Saskatchewan Mineral Deposit Index' files. The files were searched both electronically and in person at Saskatchewan Industry and Resources offices in Regina.

Table E1 provides the cumulative ranking of each of the sites assessed in Year 2. The total numerical value attributed to each site is the combined total of the public safety ranking score and the environmental ranking.

**Table E-1**
**Site Ranking**

| Site | Public Safety Score | Environmental Score | Total Score (out of 51) | Ranking (Worst to Least Worst) |
|---|---|---|---|---|
| Gunnar | 22 | 28.5 | 50.5 | 1/22 |
| Box | 19 | 18 | 37 | 2/22 |
| Rottenstone | 13 | 23.5 | 36.5 | 3/22 |
| Gulch | 19.5 | 11.5 | 31 | 4/22 |
| Lorado Mill Site | 10.5 | 18.5 | 29 | 5/22 |
| Baska | 15 | 10.5 | 25.5 | 6/22 |
| Consolidated Nicholson | 16.5 | 7 | 23.5 | 7/22 |
| Nesbitt | 14.1 | 7 | 21.1 | 8/22 |
| La Ronge | 13.45 | 4 | 17.45 | 9/22 |
| New Mylamaque | 11.1 | 5 | 16.1 | 10/22 |
| Preview Lake | 10.5 | 5 | 15.5 | 11/22 |
| Caba | 11.1 | 4 | 15.1 | 12/22 |
| Territorial | 10.15 | 4 | 14.15 | 13/22 |
| Beaverlodge-Mickey Lake | 10.9 | 3 | 13.9 | 14/22 |
| Pitching Lake | 10.5 | 3 | 13.5 | 15/22 |
| Athona | 10 | 3 | 13 | 16/22 |
| Homer Yellowknife | 9.6 | 2 | 11.6 | 17/22 |
| Jahala | 7.5 | 3 | 10.5 | 18/22 |
| Consolidated Beta Gamma | 9.5 | 1 | 10.5 | 18/22 |
| Jesko | 8.5 | 1 | 9.5 | 20/22 |
| Don Henry | 6.4 | 2 | 8.4 | 21/22 |
| Pitch-Ore | 3.2 | 1 | 4.2 | 22/22 |
| Rix Athabasca | na | na | na | na |

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# 1.0 Introduction

Saskatchewan Environment issued a Request for Proposal dated 14 May 2001 for the assessment of abandoned mining operations in northern Saskatchewan. The Shield EcoRegion of Saskatchewan Environment initiated the project in 2000 through funding provided from the Province of Saskatchewan's 'Centenary Fund'.

The objective of the abandoned mines assessment program is to assess abandoned mining and exploration sites in northern Saskatchewan which may present public safety and/or environmental concerns. The purpose of the assessments is to gather the information necessary to rank the sites based on health/public safety and environmental concerns. Information gained from the field investigations along with existing historical site information will also be used to provide the basis for estimating the cost to remediate the sites in order to remove or minimize potential public safety, health and environmental risks.

This document provides the results of the assessments completed on sites in the Uranium City and La Ronge Regions in the fall of 2001.

Clifton Associates Ltd. acting on behalf of the PANS Joint Venture, completed all assessments described in this report in 2001.

The assistance of Mr. James Augier, Mr. Dan Augier and Ms. Bernadette Knox of Uranium City was essential in the completion of the site assessments in the Uranium City region. Their historical knowledge of the region and assistance with mobilization made locating the sites much easier.

Mr. Rick Bennett of Saskatchewan Industry and Resources provided information necessary to evaluate ownership and current claims on the sites.

Throughout this document, reference is made to 'Saskatchewan Environment and Public Safety', 'Saskatchewan Environment and Resource Management' and 'Saskatchewan Environment'. Saskatchewan Environment and Public Safety became Saskatchewan Environment and Resource Management in April 1993 which subsequently became Saskatchewan Environment in March 2002. Correct document referencing requires using the Department name that was in effect at the time the document was published; therefore, Saskatchewan Environment and Public Safety is used to reference Department documents prior to April 1993, whereas Saskatchewan Environment and Resource Management is used to reference Department documents from April 1993 to March 2002. Saskatchewan Environment is the current Department name. Likewise, 'Saskatchewan Energy and Mines' became 'Saskatchewan Industry and Resources' in March 2002. Documents published prior to March 2002 are therefore also referenced using the Department name that existed at the time of publishing.

## 2.0 Background

Northern Saskatchewan contains an abundance of mineral wealth associated with the Canadian Shield.

Exploration for minerals can be traced back to the early part of the century. Beck (1959) provides a comprehensive description of mineral occurrences in the Precambrian Shield of Northern Saskatchewan and a description of Uranium Deposits (1969) in the Athabasca Region. These reports provide an extensive listing of previous work completed in northern Saskatchewan dating back to 1916. The reports completed by Beck have since been supplemented by numerous studies and research programs aimed at developing the mining industry in Saskatchewan.

Exploration activities and mining operations were not regulated to the extent of present requirements. Exploration sites and mining operations were abandoned with little, if any, regard to environmental protection, public safety or aesthetics. As a result the vast majority of sites (in general, pre 1980's) were abandoned with no closure activities. Many of the sites have since deteriorated through natural degradation processes and vandalism, leaving in some cases, severe public safety hazards and possible long term environmental concerns.

In the late 1980's, Saskatchewan Environment and Public Safety (a predecessor to Saskatchewan Environment), established the 'Abandoned Mines Remedial Action Program'. The program identified the abandoned mining operations in Saskatchewan, including all 'hard rock' mines in the north and coal mines in the south. Many of the abandoned coal mines had severe public safety hazards with large numbers of people living nearby. As a result, coal mines were prioritized in terms of remedial action requirements. Abandoned mines in the north were also inspected as resources permitted. However, many of the northern mines were not inspected when the program was terminated in the early 1990's due to budget constraints.

A proposal for funding to establish an Abandoned Mines Assessment Program was approved under the Province of Saskatchewan's Centenary Fund in July, 2000. The purpose of the program is to complete the assessments of the northern sites.

In the fall of 2000, (Year 1) 26 mine sites and 2 waste disposal sites (associated with two of the mine sites) were assessed. Each assessment involved identification of the development that occurred at the site; ownership history; current conditions of the site; site assessment and ranking; documentation of the remediation requirements and acquisition of digital photographs of the site.

Gamma readings were taken at the uranium sites and water samples were collected at sites where water was either ponded or flowing from a mine facility (such as an adit). Refer to the report 'An Assessment of Abandoned Mines in Northern Saskatchewan (KHS Management Group Ltd., March, 2001)' for further information on the results from Year 1.

In 2001 (Year 2), the program continued with attempts to assess all remaining abandoned uranium mines that were not assessed in Year 1. In addition, some gold and base metal sites in the Uranium City and La Ronge regions were assessed.

This report provides a detailed description of the Year 2 assessment activities and includes all issues included in the Year 1 program. It is anticipated that additional sites in the Creighton region will be completed in 2002 (Year 3). Upon completion of the program, it is expected that all abandoned mine and exploration sites in northern Saskatchewan that pose potential environmental/public safety concerns will have been assessed. This risk based approach identifies and prioritizes the sites in terms of hazardous to least hazardous.

The recommendations from this report will be used to develop cost estimates for remediation of the sites.

# 3.0 Assessment Criteria

## 3.1 Development of Assessment Criteria

Due to the subjective nature of conducting environmental audits and site assessments, criteria have been established and used in the assessment of the abandoned sites. Application of these criteria ensures that a consistent set of identifiers is used for each site thereby providing uniform assessment results for each site. Field personnel with a high level of expertise in conducting assessments of abandoned mining operations is essential in ensuring competent and uniform assessments are completed.

In an attempt to minimize subjectivity, a set of assessment criteria was established and used in the Year 1 assessments. In order to maintain consistency in all three years work, the same set of assessment criteria were used in Year 2 as were used in Year 1. It is anticipated that the same criteria will be used in Year 3.

A checklist was developed and used for each site assessment. The checklist contained a comprehensive list of issues to be assessed. The checklist covered possible issues that would likely be a concern at a typical abandoned mine/exploration site. Each site differed from the next site, depending on the type of mining or exploration activities, remediation work completed at the time of abandonment or since abandonment, effects of vandalism and site deterioration due to natural weathering forces.

## 3.2 Criteria

Following is a listing of the criteria used for each assessment. These criteria are consistent with those used in Year 1.

### 3.2.1 Site Description

- Specific Location (coordinates in degrees using a GPS set to NAD 84 datum).
- Review of existing site records
- Type of operation (commodity type)
- Accessibility
- Date of Assessment
- Ownership
- Date of operations
- Type of remediation completed subsequent to abandonment
- Surrounding environment description

### 3.2.2 Description of Openings

- Raise[1] adit[2], shaft[3], trench[4]
- Specific location of opening noted on site map
- Dimensions of openings
- Condition of openings and whether or not there is any type of barrier to restrict access
- Evidence of water, either standing or flowing
- Associated structures (head frame-if present- description and condition)
- Assessment of level of hazard associated with opening

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[1] A 'raise' is a vertical or inclined excavation from underground workings upward to the surface typically used for providing fresh air, emergency escapeways or allowing stale air to be removed.

[2] An 'adit' is a horizontal or slightly inclined excavation, usually on a hillside and typically used to gain access to mineralization.

[3] A 'shaft' is a vertical or slightly inclined excavation from the surface used to gain access to underground mineralization, to transport workers underground and for hoisting waste rock and ore from underground to the surface.

[4] A 'trench' is a surface excavation usually long and linear in shape and from a few metres to tens of metres deep. Trenches are excavated to explore the near surface for mineralization.

### 3.2.3 Sealed Openings

- Raise, adit, shaft, trench
- Specific location of opening noted on site map
- Type of closure method
- Condition of closure
- Evidence of liquid discharges from sealed openings
- Assessment of level of hazard associated with opening

### 3.2.4 Open Pits

- Location
- Dimensions (size of pit perimeter, orientation, and depth)
- Slope stability and angles
- Presence of vegetation, water or debris in pit
- Accessibility and escape for wildlife
- Presence of any warning markers
- Assess level of hazard

### 3.2.5 Mine De-watering Activities

- Evidence of mine dewatering
- Presence of dewatering lines and apparent location of discharge
- Examination of apparent discharge area for environmental concerns (lack of vegetation, signs of acidic discharge, oxidation or precipitation of minerals)

### 3.2.6 Waste Rock Disposal Area(s)

- Location(s) of waste rock
- Dimensions and estimated volumes of waste rock
- Vegetation encroachment
- Mineralogy
- Evidence of acid generation
- Gamma readings[5] at uranium sites
- Slope stability and angles
- Assessment of level of hazard
- Assessment of level of risk to local ecosystem health

[5] Gamma radiation is an electromagnetic radiation similar to x-rays (Western Canadian NORM Committee, 1995). In this report, the radioactive dose rate is expressed in terms of microsieverts per hour (μSv/hr).

### 3.2.7 Tailings Disposal Area

- Location(s) of tailings
- Physical description (size, colour, mineralogy)
- Dimensions and estimated volumes of tailings and location of sample (if any)
- Type of containment, stability and erosion potential through surface water runoff or wind erosion
- Vegetation encroachment
- Evidence of acid generation, oxidation and mineral precipitation
- Evidence and location of water ponding and location of sample (if any)
- Gamma readings at uranium sites
- Slope stability and angles
- Assessment of level of hazard
- Assessment of level of risk to local ecosystem health

### 3.2.8 Drill Holes

- Location and number
- Evidence of artesian conditions (if artesian sample collected)
- Assess level of hazard (protruding drill stem) and evidence of ecosystem damage

### 3.2.9 Drill Core Storage

- Location and method of storage
- Size of storage facility and estimated amount of core
- Identification numbers of core boxes
- Condition of storage facility
- Gamma readings at uranium sites

### 3.2.10 Waste Disposal Sites

- Location and dimensions
- Type and volume of debris
- Containment works (if any)
- Level of hazard
- Level of damage to ecosystem

### 3.2.11 Buildings and Site Related Facilities

- Location and type of building on site
- Condition of building
- Type of building material, presence of asbestos
- Contents in buildings
- Structure stability
- Assess level of hazard to public and wildlife
- Description of related structures (electrical substations, transformers, power lines)

### 3.2.12 Presence of Hazardous Materials

- Type of material
- Volume
- Type of containment and stability of containment
- Evidence of leaks
- Assess level of hazard to public safety, wildlife and ecosystem

### 3.2.13 Scrap Material

- Location of material
- Type and volume
- Assess level of hazard to public, wildlife and ecosystem

## 3.3 Field Assessment Checklist

Prior to initiating field work, a checklist was developed. The checklist contains a comprehensive inventory of potential issues that should be assessed at abandoned mines. Given the varying nature of each of the sites, not all issues on the checklist are applicable for each site. However, the list provided a consistent method for evaluating the sites.

The checklist is the same as was used in Year 1 assessments. Using the same checklist ensures that a consistent approach to site assessment is carried out from year to year.

A sample of a completed site assessment form is provided in Appendix A.

## 3.4 Site Assessment Scoring

As part of the Year 1 assessment program, a numerical ranking was given to specific issues at each abandoned site. The numerical ranking removed some of the subjectivity in the assessment process.

Following is the rationale for establishing the numerical ranking as taken from the Year 1 assessment report (KHS Management Group, 2001).

> *In an effort to further reduce the subjectivity of the assessment, in each category a numerical "score" of the public safety and environmental risk for each of the listed elements was established. This was done in order to account for the fact that some categories pose a more significant risk than others. For example, unsafe buildings pose more of a public safety risk than do most scrap materials and generally, tailings pose more of an environmental risk than does waste rock.*
>
> *Similarly, it must also be recognized that each element within a particular category may pose a different level of risk depending on the character of that element at a particular site. For example, acid generating waste rock presents more of an environmental risk than benign waste rock and therefore will receive a higher total risk value. Such variations must be taken into consideration when assessing the overall risk posed by a particular site or when the risks associated with a particular site is compared to those of other sites.*
>
> *Table 1 presents a description of the scoring level assigned in each category.*
>
> *The total risk posed by each site was then assessed by completing the following steps:*
>
> 1. *A detailed audit was conducted of each site using the template provided;*
> 2. *During the audit, each risk to public safety and/or to the environment was identified, recorded and assigned a risk value of between 1 and 6 (with 6 representing the highest risk);*
> 3. *After completing the entire site audit, all category risk values were added to produce the overall site risk value; and,*
> 4. *The overall site risk value for each site was used to rank each abandoned site which allowed for a comparison of all sites audited in the fall of 2000.*
>
> *It should be noted that in some categories the risk value ranges from 0 to 3 while in others the risk value ranges from 0 to 6. This variation is necessary as some categories pose a higher overall risk than others and this difference must be accounted for. A risk value of 0 indicated that no risk was identified.*
>
> *In instances where there was more than one item in each category, (i.e. two adits at the same site) each item was assessed individually. The two were then combined and assessed /reviewed to arrive at a total risk value for the item.*
>
> *By following these steps, those sites posing the most significant risk to public safety and to the environment will receive a higher site score that those posing less of a risk.*

The assessment and scoring system allows for a maximum score of 51 (excluding gamma readings) for an individual site with the minimum score approaching zero.

Table 3.1 provides a description of the scoring categories used for the assessment and the number of points applicable to each category.

**Table 3.1**
**Scoring Summary**

| **Public Safety Scoring** |
|---|
| Accessibility<br>1 = boat, snow machine or float plane.<br>2 = access consists of a long walk through an unmarked or overgrown road (>500 m)<br>3 = drive and short walk (<500 m)<br>4 = drive directly to site and openings |
| Closure Method<br>0 = sealed with concrete; in excellent condition<br>1 = sealed with concrete; deteriorating condition<br>2 = sealed with rock or steel grate; no slumping or access through grate<br>3 = covered with rock, steel grate or debris; slumping or grate with openings (<1 $m^2$)<br>4 = covered with rock, grate or debris; large opening (>1 $m^2$)<br>5 = no closure and easily recognizable<br>6 = no closure and blind opening |
| Waste Rock Stability<br>0 = no waste rock detected<br>1 = no steel slopes<br>2 = steep slopes (<5 m in height)<br>3 = steep slopes (>5 m in height |
| Gamma Survey<br>Weighted average readings |
| Buildings and Foundations<br>0 = no buildings or foundations<br>1 = foundations only; good condition; level to ground<br>2 = foundation deteriorating; above ground level<br>3 = foundations and buildings; deteriorated; falling debris hazard; fall height hazard |
| Scrap Material<br>0 = no scrap material<br>1 = small amount; no pile<br>2 = moderate amount; small pile <2 m in diameter)<br>3 = large amount; pile (>2 m in diameter) |
| Additional Public Safety Risks<br>A ranking of 0 to 3 can be assigned depending on any special circumstances that may warrant an additional public safety concern. These must be judged on a site specific basis and will be described as needed. |
| **Environmental Risk Scoring** |
| Accumulated Water<br>0 = no water on site<br>1 = small amount; ephemeral<br>2 = small amount; ponded<br>3 = large amount; ponded |
| Liquid Discharge<br>0 = no discharge<br>1 = ephemeral discharge<br>2 = small persistent discharge<br>3 = large persistent discharge |
| Waste Rock Character<br>1 = average gamma reading <2.00 µSv/hr/low acid generating potential<br>2 = average gamma reading >2.00 µSv/hr/medium acid generating potential<br>3 = average gamma reading >2.00 µSv/hr/high acid generating potential |

**Table 3.1 – Cont'd**
**Scoring Summary**

**Environmental Risk Scoring – Cont'd**

Waste Rock/Tailings Character

0 = no hazard
1 = hazard; near body of water
2 = hazard; runoff into body of water
3 = hazard; in body of water

Tailings Characteristics

1 = average gamma reading <2 μSv/hrh/low acid generating potential/covered or low metal/radionuclide content
2 = average gamma reading <2 μSv/hr/low acid generating potential
3 = average gamma reading >2 μSv/hr/medium acid generating potential/low metal and radionuclide content
4 = average gamma reading >2 μSv/hr/high acid generating potential or medium acid generating and high metal/radionuclide content
5 = average gamma reading >2 μSv/hr/high acid generating potential and exposed or high metal/radionuclide content

Scrap Material

0 = no hazard
1 = low threat of contamination (example: bag of cement)
2 = moderate threat of contamination (example: empty chemical containers, product drums)
3 = high threat of contamination (example: mill fines)

Risks to Wildlife

0 = no hazard
1 = possible hazard due to gamma readings, habitat, etc.
2 = hazard; elevated gamma readings, habitat, etc.
3 = ponded water, residual chemicals, habitat, etc.

Additional Hazards to Environment

A ranking of 0 to 3 can be placed here depending on any special circumstances that may warrant an additional environmental concern. These must be judged on a site specific basis and will be described as needed.

# 4.0 Inventory of Sites

As part of the Request for Proposal, the Shield Ecoregion of Saskatchewan Environment provided a list of abandoned sites to be assessed. In addition to the list, consultations with the local Conservation Officer, who is very familiar with the Uranium City region and abandoned sites, was made to determine if any additional sites should be checked.

Table 4.1 provides a list of sites targeted for assessment. Table 4.1 also identifies the sites that were assessed in Year 1 and those requiring assessment in Years 2 and 3. Figure 4.1 shows the locations of the areas of abandoned mines in Saskatchewan.

Initially, 67 sites in northern Saskatchewan were identified as requiring further research and potentially requiring site audits. The 67 sites included 41 sites in the Uranium City area, 6 in the La Ronge area and 20 in the Creighton area. Upon further examination, there may be up to 24 sites in the Creighton region that require assessment.

Figures 4.2 and 4.3 show the locations of sites assessed in Year 2 in the Uranium City and La Ronge regions, respectively. Figures 4.4 shows the locations of sites assessed in Year 1 in the Uranium City region. Figure 4.5 shows the location of sites assessed in Year 1 in the La Ronge and Creighton regions.

A total of 22 sites were assessed during Year 2 program. This included 17 sites in the Uranium City region and 5 sites in the La Ronge region. In addition to the 22 sites in the Uranium City region, an assessment of the Gunnar mine site and Lorado mill site was completed. The two sites were not visited as part of the Year 2 field program, but were assessed based on existing literature and a historical knowledge of the facilities.

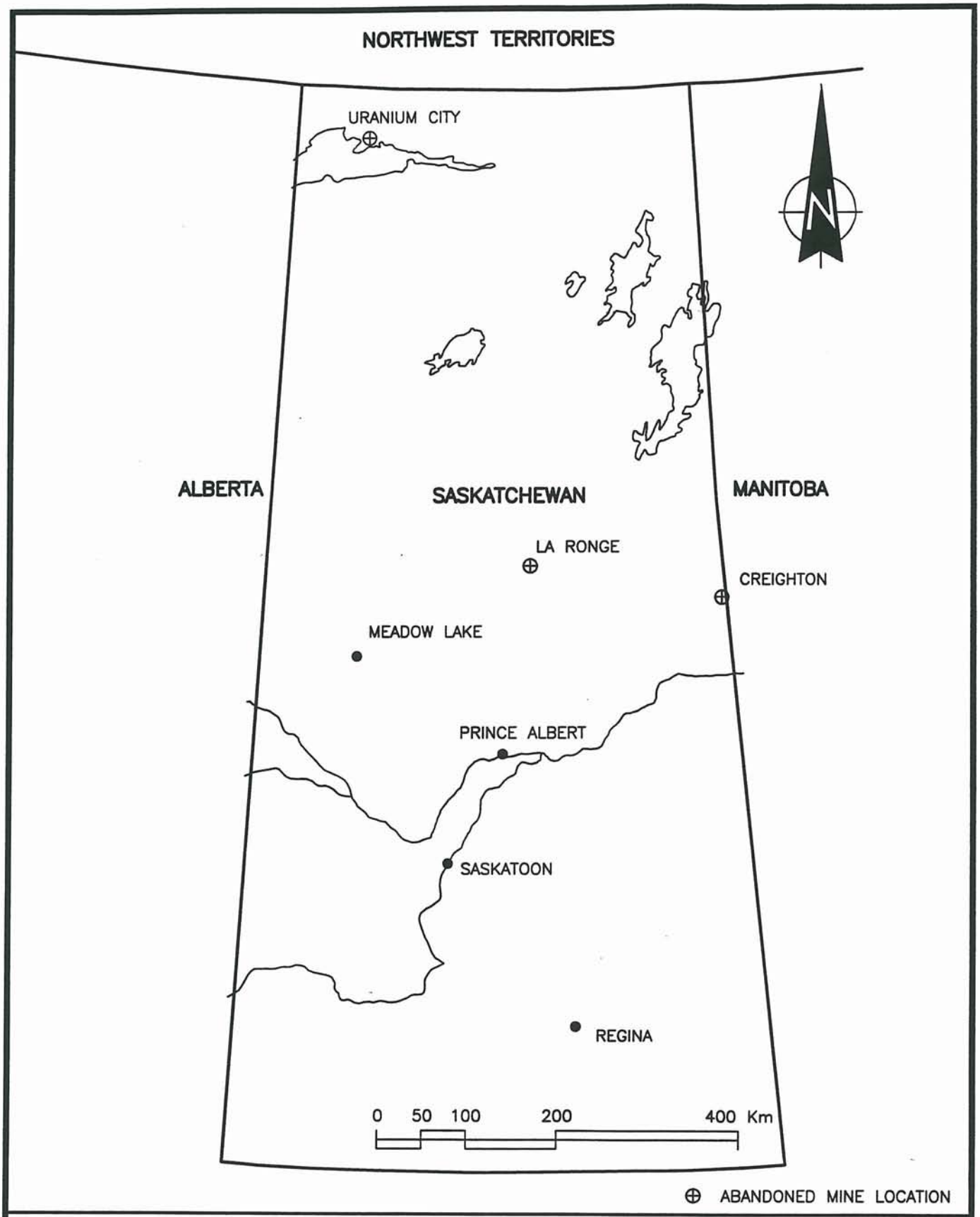
Table 4.2 provides a listing of the sites in the Creighton region to be assessed during the field season (Year 3).

**Table 4.1**
**List of Sites Assessed in Year 1 and Year 2**

| Region | Sites Assessed | |
|---|---|---|
| | Sites Assessed in Year 1 | Sites Assessed in Year 2 |
| **Uranium City** | • Amax Athabasca Uranium Mines Ltd. showing No. 50-CC1-61 | • Baska Uranium Mines Ltd. |
| | • Amax Athabasca Uranium Mines Ltd. showing No. 49-CC1-11 | • Beaverlodge Uranium Mines Ltd. |
| | • Amax Athabasca Uranium Mines Ltd. showing No. 50-CC1-39 | • Caba Uranium Mines Ltd. |
| | • Black Bay Uranium Mines Ltd. | • Consolidated Beta Gamma Mines Ltd./Northshore Developers – Tena Claims |
| | • Cayzor Athabasca Mines Limited. | • Consolidated Nicholson Mines Ltd. |
| | • Consolidated Geta Bamma Mines Limited. | • Don Henry Mines Ltd. |
| | • *Eldorado Nuclear Ltd. – Eagle Mine | • Gulch Mines Ltd. |
| | • Lake Cinch Mines Ltd. | • R.J. Harrison Mines Ltd. |
| | • Cenex Mines Ltd. | • Homer Yellowknife Mines Ltd. |
| | • Lorado Uranium Mines Ltd. (Mine site) | • Jesko Uranium Mines Ltd. |
| | • Meta Uranium Mines Ltd. | • Nesbitt Mining and Explorations Ltd. |
| | • National Exploration Ltd. – Keiller Adit | • New Mylamaque Mines Ltd. |
| | • National Explorations Ltd. – Pat claim, C Zone | • Pitch – Ore Uranium Mines Ltd. – Orb Claims |
| | • Nesbitt-Labine Uranium Mines Ltd. – ABC Mine (Site 1) | • Rix-Athabasca Mines Ltd. – No. 7 Adit |
| | • Nesbitt-Labine Uranium Mines Ltd. – ABC Mine (Site 2) | • Territorial Uranium Mines Ltd. |
| | • Nesbitt-Labine Uranium Mines Ltd. – Eagle Mine | • Box Mine |
| | • Nisto Mines Ltd. | • Athona Mine |
| | • Pitch-Ore Uranium Mines Ltd. | |
| | • Rix-Athabasca Uranium Mines Ltd. – Smitty Mine | |
| | • Rix-Athabasca Uranium Mines Ltd. – Zone 62 | • **Gunnar Mines Ltd |
| | • Rix-Athabasca Uranium Mines Ltd. – Leonard Adit | • Lorado Uranium Mines Ltd. (Lorado Mill site) |
| | • Rix-Athabasca Uranium Mines Ltd. – No. 10 Adit | |
| | • St. Michael Mines Ltd. | |
| | • Strike Uranium Mines Ltd. | |
| | • Uranium Ridge Mines Ltd. | |
| | • Waste Disposal Site #1 – Cayzor Area | |
| | • Waste Disposal Site #2 – Lorado Mill Area | |
| **La Ronge** | • Anglo-Rouyn Mines Ltd. | • Jahala Lake (Lee Lake) |
| | | • La Ronge Uranium Mines Ltd. |
| | | • Pitching Lake |
| | | • Preview Lake Mine |
| | | • Rottenstone Mine |
| **Creighton** | • Western Nuclear Mines Ltd. | |

* The decommissioned Eldorado Nuclear Ltd.-Eagle Mine was assessed as part of the sensitivity analysis for the Year 1 program.

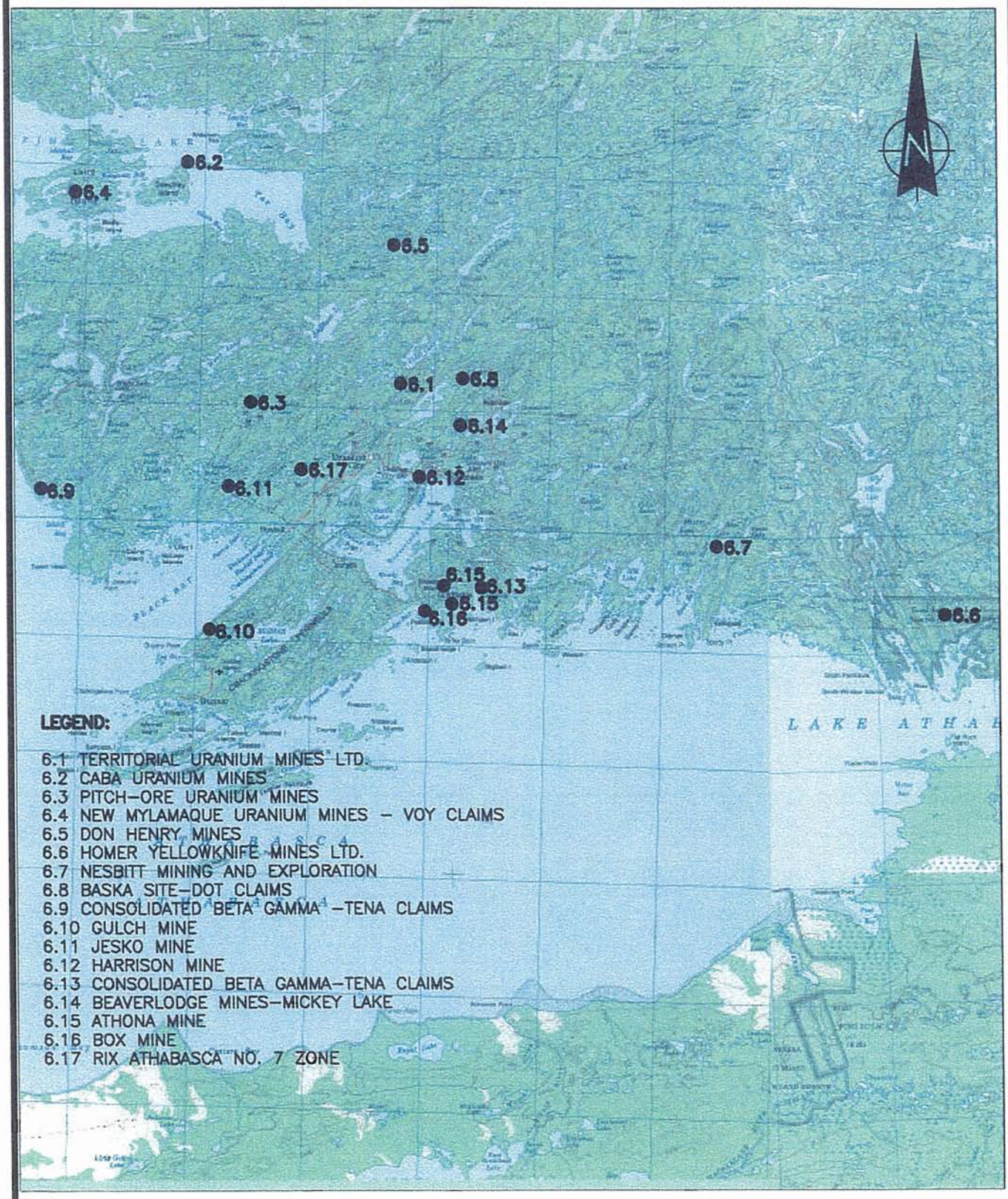
** Assessment consisted of a summary of previously documented conditions. A site inspection was not conducted. Both sites are monitored by Saskatchewan Environment.




# REGIONS OF ABANDONED MINES IN SASKATCHEWAN

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 4.1

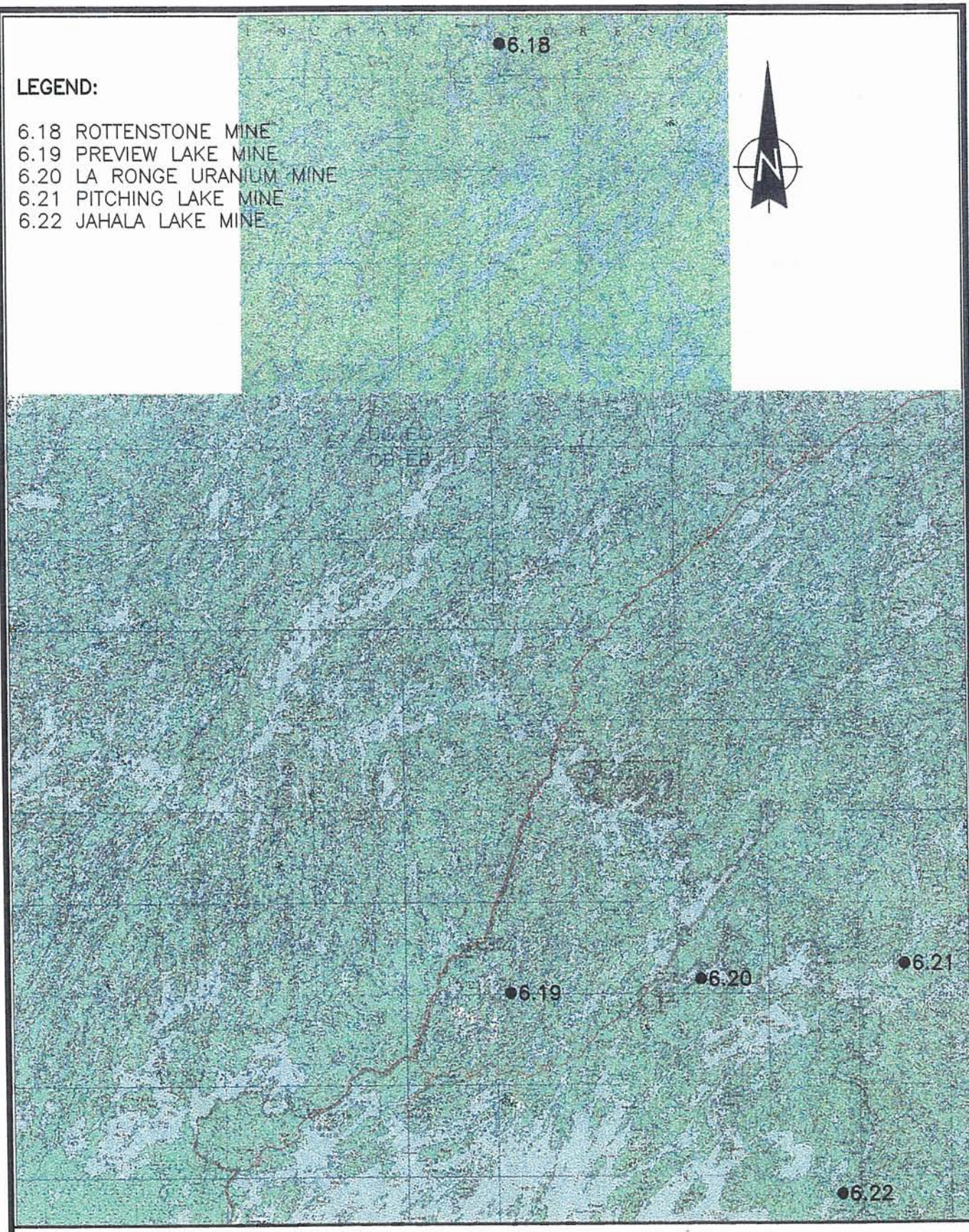
R3160/FIG4.1.DWG




R3160/FIG4.2.DWG

LOCATION OF SITES ASSESSED IN THE URANIUM CITY REGION - YEAR 2

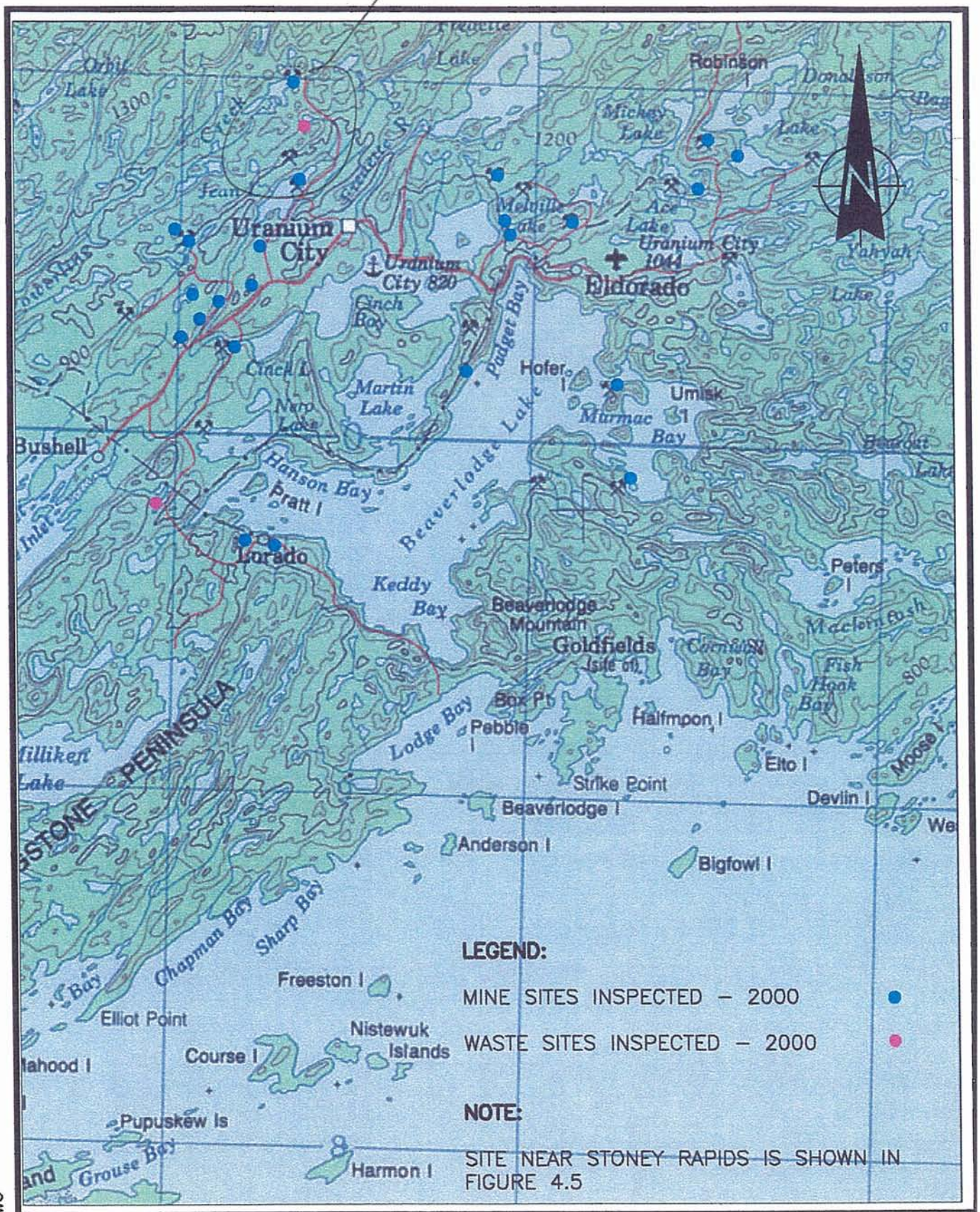
CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 4.2




LOCATION OF SITES ASSESSED IN THE LA RONGE REGION – YEAR 2

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 4.3

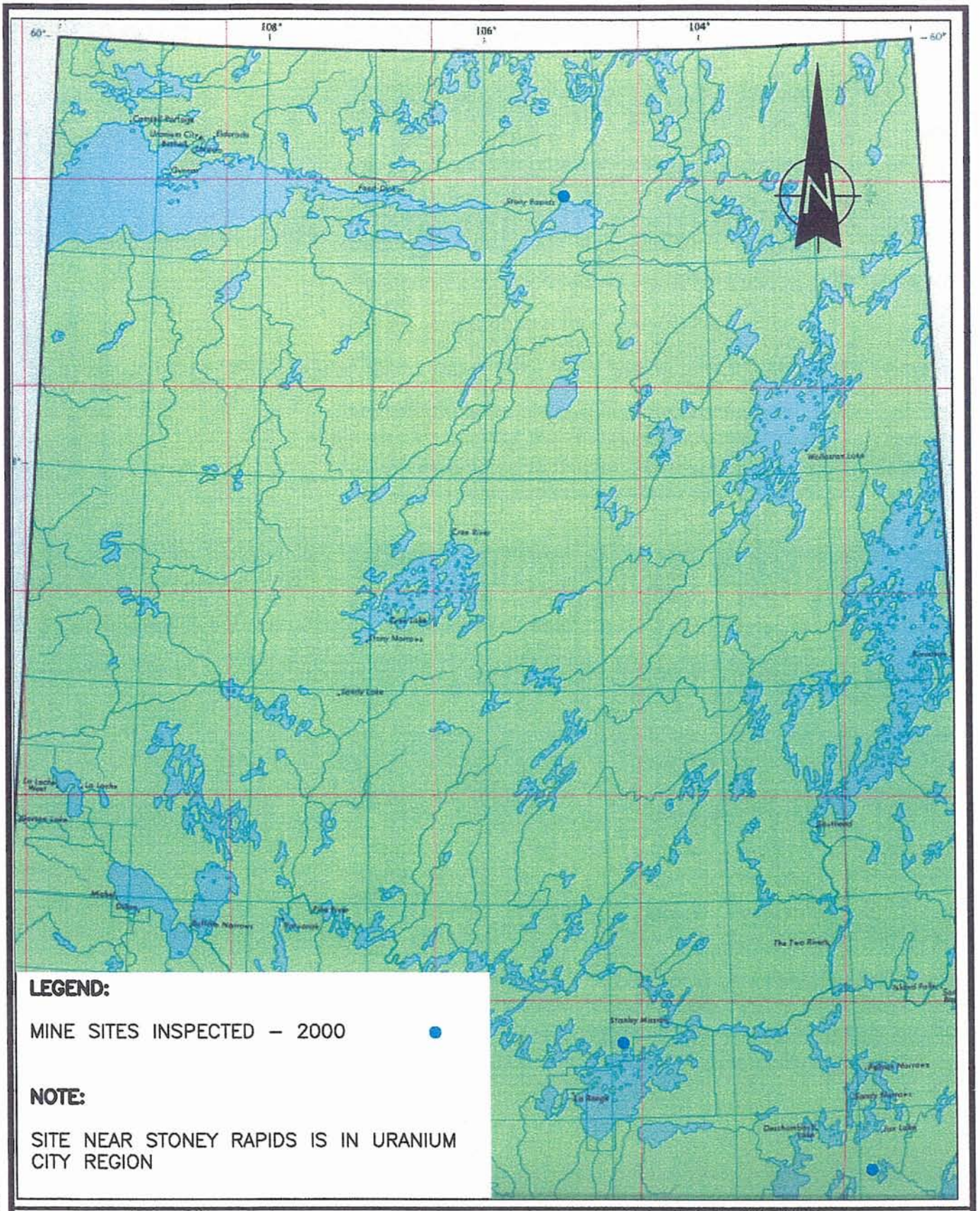
R3160/FIG4.3.DWG




R3160/FIG4.4.DWG

LOCATION OF SITES ASSESSED IN THE URANIUM CITY REGION – YEAR 1

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 4.4




**LEGEND:**

MINE SITES INSPECTED – 2000 ●

**NOTE:**

SITE NEAR STONEY RAPIDS IS IN URANIUM CITY REGION

## LOCATION OF SITES ASSESSED IN THE LA RONGE AND CREIGHTON REGION – YEAR 1

**CLIFTON ASSOCIATES LTD.** **PROJECT NO: R3160** **FIGURE NO: 4.5**

R3160/FIG4.5.DWG

**Table 4.2**
**List of Sites to be Assessed in Year 3**

| Region | Site |
|---|---|
| **Creighton** | • Ace Deposit<br>• Amisk Syndicate Mine<br>• Amisk (Beaver) Gold Mines<br>• Beaver Mine<br>• Birch Lake Mine<br>• Coronation Mine<br>• Flexar Mine<br>• Graham Mine<br>• Hannay (Bessie Island) Deposit<br>• Henning Maloney Mine<br>• Lucky Strike Mine<br>• Phantom Lake Mine<br>• Namew Lake (Saskatchewan Portion Only)<br>• Newcor Mine<br>• Prince Albert Mine<br>• Sonora Deposit<br>• Star Occurrence<br>• Vista (Bootleg) Mine<br>• Waverly Island Occurrence<br>• Wekatch Gold Mines<br>• Dion Lake North Copper Showing and Shaft<br>• SYE/Sunset Exploration Shaft<br>• Bearcat Showing and Prospect Shaft<br>• Otonadah Lake Copper Showing and Exploration Shaft<br>• Laurel Lake North Gold Zone |

Note: Some of the identified sites may not be abandoned and/or may have been decommissioned by the owner/operator. Additional searches will confirm the 'status' of all sites.

# 5.0 Field Program

## 5.1 General

Field activities were completed in two phases. Phase I included examination and assessment of sites in the Uranium City region and Phase II included examination and assessment of sites in the La Ronge region.

Prior to the commencement of field activities, research was completed to acquire data on each site. Efforts were made to determine exact location, history, previous inspections and accessibility.

Field work planning involved establishing schedules, arranging for aircraft to access remote sites, and commissioning Mr. James Augier from Uranium City to assist in inspections by providing guiding services, and vehicles, particularly a boat, to access sites near Uranium City.

Following planning, Clifton Associates personnel flew to Uranium City from Regina, Saskatchewan on 26 September 2001. Site assessments in the Uranium City region were completed during the period 26 September to 03 October 2001. Personnel returned to Regina on 03 October 2001.

For the La Ronge sites, Clifton Associates Ltd. personnel drove from Regina to La Ronge on 16 October 2001. Sites were inspected during the period 17 October to 18 October 2001. Personnel returned to Regina on 19 October 2001.

During inspections, the following information was gathered:

- Location (GPS coordinates in NAD 83 datum-see explanation below for NAD and GPS);
- Site description;
- Background gamma readings at uranium sites;
- Gamma readings on uranium site waste which exceeded background gamma level;
- Water samples where water accumulated in raises, adits or shafts, and field measurements of water samples taken, including pH, temperature and conductivity;
- Site sketch; and,
- Site photographs using an HP 315 digital camera.

At the end of each day, electronic copies of site photographs were downloaded on a DELL Inspiron 4000 laptop computer.

Field work included recording site locations using the 'Global Positioning System' (GPS). This method involves using a compact hand held GPS instrument that receives radio signals from satellites orbiting the earth. When the readings have been received, the GPS unit provides an accurate location reading. Readings can be provided in different formats, including geographic (degrees latitude and longitude) or in a format known as 'Universal Transverse Mercator or 'UTM'. The UTM system is simply a grid reference system.

The use of topographic maps and the GPS system involves what is termed a 'datum'. A datum is basically a reference system that is applied to the surface of the earth which allows us to give a location a reference point in degrees or UTM coordinates as described above. There are two types of datums. The 'North American Datum-27'(NAD 27) is an older version which is currently being phased out because it only had application to North America. The newer version is the 'North American Datum-83' (NAD 83). NAD 83 has worldwide applications.

All readings from the field were taken using the NAD 83 datum and in longitude and latitude reference points. These readings were then converted to obtain NAD 83 UTM coordinates and longitude and latitude reference points in the NAD 27 datum. This was done because some maps still use the NAD 27 reference system (therefore NAD 27 coordinates are required) whereas other maps have been upgraded to the NAD 83 format which require locations in the NAD 83 format. The Saskatchewan Mineral Deposit Index provides locations in UTM and geographic (latitude/longitude) coordinates. All coordinates provided in Section 6.0 are based on measurements taken in the field except for the NAD 27 UTM coordinates which were taken from the Saskatchewan Mineral Deposit Index.

## 5.2 Ranking

Based on the assessments completed in Year 2, all sites have been ranked based on public safety and environmental risks.

Criteria for ranking is provided in Section 3.0.

Rix Athabasca No. 7 Zone could not be located and is therefore not included in the ranking index.

Table 5.1 provides the public safety risk assessment summary. Table 5.2 provides the environmental risk assessment summary. Table 5.3 provides the combined total of the two risks. Table 5.4 provides the ranking of each site. The ranking is based on total points out of 51 (excluding gamma readings). The sites with the highest values have the highest combined site environmental and public safety risks.

Table 5.5 provides the ranking of each site assessed under Year 1 and Year 2 of the assessment program. As can be observed from the table, Gunnar mine/mill site has the highest ranking.

**Table 5.1**
**Public Safety Risk Assessment Summary**

| Mine Site | Accessibility 1-4 | Mine Closure 0-6 | Waste Rock Stability 0-3 | Gamma Survey | Buildings Foundations 0-3 | Scrap 0-3 | Additional Public Safety Risks 0-3 | Total (Out of 22) |
|---|---|---|---|---|---|---|---|---|
| Athona | 2 | 4 | 3 | 0 | 0 | 1 | 0 | 10.0 |
| Baska | 2 | 6 | 2 | 1.0 | 0 | 3 | 1 (open raise on trail) | 15.0 |
| Box | 4 | 5 | 1 | 0 | 3 | 3 | 3 (Numerous hazards and very accessible | 19.0 |
| Beaverlodge-Mickey Lake | 2 | 4.5 | 1 | 0.4 | 1 | 1 | 1 (Open adit and site used for recreation) | 10.9 |
| Caba | 1 | 5 | 1 | 1.1 | 1 | 1 | 1 (Open shaft near shore) | 11.1 |
| Consolidated Beta Gamma | 1 | 5 | 2 | 0.5 | 0 | 1 | 0 | 9.5 |
| Consolidated Nicholson | 1 | 5 | 2 | 0.5 | 3 | 3 | 2 (Steep waste rock, buildings, possible asbestos) | 16.5 |
| Don Henry | 1 | 3 | 1 | 0.4 | 0 | 1 | 0 | 6.4 |
| Gunnar [2] | 3 | 5 | 3 | 2 [1] | 3 | 3 | 3 (Numerous hazards accesible to the public) | 22.0 |
| Gulch | 2 | 5.5 | 3 | 1 | 2 | 3 | 3 (Hazards on tourist route) | 19.5 |
| Homer Yellowknife | 1 | 5.5 | 1 | 0.1 | 0 | 1 | 1 (Open shaft) | 9.6 |
| Jahala | 1 | 5 | 1 | 0.5 | 0 | 0 | 0 | 7.5 |
| Jesko | 1 | 5 | 1 | 1.5 | 0 | 0 | 0 | 8.5 |
| Lorado Mill Site[2] | 4 | 0 | 0 | 3.5 [1] | 1 | 0 | 3 (Unconfined and accessible radioactive tailings) | 10.5 |
| La Ronge | 2 | 4 | 1 | 0.45 | 3 | 2 | 1 (Active exploration site) | 13.45 |
| Nesbitt | 1 | 5 | 2 | 0.1 | 3 | 3 | 0 | 14.1 |
| New Mylamaque | 1 | 5 | 1 | 2.1 | 1 | 1 | 0 | 11.1 |
| Pitching Lake | 1 | 3.5 | 1 | 0 | 2 | 2 | 1 (Partially open shaft near canoe portage) | 10.5 |
| Pitch-Ore | 1 | 0 | 1 | 0.2 | 0 | 1 | 0 | 3.2 |
| Preview Lake | 1 | 4.5 | 2 | 0 | 1 | 2 | 0 | 10.5 |
| Rix-Athabasca | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Rottenstone Mine | 1 | 4 | 1 | 0 | 3 | 3 | 1 (Active exploration site) | 13.0 |
| Territorial | 1 | 5 | 3 | 0.15 | 0 | 1 | 0 | 10.15 |

Notes:
(1) The average gamma levels at Gunnar and Lorado were not measured and have been assumed based on available information.

(2) The Gunnar and Lorado sites were not inspected during the 2002 field work. Assessments presented are based on existing information and knowledge of the site conditions.

**Table 5.2**
**Environmental Risk Assessment Summary**

| Mine Site | Accumulated Water | Liquid Discharges | Waste Rock Character | Waste Rock Location | Tailings Character | Tailings Location re: Environment | Scrap Material | Risks to Wildlife | Additional Environmental Risks | Total (Out of 29) |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0-3 | 0-3 | 1-3 | 0-3 | 1-5 | 0-3 | 0-3 | 0-3 | 0-3 | |
| Athona | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| Baska | 2 | 0 | 1 | 3 | 0 | 0 | 2 | 1.5 | 1 (Waste rock in lake) | 9.5 |
| Box | 3 | 1 | 1 | 1 | 4 | 3 | 3 | 1 | 1 (Unconfined Tailings) | 17 |
| Beaverlodge-Mickey Lake | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 3 |
| Caba | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 4 |
| Consolidated Beta Gamma | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Consolidated Nicholson | 0 | 0 | 2 | 1 | 0 | 0 | 3 | 0 | 1 (Abundance of waste rock and miscellaneious debris) | 6 |
| Don Henry | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 2 |
| Gulch | 3 | 1 | 2 | 2 | 0 | 0 | 1.5 | 1 | 1 (Waste rock close to lake) | 10.5 |
| Gunnar | 3 | 3 | 3 | 2.5 | 5 | 3 | 3 | 3 | 3 (Abundant unconfined radioactive waste) | 25.5 |
| Homer Yellowknife | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| Jahala | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 3 |
| Jesko | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Lorado Mill site | 3 | 2 | 0 | 0 | 5 | 3 | 0 | 2.5 | 3 | 18.5 |
| La Ronge | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 4 |
| Nesbitt | 2 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 1 (water in adit) | 6 |
| New Mylamaque | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 5 |
| Pitching Lake | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 3 |
| Pitch-Ore | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Preview Lake | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 1 | 0 | 5 |
| Rix-Athabasca | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| Rottenstone Mine | 3 | 1 | 3 | 3 | 4 | 3 | 3 | 3 | 0.5 (Unconfined waste near lake) | 23.5 |
| Territorial | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 4 |

**Table 5.3**
**Combined Risk Assessment Score**

| Mine Site | Public Safety Score | Environmental Score | Total Score (out of 51) |
|---|---|---|---|
| Athona | 10 | 3 | 13 |
| Baska | 15 | 10.5 | 25.5 |
| Box | 19 | 18 | 37 |
| Beaverlodge-Mickey Lake | 10.9 | 3 | 13.9 |
| Caba | 11.1 | 4 | 15.1 |
| Consolidated Beta Gamma | 9.5 | 1 | 10.5 |
| Consolidated Nicholson | 16.5 | 7 | 23.5 |
| Don Henry | 6.4 | 2 | 8.4 |
| Gulch | 19.5 | 11.5 | 31 |
| Homer Yellowknife | 9.6 | 2 | 11.6 |
| Jesko | 8.5 | 1 | 9.5 |
| Nesbitt | 14.1 | 7 | 21.1 |
| New Mylamaque | 11.1 | 5 | 16.1 |
| Pitch-Ore | 3.2 | 1 | 4.2 |
| Rix-Athabasca | N/A | N/A | N/A |
| Territorial | 10.15 | 4 | 14.15 |
| Gunnar | 22 | 28.5 | 50.5 |
| Lorado Mill Site | 10.5 | 18.5 | 29 |
| Jahala | 7.5 | 3 | 10.5 |
| La Ronge | 13.45 | 4 | 17.45 |
| Pitching Lake | 10.5 | 3 | 13.5 |
| Preview Lake | 10.5 | 5 | 15.5 |
| Rottenstone Mine | 13 | 23.5 | 36.5 |

**Table 5.4**
**Assessment Ranking**

| Ranking | Mine Site | Total (out of 51) |
|---|---|---|
| 1/22 | Gunnar | 50.5 |
| 2/22 | Box | 37 |
| 3/22 | Rottenstone | 36.5 |
| 4/22 | Gulch | 31 |
| 5/22 | Lorado Mill Site | 29 |
| 6/22 | Baska | 25.5 |
| 7/22 | Consolidated Nicholson | 23.5 |
| 8/22 | Nesbitt | 21.1 |
| 9/22 | La Ronge | 17.45 |
| 10/22 | New Mylamaque | 16.1 |
| 11/22 | Preview Lake | 15.5 |
| 12/22 | Caba | 15.1 |
| 13/22 | Territorial | 14.15 |
| 14/22 | Beaverlodge-Mickey Lake | 13.9 |
| 15/22 | Pitching Lake | 13.5 |
| 16/22 | Athona | 13 |
| 17/22 | Homer Yellowknife | 11.6 |
| 18/22 | Jahala | 10.5 ( Tie) |
| 18/22 | Consolidated Beta Gamma | 10.5 (Tie) |
| 20/22 | Jesko | 9.5 |
| 21/22 | Don Henry | 8.4 |
| 22/22 | Pitch-Ore | 4.2 |
| | Rix Athabasca | Not Available-Not Located |

**Table 5.5**
**Year 1 and 2 Combined Scores**

| Ranking | Site | Year Assessed | Total |
|---|---|---|---|
| 1 | Gunnar | 2 | 50.5 |
| 2 | Box | 2 | 37 |
| 3 | Rottenstone | 2 | 36.5 |
| 4 | Anglo-Rouyn | 1 | 35.1 |
| 5 | Gulch | 2 | 31 |
| 6 | Lorado Mill Site | 2 | 29 |
| 7 | Western Nuclear | 1 | 28.1 |
| 8 | Baska | 2 | 25.5 |
| 9 | Lake Cinch/Cenex | 1 | 25 |
| 10 | Nesbitt-Labine-Eagle Mine | 1 | 24.5 |
| 11 | Consolidated Nicholson | 2 | 23.5 |
| 12 | Waste Disposal Area 2 | 1 | 23 |
| 13 | Consolidated | 1 | 22.5 |
| 14 | Nesbitt | 2 | 21.1 |
| 15 | Nesbitt-Labine-ABC Mine | 1 | 19.4 |
| 16 | Cayzor | 1 | 19 |
| 17 | Uranium Ridge | 1 | 17.5 |
| 18 | La Ronge | 2 | 17.45 |
| 19 | Pitch-Ore | 1 | 17.2 |
| 20 | Black Bay | 1 | 17 |
| 21 | Rix-Athabasca, Zone 62 | 1 | 16.7 |
| 22 | Rix-Athabasca-Smitty Mine | 1 | 16.5 |
| 23 | Meta | 1 | 16.4 |
| 24 | Rix-Athabasca-Leonard Mine | 1 | 16.3 |
| 25 | New Mylamaque | 2 | 16.1 |
| 26 | Lorado Mine Site | 1 | 15.6 |
| 27 | Preview Lake | 2 | 15.5 |
| 28 | St. Michaels | 1 | 15.3 |
| 29 | Caba | 2 | 15.1 |
| 30 | National Exploration-Keiller Adit | 1 | 14.7 |
| 31 | Territorial | 2 | 14.15 |
| 32 | Beaverlodge-Mickey Lake | 2 | 13.9 |
| 33 | Pitching Lake | 2 | 13.5 |
| 34 | National Exploration-Pat Claims | 1 | 13 (Tie) |
| 34 | Athona | 2 | 13 (Tie) |
| 36 | Amax Athabasca (Site 1) | 1 | 12.4 |
| 37 | Homer Yellowknife | 2 | 11.6 |
| 38 | Jahala | 2 | 10.5 ( Tie) |
| 38 | Consolidated Beta Gamma | 2 | 10.5 (Tie) |
| 40 | Waste Disposal Area 1 | 1 | 10.4 |
| 41 | Jesko | 2 | 9.5 |
| 42 | Nisto Mines Ltd. | 1 | 9.4 |
| 43 | Don Henry | 2 | 8.4 (Tie) |
| 43 | Rix Athabasca, No. 10 Adit | 1 | 8.4 (Tie) |
| 45 | Eldorado, Eagle Mine | 1 | 7.9 |
| 46 | Strike Lake | 1 | 6.5 |
| 47 | Amax Athabasca (Site No. 2) | 1 | 6.3 |
| 48 | Pitch-Ore | 2 | 4.2 |
| 49 | Amax Athabasca (Site No.3) | 1 | 4 |
| | Rix Athabasca | 2 | Not Available-Not Located |

# 6.0 Results

This section provides a description of each site assessment. Site descriptions are listed in the order that they were inspected from first to last.

Descriptions of geology and exploration history for each site are taken verbatim from the Government of Saskatchewan Department of Energy and Mines Minerals Deposits Index. The Saskatchewan Mineral Deposit Index provides a description of the sites based on existing information and provides a comprehensive description of the sites based on information contained in relevant reports such as Beck (1969).

Assessments included a general description of waste rock where present. Waste rock mineralogy was examined along with an assessment of whether or not sulphide minerals were present. Generally abundant sulphide minerals suggests that acid rock drainage may be an issue. The absence of visible sulphide minerals or insignificant amounts of visible sulphide minerals suggest that acid rock drainage is not an issue. However, sulphide minerals may occur in non-visible amounts and may therefore be a concern. Where uncertainty exists regarding acid rock drainage, waste rock samples should be analyzed for acid rock generally potential.

## 6.1 Territorial Uranium Mines Ltd.

### 6.1.1 Location and Access

Site Inspection: 26 September 2001

Location: NTS Mapsheet 74N-10-NE
UTM Zone: 12

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 59° 37' 44" lat<br>108° 35' 09" long | 6612558 m N<br>636142 m E | 59° 37' 43" lat<br>108° 35' 06" long | 6612378 m N<br>636052 m E |

* Locations recorded by GPS during Year 2 field program
** Location obtained from Saskatchewan Mineral Deposit Index

The Territorial Uranium mine is located approximately 6 km north-northeast of Uranium City and approximately 250 m south of Coe Lake. Site access is gained by float plane landing on the south shore of the east arm of Coe Lake and walking to the site. Access by float plane may be difficult if the level of Coe Lake drops by 0.5 m or more.

From the air, the site is very easily identified because of barren waste rock spread out from the adit entrance.

The site location is shown in Figure 6.1-1. The site plan is shown in Figure 6.1-2. Photographs 6.1-1 to 6.1-3 show the site.

### 6.1.2 Property Information and Ownership

**Saskatchewan Mineral Deposit Index Number:** 1481

**Property:** (formerly: KIX claim No. 2)

**Location:** Coe Lake, southeast shore

**Owner(s):** Open – see Section 6.1.4 for previous owners

**Commodity:** U **Associated Commodities:** None

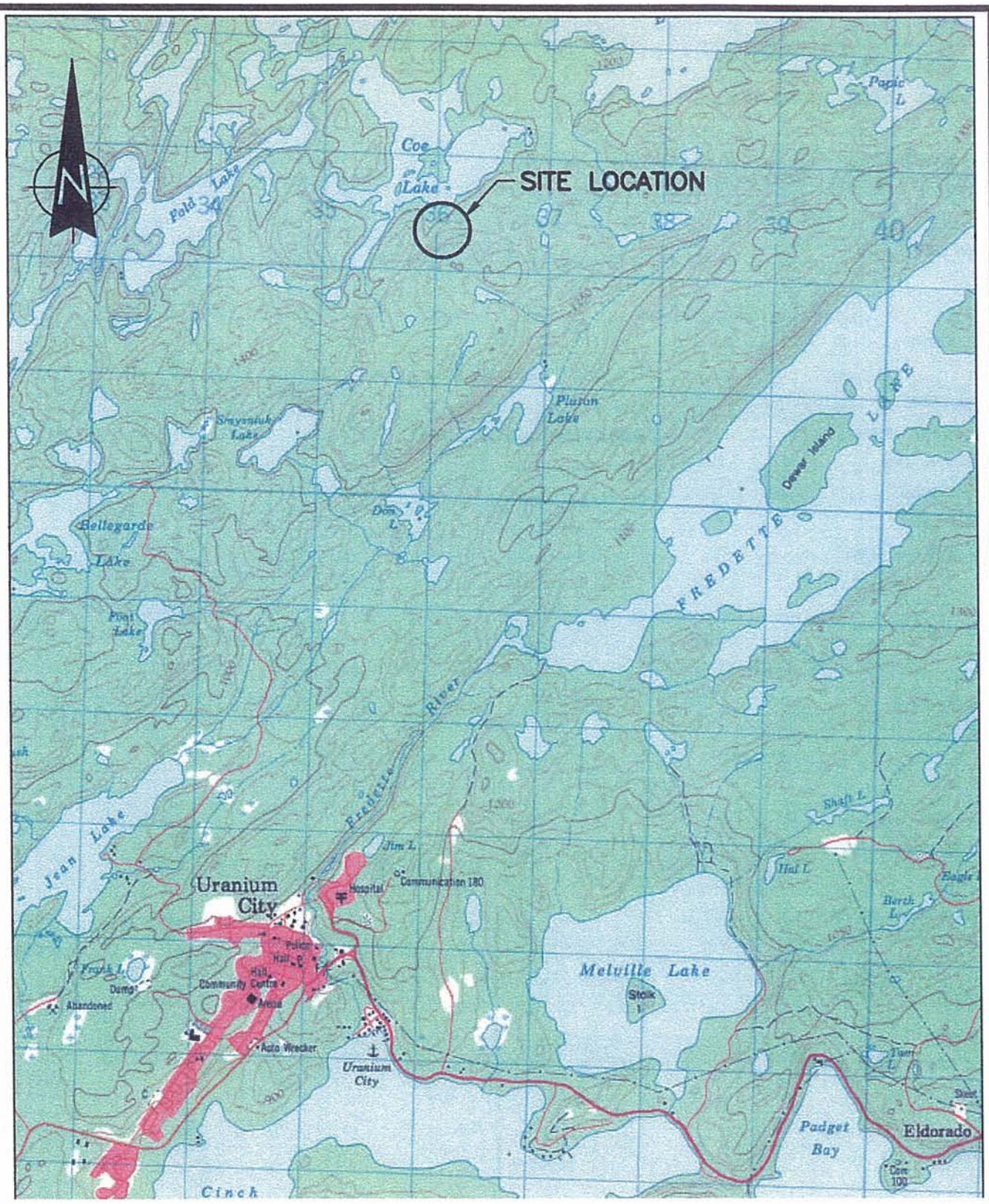
**Deposit Type:** Outcrop

### 6.1.3 Geology

The showing is located 3,200 ft (975 m) east-northeast of the most southerly tip of Coe Lake and consists of a narrow east-west shear zone over 1,200 ft (365.8 m) in length. K. Ashton et al mapped the showing host rocks as unit Qfm or gray to pink to brick red, fine to medium grained, variably sheared quartzofeldspathic gneisses (biotite-feldspar-quartz ± hornblende ± allanite).

The pitchblende occurs as discontinuous veins, narrow fracture fillings associated with carbonates and spotty coatings on joint planes. These structures are related to a fault trending east-west and tested by drifts 1 W and 1 E. This shear zone is in an intermediate paragneiss, part of the Tazin sequence of granite gneiss, granite and felsic paragneiss. Local bands and lenses of chloritized amphibolite are conformable within the gneiss.

The highest assay obtained from trench sampling was 0.65% U3O8 over 1 ft (0.3 m). Bulk sampling yielded a maximum of 1.34% U3O8 equivalent, (Saskatchewan Industry and Resources, 2002).

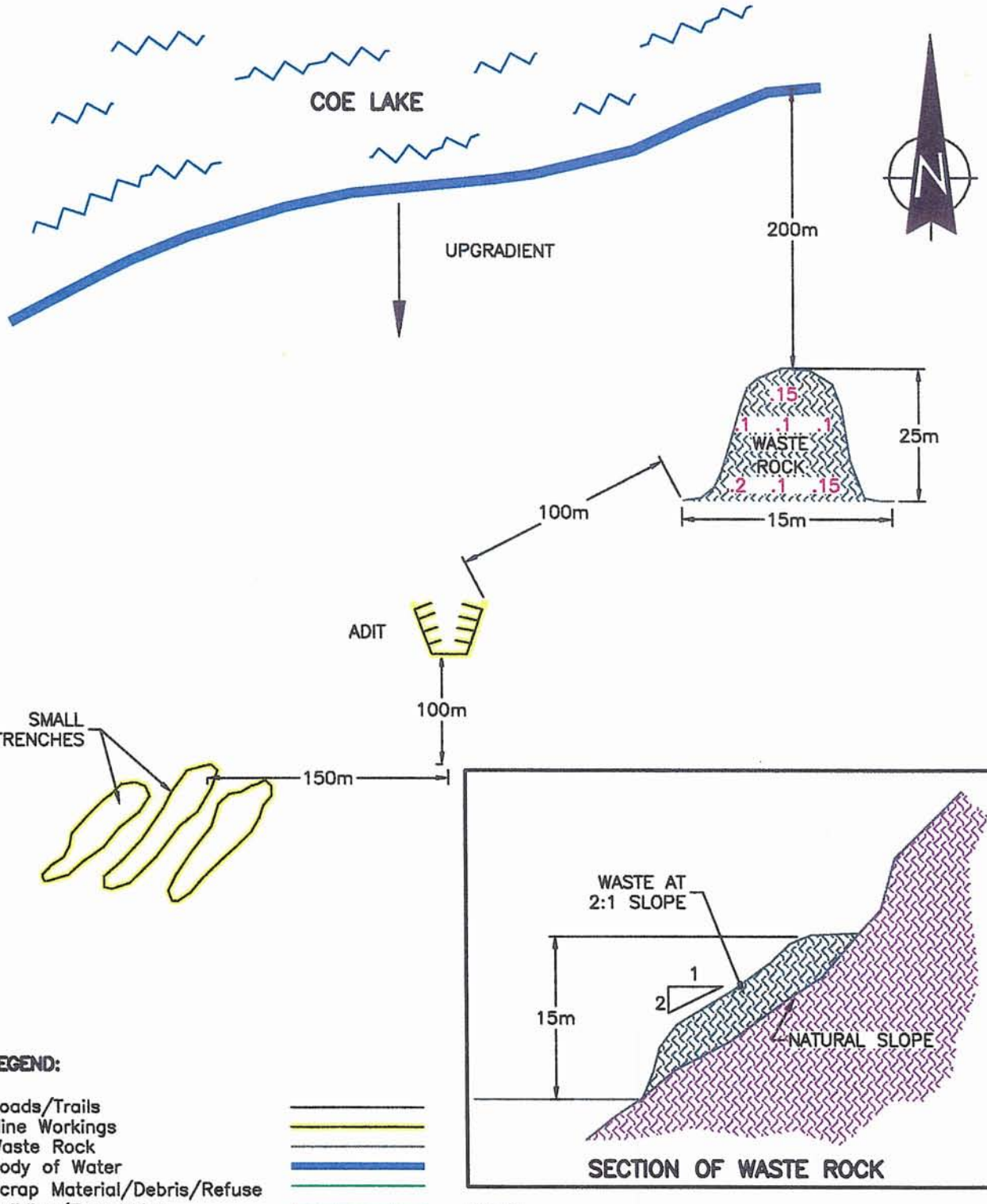



**NOTE:**
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 74 N 10.

# SITE LOCATION PLAN
# TERRITORIAL URANIUM MINE

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.1-1

R3160/FIG6.1-1.DWG




**LEGEND:**

- Roads/Trails
- Mine Workings
- Waste Rock
- Body of Water
- Scrap Material/Debris/Refuse
- Building/Foundation
- Tailings
- Natural Ground Surface
- Gamma Readings (µSv/hr.) 0.25
- Water Sample Location
- Soil Sample Location

**NOTES:**

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESCENCE ONLY.

# TERRITORIAL URANIUM MINE – SITE PLAN
## (NOT TO SCALE – DIMENSIONS ARE APPROXIMATE)

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.1–2

R3160/FIG6.1–2.DWG

### 6.1.4 Exploration History

In 1951, the showing area was covered by Hacker Atompower Mines Ltd. KIX claim 2. Hacker Atompower flew an airborne scintillometer survey over the KIX-LOU-BITE claims in 1951-52.

Between 1953 and 1956, Hacker Atompower completed follow-up geiger surveys over the property. The 52W and DD9 (located 3,300 ft (1,000 m) NE of 52W) zones were located. A series of 31 trenches and detailed geiger surveys outlined the 52W Zone. The 52W Zone is the main mineralized zone at this site.

After completing an airborne scintillometer survey in early 1967, Territorial Uranium Mines Ltd. conducted a program of surface prospecting with trenching and sampling which outlined the showing.

Drilling results were inconclusive so an adit was driven in for a total length of 1200 ft (366 m) including slashes and a raise, (Saskatchewan Industry and Resources, 2002).

### 6.1.5 2001 Inspection-Site Description

Following is the site description as noted during the Year 2 inspection.

#### *6.1.5.1 General*

The site is uphill from the shoreline of Coe Lake. Vegetation is heavy. Topographic relief is considerable in some areas leading up to the adit. There is no evidence of recent visitation, although cut trees in the area suggest a presence about 10 to 15 years ago.

#### *6.1.5.2 Mine Workings*

A dilapidated wooden door is attached to the adit entrance, however, the door is open and access to the adit is easily gained. The adit entrance is about 3.0 m high by 3.0 m wide. The adit roof is extremely unstable as shown by apparent recent rock falls. There was no standing liquid or liquid discharge from the adit. A metal water discharge line extended out from the adit for about 20 m. There was no evidence of liquid discharge in the form of precipitates or absence of vegetation at the end of the line.

*6.1.5.3 Waste Rock*

A delta shaped waste rock pile is located about 100 m northeast of the adit. The waste rock was placed on a steep natural slope and is about 25 m in length and 15 m in width at the widest portion and tapering down to a point. The height of the pile is about 15 m. It is difficult to estimate the total volume, although a rough estimate, based on the apparent dimensions of the pile is 4,000 to 5,000 $m^3$. In addition, historical records indicate the adit was driven for a length of 366 m and includes a raise and slashes. Assuming the adit is 3m x 3m, the volume of insitu rock is 3,294 $m^3$. Although no raise was located, it is assumed that an additional 1,000 $m^3$ of rock was removed for the raise and slashes bringing the insitu total to 4,294 $m^3$. This equates to a broken rock volume of about 6,800 $m^3$.

There was no standing water or liquid discharges from the waste rock. Minor amounts of sulphide minerals were present; however, there was no indication of acid rock drainage.

Background gamma readings for the mine site were about 0.15 µSv/hr.

*6.1.5.4 Debris*

A small amount of metal debris is spread across the site, including about ten 200 L barrels, drill rods, rubber, and an approximately 500 gallon (2,270 litre) water tank. Some of the barrels were sealed and contained a small amount of liquid. Screw caps were rusted to the lid and the type of liquid could therefore not be identified, but it is likely to be fuel.

### 6.1.6 History of Previous Inspections

The site was inspected by Mueller on 18 October 1976. Meuller noted the following:

- The site was last occupied in 1968;
- No ore grade material was shipped from the site;
- A minor amount of debris remains on site including steel drill stem, a water heater tank, a 2.500 litre water tank, 200 litre drums and the remnants of shack tents and a small building;
- Two to three thousand tons (1,820 to 2,730 tonnes) of waste rock in a pile about 20 ft (6.1 m) high and 150 ft (46 m) wide on the hillside;
- The adit is driven at 187° into the hillside;
- Mueller did not locate or note the presence of a raise; and,
- Vegetation is well established with birch and alder trees.

During the 2001 inspection, the shack and building remains were not noted; however, several small trenches were located in Year 2. The trenches were shallow and do not pose a public safety or environmental concern.

### 6.1.7 Risk Assessment Ranking

| | |
|---|---|
| Public Safety Assessment | 10.15 |
| Environmental Assessment | 4 |
| Combined Total Assessment | 14.15 |
| Ranking | 13/22 |

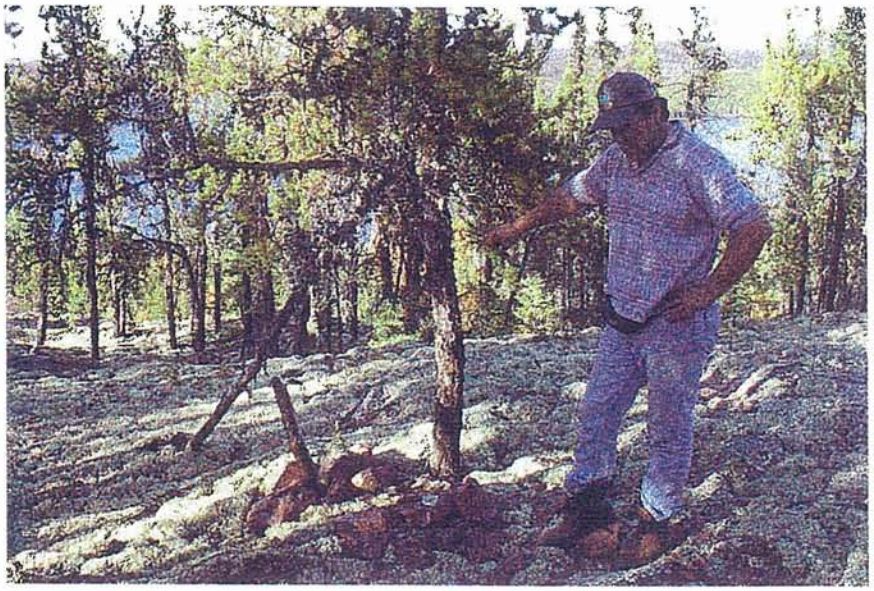
### 6.1.8 Recommended Follow-up

The site does not pose significant environmental risk. It is about 150 m above lake level and about 250 m inland from Coe Lake. Therefore, there is little chance of discharges contaminating the lake, particularly given there is no evidence of appreciable amounts of liquid discharge from either the adit or waste rock piles. The waste rock does not present an acid drainage issue.

The most significant issue is the safety concerns associated with the adit and the steep side slopes of the waste rock. Remedial action should concentrate on blasting or sealing the adit closed and smoothing the sides of the waste rock.

Debris should be consolidated and placed in the adit prior to blasting, or burying with waste rock. Liquid in the barrels should be removed from the site and properly disposed of, prior to burying the barrels.

Photo 6.1-1 Old Claim Stakes Near Waste Rock Pile September 26, 2001



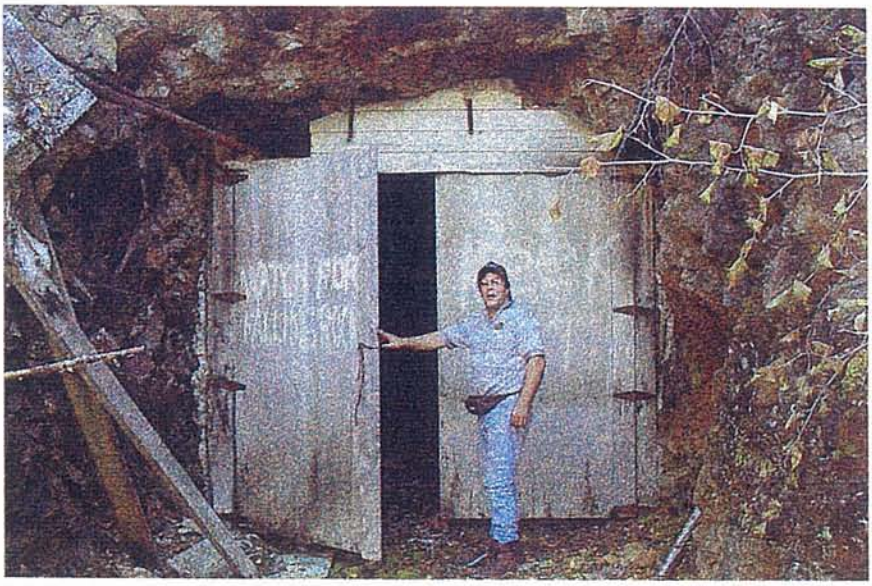
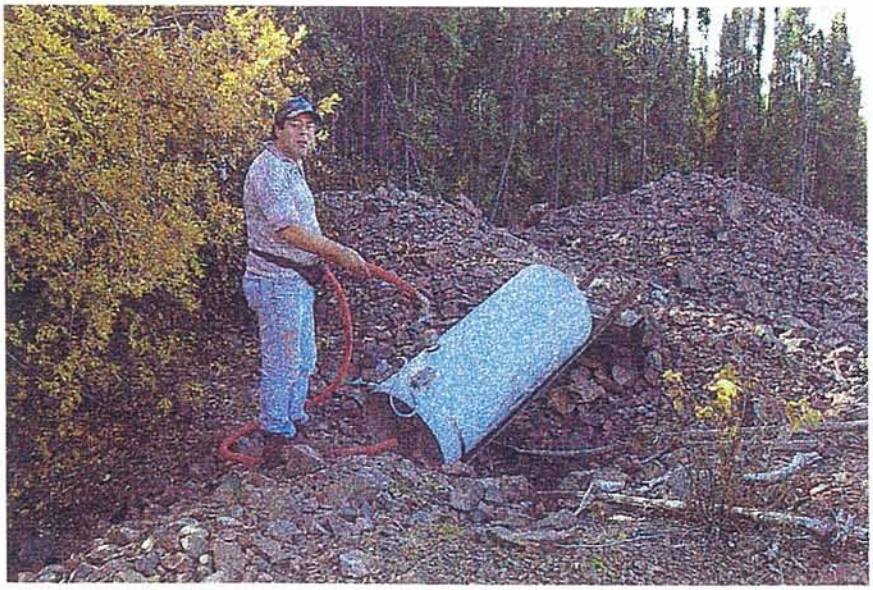


Photo 6.1-2-Territorial Adit Entrance September 26, 2001

Photo 6.1-3-Debris and Waste Rock at Territorial Site September 26, 2001



## 6.2 Caba Uranium Mines

### 6.2.1 Location and Access

Site Inspection: 26 September 2001

Location: NTS Mapsheet 74N-15-SW
UTM Zone: 12

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 59° 47' 19" lat<br>108° 54' 42" long | 66297/6 m N<br>617212 m E | 59° 47' 18.5" lat<br>108° 54' 39" long | 6629867 m N<br>617782 m E |

* Locations recorded by GPS during Year 2 field program
** Location obtained from Saskatchewan Mineral Deposit Index

The site is accessible by float plane on Tazin Lake near the northwest tip of Dewdney Island.

The site location is shown in Figure 6.2-1. The site plan is shown in Figure 6.2-2. Photographs 6.2-1 to 6.2-6 show the site.

### 6.2.2 Property Information and Ownership

**Saskatchewan Mineral Deposit Index Number:** 1546

**Property:** (formerly: CBS 495; B-16 mineral claim)

**Location:** Dewdney Island - northwest shore

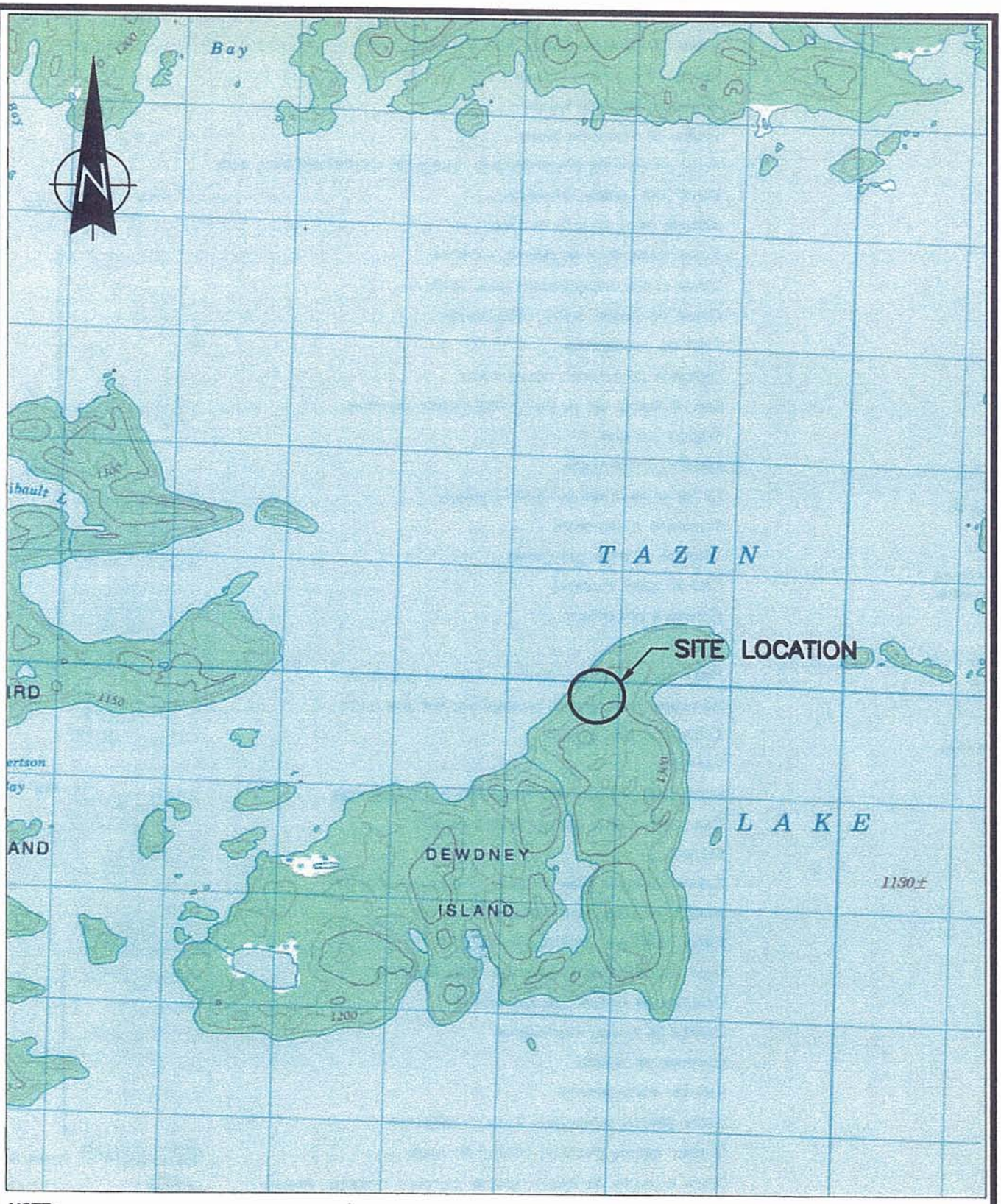
**Owner(s):** Open – see Section 6.2.4 for previous owners

**Commodity:** U **Associated Commodities:** None

**Deposit Type:** Outcrop

### 6.2.3 Geology

The showing is located on the northwest shore of Dewdney Island. The showing consists of thin seams of visible pitchblende mineralization. Rock units in the area display intense maroon coloured hematization. The drift covered shaft area was mapped by F. Koster as being underlain by unit 9 or Martin Formation hematized, retrograde metamorphosed, and mylonitized granodiorite. It is locally unconformably overlain by conglomerate of the Martin Formation. Much of the area is covered by glacial drift, (Saskatchewan Industry and Resources, 2002).

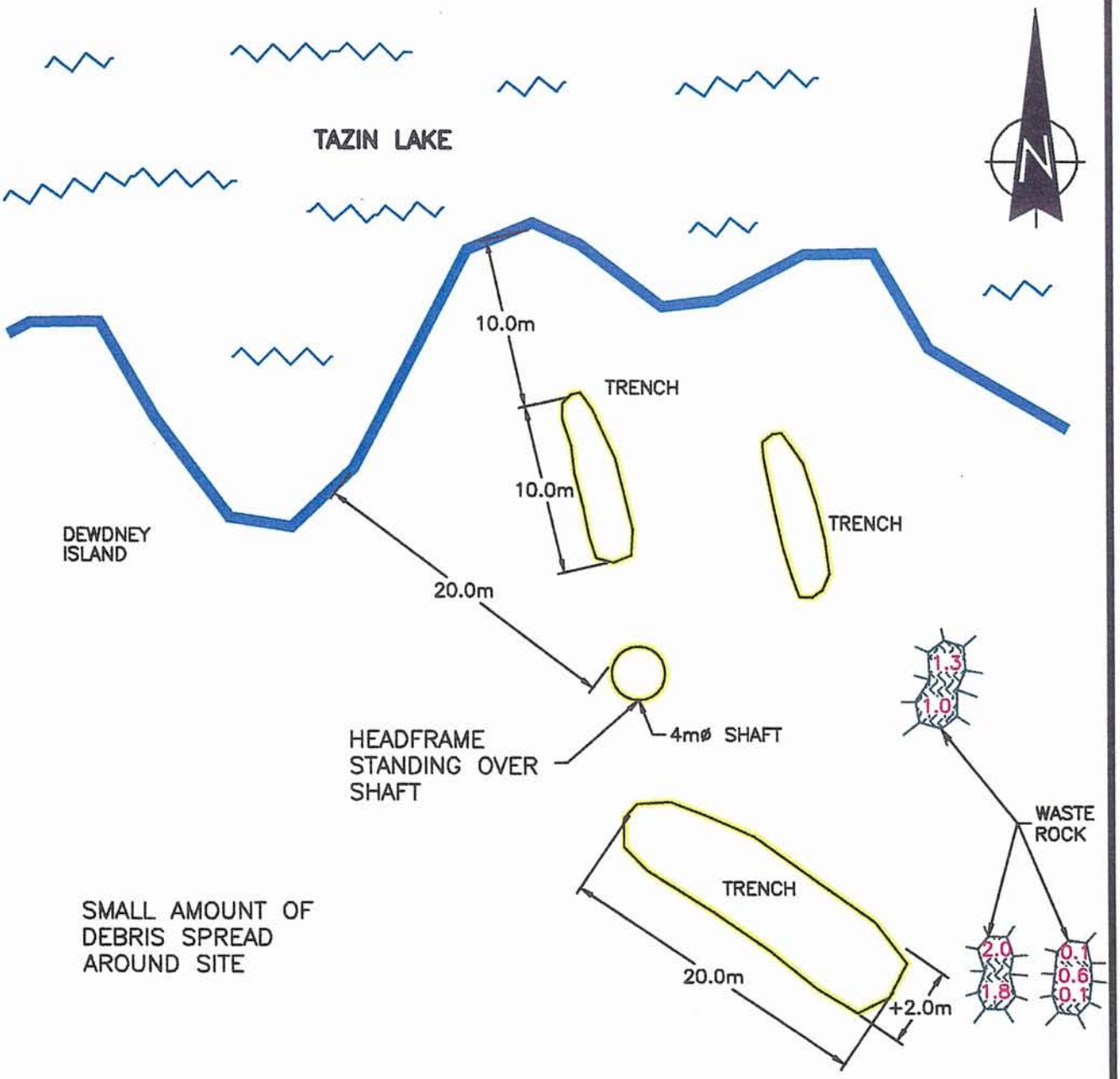



**NOTE:**
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 74 N 15.

# SITE LOCATION PLAN
# CABA URANIUM MINE

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.2-1

R3160/FIG6.2-1.DWG




**LEGEND:**

| | |
|---|---|
| Roads/Trails | |
| Mine Workings | |
| Waste Rock | |
| Body of Water | |
| Scrap Material/Debris/Refuse | |
| Building/Foundation | |
| Tailings | |
| Natural Ground Surface | |
| Gamma Readings (µSv/hr.) | 0.25 |
| Water Sample Location | |
| Soil Sample Location | |

**LEGEND:**

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

# CABA URANIUM MINE – SITE PLAN
## (NOT TO SCALE DIMENSIONS ARE APPROXIMATE)

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.2–2

R3160/FIG6.2–2.DWG

### 6.2.4 Exploration History

Caba Uranium Mines Ltd. located the showing on the B-16 mineral claim. Trenching was carried out and an exploration shaft was sunk to a depth of 100 ft (31 m) on a bearing of 037° and an incline of 60°. The year of this work is not recorded. No results were recorded.

By 1969, the showing was within CBS 495. Noram Resources Ltd. completed 5 trenches well southwest of the showing. No results were given drift, (Saskatchewan Industry and Resources, 2002).

### 6.2.5 2001 Inspection-Site Description

Following is the site description as noted during the Year 2 inspection.

#### *6.2.5.1 General*

The site is on the northwest shoreline of Dewdney Island on Tazin Lake. Although there is a wooden log structure headframe about 20 m from the shoreline, it is not readily apparent because it blends in with the backdrop of large trees and thick vegetation.

The site is accessible by float plane and a short walk inland.

There is no indication of recent visitation at the site.

The area is relatively flat with minimal topographic relief. Vegetation is moderate with jackpine, birch, alder and a thick under story dominating the landscape.

#### *6.2.5.2 Mine Workings*

The mine workings consist of a shaft located about 20 m from the shore of Tazin Lake. The shaft is about 4 m in diameter and is filled with water to about 5 m below surface. The water level appears to correspond to the water level of Tazin Lake which suggests a hydraulic connection between the lake and shaft. It was not possible to acquire a water sample due to dangerous conditions at the edge of the shaft. A dilapidated ladder extends from the surface into the shaft.

A wooden log headframe is situated over the shaft opening. The headframe is showing signs of deterioration.

According to Saskatchewan Industry and Resources records, the shaft was sunk to a depth of about 30 m (100 ft) at an incline of 60°.

Generally, the shaft is a public safety hazard; however, given the remote location of the site, there is limited opportunity for accidents to occur.

Several small trenches are located near the shaft. The most significant trenches are 10 to 20 m long, 4 to 5 m wide and about 2 m deep.

*6.2.5.3 Waste Rock*

Waste rock has been placed along the edges of the trenches. The waste rock is coarse and angular. There is no apparent standing water or seepage associated with the waste rock.

The waste rock is a dark ultra-mafic or granidioritic rock. No visible sulphide minerals were noted. Much of the waste rock is heavily hematized.

There is no apparent waste rock associated with the shaft. It appears the shaft waste rock has been spread around the site. A thick in-growth of vegetation has obscured the surface and the only apparent waste rock is the material that was excavated from the trenches.

The total volume of broken waste rock is about 1,000 $m^3$.

Gamma readings of the waste rock varied from 0.1 to 2.0 µSv/hr. The average gamma reading for the site was about 1.1 µSv/hr.

*6.2.5.4 Debris*

There is a small amount of debris scattered around the shaft, including tin cans, rubber hoses, and a small amount of steel cable.

### 6.2.6 History of Previous Inspections

There are no records of previous inspections of this site.

### 6.2.7 Risk Assessment Ranking

| | |
|---|---|
| Public Safety Assessment | 11.1 |
| Environmental Assessment | 4 |
| Combined Total Assessment | 15.1 |
| Ranking | 12/22 |

Given the presence of the open shaft near the shoreline, the public safety assessment included attributing one point under the "additional public safety risks category".

### 6.2.8 Recommended Follow-up

The site is in a remote location and does not present a significant public safety threat. There is a threat to wildlife that fall into the shaft because escape would be impossible.

Any remediation work should focus on dismantling or burning down the headframe, pushing the debris into the shaft, and covering the shaft with a secure concrete cap.

Waste rock adjacent to the trenches should be pushed back into the trenches and graded.

There appear to be little, if any, environmental concerns. The only potential concern is the quality of water in the shaft and whether or not the shaft water is connected to Tazin Lake. During any future visits to the site, attempts should be made to acquire a sample of the shaft water; however, there is little that could be done to remediate poor water quality in the shaft if a hydraulic gradient exists between the lake and shaft.

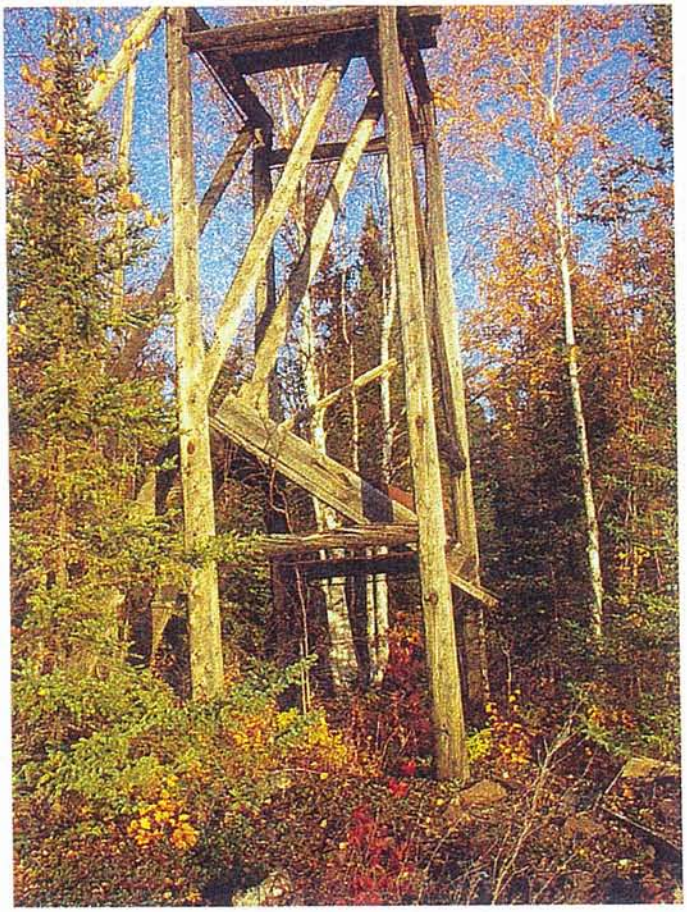


Photo 6.2-1 Caba Headframe
September 26, 2001

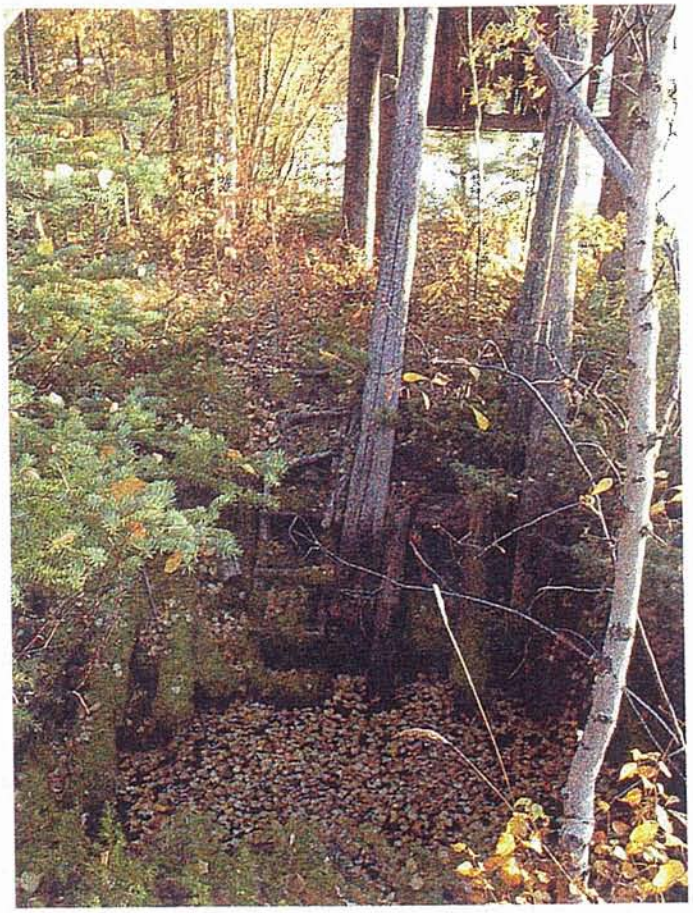


Photo 6.2-2 Caba Shaft Opening
September 26, 2001

Photo 6.2-3 Caba Shaft Opening
September 26, 2001

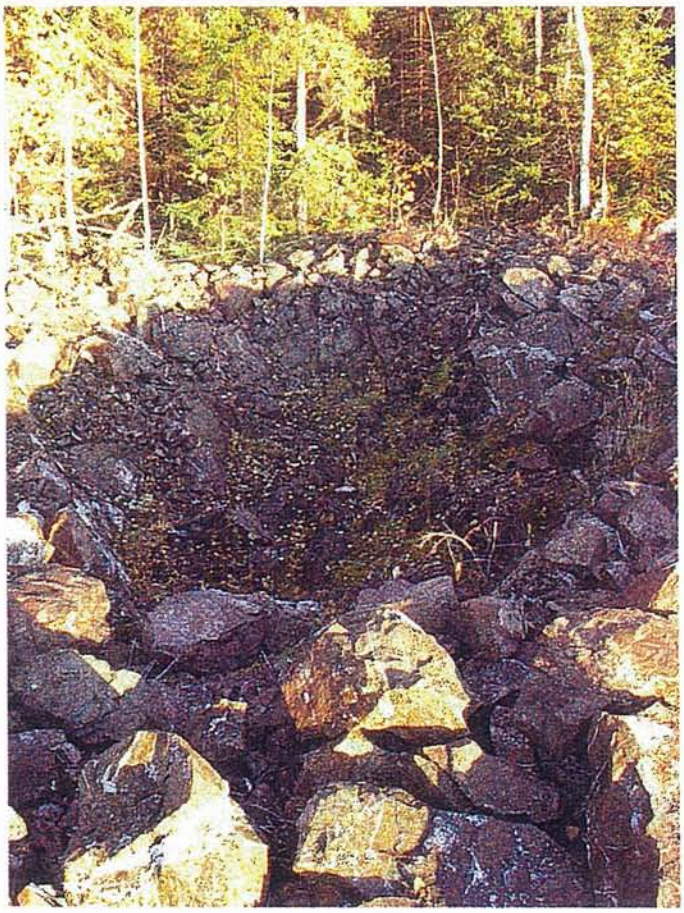


Photo 6.2-4 Caba Trench
September 26, 2001

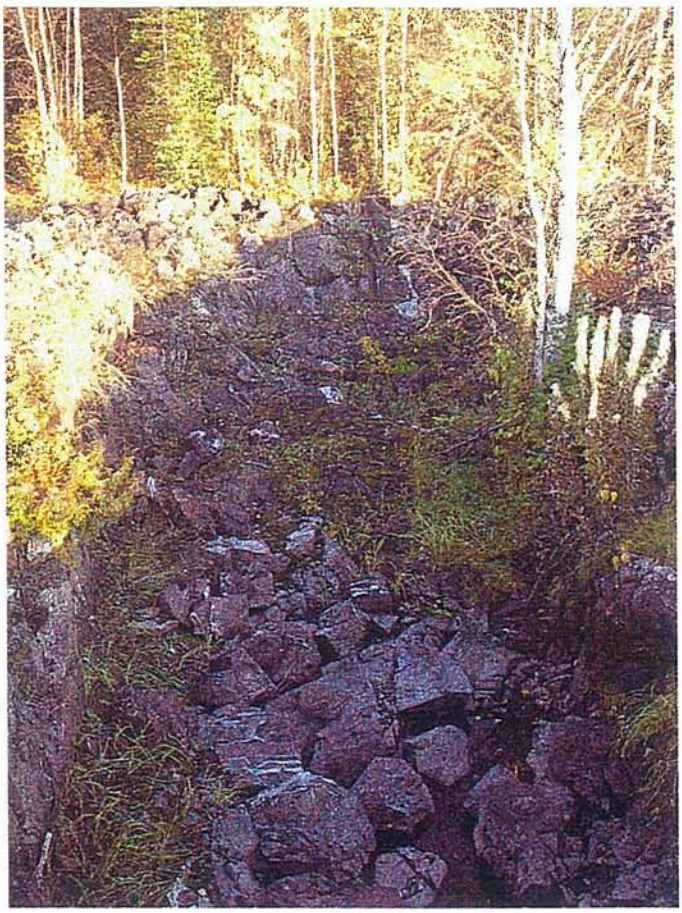


Photo 6.2-5 Caba Trench
September 26, 2001

Photo 6.2-5 Caba Trench
September 26, 2001

## 6.3 Pitch-Ore Uranium Mines

### 6.3.1 Location and Access

Site Inspection: 27 September 2001 and 28 September 2001

Location: NTS Mapsheet 74N-10-SW
UTM Zone: 12

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 59° 36' 06" lat<br>108° 46' 41" long | 6609149 m N<br>625406 m E | 59° 36' 05" lat<br>108° 46' 38" long | 6608871 m N<br>625147 m E |

* Locations recorded by GPS during Year 2 field program
** Location obtained from Saskatchewan Mineral Deposit Index

The Pitch-Ore site is located on the northwest shore of Augier Lake and about ten kilometers northwest of Uranium City. The site is accessible by float plane landing on Augier Lake.

The site location is shown in Figure 6.3-1. The site plan is shown in Figure 6.3-2. Photographs 6.3-1 and 6.3-2 show the site.

Two attempts were made to locate the site. Some camp debris was found, but the shaft was not definitely located. The recorded location of the site is only about 50 m off the north shore of Augier Lake, and should therefore be relatively easy to locate. An extensive rock fall from a cliff face near the site appears to have covered the site.

### 6.3.2 Property Information and Ownership

**Saskatchewan Mineral Deposit Index Number:** 1451

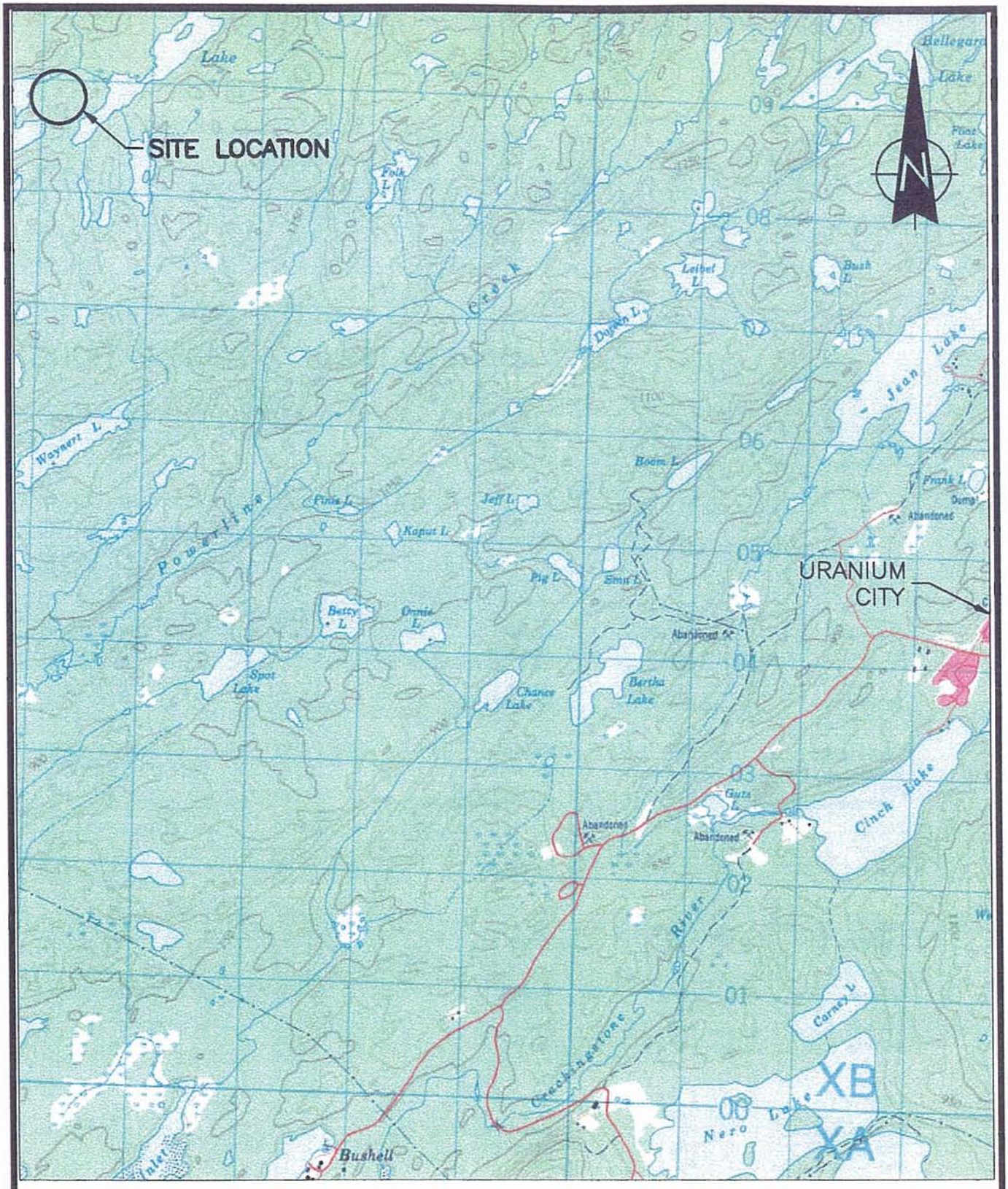
**Property:** (formerly: CBS 5353; ORB claims; PP Concession)

**Location:** Augier Lake area

**Owner(s):** Open – see Section 6.3.4 for previous owners

**Commodity:** U **Associated Commodities:** None

**Deposit Type:** Drillhole

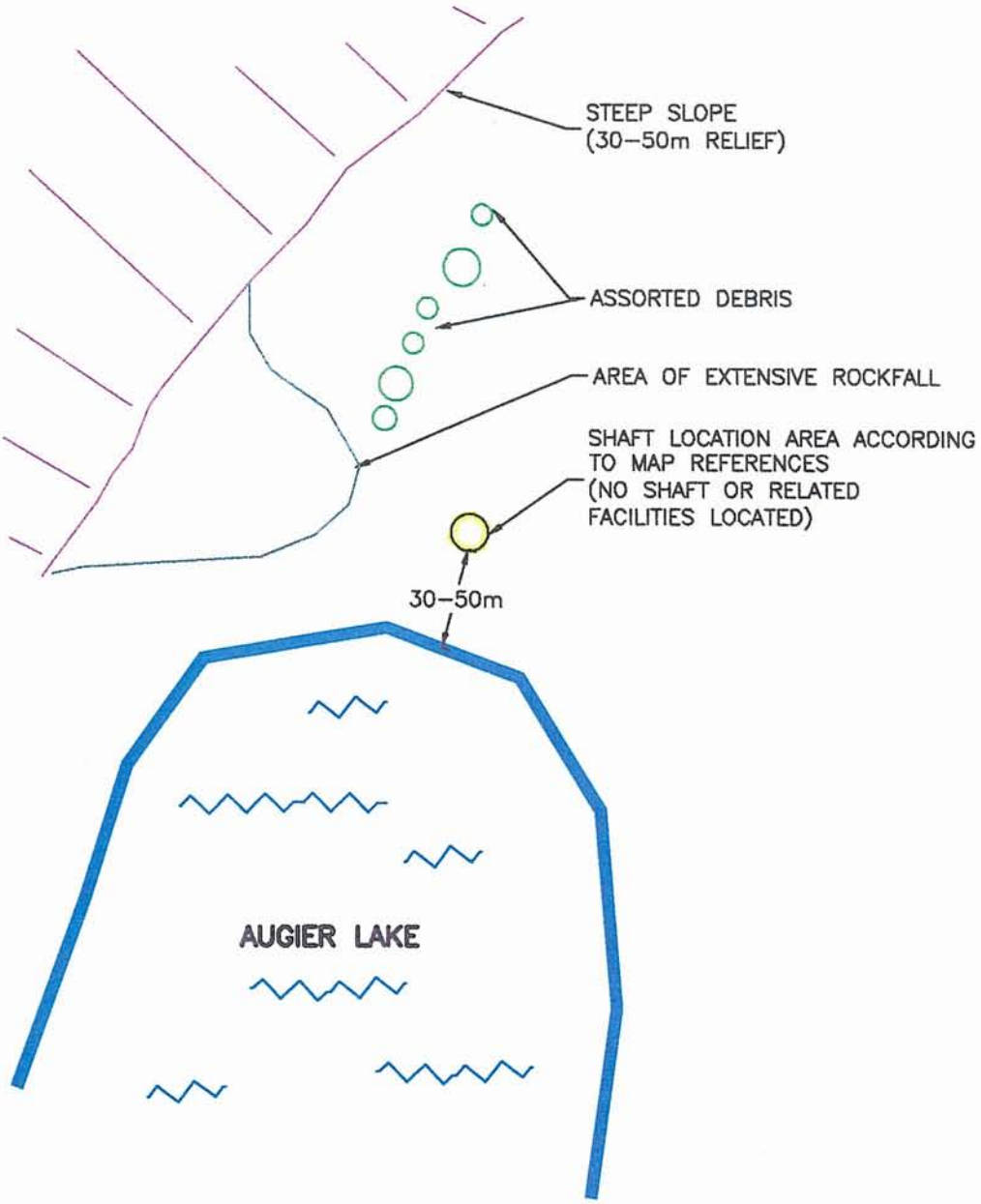



**NOTE:**
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 74 N 10.

# SITE LOCATION PLAN
# PITCH ORE URANIUM MINE

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.3-1

R3160/FIG6.3-1.DWG




**LEGEND:**

Roads/Trails
Mine Workings
Waste Rock
Body of Water
Scrap Material/Debris/Refuse
Building/Foundation
Tailings
Natural Ground Surface
Gamma Readings (μSv/hr.) 0.25
Water Sample Location
Soil Sample Location

**LEGEND:**

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

# PITCH ORE URANIUM MINE – SITE PLAN
## (NOT TO SCALE – DIMENSIONS ARE APPROXIMATE)

**CLIFTON ASSOCIATES LTD.** **PROJECT NO: R3160** **FIGURE NO: 6.3–2**

R3160/FIG6.3–2.DWG

### 6.3.3 Geology

Pitch-Ore Uranium Mine's zone 6A is located at the north end of Augier Lake and slightly west of the southern end of Orbit Lake.

The showing area, as mapped by K. Ashton et al, is underlain by unit Qfm or gray to pink to brick red, fine-to medium-grained, variably sheared quartzofeldspathic gneiss (biotite feldspar-quartz ± hornblende ± allanite) with minor pre D-2 diabase dykes.

The main deposit on the claims, named Zone 6A, is on the north limb of a tight, northeast plunging anticline in amphibolite and red-banded paragneiss. A northeast-trending fracture zone, from 2 to 4 ft (0.6 to 1.2 m) wide, in amphibolite is filled with carbonate, quartz, and chlorite with minor amounts of pitchblende and pyrite. The zone can be traced on surface for a strike length of 300 ft (91.4 m) and passes into a small lake to the northeast and under muskeg to the southwest.

Nine channel samples were taken across the zone and returned an average of 0.336% U3O8 across 26 ft (7.9 m) for a length of 300 ft (91.4 m). Diamond drill holes were generally disappointing; the core was lost in many of the holes and the best assay return from drill core was 0.1% U3O8 across 3 ft (0.9 m). A few of the holes returned high geiger-probe readings. Underground exploration on the 50 ft (15.2 m) horizon showed that only the southwestern part of the vein is significantly radioactive and work outlined a small pod of ore 58 ft (17.7 m) long by 1.5 ft (0.5 m) wide was outlined, (Saskatchewan Industry and Resources, 2002).

### 6.3.4 Exploration History

Prior to the 1950's the ORB Claims, Group No. 1 was covered by the PP Concession worked by Orbit Uranium Developments Ltd.

The claims were acquired by Pitch-Ore Uranium Mines Ltd. in October 1953 after sampling and shallow diamond drilling by the previous owners had yielded inconclusive results. During 1953 to 1954, the company drilled a further 18 holes totaling 4,705 ft (1434.1 m), but again, inconclusive results were obtained.

In 1955, an inclined shaft was put down to intersect the zone at a vertical depth of 50 ft (15.2 m) and 138 ft (42.1 m) of drifting was carried out along the vein. Insufficient ore reserves were outlined and interest in the property lapsed. A small amount of high-grading was done on the showing in 1958 to 1959.

Channel samples and drill core samples were taken across the zone and returned the values listed above.

In 1966, Mokta Canada Ltd. re-staked the property. Between 1966 and 1968, Mokta completed an airborne scintillometer survey and follow-up ground surveys over the deposit.

By 1975, the showing was within disposition CBS 5353. In this year, Mr. A. Frame sampled existing stockpiles on the site. No results were given, (Saskatchewan Industry and Resources, 2002).

### 6.3.5 2001 Inspection-Site Description

Following is the site description based on the 2001 site inspection.

#### *6.3.5.1 General*

Attempts were made on 27 September and 28 September to locate facilities of the site. Both attempts were unsuccessful. The recorded location of the site is very close to Augier Lake and should therefore be easy to locate; however, an extensive rock fall appears to have covered the mine site and no facilities were definitely located. Mr. J. Augier assisted with the inspection on 28 September and believes that the site has in fact been covered by a rock fall. Mr. Augier worked at the site in the 1960's and is familiar with the site location.

Background gamma readings for the area were 0.01to 0.30 µSv/hr with an average reading of about 0.17 µSv/hr for the presumed mine site.

#### *6.3.5.2 Debris*

A small amount of camp debris (rusted tin cans and an old wood stove) were located near the recorded site location.

#### *6.3.5.3 Vegetation*

Vegetation in the area is moderately thick with pine and birch trees dominating the area. A moderate under story exists.

### 6.3.6 History of Previous Inspections

Mueller (1976 to 1977) inspected the site on 17 October 1977. At the time, the site was held by Mr. A Frame of Uranium City. Mueller reports that at the time of high grading, the site was held by Pitch-Ore Uranium Mines Ltd. Only a few tons of ore was shipped from the site.

Mueller reported that about 300 tons (273 tonnes) of waste rock was on site. A small rail line was located on top of the waste pile from the shaft to the water edge for a total track length of 200 ft (60 m).

Debris on site included an old bucket hoist, a few gasoline drums and some iron rails. A small rotted and collapsed shack was located about 800 ft (244 m) northwest of the shaft.

Surface workings consisted of two large trenches about 30 ft (9 m) long, 4 ft (1.3 m) deep and 5 ft (1.5 m) wide plus several much smaller trenches in the area. The inclined shaft was constructed in 1955 to a depth of 50 ft (15 m) and 138 ft (42 m) of lateral work. Mueller reported that the shaft opening was about 10 by 10 ft (3 by 3 m) and was covered by a platform of plywood and rotting birch trees. The platform was collapsed inward at the time of Mueller's inspection. There was no apparent water entering or discharging from the shaft.

### 6.3.7 Risk Assessment Ranking

Assuming the shaft area has been covered by waste rock, the following ranking applies.

| | |
|---|---|
| Public Safety Assessment | 3.2 |
| Environmental Assessment | 1 |
| Combined Total Assessment | 4.2 |
| Ranking | 22/22 |

### 6.3.8 Recommended Follow-up

Assuming that the site has in fact been covered by the rock fall, there is no follow-up required. A follow-up inspection of the area should be done in the future to confirm that the site has been covered.

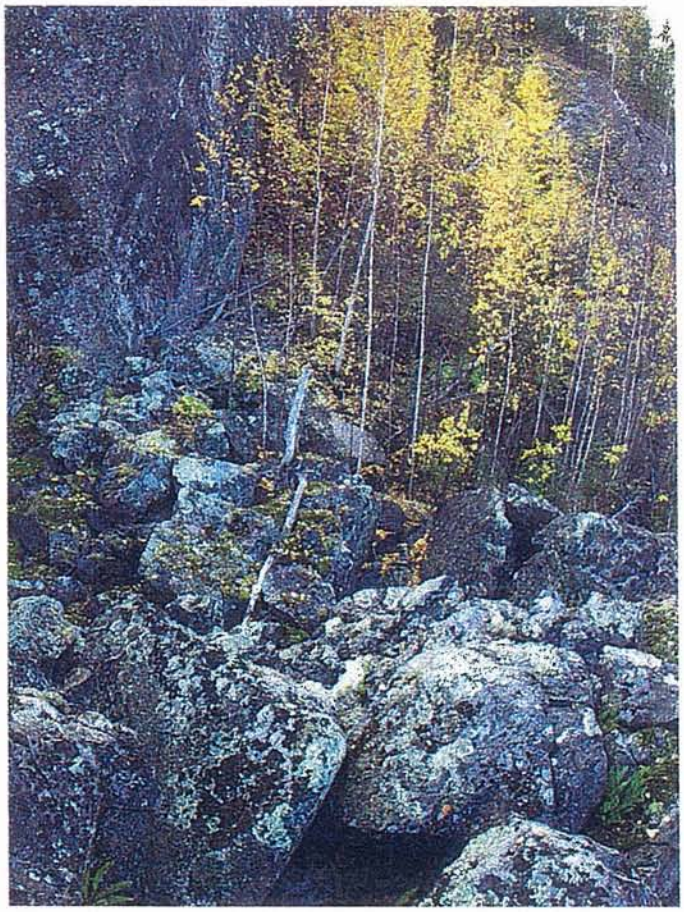


Photo 6.3-1 Rock Fall at Pitch Ore Site
September 27, 2001

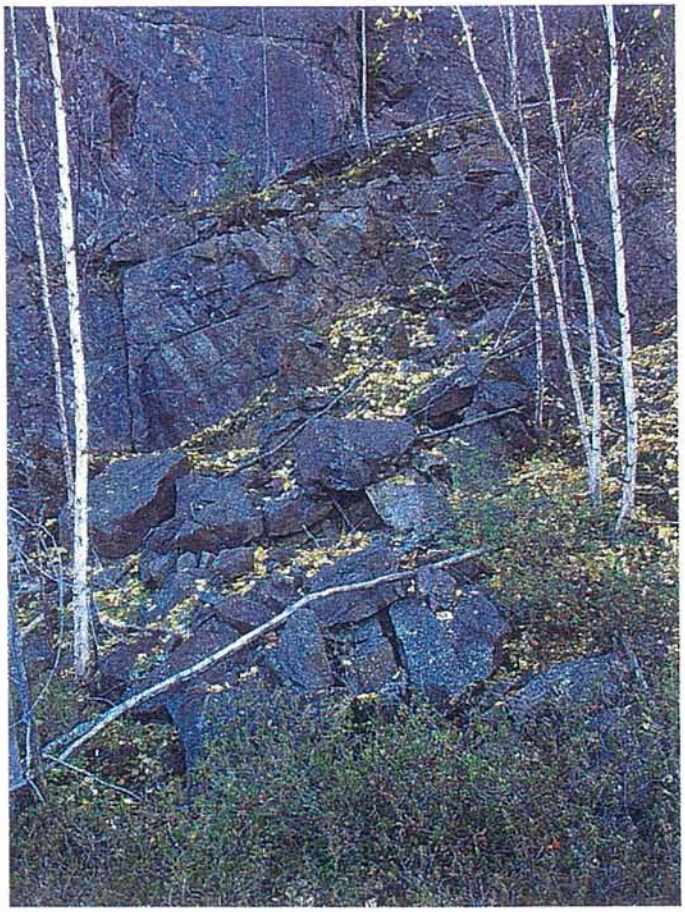


Photo 6.3-2 Rock Fall at Pitch Ore Site
September 27, 2001

## 6.4 New Mylamaque Uranium Mines –VOY Claims

### 6.4.1 Location and Access

Site Inspection: 27 to 28 September 2001

Location: NTS Mapsheet 74N-14

UTM Zone: 12

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 59° 47' 00" lat<br>109° 05' 43" long | 6628818 m N<br>606925 m E | 59° 76' 00" lat<br>109° 05' 41" long | 6628699 m N<br>606771 m E |

* Locations recorded by GPS during Year 2 field program

** Location obtained from Saskatchewan Mineral Deposit Index

The site is accessible by float plane on Tazin Lake on the north side of Laird Island or King Lake on the south side of Laird Island.

The site location is shown in Figures 6.4-1 and 6-4-2. The site plan is shown in Figure 6.4-3. Photographs 6.4-1 to 6.4-7 show the site.

### 6.4.2 Property Information and Ownership

**Saskatchewan Mineral Deposit Index Number:** 1536

**Property:** (formerly: ML 5029; VOY claims)

**Location:** King Lake - Laird Island

**Owner(s):** Open – see Section 6.4.4 for previous owners

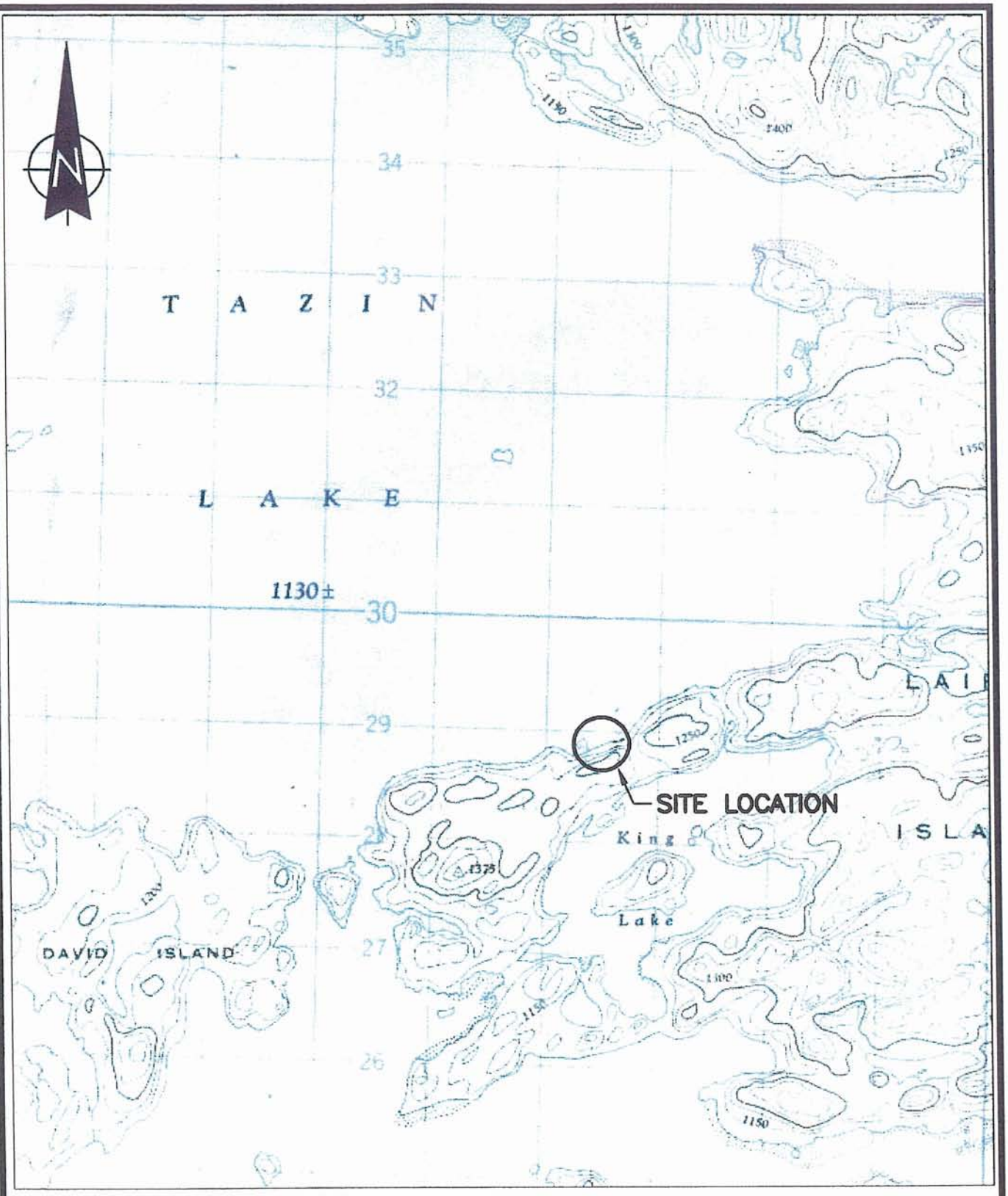
**Commodity:** U **Associated Commodities:** None

**Deposit Type:** Outcrop

### 6.4.3 Geology

*6.4.3.1 Claims 5, 6 and 7*

The showing consists of several occurrences, #5, #6 and #7, located on the narrow strip of land between the north shore of King Lake (on Laird Island) and the northwest shore of Laird Island in Tazin Lake.




**NOTE:**
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 74 N 14.

# SITE LOCATION PLAN
# NEW MYLAMAQUE URANIUM MINE

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.4–1

R3160/FIG6.4–1.DWG

MAP OF A PORTION OF THE
VOY CLAIMS, SHOWING RADIOACTIVE ZONES
AND DIAMOND DRILL HOLE LOCATIONS

LEGEND

Trench with radioactive zone .....

Diamond drill hole and number .....

Outcrop area .....

Overburden .....

Note: The following drill holes have been omitted because of the scale: Zone 3 (holes 1-7); Zone 5 (holes 11-19, 21)

Compiled by L.S. Beck from assessment work data submitted by New Mylamaque Explorations

TAZIN LAKE

Zone 1
Zone 2
Zone 3
Zone 4
Zone 5
Zone 6
Zone 7
Zone 8

Adit
Camp
Core Rock

LOCATION MAP

LAIRD ISLAND
TAZIN LAKE
50°45'N
SCALE - MILES
0 2 4

SCALE - FEET
200 0 200 400 600 800 1000

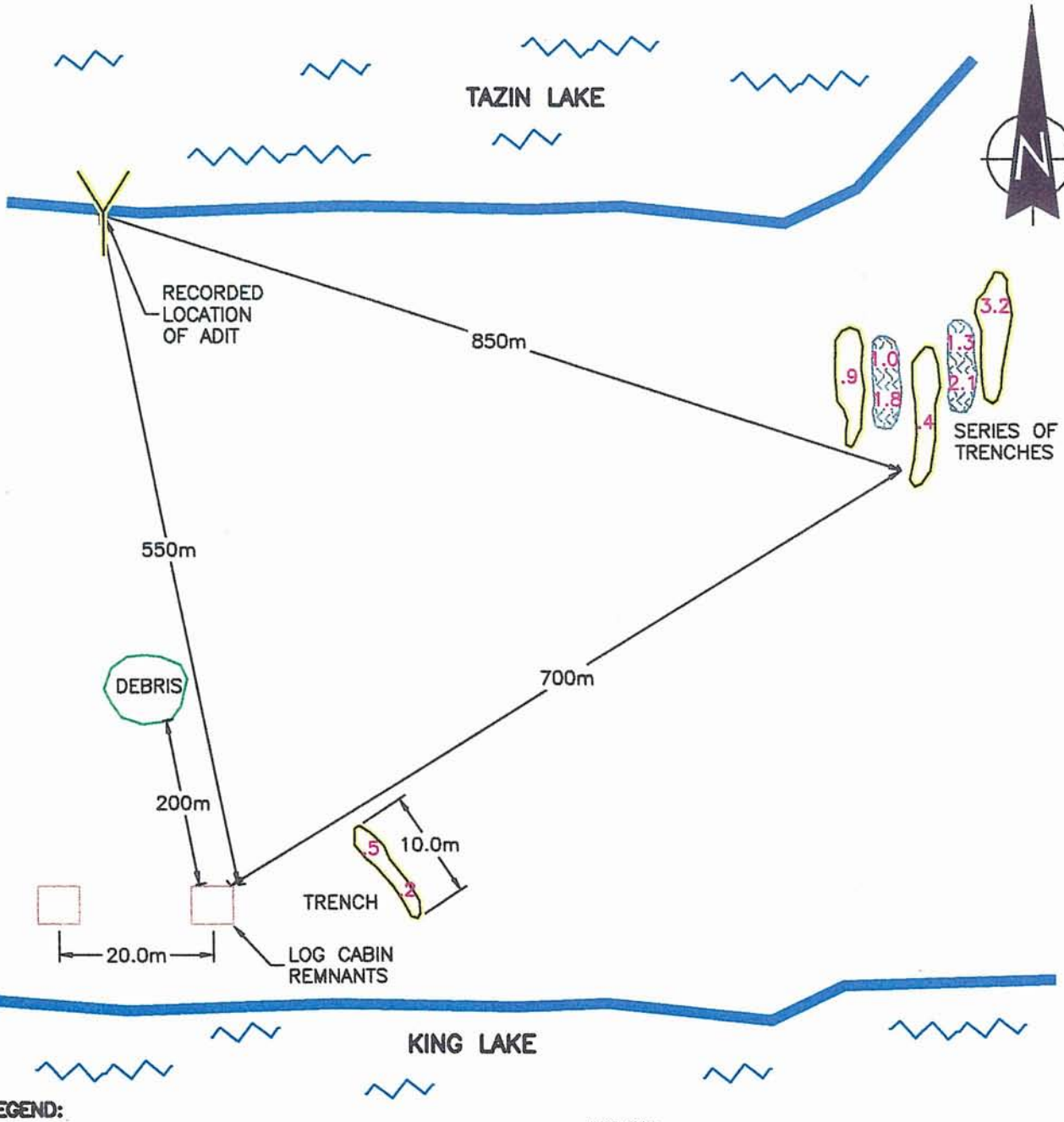
NEW MYLAMAQUE REGIONAL SITE LOCATION

CLIFTON ASSOCIATES LTD.

PROJECT NO: R3160

FIGURE 6.4-2

R3160/FIG6.4-2.DWG




**LEGEND:**

| | |
|---|---|
| Roads/Trails | |
| Mine Workings | |
| Waste Rock | |
| Body of Water | |
| Scrap Material/Debris/Refuse | |
| Building/Foundation | |
| Tailings | |
| Natural Ground Surface | |
| Gamma Readings (μSv/hr.) | 0.25 |
| Water Sample Location | |
| Soil Sample Location | |

**LEGEND:**

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

# NEW MYLAMAQUE – SITE PLAN
## (NOT TO SCALE – DIMENSIONS ARE APPROXIMATE)

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.4–3

R3160/FIG6.4–3.DWG

The bedrock is a northeast-trending sequence of granite and paragneiss containing thin bands of amphibolite. These are unconformable overlain to the northwest by gently dipping conglomerates, arkoses and siltstones of the Martin Formation.

Occurrence #5 is a gently curved shear zone striking 070° and dipping south. It contains abundant calcite veins, specularite, red earthy hematite and visible pitchblende. It ranges from 1 to 6 ft (0.3 to 1.8 m) in width and has been traced on the surface by trenching for 85 ft (26 m). Channel samples were taken over the showing which averaged 0.66% U3O8 across 3.1 ft (0.9 m) for 65 ft (20 m) or 1.75% U3O8 across 1.1 ft (0.3 m) for 65 ft (20 m). This zone was examined underground by a 116 ft (35.4 m) adit located near the shore of Laird Island and driven to a vertical depth of 80 ft (24 m). The vein was exposed in a drift 75 ft (22.9 m) long. Sampling of the drift face indicated trace to 0.03% U3O8.

Occurrence #7 is located approximately 600 ft (183 m) south of #5. It is a radioactive fracture zone that parallels the bedrock gneissosity. Trenching exposed hematite, chlorite and secondary copper minerals for 50 ft (15 m), but no visible uranium mineralization was noted.

Occurrence #6 is located 0.25 miles (0.4 km) east-northeast of #5. The fracture exhibits intermittent radioactivity and was traced for 95 ft (29 m) by shallow trenching. A 23 ft (7 m) length was sampled near the southwest end of the trench where a small lens of calcite contains abundant pitchblende. It yielded 0.71% U3O8 over 1 ft (0.3 m), but elsewhere, assay values were generally less than 0.05% U3O8.

*6.4.3.2 Claims 1, 2 and 3*

The showing consists of several occurrences, #1, 2 and 3, located on the narrow strip of land between the north shore of King Lake (on Laird Island) and the northwest shore of Laird Island in Tazin Lake.

The area of the showing is underlain by a northeast trending sequence of granite and paragneiss containing thin bands of amphibolite. These are unconformably overlain to the northwest by gently dipping conglomerate, arkose and siltstone of the Martin Formation.

Occurrence #1 consists of intermittent cross fractures trending 330° for a length of 480 ft (146 m). The north fracture zone is exposed for 380 ft (116 m) and is separated from the 100 ft (30.5 m) long southern fracture by 100 ft (30.5 m) of intermittently radioactive, discontinuous fractures. The northern fracture exhibits continuous radioactivity for 100 ft (30.5 m) and the southern one for 75 ft (23 m). This occurrence is the most easterly of the three occurrences. Three channel samples taken over the most radioactive sections assayed 0.66% U3O8 over 2 ft (0.6 m), 0.16% U3O8 over 1 ft (0.3 m) and 4.8% U3O8 over 1.5 ft (0.5 m).

Occurrence #3 consists of a 140 ft (43 m) fracture zone striking 310° and dipping 80°SW. The central 4 ft (12 m) are the most strongly radioactive. Five channel samples were taken over 10 ft (3 m) intervals and averaged 0.38% U3O8 over 3.6 ft (1.1 m). Occurrence #2 has a main fracture that is on strike with No. 3 and the shore arm curves eastward to trend on strike with #1. The occurrence forms a Y at the base of #1. One channel sample from this zone yielded 0.37% U3O8 across 4 ft (1.2 m).

Pitchblende in these showings occurs as grains, veinlets and botryoidal masses associated with fracture fillings of calcite ±quartz and hematite ± minor chalcocite, covellite and native copper. No mineralization was encountered on CBS 1132 to account for the anomaly; however, the structural picture of the Martin and Tazin rocks in the subsurface was discovered to be much more complex than previously thought.

*6.4.3.3 Claims 4 and 8*

The showing consists of two occurrences, #4 and #8, located on the channel way that links King Lake to the northwest shore of Laird Island in Tazin Lake.

The area of the showing is underlain by a northeast-trending sequence of granite and paragneiss containing thin bands of amphibolite. These are unconformable overlain by gently dipping conglomerate, arkose and siltstone of the Martin Formation near the north end of Trench #4.

Occurrence 4 consists of a narrow, north-trending fracture zone in paragneiss. The fractures are filled with hematite and carbonate veinlets. Pitchblende is visible and coats the fracture surfaces. Trenching exposed the occurrence for 35 ft (10.7 m) and 1 ft (0.3 m) channel samples returned assays from 0.01 to 7.95% U3O8 that averaged 1.09% U3O8.

Occurrence 8 is a narrow fracture 3 to 6 inches wide (7.6-15.2 cm) wide, striking 355° and dipping 80°W. It contains hematite, chlorite and calcite with sporadic pitchblende mineralization. Trenching exposed this fracture for 65 ft (20 m) and the grade was estimated at 0.427% U3O8 across 1 ft (0.3 m) for a strike length of 36 ft (11 m).

No radioactivity was encountered in L-2-74 at Occurrence 4; however, the structural relationships in the Martin-Tazin sequence were revealed to be more complex than expected. A small intersection of pitchblende within a zone of brecciated Tazin rock fragments was encountered in hole L-3-74, marked on the small peninsula 1 mile (1.6 km) east-northeast of occurrence #4. It is unclear whether this represents a conglomerate or a cemented fault zone, (Saskatchewan Industry and Resources, 2002).

### 6.4.4 Exploration History

*6.4.4.1 Claims 5,6 and 7*

These occurrences were worked by New Mylamaque Mines Ltd. from 1953 to 1968.

All of the VOY claims were explored by geological mapping, prospecting and trenching in 1953. Eight occurrences were outlined and tested by 55 diamond drill holes totaling almost 9,000 ft (2,743 m). Occurrences #5 and 7 were tested by 10 holes with negative results.

The VOY claims became ML 5029 in 1964 and were transferred to Northgate Exploration Ltd. in 1968. In 1969, ground grid scintillometer, topographical and geological surveys were completed. R.W. Johns produced mineral distribution maps based on 487 chip samples. A broad band lying along the northwest shore of Laird Island and extending slightly into Tazin Lake was recommended for further study.

As a result, CBS 1132 and S-88091 to 93 were staked by Dejour Mines Ltd. and an underwater radiometric and echo sounding depth survey was contracted to G. Goldak as a joint venture to test a small anomaly offshore from ML 5029. An east-west linear anomaly was detected to the east, fading towards Occurrence #5. This work prompted a drilling program in 1974 and Hole L-4-74 was sited 0.5 miles (0.8 km) west of Occurrence #5. The results were economically disappointing but revealed good structural information.

*6.4.4.2 Claims 1,2 and 3*

The occurrences were worked by New Mylamaque Mines Ltd. from 1953-1964. All of the VOY Claims were explored by geological mapping, prospecting and trenching in 1953. Eight showings were outlined and tested by 55 diamond drill holes totaling almost 9,000 ft (2,743 m). Showings 1, 2 & 3 were tested by 21 holes and the surrounding area by an additional 19 holes. All drilling yielded poor results. The VOY claims became ML 5029 in 1964 and were transferred to Northgate Explorations Ltd. in 1968. In 1969, ground grid scintillometer, topographic and geological surveys were completed. R.W. Johns produced mineral distribution maps based on 487 chip samples. A broad band lying along the northwest shore of Laird Island and extending into Tazin Lake was recommended for further study. As a result, CBS 1132 was staked by Dejour Mines Ltd. and an underwater radiometric and echo-sounding depth survey was contracted out to G. Goldac as a joint venture to test a possible fault zone offshore from ML 5029. An east-west linear anomaly was detected over the predicted course of a fault that transects Laird Island. Based on this information drill hole L-1-74 was drilled in 1974.

*6.4.4.3 Claims 4 and 8*

The occurrences were worked by New Mylamaque Mines Ltd. from 1953-1964 and are located on the channel-way that links King Lake to the NW shore of Laird Island in Tazin Lake. All of the Voy claims were explored by geological mapping, prospecting and trenching in 1953. Eight showings were outlined and tested by 55 diamond drill holes totaling almost 9,000 ft (2,744 m). Zones 4 and 8 were tested by 5 holes. The area surrounding zones 1 to 4 and 8 were tested by 19 holes. All drilling yielded poor results.

The occurrences were trenched and sampled and returned the values listed above.

The VOY claims became ML 5029 in 1964 and were transferred to Northgate Exploration Ltd. in 1968. In 1969, ground grid scintillometer, topographical and geological surveys were completed. R.W. Johns produced mineral distribution maps based on 487 chip samples. A broad band lying along the northwest shore of Laird Island and extending into Tazin Lake was recommended for further study.

As a result, CBS 1132 and S-88094-95 were staked by Dejour Mines Ltd. and an underwater radiometric and echo sounding depth survey was carried out by G. Goldak (as a joint venture) to test a possible fault zone offshore from ML 5029. An east-west linear anomaly was detected over the predicted course of a fault that transects Laird Island. Based on this information, drill holes L-2-74 and L-3-74 were completed to test the anomaly. No radioactivity was encountered in L-2-74 at Occurrence 4. Further work was recommended for this area, (Saskatchewan Industry and Resources, 2002).

### 6.4.5 2001 Inspection-Site Description

Following is the site description as noted during the 2001 inspection.

*6.4.5.1 General*

The site is located on a thin stretch of land on the east side of Laird Island on Tazin Lake. It is about 35 km northwest of Uranium City and is accessible by float plane landing on either the north side or south side of Laird Island.

There is no evidence of recent visitation.

*6.4.5.2 Mine Workings*

Records indicate an adit on the north side, several trenches about 700 to 800 m east of the adit and cabins on the south side of the area just off the shore of King Lake.

The adit was not located after an extensive search of the recorded location area. Several trenches were located about 700 m east of the area where the adit is located. The trenches vary in size, location and orientation. Dimensions generally vary from about 5 m long, 3 m wide and 2 m deep to 20 m long, 5 m wide and 3 m deep.

There was no standing water in any of the trenches. The trenches do no present an environmental concern.

*6.4.5.3 Waste Rock*

Waste rock is associated with the trenches. The waste rock is coarse, fragmented, and piled 0.5 to 1.0 m high adjacent to the trenches. There were no visible sulphides associated with the waste rock and there was no evidence of acid generation. The majority of the trenches are associated with what are known as zones 1, 2, 3, 4, 6 and 8. The waste rock for these trenches is hematized, and is typically a granite or granodiorite. Gamma readings for the waste rock around trenches were up to 3.2 µSv/hr with an average reading for the area of 2.1 µSv/hr.

*6.4.5.4 Debris*

Three dilapidated cabin frames were located on the south shore. The cabins appear to have served as camp. A small amount of debris, including scrap wood and metal, is located near the cabins.

A small amount of debris is located near the trenches on the northeast side of the property and consists of tin cans. A small pile of broken bottles and tin cans were located about 200 m north of the cabins.

### 6.4.6 History of Previous Inspections

There are no records of previous inspections of the site.

### 6.4.7 Risk Assessment Ranking

The adit for the New Mylamaque site was not located and the risk assessment ranking for the site is therefore based on some assumptions regarding the adit.

It was assumed the adit is open, with some stability problems, a small amount of water (intermittent) and waste rock located close to Tazin Lake.

The ranking takes into consideration the entire site, including the trenches and waste rock located east of the adit, and the cabins on the south side of the property.

| | |
|---|---|
| Public Safety Assessment | 11.1 |
| Environmental Assessment | 5 |
| Combined Total Assessment | 16.1 |
| Ranking | 10/22 |

### 6.4.8 Recommended Follow-up

It is recommended that additional time be spent to locate the adit. After the inspection, the Conservation Officer for the area indicated that the adit is probably easier to locate from a float plane flying along the shoreline than it would be from the ground.

The trenches and cabins do not require any follow up work from a public safety perspective.

Consideration should also be given to covering or locating portions of waste rock that has elevated gamma radiation levels.

Photo 6.4-1 Remnants of Camp
September 27, 2001

Photo 6.4-2 Dilapidated Cabins Frame
September 27, 2001

Photo 6.4-3 Dilapidated Cabin and
Debris
September 27, 2001

Photo 6.4-4 Trench Near Cabins on South Side
September 27, 2001

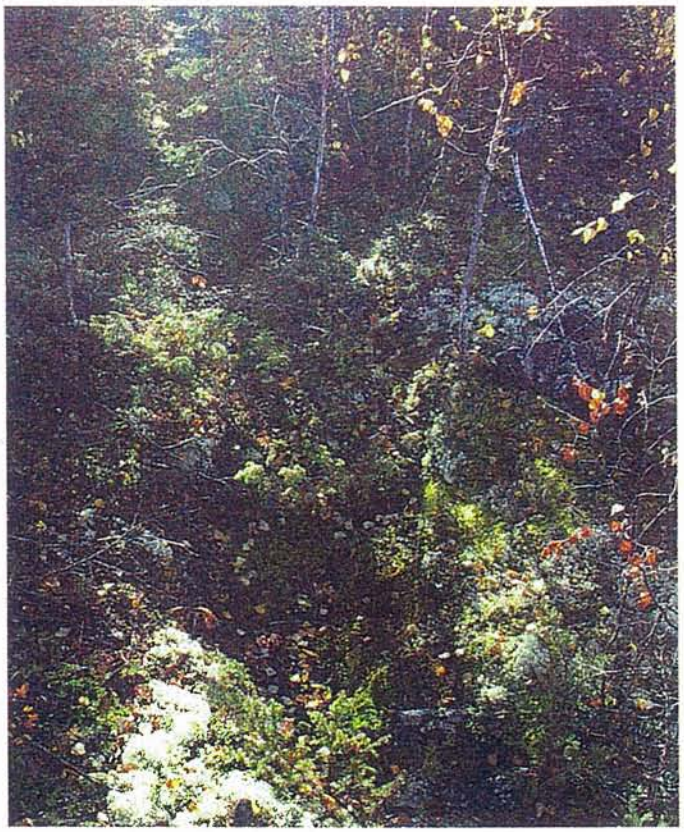


Photo 6.4-5 Trench Near Cabins-September 27,
2001

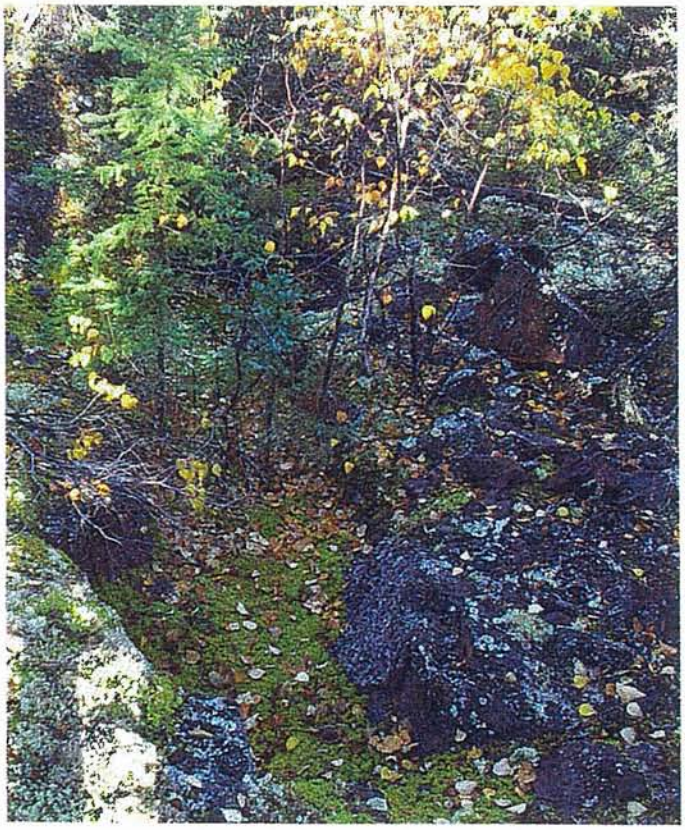


Photo 6.4-6 Trench on Northeast End of Property
September 27, 2001

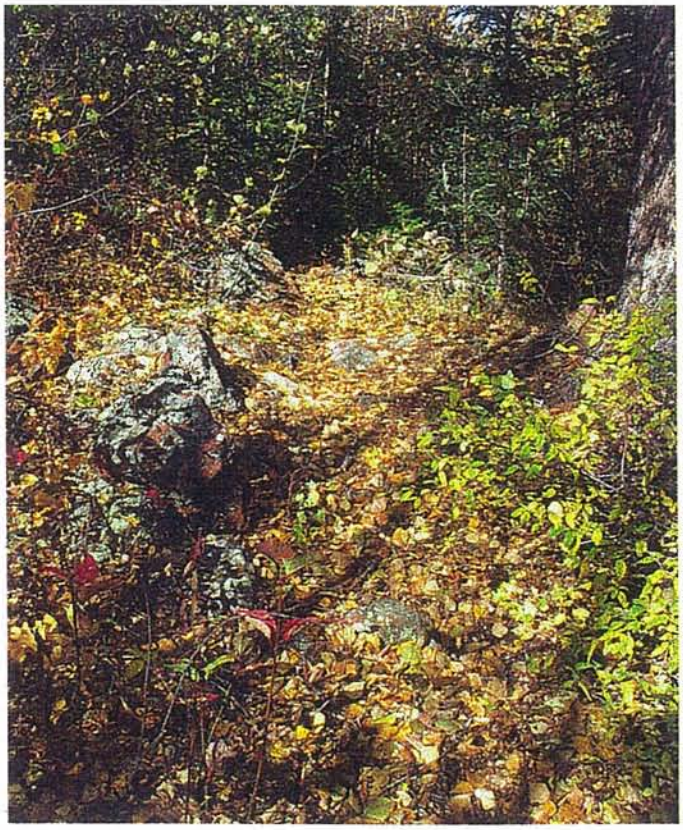


Photo 6.4-7 Trench on Northeast End of Property
September 27, 2001

## 6.5 Don Henry Mines

### 6.5.1 Location and Access

Site Inspection: 27 September 2001

Location: NTS Mapsheet 74N-10

UTM Zone: 12

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 59° 47' 21" lat<br>109° 05' 35" long | 6629471 m N<br>607031 m E | 59° 47' 21" lat<br>109° 05' 33" long | 6623599 m N<br>638912 m E |

* Locations recorded by GPS during Year 2 field program

** Location obtained from Saskatchewan Mineral Deposit Index

The Don Henry Mine is located about 500 m west of Gatzke Lake and about 18 km north-northwest of Uranium City.

The site location is shown in Figure 6.5-1. The site plan is shown in Figure 6.5-2. Photographs 6.5-1 to 6.5-3 show the site.

### 6.5.2 Property Information and Ownership

**Saskatchewan Mineral Deposit Index Number:** 1473

**Property:**

**Location:** West of Nesbitt Lake

**Owner(s):** Open – see Section 6.5.4 for previous owners

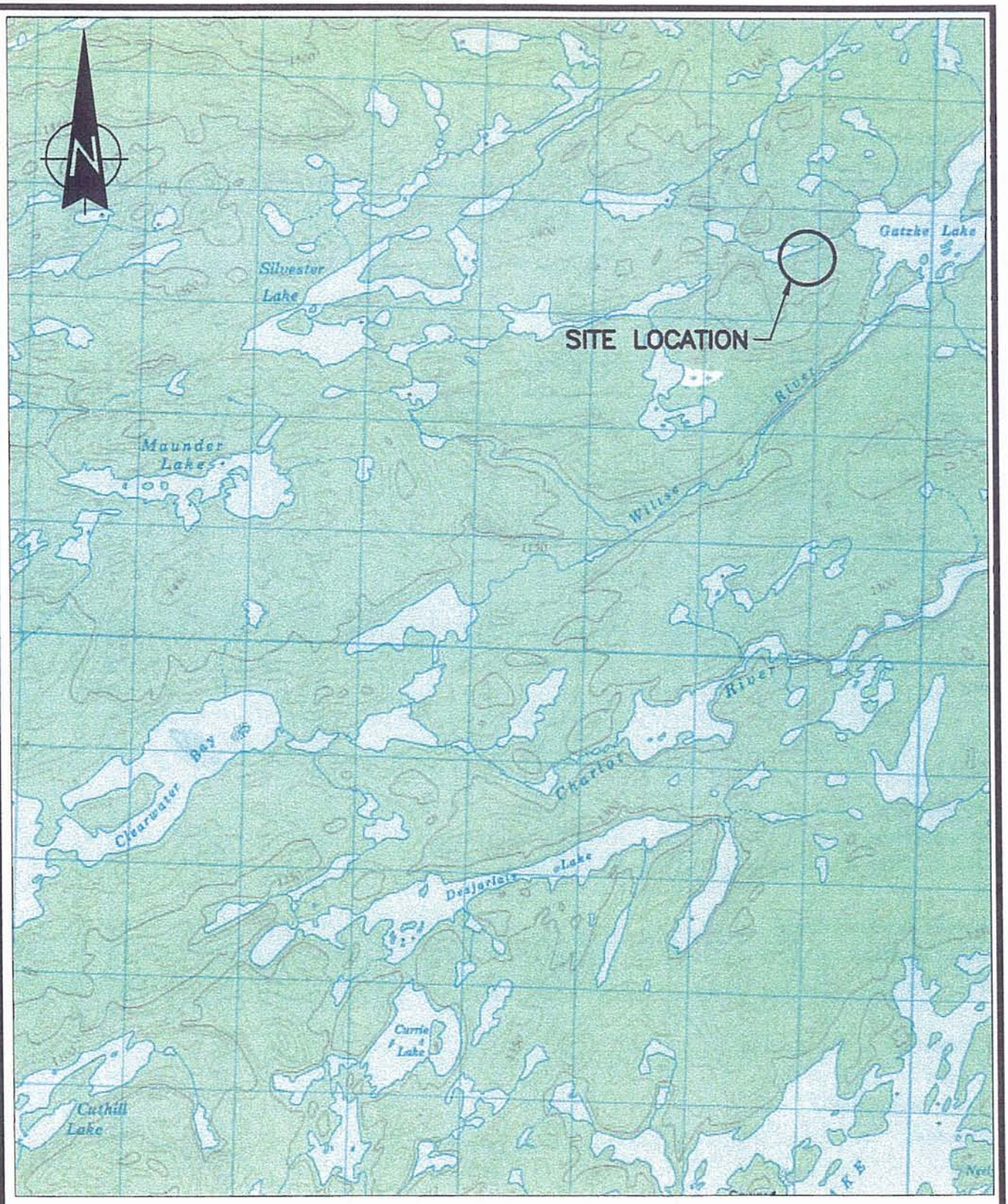
**Commodity:** U **Associated Commodities:** None

**Deposit Type:** Outcrop

### 6.5.3 Geology

The Don Henry Uranium Mine is located 2,000 ft (610 m) west of Nesbitt Lake.

The surface showings are exposed in six shallow rock cuts along the vein occupying a narrow shear zone in graphitic schist and biotite-garnet gneiss. It is traceable for 150 ft (45.7 m) and has a width of 1 to 3.5 ft (0.3 to 1.1 m). It strikes due north and dips steeply east.

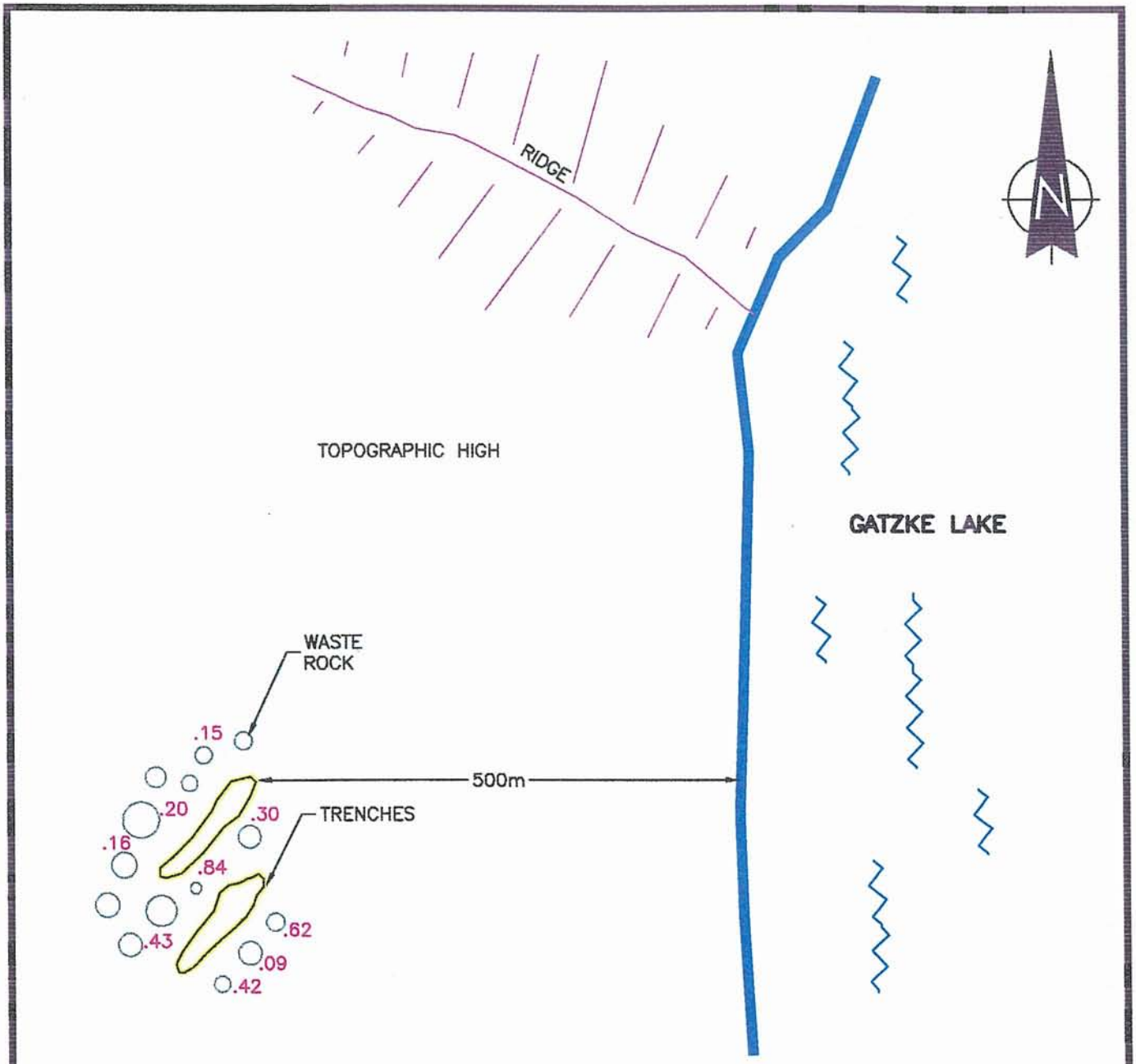



**NOTE:**
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 74 N 10.

## SITE LOCATION PLAN
## DON HENRY URANIUM MINE

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.5–1

R3160/FIG6.5–1.DWG




**LEGEND:**

Roads/Trails
Mine Workings
Waste Rock
Body of Water
Scrap Material/Debris/Refuse
Building/Foundation
Tailings
Natural Ground Surface
Gamma Readings (μSv/hr.) 0.25
Water Sample Location
Soil Sample Location

**LEGEND:**

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

# DON HENRY URANIUM MINE – SITE PLAN
## (NOT TO SCALE – DIMENSIONS ARE APPROXIMATE)

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.5–2

R3160/FIG6.5–2.DWG

The Nesbitt Lake area is underlain by rocks of the Tazin Group and the granite gneiss complex of Archean age. They range in composition from granitic pegmatite to amphibolite and garnet biotite gneiss. Folding is evident with migmatite and brecciated zones associated to it or related to shear zones subsidiary to the Nesbitt Fault.

Sampling yielded 0.094% U3O8 over 3.3 ft (1.0 m), (Saskatchewan Industry and Resources, 2002).

### 6.5.4 Exploration History

The original surface showing was explored in 1955 by Don Henry Mines Ltd. Results prompted the sinking of an exploratory inclined shaft with drifting along the vein structures. Sampling yielded low values.

In 1973, the area was re-staked and optioned to Colby Mines Ltd. Their sampling yielded the values listed above, (Saskatchewan Industry and Resources, 2002).

### 6.5.5 2001 Inspection-Site Description

#### *6.5.5.1 General*

The site was inspected on 27 September 2001. Access is gained by float plane landing on the west shore of Gatzke Lake.

The area has been subject to a recent forest fire and is characterized by extensive deadfall. Walking in the area is difficult due to the deadfall and rugged terrain.

There is no sign of recent visitation.

The gamma levels in the area of the waste rock and trenches was about 0.4 µSv/hr.

#### *6.5.5.2 Mine Workings*

The shaft area could not conclusively be located; however, trenches were located in the area of the recorded shaft location. It is possible that the shaft has been covered by deadfall material.

There are two trenches both of which are about 10 m long, 3 m wide and 1 to 1.5 m deep. There was no water in any of the trenches. Vegetation is infilling the trenches.

*6.5.5.3 Waste Rock*

A small amount of waste rock is associated with the trenches. The waste rock is piled adjacent to the trenches. There is no standing water or water discharges associated with the waste rock. The piles are low (1 to 1.5 m high) and are stable. They do not pose an environmental or public safety threat.

There are no visible sulphide minerals in the waste rock. The waste rock was generally a biotite schist with some pegmatite. Gamma readings for the waste rock varied from 0.16 to 0.84 µSv/hr with an average reading of about 0.4 µSv/hr.

*6.5.5.4 Debris*

Only a small amount of debris was located near the trenches. Any debris that exists in the area would have been covered by the extensive deadfall resulting from the recent forest fire.

### 6.5.6 History of Previous Inspections

There is no record of previous inspections of this site.

### 6.5.7 Risk Assessment Ranking

| | |
|---|---|
| Public Safety Assessment | 6.4 |
| Environmental Assessment | 2 |
| Combined Total Assessment | 8.4 |
| Ranking | 21/22 |

### 6.5.8 Recommended Follow-up

Although it is believed the shaft was located, additional attempts should be made to search the area to verify the shaft conditions. This could be done if Saskatchewan Environment personnel or Saskatchewan Environment representatives are in the region. Upon verification that the shaft is closed, no additional work at the site is recommended.

Photo 6.5-1 Trench at Don Henry Site
September 27, 2001

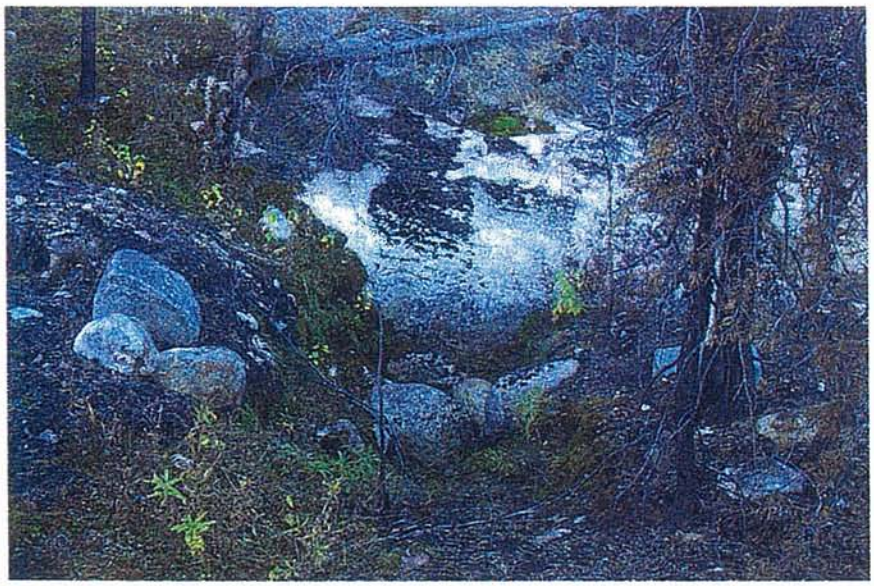


Photo 6.5-2 Trench at Don Henry Site
September 27, 2001

Photo 6.5-3 Trench at Don Henry Site
September 27, 2001

## 6.6 Homer Yellowknife Mines Ltd.

### 6.6.1 Location and Access

Site Inspection: 28 September 2001

Location: NTS Mapsheet 74 O/5
UTM Zone: 13

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 59° 26' 51" lat<br>107° 47' 41" long | 6593212 m N<br>341555 m E | 59°26' 51" lat<br>107° 47' 41" long | 6592808 m N<br>341793 m E |

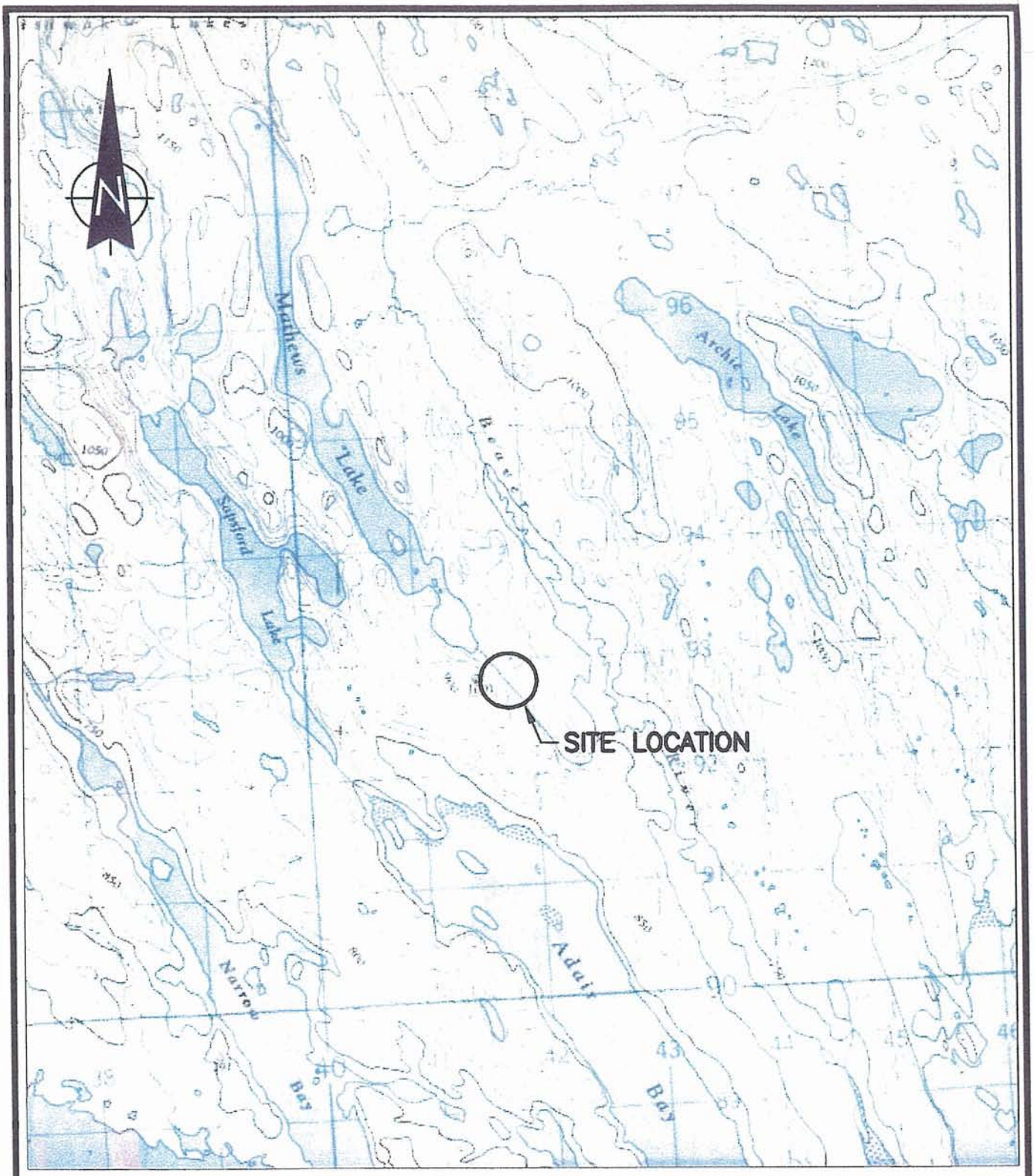
* Locations recorded by GPS during Year 2 field program
** Location obtained from Saskatchewan Mineral Deposit Index

The Homer Yellowknife site is accessible by float plane landing on Adair Bay. At the time of the inspection, the northwest shore of Adair Bay was shallow, and access was therefore gained by landing on west shore of Adair Bay, about half way south of the tip of the Bay. The site was then reached by a one hour walk around the northwest tip of Adair Bay.

The area was subject to a forest fire in about 1995. Access to the site is difficult due to the combination of rugged terrain and extremely thick birch saplings.

It should be noted there is substantial difference between the locations recorded on the Saskatchewan Mineral Deposit Index and the location recorded during the field assessment. Reasons for this discrepancy are not known; however, additional GPS readings should be taken in the future if Saskatchewan Environment personnel are at the site.

The site location is shown in Figure 6.6-1. The site plan is shown in Figure 6.6-2. Photographs 6.6-1 to 6.6-6 show the site.

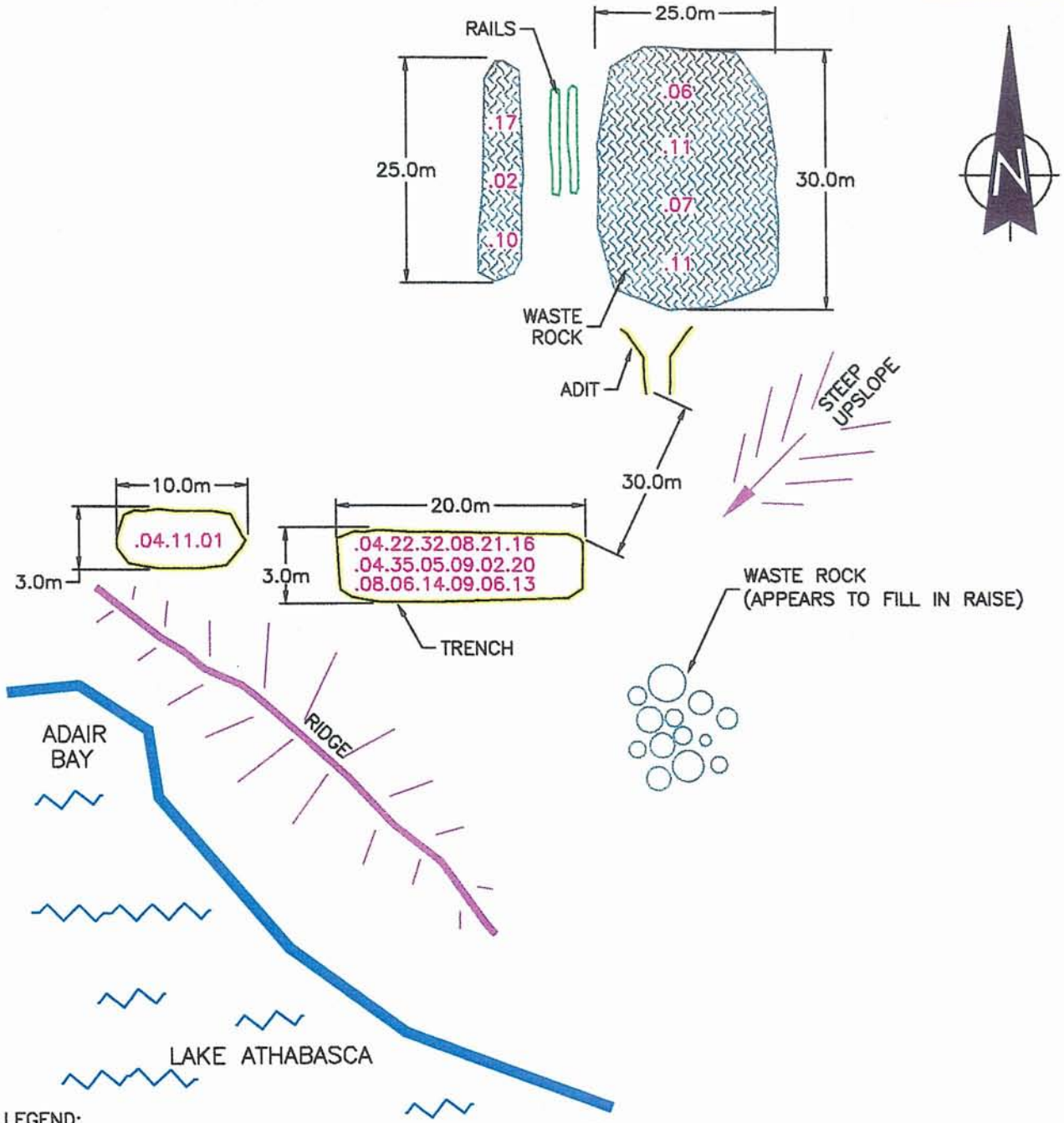



**NOTE:**
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 74 O 5.

# SITE LOCATION PLAN
# HOMER YELLOWKINFE MINES

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.6–1

R3160/FIG6.6–1.DWG




LEGEND:

| | |
|---|---|
| Roads/Trails | |
| Mine Workings | |
| Waste Rock | |
| Body of Water | |
| Scrap Material/Debris/Refuse | |
| Building/Foundation | |
| Tailings | |
| Natural Ground Surface | |
| Gamma Readings (μSv/hr.) | 0.25 |
| Water Sample Location | |
| Soil Sample Location | |

LEGEND:

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

# HOMER YELLOWKNIFE URANIUM MINE SITE PLAN
(NOT TO SCALE– DIMENSIONS ARE APPROXIMATE)

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.6–2

R3160/FIG6.6–2.DWG

### 6.6.2 Property Information and Ownership

**Saskatchewan Mineral Deposit Index Number:** 1559

**Property:** (formerly: RAM claim no. 26 and AR claims)

**Location:** Southeast of Mathews Lake

**Owner(s):** See Section 6.6.4 for previous owners. Additional research is required to determine current ownership.

**Commodity:** U **Associated Commodities:** Cu

**Deposit Type:** Outcrop

### 6.6.3 Geology

The showing is located approximately 0.3 mile (0.48 km) southeast of the south end of Mathews Lake.

The showing area is underlain by a northeast-trending belt of Nevins Lake Block amphibolite which contacts with, to the east and west, Sillimanite-garnet-feldspar gneiss.

The showing consists of pitchblende, in association with pyrite and chalcopyrite, within a northwest-trending dyke of pegmatite cutting amphibolite metasediments and pitchblende in quartz veining which appears to be transitional from the mineralized pegmatite. The amphibolites are hematized and locally display yellow and orange oxides of uranium where in contact with the pegmatite, (Saskatchewan Industry and Resources, 2002).

### 6.6.4 Exploration History

The RAM 26 and AR claims, located approximately 0.25 miles (0.4 km) southeast of Mathews Lake were acquired by Homer Yellowknife Mines Ltd. and Nu-Age Uranium Mines Ltd. in 1953. Trenching and stripping were carried out followed by diamond drilling of 24 AX size holes totaling 2,792 ft (851.0 m) and 3 X-ray size holes totaling 146 ft (44.5 m). This work was focused on Ram 26 where holes 18, 19, 20 and 21 yielded the assays listed above.

A crosscut was driven for 210 ft (64.0 m) on a bearing of 245°. Drifting was carried out at right angles to the crosscut for 100 ft (30.5 m) north and 20 ft (6.1 m) south from a point 110 ft (33.5 m) from the adit portal. A 40 ft (12.2 m) raise to surface was driven from 30 ft (9.1 m) north of the crosscut. The highest assay obtained from the adit samples was 0.07% U3O8 equivalent. The average was in the range 0.03 - 0.04% U3O8. Re-sampling in 1954 failed to corroborate earlier high values and no further work was carried out, (Saskatchewan Industry and Resources, 2002).

### 6.6.5 2001 Inspection-Site Description

Following is the site description as noted during the 2001 inspection.

#### *6.6.5.1 General*

The site is located on the northeast side of Adair Bay on the north side of Lake Athabasca and about 50 km east-southeast of Uranium City. Access to the site is difficult due to a forest fire in the mid 1990's and the extremely heavy re-growth of birch trees. In addition, the north end of Adair Bay is too shallow for a float plane to land on and it was therefore necessary to dock at the west side of the Bay. This requires a one hour walk to the site.

The site is easily located from the air.

There was no visible signs of recent visitation to the site although any signs prior to the fire would likely have been obliterated by the fire.

The background gamma level for the site was about 0.1 µSv/hr.

#### *6.6.5.2 Mine Workings*

The site contains one adit and three trenches and possibly a raise. The adit is about 250 m inland from the northeast shore of Adair Bay. A prominent ridge separates the shoreline from the adit which is on the northeast side of the ridge. The adit faces north. The adit is in poor shape with rotting timber supports at the entrance. There is no evidence of liquid discharges or standing water.

The adit entrance is about 3 m high by 2 m wide and is open. There have been no apparent attempts to seal the adit.

Upslope from the adit is what appears to be a raise plugged with waste rock. The stability of the sealed raise is poor. It appears the raise could open over the next several years.

South and upslope of the adit are two trenches in a generally east-west orientation. The larger trench is about 20 m in length by 3 m wide and 3 m deep. It has steep sideslopes, but is not dangerous. The smaller trench is about 10 m long by 4 m wide and 1 m deep. It also has steep slopes but is not a hazard. There is no evidence of water discharges from the adits.

Gamma values in the larger trench varied from 0.02 µSv/hr to 0.35 µSv/hr. Gamma values in the smaller trench were 0.01 µSv/hr to 0.11 µSv/hr.

*6.6.5.3 Waste Rock*

Waste rock from the adit is located in two main piles north of the adit entrance. The larger main pile is located immediately outside the adit and is about 30 m in length by 25 m wide at the base and about 4 m in height. The side slopes are at an angle of about 3:1. The main pile is located on a downslope making it difficult to estimate the volume. However, it is estimated there is about 1,500 $m^3$. The smaller pile is located west of the large pile and is about 25 m in length by 10 m wide at the base and 3 m high. Estimated volume is 350 to 500 $m^3$. The piles appear stable.

The waste rock is a hematized biotite-quartzite schist. There are minor sulphides in the waste rock although there is no indication of acid rock drainage.

Gamma values on the waste rock varied from 0.06 µSv/hr to 0.11 µSv/hr for the main pile and 0.02 µSv/hr to 0.17 µSv/hr for the smaller pile.

The two trenches located south of the adit have small amounts of waste rock adjacent to the edges of the trenches. Total volume is about 100 $m^3$.

*6.6.5.4 Debris*

There is only a small amount of debris on site including metal tracking.

### 6.6.6 History of Previous Inspections

There is no record of previous inspections of the site

### 6.6.7 Risk Assessment Ranking

| | |
|---|---|
| Public Safety Assessment | 9.6 |
| Environmental Assessment | 2 |
| Combined Total Assessment | 11.6 |
| Ranking | 17/22 |

Although the site is in a remote location, the open shaft is a public safety hazard. The public safety assessment ranking therefore includes one point under the "additional public safety risks" category.

### 6.6.8 Recommended Follow-up

Follow-up should concentrate on blasting or sealing the adit closed and securing the raise. The waste rock currently plugging the raise should be removed and a more permanent cap placed on the raise.

Waste rock piles and trenches could be left as is.

Photo 6.6-1 Homer Yellowknife Adit
September 28, 2001

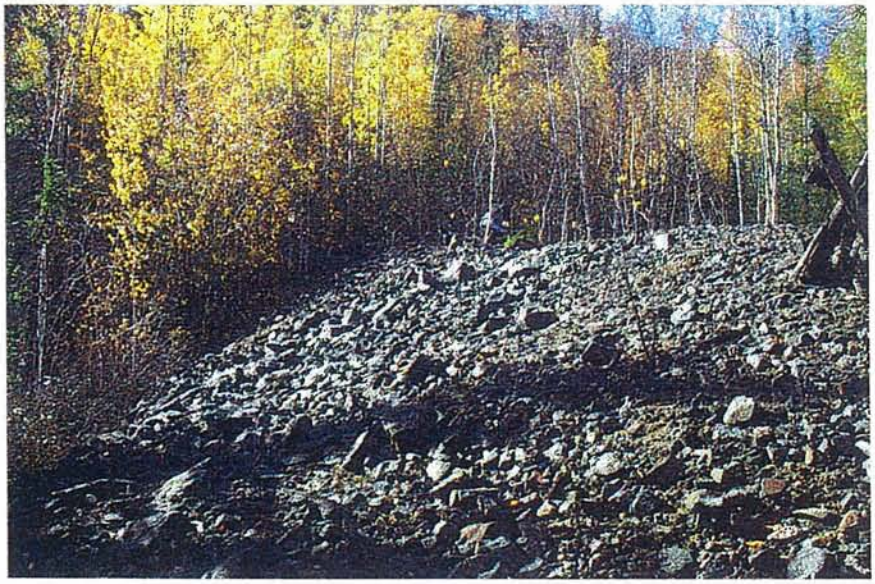


Photo 6.6-2 Main Waste Rock
Pile-Homer Yellowknife
September 28, 2001

Photo 6.6-3 Trench Waste Rock
September 28, 2001

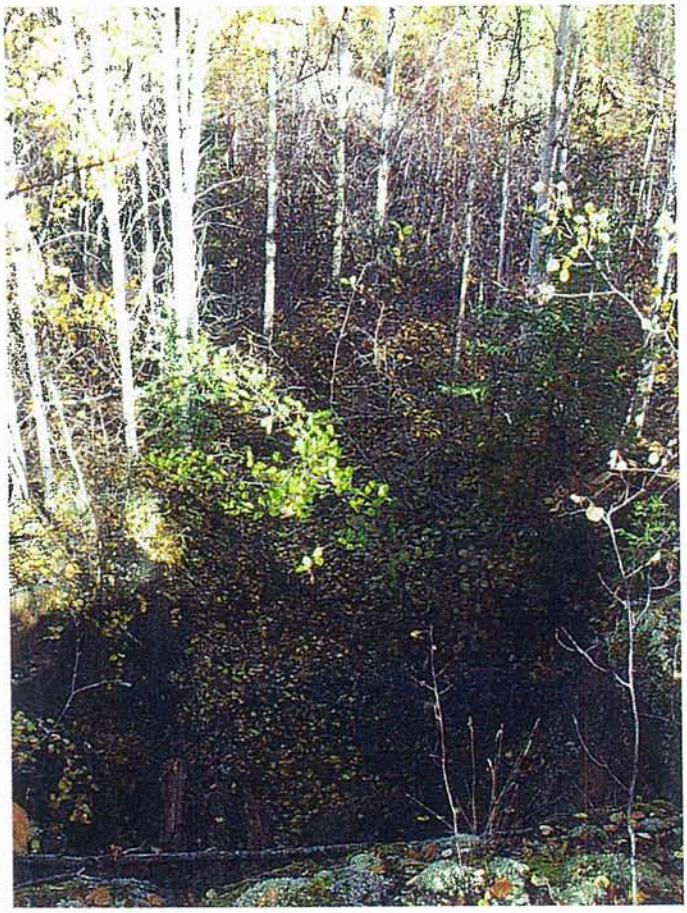


Photo 6.6-4 Large Trench-Homer Yellowknife
September 28, 2001

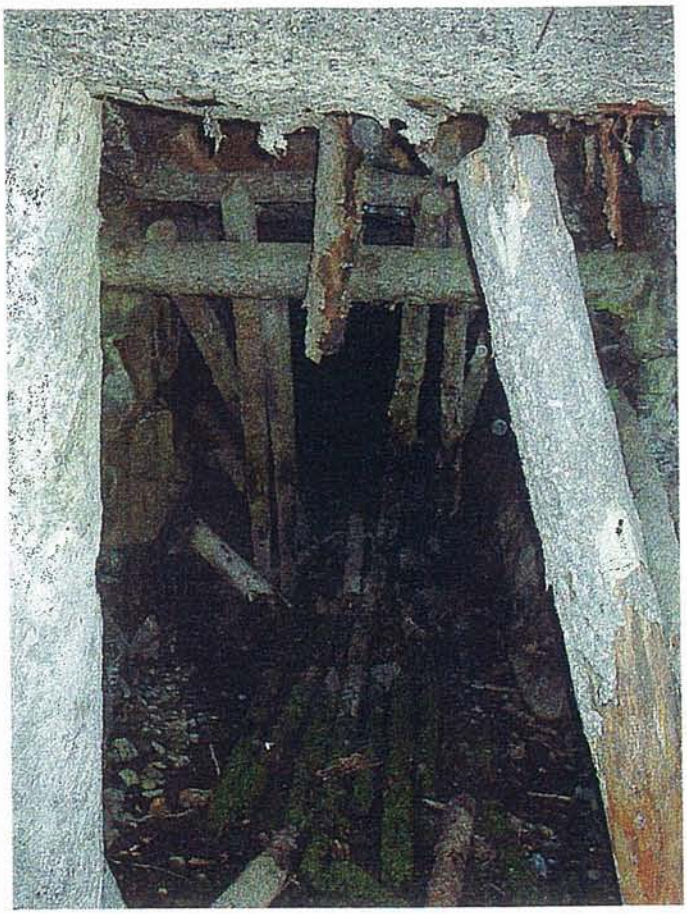


Photo 6.6-5 Adit Closeup-Homer Yellowknife
September 28, 2001

Photo 6.6-6 Debris-Homer Yellowknife
September 28, 2001

## 6.7 Nesbitt Mining and Exploration

### 6.7.1 Location and Access

Site Inspection: 28 September 2001

Location: NTS Mapsheet 74N-8-NE

UTM Zone: 12

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 59° 29' 56" lat<br>108° 06' 06" long | 6599182 m N<br>664067 m E | 59° 26' 55" lat<br>108° 06' 03" long | 6598524 m N<br>664392 m E |

* Locations recorded by GPS during Year 2 field program

** Location obtained from Saskatchewan Mineral Deposit Index

The site is about 30 km southeast of Uranium City and northeast of Reed Bay on the north shore of Lake Athabasca. From the shore of Reed Bay, the site is located by a 45 minute walk to the northeast along a poorly defined former exploration trail. It is accessible by float plane or by boat from the dock near Goldfields.

The site location is shown in Figure 6.7-1. The regional site plan is shown in Figure 6.7-2. The mine site plan is shown in Figure 6.7-3. Photographs 6.7-1 to 6.7-9 show the site.

### 6.7.2 Ownership

**Saskatchewan Mineral Deposit Index Number:** 1280

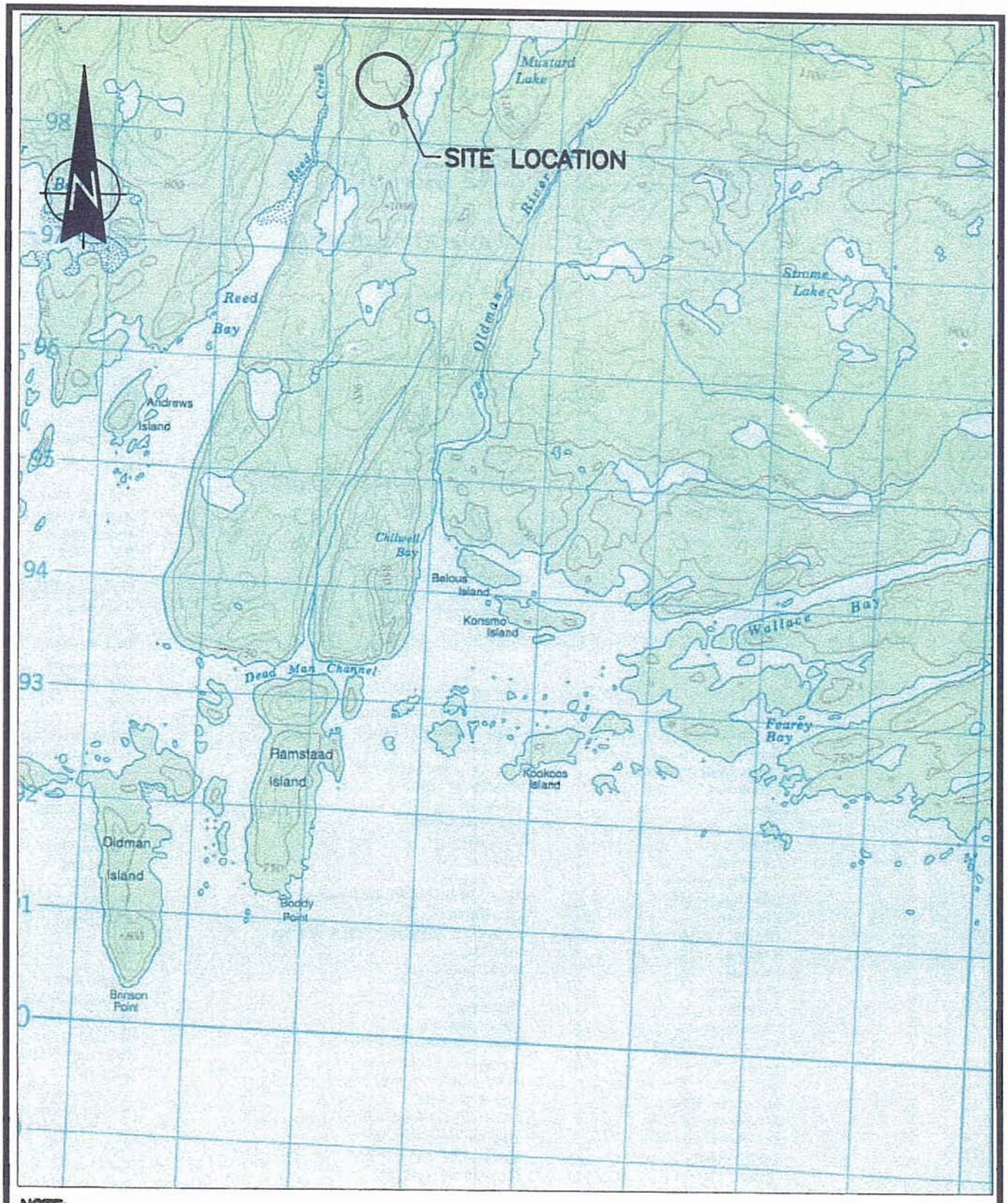
**Property:** (formerly: ML 5176; CBS 409; DELLO claims)

**Location:** Reed Bay – North shore of Lake Athabasca

**Owner(s):** Open – see Section 6.7.4 for previous owners

**Commodity:** U **Associated Commodities:** Hm; Cp; Ep

**Deposit Type:** Outcrop

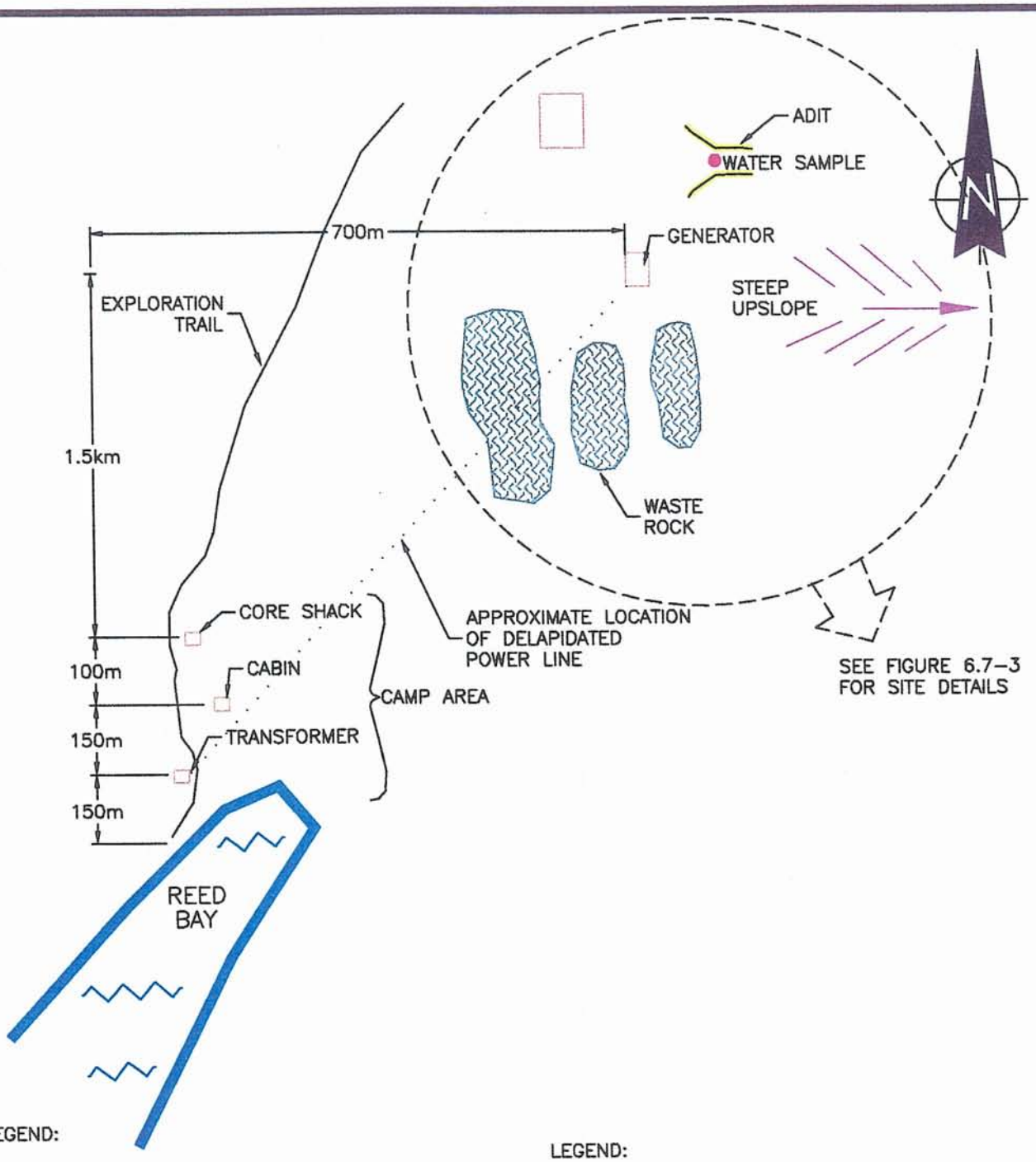



**NOTE:**
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 74 N 8.

# SITE LOCATION PLAN
# NESBITT URANIUM MINE

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.7-1

R3160/FIG6.7-1.DWG




LEGEND:

| | |
|---|---|
| Roads/Trails | |
| Mine Workings | |
| Waste Rock | |
| Body of Water | |
| Scrap Material/Debris/Refuse | |
| Building/Foundation | |
| Tailings | |
| Natural Ground Surface | |
| Gamma Readings (µSv/hr.) | 0.25 |
| Water Sample Location | |
| Soil Sample Location | |

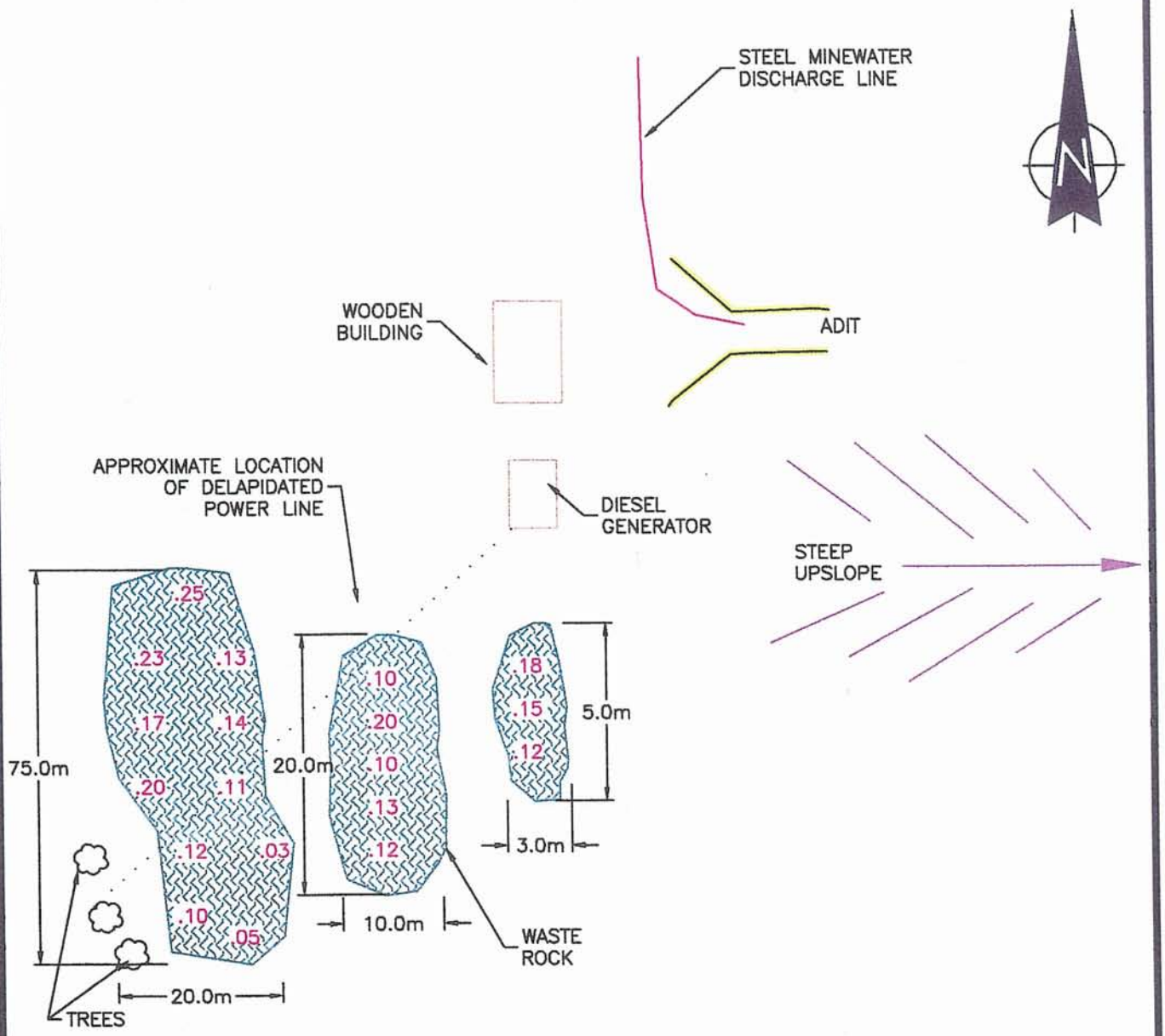
LEGEND:

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

NESBITT EXPLORATION – REGIONAL SITE LAYOUT
(NOT TO SCALE– DIMENSIONS ARE APPROXIMATE)

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.7-2

R3160/FIG6.7-2.DWG




**LEGEND:**

| | |
|---|---|
| Roads/Trails | |
| Mine Workings | |
| Waste Rock | |
| Body of Water | |
| Scrap Material/Debris/Refuse | |
| Building/Foundation | |
| Tailings | |
| Natural Ground Surface | |
| Gamma Readings (μSv/hr.) | 0.25 |
| Water Sample Location | |
| Soil Sample Location | |

**LEGEND:**

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

## NESBITT EXPLORATION – MINESITE LAYOUT
## (NOT TO SCALE– DIMENSIONS ARE APPROXIMATE)

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.7–3

R3160/FIG6.7–3.DWG

### 6.7.3 Geology

The showing is approximately 0.5 miles (0.8 km) north-northeast of the north end of Reed Bay.

The area of the showing is underlain by an elongate body of amphibolite which has been folded into a northeast-trending syncline. A scarp developed along the west side of the amphibolite mass suggests the presence of a major fault zone.

The showing consists of three northwest-striking veins, A, B and C. The showing consists of 2 vein systems, A and B, about 100 ft (30.5 m) apart and a minor system, C, located further north. Each system consists of a number of steeply-dipping fractures on which there has been some shearing and brecciation of the amphibolite host rock. Pitchblende occurs with secondary uranium minerals, carbonate, hematite, chlorite, quartz, specularite, chalcopyrite, pyrite and epidote. Mineralization can be traced along strike for 160 ft (48.8 m), and for 75 ft (22.9 m) down the face of the escarpment.

Pitchblende occurs in vein fracture systems striking northwest and showing vertical dips, down the western face of the scarp developed along the west side of the amphibolite mass (Saskatchewan Industry and Resources, 2002).

### 6.7.4 Exploration History

The showing was located by S. Yanik in 1949 and occurs on the DELLO group of 9 claims staked by the Neiman Lake Uranium Prospecting Syndicate. The showing was investigated at that time by 5 closely spaced pits.

The CBS 409 was staked by Nesbitt Mining and Exploration Ltd. in 1966. In 1967, Newmont Mining Corporation completed 5 diamond drill holes to test the extension of the radioactive fracture zones exposed on the surface.

In 1967 and 1968, trenching of the main zone was done by Nesbitt.

In 1969, the claim block was acquired by Nesbitt Mining and Exploration Ltd. Up until then, the main showing had been exposed by 8 trenches. This same year the A, B and C veins were explored by drilling 15 drill holes totaling 6,846 ft (2,086.7 m).

Early in 1970 Nesbitt drove an adit, named the Archie adit, to test the A and B veins. The adit was driven horizontally for 200 ft (61.0 m) and the rest of its 1,157 ft (352.7 m) length at an incline of 12° to 13°. Neither the A or B veins were intersected, although 3 radioactive zones were encountered.

In September 1970, 12 diamond drill holes totaling 2,716 ft (827.8 m) were completed from the adit. Nothing of importance was indicated by the underground work or the diamond drilling from the adit on the surface.

The property went to lease in 1976 as ML 5176, (Saskatchewan Industry and Resources, 2002).

### 6.7.5 2001 Inspection-Site Description

Following is the site description as noted during the 2001 inspection.

#### *6.7.5.1 General*

The site was inspected on 28 September 2001. Access was gained by float plane landing on the north shore of Reed Bay and walking approximately 45 minutes to the site on an old exploration trail to the site. A recent forest fire followed by extensive vegetation re-growth has obscured the trail making it both difficult to walk on and to follow.

There is no evidence of recent visitation.

The background gamma level for the site was about 0.09 µSv/hr.

#### *6.7.5.2 Mine Workings*

Mine workings consist of a single adit at the foot of a steep hill. The adit is open and has no evidence of previous closure attempts. The opening is about 3.5 m high and 2.5 m wide. Standing water is in the adit. A water sample was obtained. Analytical results are provided in Table 6.7-1. Field measurements of the water were as follows:

| | |
|---|---|
| Date: | 28 September 2001 |
| Time | 4:20 p.m. |
| pH | 6.18 |
| Conductivity | 270 µS/cm |
| Temperature | 6.8° C |

Ice is visible about 20 m into the adit. Wooden framing around the opening of the adit is deteriorating resulting in unstable and dangerous conditions.

**Table 6.7-1**
**Nesbitt Mining and Exploration Ltd. - Adit Water Quality - 28 September 2001**

| Parameter | Units | Result | SSWQO [1] |
|---|---|---|---|
| **Total Trace Metals** | | | |
| Silver (Ag) | mg/L | <0.0004 | 0.01 |
| Aluminum (Al) | mg/L | <0.02 | |
| Arsenic (As) | mg/L | <0.001 | 0.05 |
| Boron (B) | mg/L | 0.316 | |
| Barium (Ba) | mg/L | 0.141 | 1.00 |
| Beryllium (Be) | mg/L | <0.001 | |
| Bismuth (Bi) | mg/L | <0.0001 | |
| Cadmium (Cd) | mg/L | <0.0002 | 0.001 |
| Cobalt (Co) | mg/L | <0.0002 | |
| Chromium (Cr) | mg/L | 0.0018 | 0.02 |
| Copper (Cu) | mg/L | 0.001 | 0.01 |
| Molybdenum (Mo) | mg/L | 0.001 | |
| Nickel (Ni) [4] | mg/L | 0.0002 | 0.03 |
| Phosphorous (Ph) | mg/L | 0.07 | |
| Lead (Pb) | mg/L | 0.0003 | 0.02 |
| Antimony (Sb) | mg/L | <0.005 | |
| Selenium (Se) | mg/L | <0.0008 | 0.01 |
| Tin (Sn) | mg/L | <0.0004 | |
| Strontium (Sr) | mg/L | 0.445 | |
| Titanium (Ti) | mg/L | 0.0042 | |
| Thallium (Th) | mg/L | <0.0001 | |
| Vanadium (V) | mg/L | 0.0011 | |
| Zinc (Zn) | mg/L | 0.008 | 0.05 |
| **Total Major Metals** | | | |
| Calcium (Ca) | mg/L | 29.1 | |
| Potassium (K) | mg/L | 4.7 | |
| Magnesium (Mg) | mg/L | 10.8 | |
| Sodium (Na) | mg/L | 29 | |
| Iron (Fe) | mg/L | 1.18 | 1.00 |
| Manganese (Mn) | mg/L | 0.07 | |
| Silicon (Si) | mg/L | 3 | |
| Zirconium (Zr) | mg/L | <0.0006 | |
| **Radionuclides** | | | |
| Uranium (U) | mg/L | 0.0083 | 0.1 to 0.2 [2] |
| Lead-210 | Bq/L | $<0.103 \pm 0.060$ | |
| Polonium-210 | Bq/L | $0.04 \pm 0.04$ | |
| Radium-226 | Bq/L | $0.092 \pm 0.016$ | 0.11 [3] |

(1) Unless noted, the value is the Specific Surface Water Quality Objective for the Protection of Aquatic Life and Wildlife from the Surface Water Quality Objectives (August, 1997) published by SERM.

(2) For comparitive purposes, the current Municipal Drinking Water Quality Objective for Saskatchewan (SERM, 1996) is 0.1 mg/L and the Specific Surface Water Quality Objective for Protection of water for livestock watering is 0.2 mg/L.

(3) General Surface Water Quality Objective from Surface Water Quality Objectives published by SERM (August, 1997).

(4) The Specific Surface Water Quality Objective for Nickel is 0.025 mg/L where hardness $\leq$ 100 mg/L ($CaCO_3$)
The Specific Surface Water Quality Objective for Nickel is 0.100 mg/L where hardness < 100 mg/L ($CaCO_3$).

Generally, the adit water quality is good with only iron exceeding Specific Surface Water Quality Objectives (SSWQO) for the protection of aquatic life and wildlife. Some elevated values of boron, strontium, barium, calcium, potassium, magnesium and iron were detected. Ra-226 values are above detection but are below the General Surface Water Quality Objectives.

For radio-chemistry results water quality is reported with the activity followed by an error (±) value. The error is a statistical value calculated based on the procedural and instrumental errors associated with the analysis.

A steel mine water discharge line extends out of the adit to the north, along the hillside, for about 30 m. There is no evidence of mine water discharge such a mineral precipitates at the end of the pipe; however, it appears very likely that the line was in fact used for mine water discharge.

There was no sign of a raise on the upslope above the adit.

*6.7.5.3 Waste Rock*

Three waste rock piles are located at the site and are situated south of the adit.

The first pile is about 75 m long by 20 m wide and 5 m high, the second is about 20 m long by 10 m wide and 3 m high and the third is about 5 m long by 3 m wide and 3 m high. All have side slopes of about 3:1.

Gamma measurements varied from 0.03 µSv/hr to 0.25 µSv/hr on the large pile, 0.10 to 0.20 µSv/hr for the medium pile, and 0.12 to 0.18 µSv/hr for the smaller pile.

The waste rock was generally an amphibolite quartz with no visible sulphides, therefore the potential for acid rock drainage is likely low.

Vegetation was encroaching on the sides of the waste rock piles, but there was no vegetation on the side slopes or surfaces.

The piles appear to be stable and do not present an environmental or public safety hazard.

The estimated volume of waste rock is about 4,000 $m^3$.

*6.7.5.4 Debris*

A considerable amount of debris is spread at two main locations, the camp and the mine site. Debris at the camp consists of the following:

- Shed;
- Electrical transformer;
- Electrical wiring, panels, and line running from the camp to the mine site;
- Core shack and core;
- Small electrical generator;
- 1,000 litre fuel tank near core shack; and,
- Barrels, wood, scrap metal.

The electrical transformer contained the following information on its identification panel:

- Westinghouse, single phase type SC 120/240 60 cycle;
- Holds 9 gallons of oil when full (it was sealed and showed no signs of leakage although it could not be opened to determine if it still had oil);
- Serial # 285068;
- Style 21K70047; and,
- 275 pounds weight with oil.

The core was labelled RB-79-18. Gamma levels around the core were at or below background. There are about 250 core racks many of which have been tipped over which has caused the core to spill on the ground. The entire core shack is in a poor dilapidated state, but does not contain an apparent public safety or environmental concern.

Debris at the mine site includes the following:

- Diesel genset situated in a concrete foundation;
- Drill stem;
- Delapidated wooden building;
- Fuel tank; and,
- Scrap wood and metal.

The genset is in good shape. It still contains 40 gallons of fuel, according to a dipstick check. It could still be cranked by hand.

At the shoreline, there is a large fuel storage tank. Approximate dimensions are 6 m high by 8 m diameter. Approximate volume is therefore about 300 $m^3$ or 300,000 l (66,000 imperial gallons). A steel fill line extends out from the base of the tank towards the shoreline. The line does not extend all the way to the shoreline. There are no signs of leaking fuel from the tank or the line. The tank did not appear to contain significant amounts of fuel (based on knocking on the side of the tank and listening for differences in sound).

### 6.7.6 History of Previous Inspections

There is no record of previous site inspections.

### 6.7.7 Risk Assessment Ranking

| | |
|---|---|
| Public Safety Assessment | 14.1 |
| Environmental Assessment | 7 |
| Combined Total Assessment | 21.1 |
| Ranking | 8/22 |

Given the presence of standing water in the adit, one point was attributed to the "additional environmental risks" category.

### 6.7.8 Recommended Follow-up

The site requires extensive follow-up work. Work should focus on permanently blasting the adit closed, removing the large fuel tank, genset, and transformers. Shacks at the camp and mine sites could be burned along with a general housecleaning by either removing debris from the site or disposing of it at the site. Steel drill stem at the mine site could be removed along with the genset. The former exploration trail could be used to drive a skidder to the site and pull debris out. The debris could be piled up in the summer and pulled out by a skidder over the lake in the winter to Uranium City for disposal or disposed of in the adit before it is closed.

Photo 6.7-1 Camp Building on Trail Leading to Mine Site
September 28, 2001

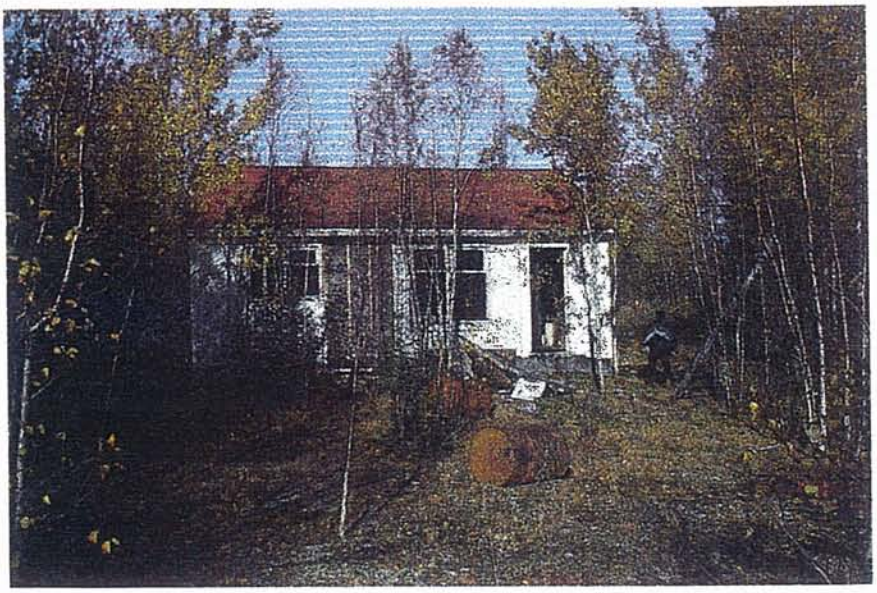


Photo 6.7-2 Electrical Station and Transformer on Trail Leading to Mine Site
September 28, 2001

Photo 6.7-3 Dilapidated Core Storage Facility
September 28, 2001

Photo 6.7-4 Large Fuel Tank on Shoreline
September 28, 2001

Photo 6.7-5 Fill Line From Shoreline to Tank
September 28, 2001

Photo 6.7-6 Nesbitt Mining and Exploration Adit
September 28, 2001

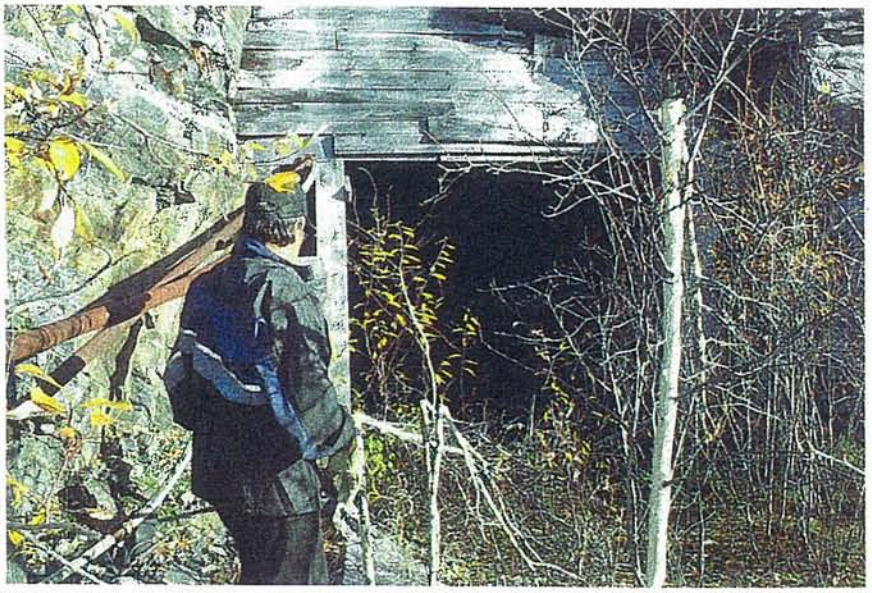


Photo 6.7-7 Diesel Generator Outside Adit
September 28, 2001

Photo 6.7-8 Debris Outside Adit
September 28, 2001

Photo 6.7-9 Main Waste Rock Pile
September 28, 2001

## 6.8 Baska Site-Dot Claims

### 6.8.1 Location and Access

Site Inspection: 29 September 2001

Location: NTS Mapsheet 74 N 09-SW

UTM Zone: 12

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 59° 37' 05" lat<br>108° 27' 34" long | 6611618 m N<br>643314 m E | 59° 37' 04" lat<br>109° 27' 31" long | 6611728 m N<br>643527 m E |

* Locations recorded by GPS during Year 2 field program

** Location obtained from Saskatchewan Mineral Deposit Index

The site is located on the southwest shore of Virgin Lake about 13 km northeast of Uranium City. It is accessible by float plane landing on the south tip of Virgin Lake, by snowmobile via a trail from Uranium City, or by a 3 to 4 km walk from the end of the old road running between Donaldson and Mickey Lakes.

The site location is shown in Figure 6.8-1. The site plan is shown in Figure 6.8-2. Photographs 6.8-1 to 6.8-11 show the site.

### 6.8.2 Property Information and Ownership

**Saskatchewan Mineral Deposit Index Number:** 1292

**Property:** (formerly: S-102826; ML 5013; DOT claims; GG Concession)

**Location:** Southwest side of Virgin Lake

**Owner(s):** Open – see Section 6.8.4 for previous owners

**Commodity:** U **Associated Commodities:** None

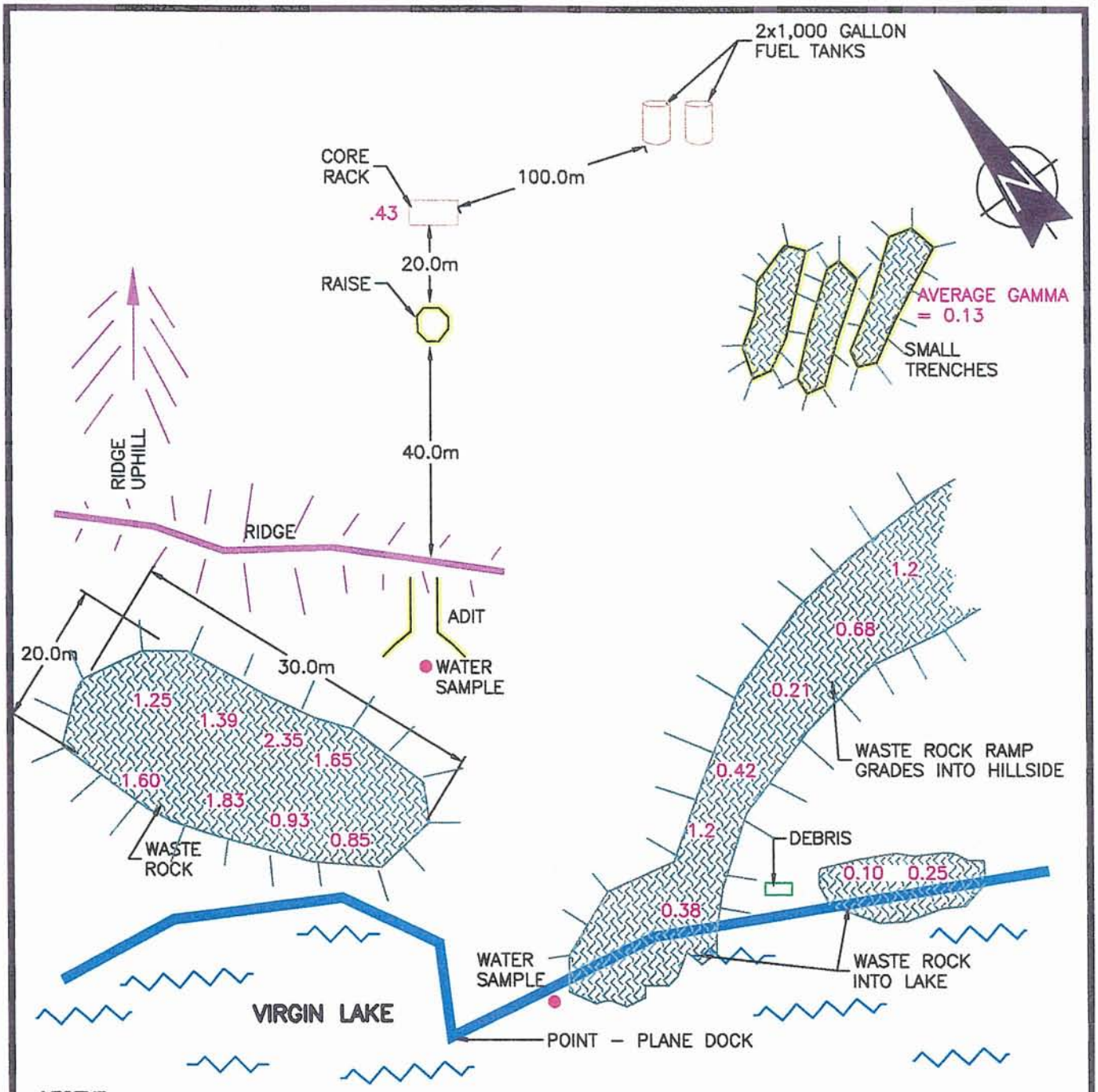
**Deposit Type:** Outcrop


**NOTE:**
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 74 N 9.

# SITE LOCATION PLAN
# BASKA–DOT CLAIMS

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.8–1

R3160/FIG6.8–1.DWG




**LEGEND:**

| | |
|---|---|
| Roads/Trails | |
| Mine Workings | |
| Waste Rock | |
| Body of Water | |
| Scrap Material/Debris/Refuse | |
| Building/Foundation | |
| Tailings | |
| Natural Ground Surface | |
| Gamma Readings (μSv/hr.) | 0.25 |
| Water Sample Location | |
| Soil Sample Location | |

**LEGEND:**

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

# BASKA–DOT CLAIMS – SITE PLAN
## (NOT TO SCALE– DIMENSIONS ARE APPROXIMATE)

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.8–2

R3160/FIG6.8–2.DWG

### 6.8.3 Geology

The showing is located approximately 300 ft (91 m) northeast of the southwest end of Virgin Lake.

The area of the showing is underlain by northeast-trending granite and granite gneiss of the Tazin Formation unconformably overlain by over 1,500 ft (450 m) of basal conglomerate of the Martin Formation to the northwest.

The showing, termed Zone 103, consists of three main mineralized fractures referred to as A, B and C.

Zone 103A (or the A Zone) is a curved fracture zone, convex to the southwest, that changes strike at about the mid point of its exposed strike length. The northwest part strikes 340° and dips 75° west, but southeast of the bend the average trend is 290° and the dip is 60-70° south. The zone is exposed by several cuts and trenches for a strike length of about 250 ft (76 m). Radioactivity is moderate to high across much of the zone and very high in the vicinity of the bend where the zone widens. Five channel samples, cut across the widest part of the zone at 5 ft (1.5 m) intervals, gave an average grade of 0.33% U3O8 across 5.2 ft (1.6 m) and 4 diamond drill holes, spaced over a strike length of 60 ft (18.3 m), were put down to test the zone at a vertical depth of 30 ft (9.1 m). Two of the holes intersected the zone and returned similar values to those returned on the surface, but a deeper hole, intended to intersect the zone at 60 ft (18.3 m), did not encounter any anomalous radioactivity. Zone 103B is a moderately radioactive fracture zone that is exposed for a strike length of 110 ft (33.5 m) by a long narrow trench. Five diamond drill holes were put down to test the zone to a vertical depth of 50 ft (15.2 m), but only one intersected radioactivity. A 1 ft (0.3 m) section of the zone assayed 0.11% U3O8.

Zone 103C consists of several east-trending fractures arranged an echelon and forming a zone striking 075° for a length of about 300 ft (91 m). The fractures are erratically radioactive and no sample or drill results are known.

Zone 103A was explored by an adit from the base of the scarp at the southwest end of the lake. It was driven on a bearing of 025° for a distance of 180 ft (54.9 m). From that point, a long drive was made to the west to connect the A, B and C fractures and 1,600 ft (487.7 m) of drifting and cross cutting was carried out along the veins. The best results were obtained in the 103C-1 drift of the C fracture where a small ore shoot 80 ft (24.4 m) long across a width of 6 ft (1.8 m) was outlined.

The mineralization, which occurs exclusively in 75° southwest dipping joint-type red hematite-coated fractures, consists of pods and veins (up to 1 inch thick) of carbonate-associated pitchblende and films of pitchblende as coatings on fracture walls. The concentration of pitchblende is greatest in the fractures in fine-grained dense granite, (Saskatchewan Industry and Resources, 2002).

### 6.8.4 Exploration History

In 1949, Domino Athabasca Uranium Mine's GG Concession covered the showing.

In 1950, Baska Uranium Mines completed geological mapping, radiometric prospecting and follow-up trenching and 14 drill holes on DOT claims 23 to 25.

Initial prospecting on the 32 DOT claims in 1953 by Baska Uranium Mines Ltd. resulted in locating 110 radioactive occurrences. Twenty-six of these were further investigated. Five were drilled and one of them, Zone 103, was explored underground from an adit. Insufficient ore reserves were outlined on this zone and work on the property ceased in 1956.

Baska worked on their DOT claims from 1953 to 1956 doing geological mapping, geigering, trenching, sampling and diamond drilling. 10,000 ft (3,048 m) of diamond drilling was done on the 103 Zone.

In 1955-1956, the No. 103A Zone was explored by an adit from the base of the scarp at the southwest end of the lake. Drifting totaling 1,900 ft (579 m) cross cutting, raise development, and sampling were completed.

In 1966, the company was renamed Norbaska Mines Ltd. In 1967-1968, more diamond drilling along with and airborne and ground scintillometer survey was done on the DOT claims, which had since been changed to ML 5013, following Eldorado Mining and Refining Ltd.'s decision to develop the Hab Mine. On 23 April 1994, Greater Lenora Resource Corporation staked the showing as S-102826. In 1997, they flew a helicopter-borne EM, magnetic. resistivity, and spectrometer survey over the claim. The property lapsed on 01 October 2000, (Saskatchewan Industry and Resources, 2002).

### 6.8.5 2001 Inspection-Site Description

Following is the site description based on the 2001 inspection.

#### *6.8.5.1 General*

The Baska site was inspected on 29 September 2001. The site was reached by float plane landing on the southwest shore of Virgin Lake. There is no evidence of recent visitation. The site is easily spotted from the air. Most of the major features are located very close to the shore line of Virgin Lake and have easy access. A raise, core storage area and assorted debris are located upslope of the shoreline and are also easy to access. The average gamma reading for the site was about 1.0 µSv/hr.

#### *6.8.5.2 Mine Workings*

The adit is located in a rock face about 30 m off the south shore of Virgin Lake near the southwest end of the lake. The adit faces southeast toward the lake. There have been no previous attempts to close the adit. Timber framing around the adit opening is rotting and dilapidated. The opening is about 4 m high and 3 m wide.

There is standing water in the adit. A water sample was taken and had the following field measurements:

| | |
|---|---|
| Date: | 29 September 2001 |
| Time: | 10:20 a.m. |
| pH | 6.27 |
| Conductivity | 255 µS/cm |
| Temperature: | 4.2°C |

Table 6.8-1 provides the analytical results of the sample.

The adit is considered a public safety hazard due to the easy access and unstable roof conditions. The adit poses an environmental risk due to the elevated levels of radionuclides in the water and proximity to Virgin Lake. In addition, some total major metals, barium, aluminum, phosphorous and strontium are elevated. There is no evidence of seasonal flow from the adit. Although heavy rainfall or snowmelt could cause water to be flushed from the adit.

About 200 m upslope from the adit is an open raise. The raise is about 3 m in diameter, is overgrown with vegetation and was difficult to locate. The raise can be considered to be a blind opening because it is not noticeable until a person is right beside it. According to the local Conservation Officer, the area is frequented in the winter by local recreational snowmobilers. The raise is likely more hazardous in the winter when it would become obscured with snow. Gamma readings around the raise averaged 0.43 µSv/hr.

Northwest of the adit are a series of small trenches. There is no standing water in the trenches. Gamma values near the trenches average 0.13 µSv/hr.

*6.8.5.3 Waste Rock*

There is a significant amount of waste rock spread around the site. It appears some waste rock was used for site grading. There are two main piles; to the south is the larger pile which is about 30 m long by 20 m wide and 8 m at its highest point. Gamma values at this pile ranged from 0.85 to 2.35 µSv/hr. The smaller pile is located to the north of the property and appears to have been used to construct a ramp or roadway. This smaller pile widens out and is about 25 m long by 5 m wide at the top. Gamma values for the smaller pile range from 0.21 to 2.1 µSv/hr.

There is a small amount of waste rock located at the edge of the trenches. The trenches are not considered to have any public safety or environmental concerns. Some of the trenches have been backfilled with waste rock.

The waste rock is a hematized granodiorite. There are no visible sulphide minerals present. Vegetation has encroached up to the waste rock edges, but there is no vegetation on the side slopes or surfaces of the waste rock.

There appears to be about 2,500 $m^3$ of waste rock at the site.

Some of the waste rock (about 50 $m^3$) is spread into Virgin Lake. There are no precipitates and no other type of environmental issues appear related to the waste rock in the lake. A water sample of the lake immediately adjacent to the waste rock (in the lake) was taken. Field measurements are as follows:

| | |
|---|---|
| Date: | 29 September 2001 |
| Time: | 10:40 a.m. |
| pH | 6.18 |
| Conductivity | 93 µS/cm |
| Temperature: | 10.5°C |

Table 6.8-1 provides analytical results of the sample. Generally, the water quality is good with no values exceeding Specific Surface Water Quality Objectives (SSWQO) for the protection of Aquatic Life and Wildlife. Uranium concentrations are comparable to a control sample taken from Lake Athabasca in the past (Saskatchewan Environment, per. comm., 2002).

*6.8.5.4 Debris*

A considerable amount of debris is spread around the site. Debris includes drill stem near the adit, scrap metal and wood, rubber hoses, large empty fuel tanks, rail cars and rails, and drill core.

A dilapidated core shack is located immediately upslope of the adit and about 20 m past the raise. The core shack is collapsed and in poor condition. There are about 100 core boxes, most of which have fallen over resulting in core being strewn about the area. The average gamma reading around the core was 0.41 µSv/hr.

Near the core shack are two large (approximately 5,000 L) fuel tanks. The tanks are in good condition and appear to be empty. There is no sign of leakage from either tank.

### 6.8.6 History of Previous Inspections

There is no record of previous inspections.

### 6.8.7 Risk Assessment Ranking

| | |
|---|---|
| Public Safety Assessment | 15 |
| Environmental Assessment | 10.5 |
| Combined Total Assessment | 25.5 |
| Ranking | 6/22 |

The site is located on a popular snowmobile trail. The raise presents a public safety hazard, particularly in the winter when it could be obscured by snow and becomes a blind opening. Therefore, one point was attributed to the "additional public safety risks" category. In addition, due to the presence of waste rock in Virgin Lake, one point was attributed to the "additional environmental risks" category.

**Table 6.8-1**
**Baska (Dot Claims) - Adit and Virgin Lake Water Quality - 29 September 2001**

| Parameter | Units | Result | | SSWQO [1] |
|---|---|---|---|---|
| | | Adit | Virgin Lake | |
| **Total Trace Metals** | | | | |
| Silver (Ag) | mg/L | <0.0004 | <0.0004 | 0.01 |
| Aluminum (Al) | mg/L | 0.88 | 0.03 | |
| Arsenic (As) | mg/L | <0.001 | <0.001 | 0.05 |
| Boron (B) | mg/L | <0.002 | <0.002 | |
| Barium (Ba) | mg/L | 0.145 | 0.0225 | 1 |
| Beryllium (Be) | mg/L | <0.001 | <0.001 | |
| Bismuth (Bi) | mg/L | <0.0001 | <0.0001 | |
| Cadmium (Cd) | mg/L | <0.0002 | <0.0002 | 0.001 |
| Cobalt (Co) | mg/L | 0.002 | <0.0002 | |
| Chromium (Cr) | mg/L | 0.0038 | 0.0022 | 0.02 |
| Copper (Cu) | mg/L | 0.007 | <0.001 | 0.01 |
| Molybdenum (Mo) | mg/L | 0.0057 | 0.0009 | |
| Nickel (Ni) [4] | mg/L | 0.002 | 0.0004 | 0.025 |
| Phosphorous (Ph) | mg/L | 0.12 | 0.08 | |
| Lead (Pb) | mg/L | 0.013 | <0.0001 | 0.02 |
| Antimony (Sb) | mg/L | <0.005 | <0.005 | |
| Selenium (Se) | mg/L | <0.0008 | <0.0008 | 0.01 |
| Tin (Sn) | mg/L | <0.0004 | <0.0004 | |
| Strontium (Sr) | mg/L | 0.144 | 0.0326 | |
| Titanium (Ti) | mg/L | 0.0745 | 0.0082 | |
| Thallium (Th) | mg/L | <0.0001 | <0.0001 | |
| Vanadium (V) | mg/L | 0.0039 | 0.001 | |
| Zinc (Zn) | mg/L | 0.042 | 0.005 | 0.05 |
| **Total Major Metals** | | | | |
| Calcium (Ca) | mg/L | 48.4 | 12.9 | |
| Potassium (K) | mg/L | 1.8 | 0.6 | |
| Magnesium (Mg) | mg/L | 13.4 | 4 | |
| Sodium (Na) | mg/L | 3 | 1 | |
| Iron (Fe) | mg/L | 5.08 | 0.092 | 1 |
| Manganese (Mn) | mg/L | 0.407 | 0.009 | |
| Silicon (Si) | mg/L | 6.7 | 0.2 | |
| Zirconium (Zr) | mg/L | 0.0016 | <0.0006 | |
| **Radionuclides** | | | | |
| Uranium (U) | mg/L | 0.371 | 0.0065 | 0.1 to 0.2 [2] |
| Lead-210 | Bq/L | 1.87± 0.078 | <0.103+ 0.059 | |
| Polonium-210 | Bq/L | 1.51 ± 0.26 | <0.05 + 0.02 | |
| Radium-226 | Bq/L | 0.649 ± 0.036 | 0.019 + 0.007 | 0.11 [3] |

(1) Unless noted, the value is the Specific Surface Water Quality Objective for the Protection of Aquatic Life and Wildlife from the Surface Water Quality Objectives (August, 1997) published by SERM.

(2) For comparitive purposes, the current Municipal Drinking Water Quality Objective for Saskatchewan (SERM, 1996) is 0.1 mg/L and the Specific Surface Water Quality Objective for Protection of water for livestock watering is 0.2 mg/L

(3) General Surface Water Quality Objective from Surface Water Quality Objectives published by SERM (August, 1997)

(4) The Surface Water Quality Objective for Nickel is 0.025 mg/L where hardness < 100 mg/L ($CaCO_3$)
The Surface Water Quality Objective for Nickel is 0.100 mg/L where hardness < 100 mg/L ($CaCO_3$)

### 6.8.8 Recommended Follow-up

Recommended follow-up work includes permanently blasting or sealing the adit closed. Some benign material such as mine cars, drill stem, and lumber could be pushed into the adit prior to blasting.

Core could be pushed into the raise. The raise should then be permanently sealed with a concrete bulkhead. Topsoil should be cleared off down to bedrock. The bulkhead should be placed and secured to the bedrock.

The large fuel tanks should be removed from the site. This could be done in winter with a skidder and sled. Alternatively, the tanks could be cut up and dropped down the raise. Other debris could be removed or dropped down the raise.

Waste rock should be graded to remove steep slopes and cover areas with elevated gamma radiation.

Consideration should also be given to excavating the waste rock within Virgin Lake and placing it on the main pile, provided the benefits associated with moving the pile outweigh the short term impacts associated with removal.

Photo 6.8-1 Abandoned Mine Cars Near Adit
September 29, 2001

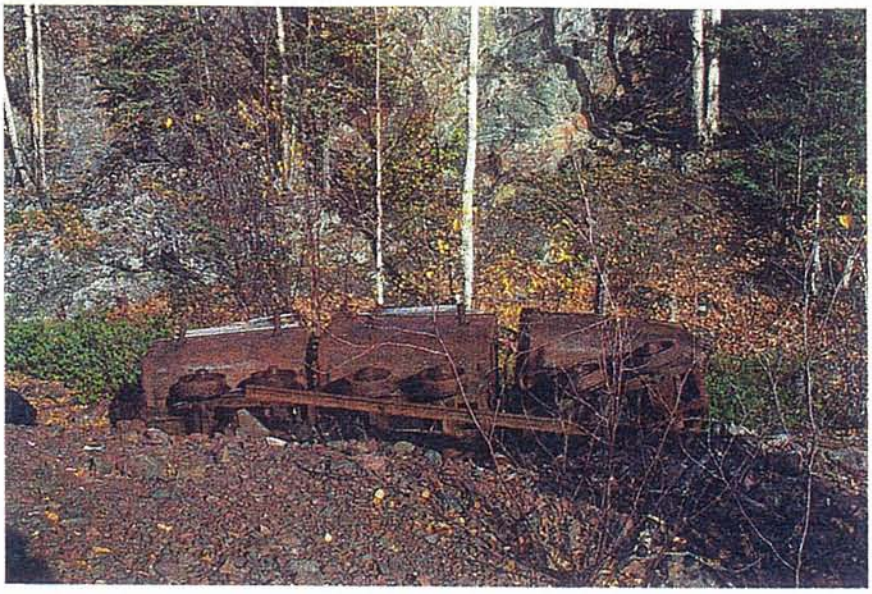


Photo 6.8-2 Baska Adit Opening
September 29, 2001

Photo 6.8-3 Debris Near Baska Adit
September 29, 2001

Photo 6.8-4 Baska Core Storage Area
September 29, 2001

Photo 6.8-5 Baska Raise Opening
September 29, 2001

Photo 6.8-6 Baska Raise Opening
Showing Dewatering Line
September 29, 2001

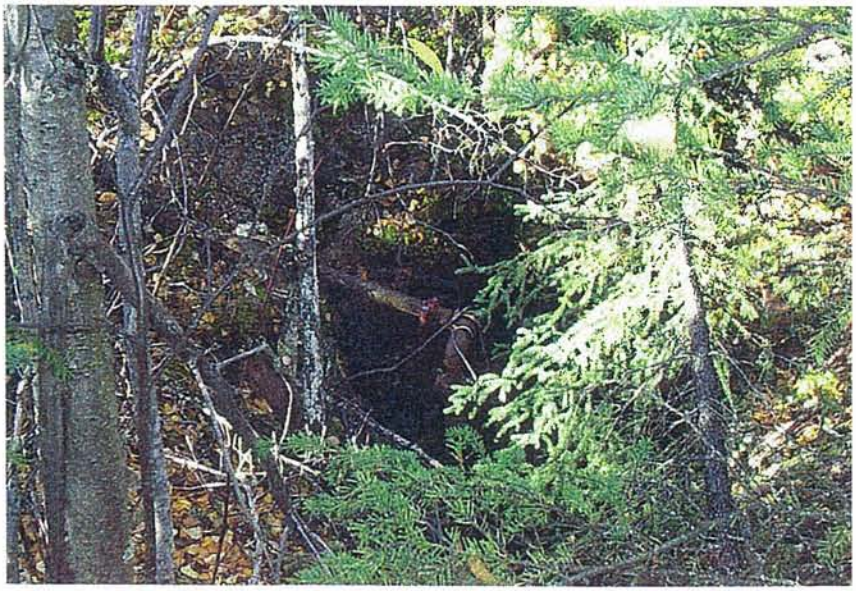


Photo 6.8-7 Small Trench Upslope and North of Adit
September 29, 2001

Photo 6.8-8 Waste Rock Ramp
September 29, 2001

Photo 6.8-9 Main Waste Rock Pile
September 29, 2001

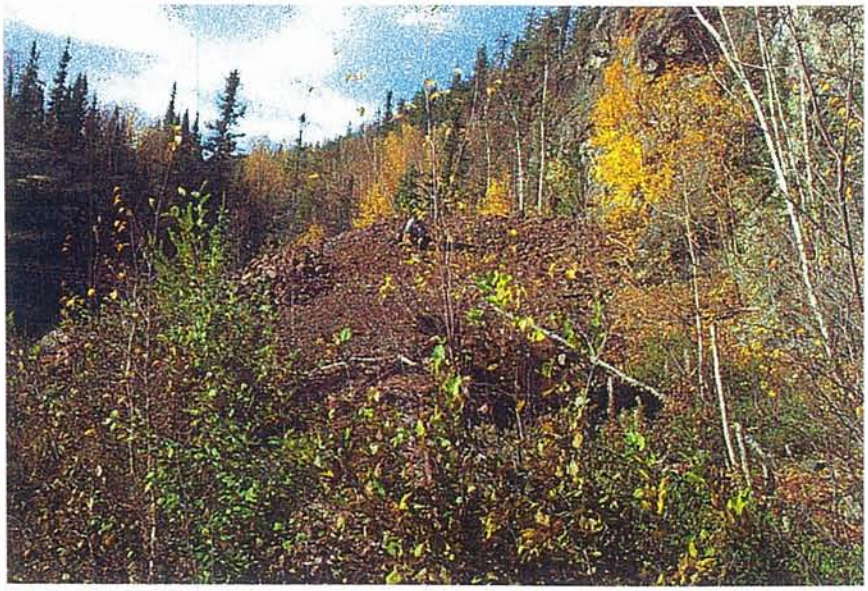


Photo 6.8-10 View of Main Waste Rock Pile
September 29, 2001

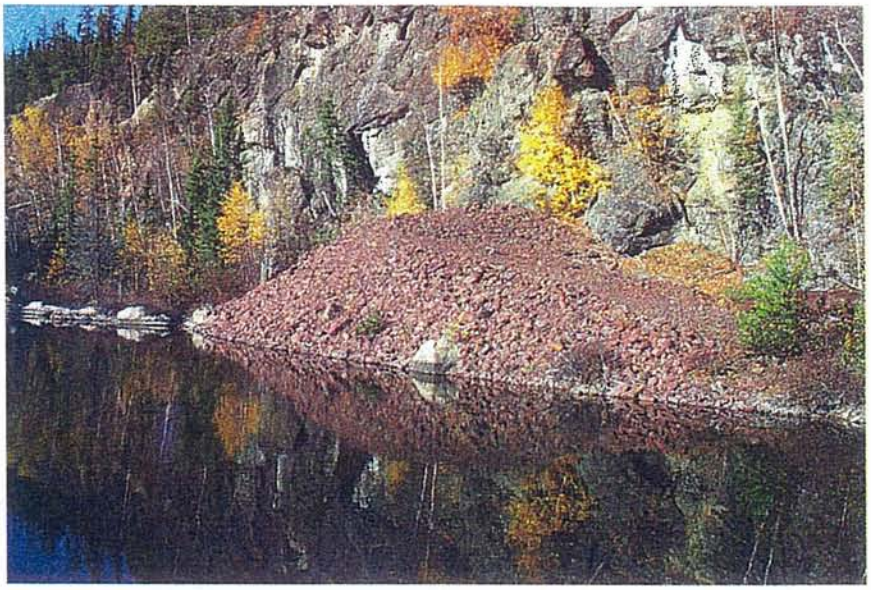


Photo 6.8-11 Aerial View of Baska Site
Looking Southwest
Septebmber 29, 2001

## 6.9 Consolidated Beta Gamma-Tena Claims

### 6.9.1 Location and Access

Site Inspection: 29 September 2001

Location: NTS Mapsheet 74 N-11-SE

UTM Zone: 12

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 59° 32' 17" lat<br>109° 04' 13" long | 6601552 m N<br>609122 m E | 59° 32' 16" lat<br>109° 04' 11" long | 6601441 m N<br>609281 m E |

* Locations recorded by GPS during Year 2 field program

** Location obtained from Saskatchewan Mineral Deposit Index

The site is located about 2.5 km inland from the northern tip of Island Bay on Lake Athabasca. The site is accessible by boat or float plane and about a one hour walk from the shore.

The site location is shown in Figure 6.9-1. The site plan is shown in Figure 6.9-2. Photographs 6.9-1 to 6.9-3 show the site.

### 6.9.2 Property Information and Ownership

**Saskatchewan Mineral Deposit Index Number:** 1511

**Property:** (formerly: CBS 307; TENA claims)

**Location:** Southeast of Charlot River

**Owner(s):** Open – see Section 6.9.4 for previous owners

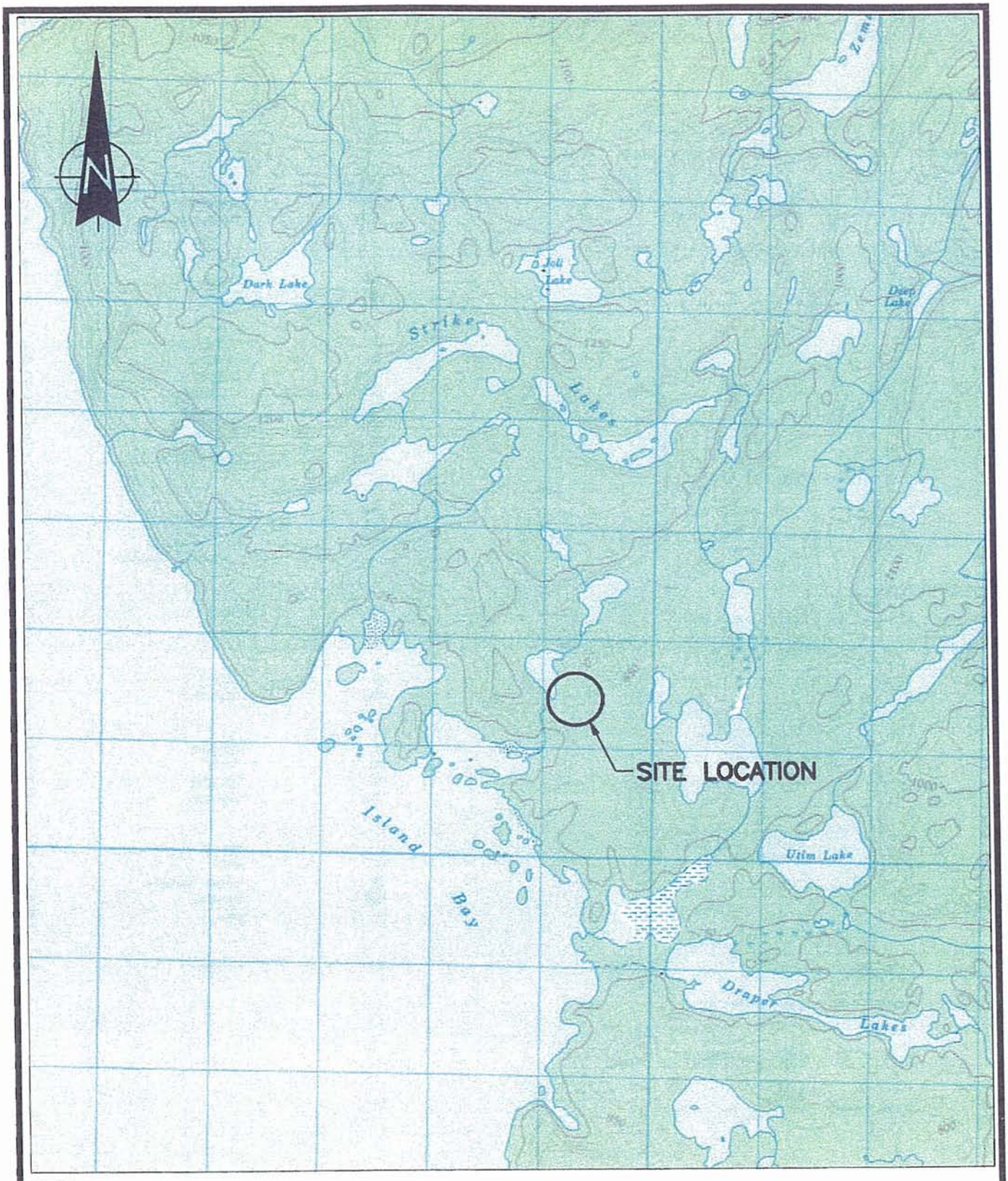
**Commodity:** U **Associated Commodities:** None

**Deposit Type:** Trench

### 6.9.3 Geology

The showing is located approximately 5 miles (8 km) southeast of the mouth of the Charlot River near the shore of Lake Athabasca.

The showing consists of pitchblende in four en echelon fractures forming an east-trending zone. Individual fractures strike 060° to 080° and are 40 to 140 ft (12 to 43 m) apart. The fractures are filled with hematite, calcite and pitchblende with strongly hematized wall rocks.

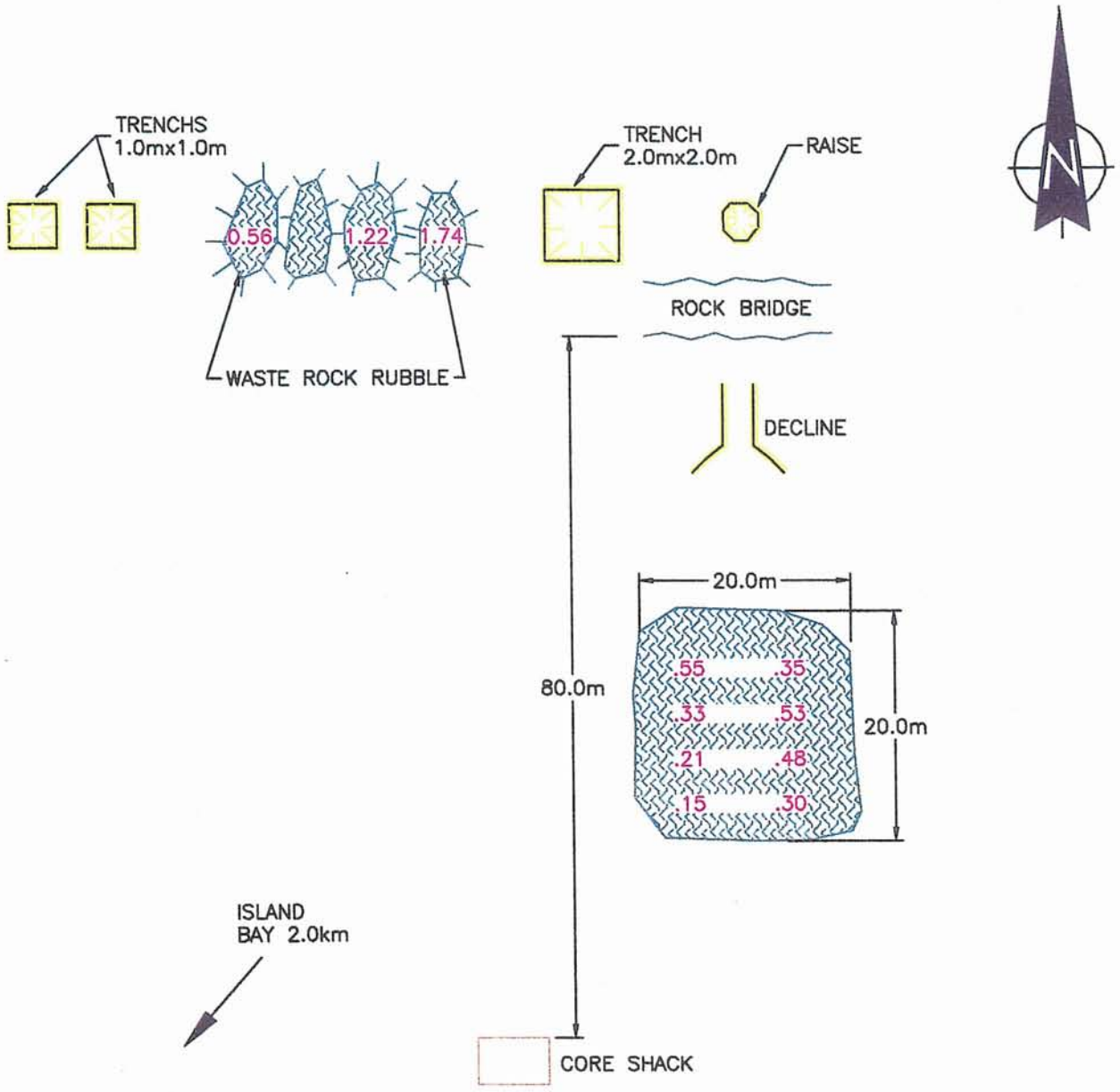



**NOTE:**
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 74 N 11.

# SITE LOCATION PLAN
# CONSOLIDATED BETA GAMMA–TENA CLAIMS

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.9–1

R3160/FIG6.9–1.DWG




**LEGEND:**

Roads/Trails
Mine Workings
Waste Rock
Body of Water
Scrap Material/Debris/Refuse
Building/Foundation
Tailings
Natural Ground Surface
Gamma Readings (μSv/hr.) 0.25
Water Sample Location
Soil Sample Location

**LEGEND:**

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

# CONSOLIDATED BETA GAMMA – SITE PLAN
## (NOT TO SCALE– DIMENSIONS ARE APPROXIMATE)

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.9–2

R3160/FIG6.9–2.DWG

The area is underlain by a north-trending contorted and drag folded sequence of quartzites and quartz-biotite gneisses.

Trenching exposed a small ore shoot 160 ft (49 m) long by 2.5 ft (0.76 m), which constitutes Zone 1, (Saskatchewan Industry and Resources, 2002).

### 6.9.4 Exploration History

The TENA Group of claims, on which the showing occurs, was staked by A. McIvor in 1948. Stripping, trenching and sampling were carried out under option.

In 1952, Beta Gamma Mines Ltd. purchased the property and carried out a geiger survey, surface stripping, trenching and sampling. A test pit and 921 ft (281 m) of diamond drilling failed to prove the property and work was discontinued after basic geological mapping. Beck (1969) reports that a series of small trenches were located on the property.

In 1957, Northshore Uranium Developers leased the property for development and mining. A 200 ft (61 m) inclined shaft was sunk along Zone 1 and about 507 tons (461 tonnes) of ore was extracted and shipped to the Lorado mill between 1957 and 1959.

The ore was removed from the west raise and stope and the smaller east raise and stope.

In 1966, Mokta Canada Ltd. recorded CBS 307 and completed an airborne radiometric and photo-geological survey along with ground prospecting of known showings. The showing was reinvestigated, mapped, sampled and tested by geochemical sampling and geophysical surveys.

In 1968, the property was transferred to Amok Ltd. who diamond drilled 1,750 ft (533 m) to test horizontal and vertical extensions of the zone. The results were disappointing although a few mineralized intersections were encountered, (Saskatchewan Industry and Resources, 2002).

### 6.9.5 2001 Inspection-Site Description

Following is the site description as noted during the 2001 inspection.

#### *6.9.5.1 General*

The Consolidated Beta Gamma site was inspected on 29 September 2001. Site access was gained by boat from Bushell Inlet to the north end of Island Bay and a one hour walk from Island Bay to the site.

There is no evidence of recent visitation. The site is moderately vegetated and access to the site is relatively easy. However, the site would be difficult to find unless accompanied by someone who has previously been to the site.

The background gamma values for the mine site were about 0.50 µSv/hr.

*6.9.5.2 Mine Workings*

Mine workings consist of a shaft approximately 3 m in diameter. There are no ancillary facilities such as a headframe associated with the shaft. A second opening is beside the shaft. The two openings are separated by a 1 m wide rock bridge. The second appears to be a stope (a vertical excavation developed from underground) which has broken through to the surface leaving a small open pit which intersects the shaft. Both openings are open and very visible, but are steep and dangerous.

There is no standing water in the shaft. Large rocks dropped into the shaft appear to hit rock bottom rather than water.

Small trenches are located west of the shaft. The trenches are small and square with dimensions of about 1 m x 1 m to 2 m x 2 m and 2 to 3 m deep. There are several small trenches, as described by Beck (1969). The trenches do not pose a serious environmental or public safety hazard. There is no evidence of standing water in the trenches.

Although there are two recorded adits, only one could be located. Mueller (1978) states that the second adit appears to be flooded (see section 6.9.6).

*6.9.5.3 Waste Rock*

A small amount of waste rock is spread about the site. Most of the waste rock is in a pile south of the shaft. This pile is about 20 m by 20 m and 1 to 2 m high. There are no steep slopes or safety concerns. Several smaller piles about 1 m in diameter and 1 m high are located west of the shaft. Vegetation is encroaching on the waste rock.

Gamma readings for the main pile varied from 0.15 to 0.55 µSv/hr and averaged 0.68 µSv/hr for the smaller piles. There are no visible sulphides associated with the waste rock.

There is likely about 250 to 400 $m^3$ of waste rock on site.

*6.9.5.4 Debris*

Although Mueller (1978) reports debris and collapsed buildings on the site, there is virtually no debris remaining at the site. A small dilapidated core shack is located southwest of the shaft. The wooden frame supporting the core boxes has rotted and tipped. About 50 core boxes have fallen over and most core is spilled. Average gamma readings at the core storage areas are 0.11 µSv/hr.

### 6.9.6 History of Previous Inspections

Mueller (1978) inspected the site on 01 October 1976. Following is a summary of Mueller's report.

At the time, the property was held by Frank Camsell of Uranium City. At the time of operations, the property was held by Consolidated Beta Gamma Mines. The high grading was done by Northshore Uranium Developers who removed 1,300 tons (1,183 tonnes) of rock.

There was about 200 tons (182 tonnes) of broken waste rock piled outside the upper adit. Other litter at the site consisted of a short collapsed trestle railway, the remains of three collapsed buildings, a home made ore scraper, several 200 litre drums, a small amount of miscellaneous garbage. A small loading quay constructed out of waste rock was built on the lake shore at the end of the access road.

Mueller reported that the site may have two adits. These include the opening adjacent to the shaft which appears to be the stope that has broken through to the surface, as well as the second adit which appears to be flooded. Mueller could only locate the adit adjacent to the shaft. Mueller reports that the main adit was about 100 ft (33 m) in length and ends in a raise, the roof of which has collapsed leaving a small open pit about 30 ft (9 m) deep. Mueller's observations are consistent with those recorded in 2001, namely that there is a shaft with an adjacent opening which is either an associated adit or stope that has broken through to the surface.

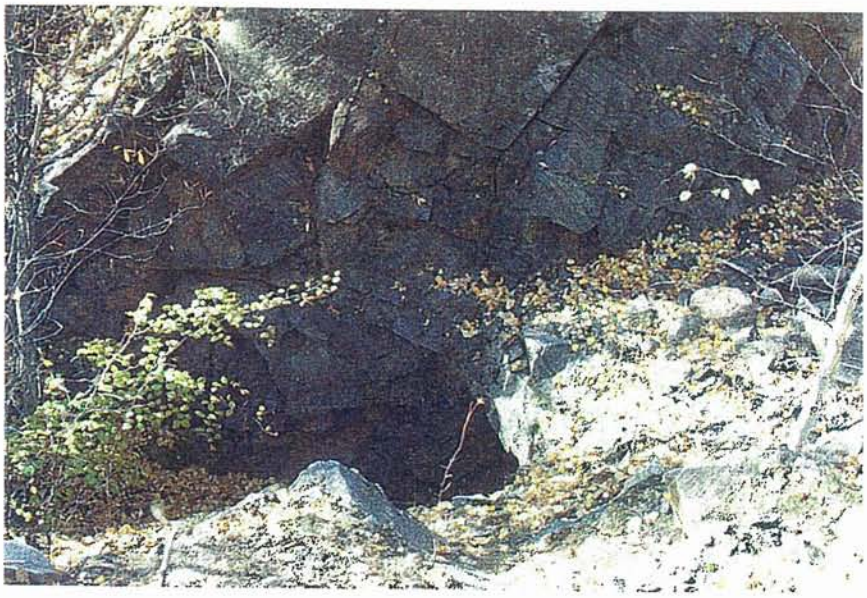
Mueller reported the vegetation was well re-established even in the bottom of the 30 ft (9 m) deep pit. Alder and young birch were abundant on the site. No water was running from or into any of the openings. A small amount of water remained in the pit around the collapsed lower opening.

### 6.9.7 Risk Assessment Ranking

| | |
|---|---|
| Public Safety Assessment | 9.5 |
| Environmental Assessment | 1.0 |
| Combined Total Assessment | 10.5 |
| Ranking | 18/22 |

There is little follow-up work required at the site. The site is far removed from view or public access; however, remediation could be restricted to blasting or sealing the adit permanently shut and reducing the side slopes of the open pit.

Photo 6.9-1 Consolidated Beta Gamma
Shaft Opening
September 29, 2001



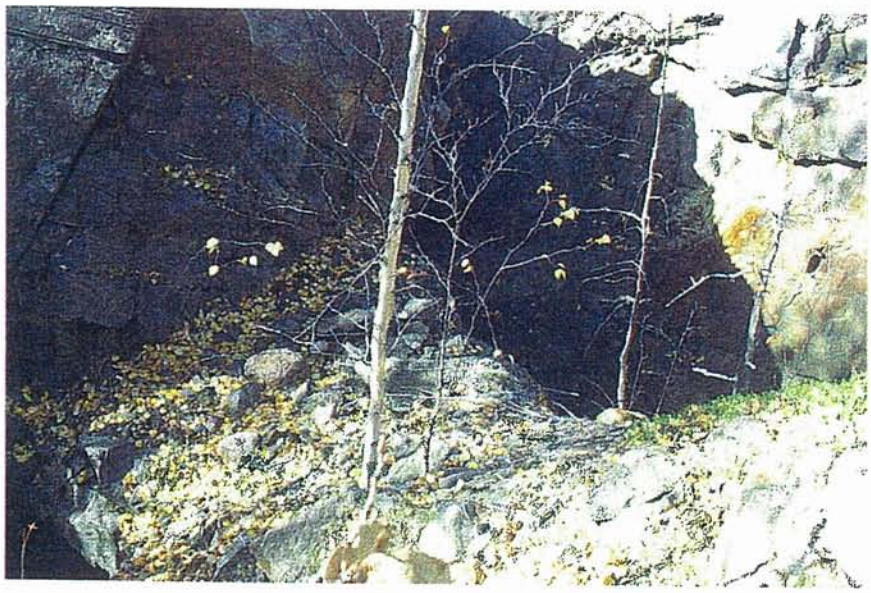
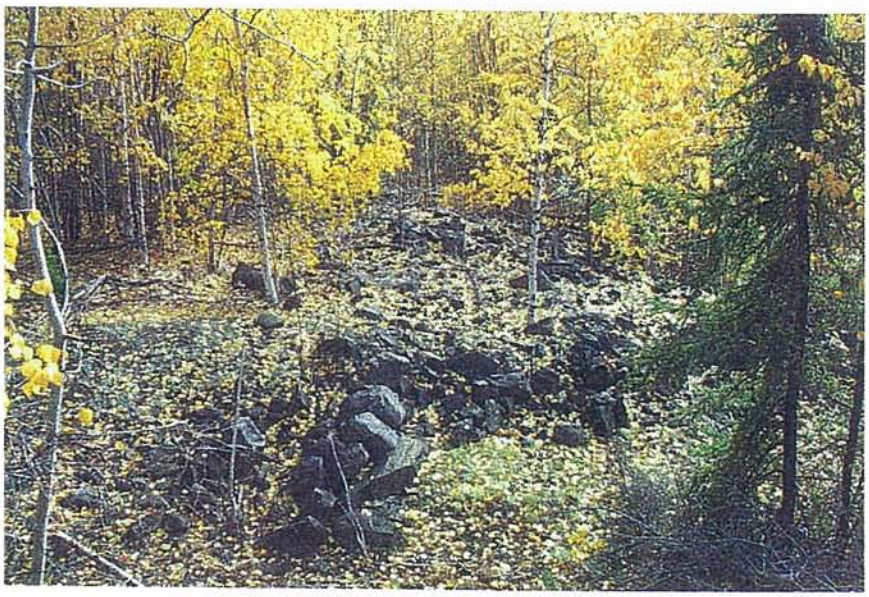


Photo 6.9-2 Consolidated Beta Gamma
Shaft Opening; Note Bridge of Rock
Between Shaft and Breakthrough to
Surface on Left of Photo
September 29, 2001

Photo 6.9-3 Consolidated Beta Gamma
Waste Rock
September 29, 2001



## 6.10 Gulch Mine

### 6.10.1 Location and Access

Site Inspection: 29 September 2001

Location: NTS Mapsheet 74-N-7 and 74-N-6
UTM Zone: 12

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 59° 26' 44" lat<br>108° 51' 40" long | 6591616 m N<br>621279 m E | 59° 26' 43" lat<br>108° 51' 37" long | 6591440 m N<br>621283 m E |

* Locations recorded by GPS during Year 2 field program
** Location obtained from Saskatchewan Mineral Deposit Index

The site is located about 20 km southwest of Uranium City, Saskatchewan on a prominent escarpment on Black Bay in Lake Athabasca. It is easily accessible by float plane, snowmobile or boat from Bushell Inlet.

The site location is shown in Figure 6.10-1. The site plan is shown in Figure 6.10-2. Photographs 6.10-1 to 6.10-9 show the site.

### 6.10.2 Property Information and Ownership

**Saskatchewan Mineral Deposit Index Number:** 1221

**Property:** (formerly: GULCH-ARKO claims)

**Location:** Black Bay fault area

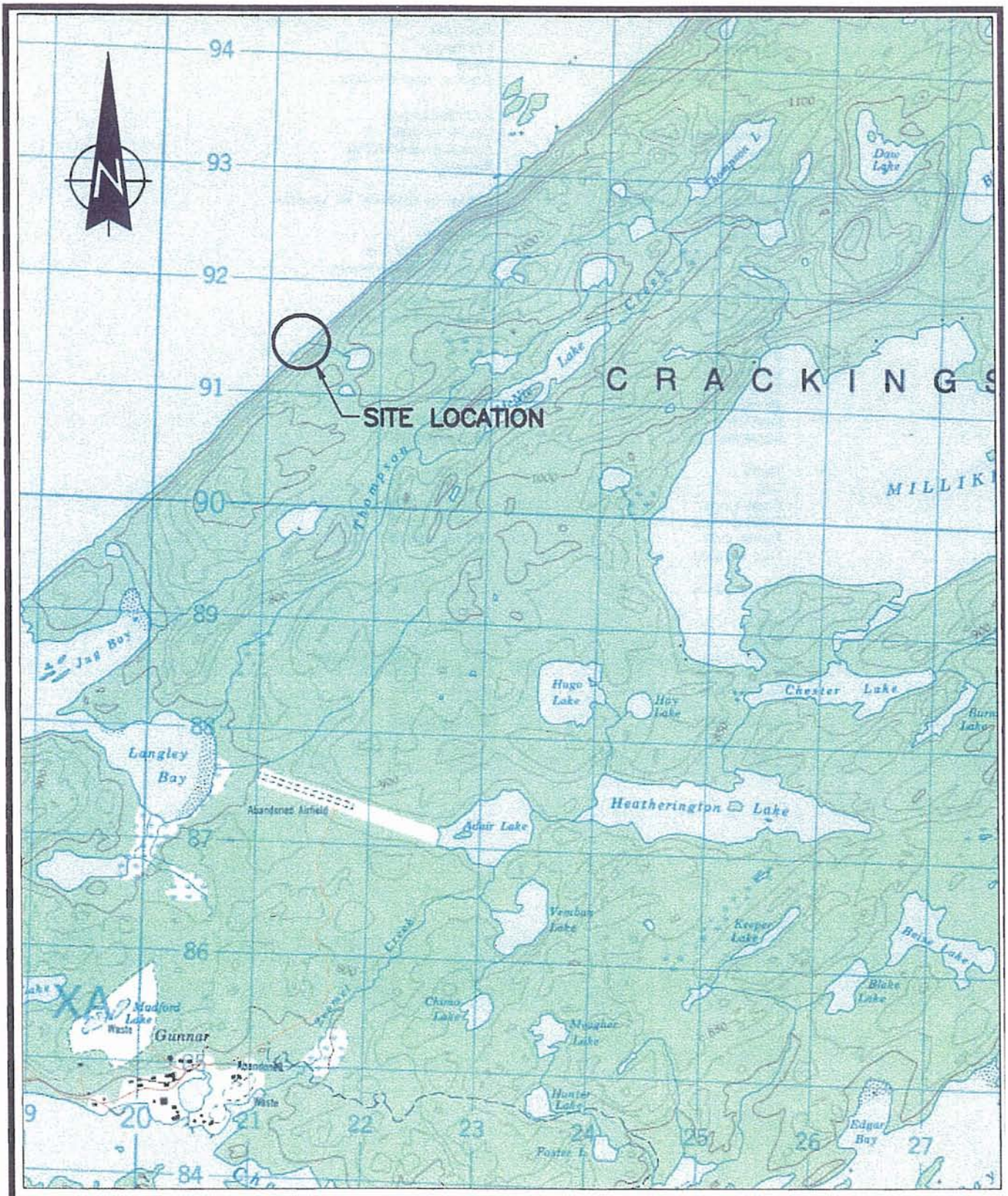
**Owner(s):** Open – see Section 6.10.4 for previous owners

**Commodity:** U **Associated Commodities:** Cu;Pb;Co;Ni;As

**Deposit Type:** Outcrop

### 6.10.3 Geology

The main structural element which controls the ore at the Gulch Mine is the Black Bay fault. The fault strikes N52°E and dips 65° to 69° southeast in the vicinity of the 'gulch'. The fault was exposed in underground workings and characterizing gouges, ranging from 3 to 24 inches (7.6 to 61 cm) in thickness, can be seen.

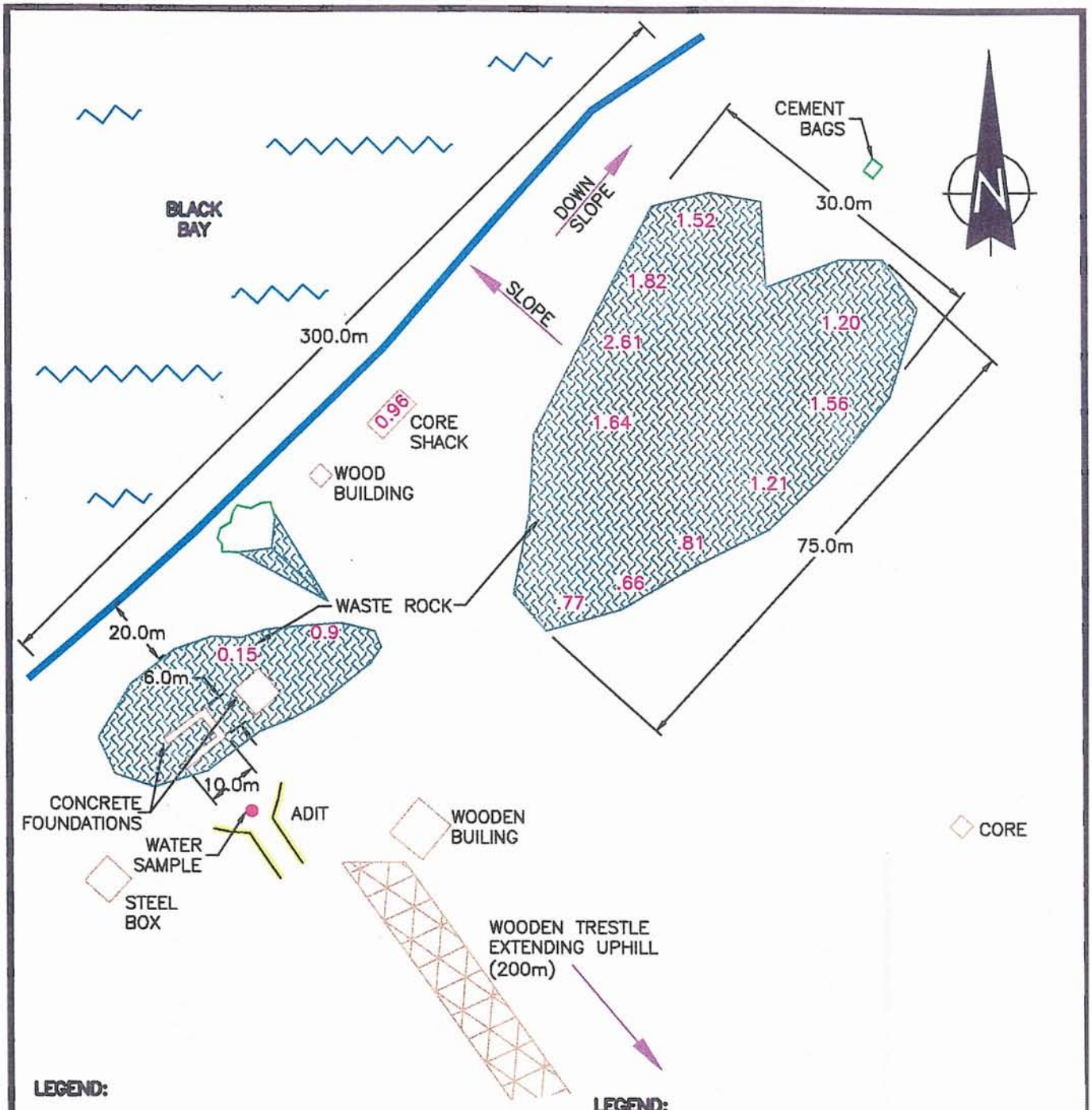



**NOTE:**
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 74 N 7.

# SITE LOCATION PLAN
# GULCH URANIUM MINE

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.10–1

R3160/FIG6.10–1.DWG




**LEGEND:**

| | |
|---|---|
| Roads/Trails | |
| Mine Workings | |
| Waste Rock | |
| Body of Water | |
| Scrap Material/Debris/Refuse | |
| Building/Foundation | |
| Tailings | |
| Natural Ground Surface | |
| Gamma Readings (µSv/hr.) | 0.25 |
| Water Sample Location | |
| Soil Sample Location | |

**LEGEND:**

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

# GULCH URANIUM MINE – SITE PLAN
## (NOT TO SCALE– DIMENSIONS ARE APPROXIMATE)

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.10–2

R3160/FIG6.10–2.DWG

On the hanging wall side of the fault, the bedrock consists of a sequence of brecciated arkoses with minor siltstone and conglomerate of the Helikian Martin Formation overlying brecciated and mylonitized Aphebian granitic rocks.

The foot wall rocks consist of brecciated and red-altered meta-argillites and quartz feldspar gneisses which are, locally, rich in chlorite and epidote. Most of the foot wall rocks strike parallel to the Black Bay fault and dip southeast at a flatter angle than the fault. In the foot wall rocks, three sets of mineralization exist; one set strikes N25° west and 2 sets strike N52° east.

Most of the pitchblende is associated with the northwest trending fractures. It occurs as small veinlets from up to 1/8 inches wide to paper-thin smears which coat fracture surfaces. Variable amounts of pyrite, carbonate, and graphite are present in the veins; chalcopyrite, galena, and smaltite, [(Co,Ni)As2-3], have been reported. Underground work outlined eleven ore shoots, which vary from 60 to 160 ft (18-49 m) in length and 4 to 14 ft. (1.2 to 4.3 m) in width, between the 500 ft (152 m) and 800 ft. (244 m) levels, (Saskatchewan Industry and Resources, 2002).

### 6.10.4 Exploration History

A group of 21 claims, straddling the Black Bay fault, was acquired by New Bidlamaque Mines in 1953. Several promising uranium discoveries were made on the GULCH and ARKO Claims (the above mentioned 21 claims) prior to 1953, and detailed geological mapping and radioactive surveys during the summer of 1953 indicated that a diamond drilling program was warranted. Sampling and rock trenching carried out in October proved encouraging and Gulch Mines Ltd., in the following year, was formed to develop the property.

Between 1953 and 1957, geological mapping, radiometric surveys, trenching, sampling and diamond drilling were used to delineate the property. A 831 ft (253 m) shaft with three levels was sunk. Underground drilling and lateral work further delineated the deposit.

The main showing, or the Gulch Zone, was initially investigated by 3 drill holes. Drill results were disappointing but the structural setting of the property was revealed. Drilling through the Black Bay Fault into the Aphebian foot wall rocks commenced. The first hole hit pitchblende. This led to a 31 hole drill program totalling about 19,300 ft. (5,900 m) that outlined a deposit. Reserves were calculated at this time. The deposit is open at both ends of the structure.

In January 1955, an adit, located 400 ft (122 m) southwest of "Gulch", was driven 260 ft (79 m) into the Black Bay escarpment. From this adit, a shaft was sunk to a depth of 525 ft (160 m) and stations were cut at 350 and 500 ft (107 and 152 m) below the lake level. In August 1955, the

shaft was deepened to 830 ft (253 m) and a further 2 levels were established at 650 and 800 ft (198 and 243 m) below the lake level. In all 5,456 ft (1,663 m) of lateral workings were dug, mostly on the 500 ft (152 m) level and about 35,000 ft (10,670 m) of diamond drilling was done on 3 levels. Underground operations were ended in March 1957. Development work on the 500 ft (152 m) level of the mine outlined 11 oreshoots ranging in length from 60 to 160 ft (18 to 48 m) and in width from 4 to 14 ft (1.2 to 4.3 m). Reserves were re-calculated in March of 1957. The continuance of the mineralized fractures to the 650 and 800 ft (198 m to 244 m) levels was established with no significant change in size or grade of the ore shoots.

Between 1967 and 1968, Gunnex Ltd. and Gulch Mines Ltd. completed further geological and geophysical surveys on the property. In 1967, they completed an extensive exploration program that included radiometric prospecting and geological mapping in an effort to locate further ore bodies on the foot wall side of the Black Bay fault. Twenty drill holes were put down between 1967 and 1968 for a total of 9,478 ft (2,890 m). Only one hole, which was spudded near the old underground workings, gave encouraging assays. Eighteen more holes were drilled to test a showing located a few hundred ft (approximately 100 m) from the Gulch Mine. This zone was tested over a strike length of 4,000 ft (1,220 m).

Between 1974 and 1976, nearby underwater radiometric anomalies were drill tested. The deposit drill-indicated reserves of the Gulch Deposit were published in the 1989 GSC Canadian Deposits Not Being Mined.

In 1988, Kelmet Resources Ltd. optioned the property, (Saskatchewan Industry and Resources, 2002).

### 6.10.5 2001 Inspection-Site Description

Following is the site description as noted during the 2001 inspection.

*6.10.5.1 General*

The Gulch Mine site was inspected on 29 September 2001. The site was accessed by a short boat ride from Bushell Inlet. There is evidence of recent visitation as shown by recently disturbed vegetation, footprints and recently overturned rocks.

The area is very rugged, with a steep upslope from the shoreline to the site. From the site to the southeast is a steep hill rising in elevation by about 150 m.

The average gamma reading for the site is approximately 1.0 μSv/hr.

*6.10.5.2 Mine Workings*

Mine workings consists of a single adit facing Black Bay and about 30 m from the shoreline. The adit opening is about 4 m high by 3 m wide. There appears to have been no previous attempts at closure. Water was observed within the adit. A water sample was taken with analytical results provided in Table 6.10-1. The field measurements for the water sample were as follows:

| | |
|---|---|
| Date: | 29 September 2001 |
| Time: | 2:45 p.m. |
| pH: | 6.25 |
| Conductivity: | 280 µS/cm |
| Temperature: | 8.0°C |

The water quality is very good with only slightly elevated Ra-226 values, however, the concentration is below the General Surface Water Quality Objective of 0.11 Bq/L for Ra-226.

According to Beck (1969), there is a shaft internal to the adit. The shaft is about 800 ft (244 m) deep and accesses three working levels. No attempts were made to enter the adit to observe the shaft, due to dangerous roof conditions and poor visibility in the adit. Given the proximity to Black Bay, it is likely that the underground development is flooded to the level of Black Bay. The adit is about 30 m above the level of Black Bay; therefore, the shaft may be open to a depth of about 30 m from surface to the water level.

There was no dewatering line from the adit, but a line that appears to have been the dewatering line was located just outside the adit and leading to Black Bay. It appears that the line was disconnected from the adit, but the major portion leading to the lake was left intact. There was no evidence of mine water discharge such as mineral precipitates or barren vegetation.

The mine site is located in a highly visible location that is traveled by tourists.

*6.10.5.3 Waste Rock*

An extensive amount of waste rock is located on the site, the majority of which is located on the north side of the property on a surface sloping toward the lake. The main pile is about 75 m long by 30 m wide and 5 to 10 m deep. A smaller pile is located on the south side of the property and is about 15 m by 5 m by 2 m deep. The total volume of waste rock is likely 20,000 to 25,000 $m^3$. Considering the extensive amount of underground work, a large volume of waste rock is expected.

The position of the waste rock would result in runoff from snowmelt or intense rainfall entering Black Bay.

**Table 6.10-1**
**Gulch Mine Adit - Water Quality - 29 September 2001**

| Parameter | Units | Result | SSWQO [1] |
|---|---|---|---|
| **Total Trace Metals** | | | |
| Silver (Ag) | mg/L | <0.004 | 0.01 |
| Aluminum (Al) | mg/L | 0.12 | |
| Arsenic (As) | mg/L | <0.001 | 0.05 |
| Boron (B) | mg/L | 0.021 | |
| Barium (Ba) | mg/L | 0.0902 | 1 |
| Beryllium (Be) | mg/L | <0.001 | |
| Bismuth (Bi) | mg/L | <0.0001 | |
| Cadmium (Cd) | mg/L | <0.0002 | 0.001 |
| Cobalt (Co) | mg/L | <0.0002 | |
| Chromium (Cr) | mg/L | 0.0025 | 0.02 |
| Copper (Cu) | mg/L | 0.002 | 0.01 |
| Molybdenum (Mo) | mg/L | 0.0016 | |
| Nickel (Ni) [4] | mg/L | 0.004 | 0.025 |
| Phosphorous (Ph) | mg/L | 0.06 | |
| Lead (Pb) | mg/L | 0.0002 | 0.02 |
| Antimony (Sb) | mg/L | <0.005 | |
| Selenium (Se) | mg/L | <0.0008 | 0.01 |
| Tin (Sn) | mg/L | <0.0004 | |
| Strontium (Sr) | mg/L | 0.154 | |
| Titanium (Ti) | mg/L | 0.0114 | |
| Thallium (Th) | mg/L | <0.0001 | |
| Vanadium (V) | mg/L | 0.0009 | |
| Zinc (Zn) | mg/L | 0.007 | 0.05 |
| **Total Major Metals** | | | |
| Calcium (Ca) | mg/L | 48.7 | |
| Potassium (K) | mg/L | 1.9 | |
| Magnesium (Mg) | mg/L | 13.4 | |
| Sodium (Na) | mg/L | 3 | |
| Iron (Fe) | mg/L | 5.11 | 1 |
| Manganese (Mn) | mg/L | 0.41 | |
| Silicon (Si) | mg/L | 6.8 | |
| Zirconium (Zr) | mg/L | <0.0006 | |
| **Radionuclides** | | | |
| Uranium (U) | mg/L | 0.0001 | 0.1 to 0.2 [2] |
| Lead-210 | Bq/L | <0.103+ 0.061 | |
| Polonium-210 | Bq/L | <0.03 + 0.02 | |
| Radium-226 | Bq/L | 0.058 + 0.013 | 0.11 [3] |

(1) Unless noted, the value is the Specific Surface Water Quality Objective for the Protection of Aquatic Life and Wildlife from the Surface Water Quality Objectives (August, 1997) published by SERM.

(2) For comparitive purposes, the current Municipal Drinking Water Quality Objective for Saskatchewan (SERM, 1996) is 0.1 mg/L and the Specific Surface Water Quality Objective for Protection of water for livestock watering is 0.2 mg/L

(3) General Surface Water Quality Objective from Surface Water Quality Objectives published by SERM (August, 1997).

(4) The specific Surface Water Quality Objective for Nickel is 0.025 mg/L where hardness < 100 mg/L ($CaCO_3$)
The specific Surface Water Quality Objective for Nickel is 0.100 mg/L where hardness < 100 mg/L ($CaCO_3$)

Both piles have relatively steep slopes (2:1) with flat surfaces. Gamma values for the waste rock varied from 0.66 µSv/hr to 2.61 µSv/hr for the main and 0.09 µSv/hr to 0.15 µSv/hr for the smaller pile.

The waste rock can be generally described as quartzite, arkose and feldspar gneiss. There were no visible sulphides in the waste rock which suggests the potential for acid rock drainage is low.

Given the easy access and steep slopes, the waste rock can be considered a public safety risk.

*6.10.5.4 Debris*

There is an extensive amount of debris scattered about the site. Debris includes concrete foundations, several dilapidated wooden buildings, railings for ore cars, bags of hardened cement, scrap steel, metal ore bin, core and a partially collapsed, but significant wooden trestle leading uphill about 150 to 200 m in length.

There is approximately 500 $m^3$ of debris.

There have apparently been no previous attempts at cleaning up the site.

### 6.10.6 History of Previous Inspections

There is no record of previous inspections of the Gulch Site, aside from Beck (1969).

### 6.10.7 Risk Assessment Ranking

| | |
|---|---|
| Public Safety Assessment | 19.5 |
| Environmental Assessment | 11.5 |
| Combined Total Assessment | 31 |
| Ranking | 4/22 |

The site contains public safety hazards including steep waste rock, an open adit and dilapidated buildings. Given the site is on a popular tourist travel-way (fishing), three points were attributed to the "additional public safety risks" category. In addition, one point was attributed to the "additional environmental risks" category due to the presence of waste rock close to the shoreline.

### 6.10.8 Follow-up

There is extensive follow-up work required at this site. Primary activities should focus on permanently blasting or sealing the adit with waste rock or other materials. Additional activities should include a general clean-up of the site by collecting wooden scrap material into one location and burning it in the winter, knocking down concrete foundations and covering the remnants, and sloping waste rock to reduce steep slopes and promoting runoff inland rather than into Black Bay. If the waste rock is re-sloped, it should be done in a manner that reduces gamma radiation levels. Scrap steel could be transported to a disposal area near, or within Uranium City, or properly disposed of on site.

It is important to note that this site is easily visible from Black Bay, which is frequently traveled by tourists on fishing expeditions. This factor significantly adds to the public safety risks associated with the site.

Photo 6.10-1 Gulch Adit
September 29, 2001

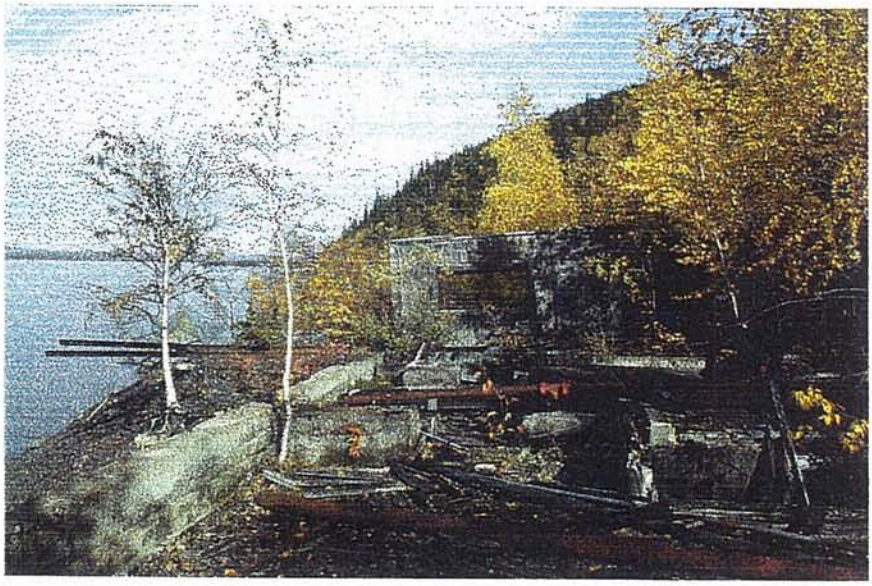


Photo 6.10-2 Concrete Foundations
September 29, 2001

Phot 6.10-3 Dilapidated Wooden Building
September 29, 2001

Photo 6.10-4 Wooden Debris near Shoreline
September 29, 2001

Photo 6.10-5 View of Site from Adjacent Hill
September 29, 2001

Photo 6.10-6 Metal Rock Hoist
September 29, 2001

Photo 6.10-7 Bags of Cement
September 29, 2001

Photo 6.10-8 View of Site from Black Bay-Note Prominent Waste Rock Dump on Right (North) Side
September 29, 2001

Photo 6.10-9 Wooden Trestle Leading Upslope From Adit
September 29, 2001

## 6.11 Jesko Mine

### 6.11.1 Location and Access

Site Inspection: 29 September 2001

Location: NTS Mapsheet 74-N-10-SW
UTM Zone: 12

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 59° 31' 38" lat<br>108° 49' 08" long | 6600785 m N<br>623374 m E | 59° 31' 37" lat<br>108°49' 05" long | 6600798 m N<br>623498 m E |

* Locations recorded by GPS during Year 2 field program
** Location obtained from Saskatchewan Mineral Deposit Index

The site is located about 8 km from Uranium City on Griffith Bay. Griffith Bay is on the north shore of Lake Athabasca northwest of Bushell Inlet. The site is accessible by boat from Bushell Inlet, by float plane or by snowmobile in the winter. The site is a short walk from the shoreline. Vegetation is thin and access is very easy.

The site location is shown in Figure 6.11-1. The site plan is shown in Figure 6.11-2. Photographs 6.11-1 to 6.11-6 show the site.

### 6.11.2 Property Information and Ownership

**Saskatchewan Mineral Deposit Index Number:** 1447

**Property:** (formerly: BAY claim 17; CAR claims; NN Concession)

**Location:** Griffith Bay

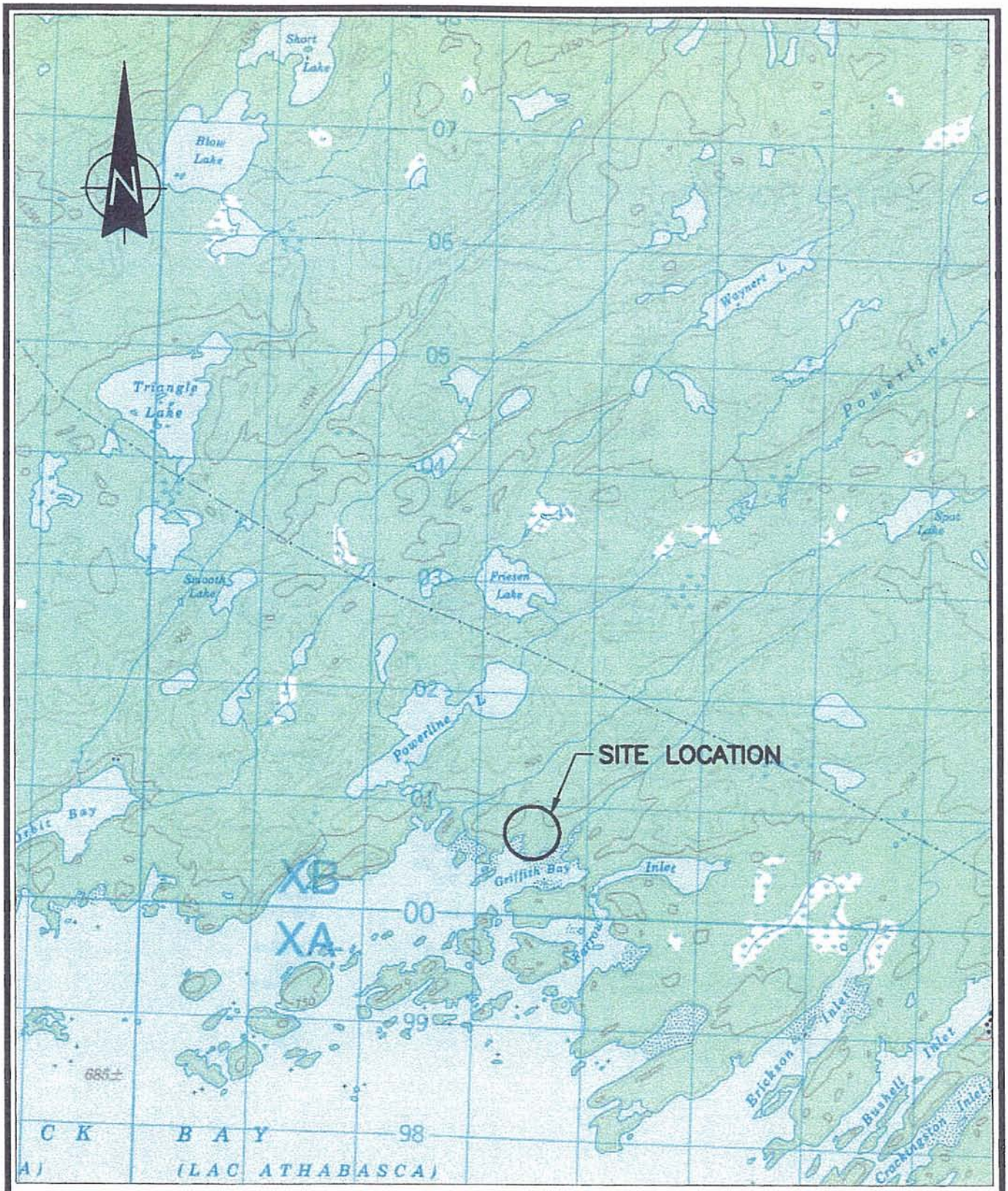
**Owner(s):** Open – see Section 6.11.4 for previous owners

**Commodity:** U **Associated Commodities:** V; Pb

**Deposit Type:** Drill hole

### 6.11.3 Geology

The area of the showing is underlain by Archean aged Tazin Group paragneiss and metasediments. K. Ashton et al mapped the showing area as being underlain by unit Qfm or a northeast-trending band of gray to brick red, fine to medium-grained, variably sheared quartzofeldspathic gneisses of sedimentary origin. The majority of showings in the area occur at or near the contact of

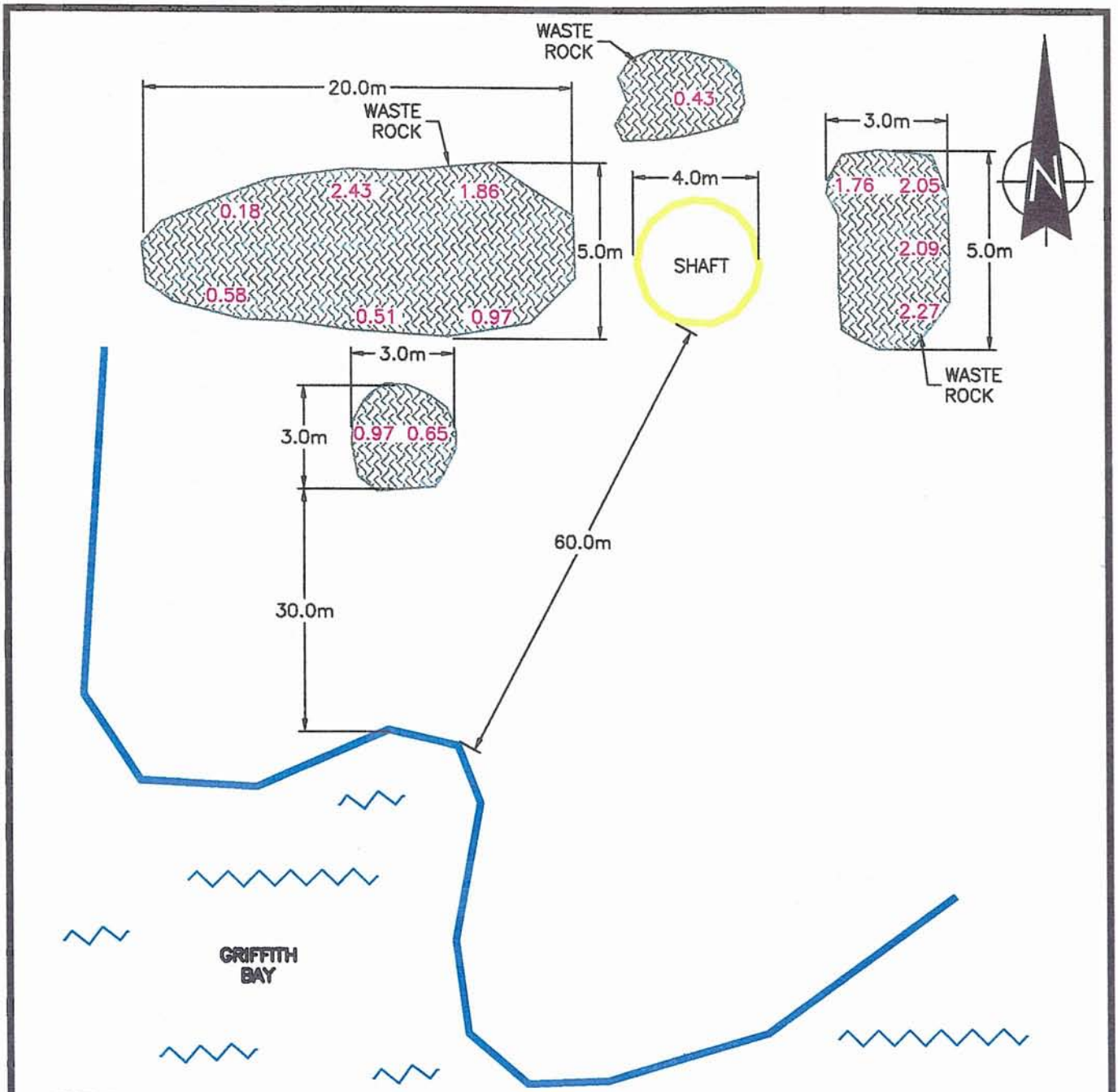



**NOTE:**
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 74 N 10.

# SITE LOCATION PLAN
# JESKO URANIUM MINE

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.11-1

R3160/FIG6.11-1.DWG




**LEGEND:**

| | |
|---|---|
| Roads/Trails | |
| Mine Workings | |
| Waste Rock | |
| Body of Water | |
| Scrap Material/Debris/Refuse | |
| Building/Foundation | |
| Tailings | |
| Natural Ground Surface | |
| Gamma Readings (µSv/hr.) | 0.25 |
| Water Sample Location | |
| Soil Sample Location | |

**LEGEND:**

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

# JESKO URANIUM MINE – SITE PLAN
## (NOT TO SCALE– DIMENSIONS ARE APPROXIMATE)

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.11–2

R3160/FIG6.11–2.DWG

metasedimentary belts with the paragneiss along the foliation and cross-cutting fractures and breccia zones.

Uranium enrichment is not usually accompanied by an enrichment of other metals and most of the occurrences in the area are located within single isolated veins of limited width and horizontal extent.

Showing 50-NN-31 is an exception to the general characteristic of the showing type. It consists of two brecciated carbonate veins, about 1 ft (0.3 m) apart, striking northwest and dipping 75° to 80° northeast. The veins are 3 to 5 inches (7.6 to 12.7 cm) wide and contain minor amounts of quartz and pitchblende. The mineralized zone lies along a breccia filled cross fracture. The best ore zone graded 0.42% $U_3O_8$ over 1.75 ft (0.5 m) for a 50 ft (15 m) length. The vein was analyzed and found to be enriched with vanadium and lead, (Saskatchewan Industry and Resources, 2002).

### 6.11.4 Exploration History

Jesko Uranium Mines Ltd.'s showing 50-NN-31 is located on the north shore of Griffith Bay, on what was formerly the CAR Claims, previously covered by Goldfields Uranium Mines Ltd.'s NN Concession.

In 1952, Goldfields Uranium BAY claim No. 17 (S-9490) covered the showing. Two holes were completed on adjoining claims. In early 1954, the zone was tested by 10 diamond drill holes for a total of 1,717 ft (523 m) but results were inconclusive and it was decided to explore the zone underground. An inclined prospect shaft was sunk and 147 ft (45 m) of drifting was carried out along the vein at the 50 ft (15 m) level.

In 1958, the property was leased to Norcan Development for high grading purposes. Exposed ore in the underground working was mined and the stockpile was sorted.

Saskatchewan Mining and Development Corporation (SMDC) carried out detailed exploration on the property in 1979 which consisted of detailed prospecting and sampling, basal till sampling, ground radiometric surveys and diamond drilling. As a result of this prospecting the discoveries were re-sampled and returned the values listed above. No further work has been reported on the showing, (Saskatchewan Industry and Resources, 2002).

### 6.11.5 2001 Inspection-Site Description

Following is the site description as noted during the 2001 inspection.

*6.11.5.1 General*

The Jesko site was inspected on 29 September 2001. Access was gained by a short boat ride from Bushell Inlet to Griffith Bay followed by a short walk inland.

There is no evidence of recent visitation. The site is thinly vegetated and access to the site is relatively easy.

The background gamma reading for the mine site is approximately 1.5 μSv/hr.

*6.11.5.2 Mine Workings*

Mine workings consist of a single open shaft. There does not appear to have been any attempt to close the shaft. The opening is about 3 m in diameter and is recorded as being 147 ft (45 m) deep with lateral work at the 50 ft (15 m) level. The shaft is filled with water to about 10 to 15 m from the surface. A sample of the shaft water was not obtainable due to unstable conditions.

Remnants of a wooden timber headframe are jammed in the top portion of the shaft.

Some slumping of the rock at the surface of the shaft is evident.

*6.11.5.3 Waste Rock*

Waste rock is located in two main piles. The larger pile is located west of the shaft and is about 20 m long by 5 m by 3 m high. It is relatively fine suggesting it had been crushed prior to deposition. The second pile is located east of the shaft and is about 5 m by 3 m by 2 m high. A smaller pile is located southwest of the shaft and is about 3 m by 3 m by 2 m high. All three piles are stable with about 3:1 slopes. The waste rock is quartzitic in nature with no visible sulphides.

A small amount of coarse waste rock is located adjacent to the fine grained west waste rock pile. The finer grained pile may have been classified as ore and was crushed in anticipation of shipping it off site.

There is no vegetation encroaching on the waste rock.

Gamma values on the waste rock are 1.76 to 2.27 µSv/hr for the east pile, 0.18 to 2.43 µSv/hr for the larger west pile, and 0.65 to 0.97 µSv/hr for the smaller southwest pile.

There is about 250 to 300 $m^3$ waste rock on site.

Risks to public safety and the environment are considered to be minimal.

*6.11.5.4 Debris*

The site is relatively clean and has only a small amount of debris spread about the site. Debris includes a small amount of wood debris and a metal rock hoist.

### 6.11.6 History of Previous Inspections

Mueller (1978) inspected the site on 13 October 1976. Following is a summary of Mueller's report.

At the time of the inspection, the property was held by SMDC. At the time of shaft development, the property was held by Jesko Uranium Mines Limited. The showing was high graded by Norcan development. Approximately 500 tons (455 tonnes) of ore was removed from the site.

There was abundant wooden debris and remains of the headframe. The metal bucket hoist and some barrels were on site. Mueller estimated there was 200 tons (182 tonnes) of rock on site.

Vegetation was well established both on the waste rock pile and in the general shaft area. The shaft was filled with water to about 10 ft (3 m) from the surface.

Mueller reported the site appeared to be frequented by campers and boaters.

### 6.11.7 Risk Assessment Ranking

| | |
|---|---|
| Public Safety Assessment | 8.5 |
| Environmental Assessment | 1.0 |
| Combined Total Assessment | 9.5 |
| Ranking | 20/22 |

### 6.11.8 Follow-up

There is little follow-up work required at the site. Remediation should include removal of debris and securing a concrete cap over the shaft opening. Covering or transferring a portion of the waste rock pile into the shaft opening may also be appropriate to reduce elevated gamma radiation levels.

Photo 6.11-1 Debris and Waste Rock
September 29, 2001

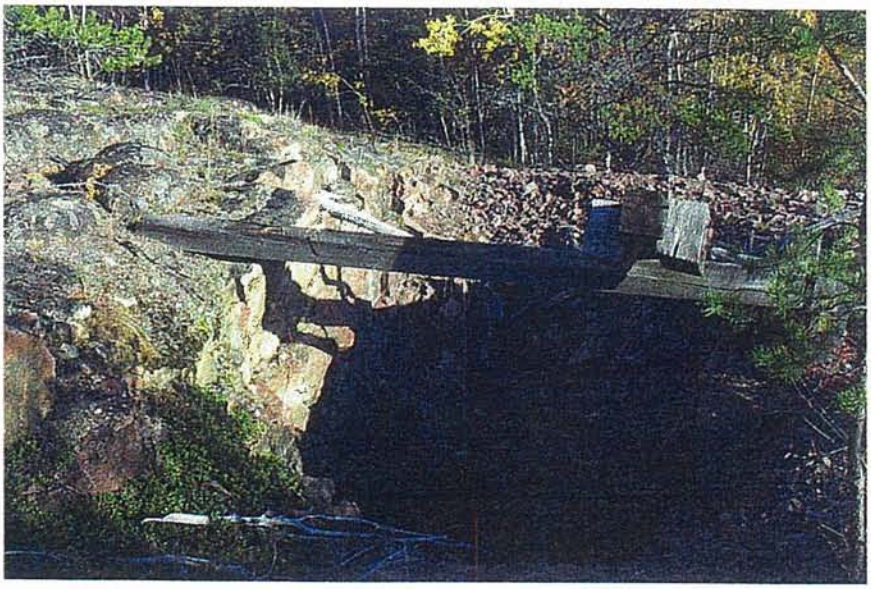


Photo 6.11-2 Jesko Shaft Opening
September 29, 2001

Photo 6.11-3 Jesko Shaft Opening
September 29, 2001

Photo 6.11-4 Small Amount of Waste Rock and Concrete Headframe Footing
September 29, 2001

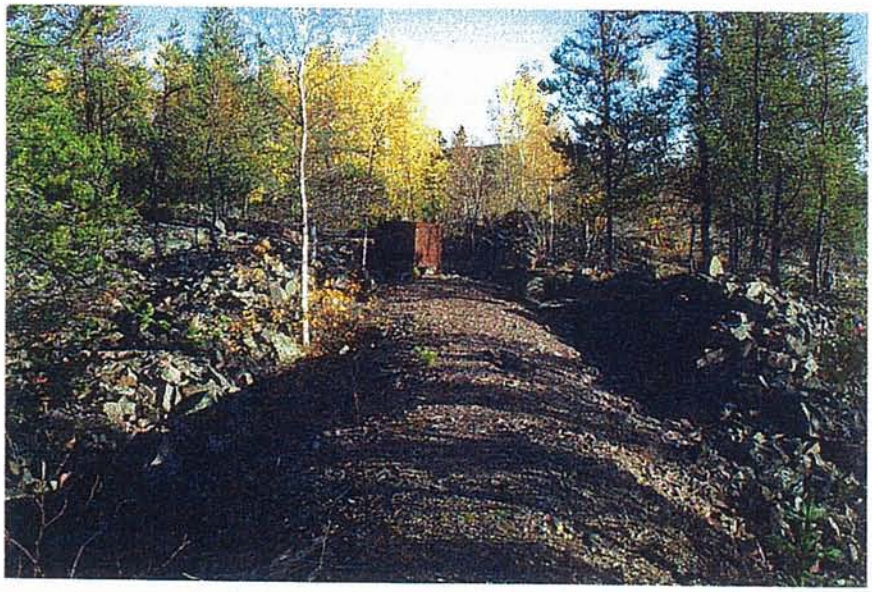


Photo 6.11-5 Main Waste Rock Pile (Ore?) and Coarse Waste Rock on Sides
September 29, 2001

Photo 6.11-6 Jesko Site Looking East From Shaft Area
September 29, 2001

## 6.12 Harrison Mine

### 6.12.1 Location and Access

Site Inspection: 30 September 2001

Location: 74-N-10-SE

UTM Zone: 12

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 59° 33' 05" lat<br>108° 32' 25" long | 6604025 m N<br>639030 m E | 59° 33' 04" lat<br>108°'32' 22" long | 6603173 m N<br>638352 m E |

* Locations recorded by GPS during Year 2 field program

** Location obtained from Saskatchewan Mineral Deposit Index

The site is located about 1.0 km off the main road between Uranium City and the airport on the west side of Beaverlodge Lake on Padget Bay. The site is about 5 km southeast of Uranium City. The access road is also known as 'the ten mile road' because it is about 10 miles from Bushell Inlet.

The site name is R.J. Harrison Mines. Although there is no record of any R.J. Harrison Mines, Mr. J. Augier, a life long resident of Uranium City and who is very familiar with the mines in the region, said that the site of the inspection is the R.J. Harrison Mine. This site is recorded as the Martin Lake Mine Adit. GPS coordinates obtained from the inspection closely correspond to the coordinates provided for the R.J. Harrsion site.

The site location is shown in Figure 6.12-1. Photographs 6.12-1 to 6.12-6 show the site.

### 6.12.2 Property Information and Ownership

**Saskatchewan Mineral Deposit Index Number:** 1361

**Property:** (formerly: RA claim No. 9)

**Location:** East of Martin Lake

**Owner(s):** Cameco

**Commodity:** U **Associated Commodities:** Cu; Pb; Se; Au

**Deposit Type:** Outcrop


NOTE:
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 74 N 10.

SITE LOCATION PLAN
R.J. HARRISON MINES

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.12–1

R3160/FIG6.12–1.DWG

### 6.12.3 Exploration History

The site is also known as the Martin Lake Mine Adit. At the time of inspection, no records of the site (R.J. Harrison) could be located. The listing for the R.J. Harrsion site was taken from Saskatchewan Environment records dated 1989. The site is not listed in Beck (1969) or Mueller (1977), however, the area was inspected to verify it's existence. After conversations with Mr. Augier, it was determined that the Martin Lake adit is also known as the R.J. Harrison site.

The property was owned by Eldorado Mining and Refining Ltd. The property straddles the narrow strip of land that separates Martin Lake from Beaverlodge Lake. The original site of the mine is on the east shore of Martin Lake, toward the south end of the narrows that connect the two halves of Martin Lake. Another mine site on the west shore of the north end of Beaverlodge Lake, immediately below Padgett Bay on RA claim No. 9, was established in 1954.

The Martin Lake adit and the Martin Lake Mine adit (Padgett Bay) are on Cameco Corporation's surface lease with the Province. Cameco has conducted decommissioning activities at the adits and conducts periodic monitoring.

Since the property was decommissioned in the past and is on a surface lease, it was not assessed in this report.

Photo 6.12-1 Harrison Adit-Sealed With Waste Rock
September 30, 2001

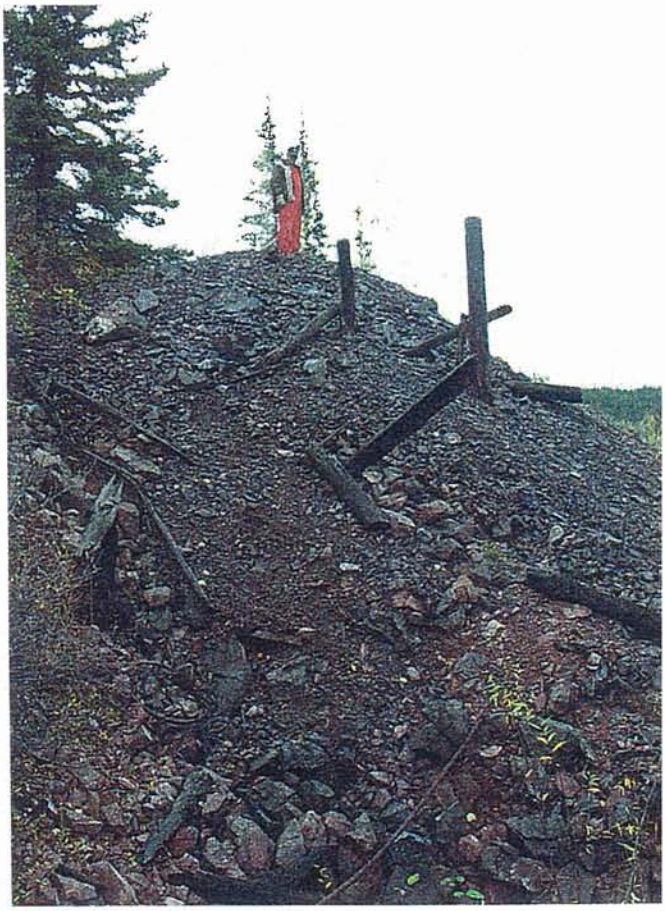


Photo 6.12-2 Main Waste Rock Pile
September 30, 2001

Photo 6.12-3 Partially Buried Debris
September 30, 2001

Photo 6.12-4 Road Leading to Site
September 30, 2001

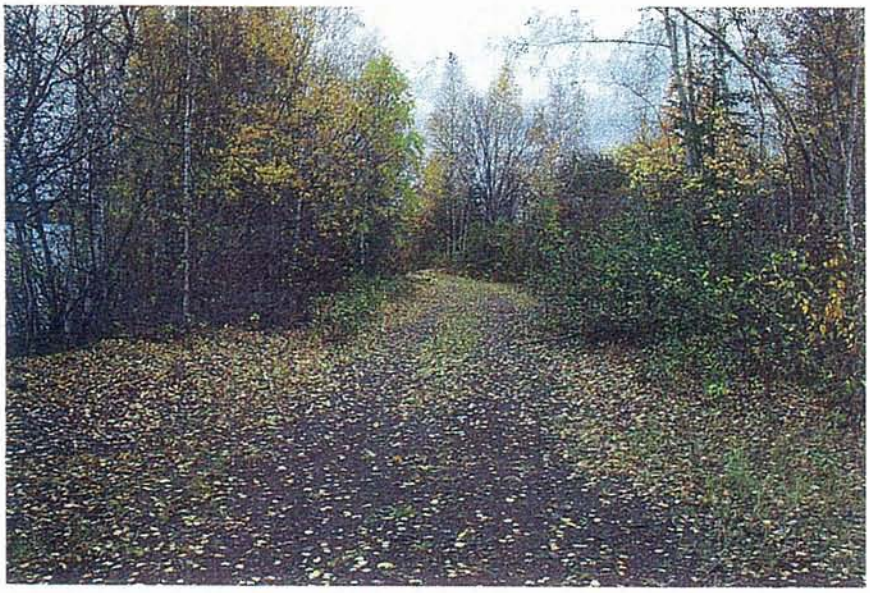


Photo 6.12-5 Boat Ramp Near Site With
Waste Rock Used For Grading
September 30, 2001

Photo 6.12-6 Main Waste Rock Pile
September 30, 2001

## 6.13 Consolidated Nicholson Mines Ltd.

### 6.13.1 Location and Access

Site Inspection: 01 October 2001

Location: 74-N-08-NW
UTM Zone: 12

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 59° 27' 34" lat<br>108° 26' 11" long | 6594014 m N<br>645295 m E | 59° 27' 33" lat<br>108°'26' 08" long | 6593629 m N<br>645544 m E |

* Locations recorded by GPS during Year 2 field program
** Location obtained from Saskatchewan Mineral Deposit Index

The site is located on the north end of Nicholson Bay on the north shore of Lake Athabasca and about 16 km southeast of Uranium City. The site is accessible by boat from Bushell Inlet or by float plane or by snowmobile from the dock near Goldfields.

There is a slight variation between the measured location and the location provided in the Saskatchewan Mineral Deposit Index. This is likely due to the large area over which the site is located. The location reading taken during the 2001 field program was from the shaft No. 1 area.

The site location is shown in Figure 6.13-1. The site plan is shown in Figure 6.13-2. Photographs 6.13-1 to 6.13-12 show the site.

### 6.13.2 Property Information and Ownership

**Saskatchewan Mineral Deposit Index Number:** 1264

**Property:** CBS 8204 (formerly: ML 4760 to 4762; ML 5131; MC claims)

**Location:** Lake Athabasca (north)

**Owner(s):** Eldor Resources Ltd. (60%) - Mary Ellen Resources (40%)
(CBS 8204 – Greater Lenora), see Section 6.13.4 for previous owners

**Commodity:** U **Associated Commodities:** Nc; Cu; Co; Se; V; Pb; Zn; Au; Ag

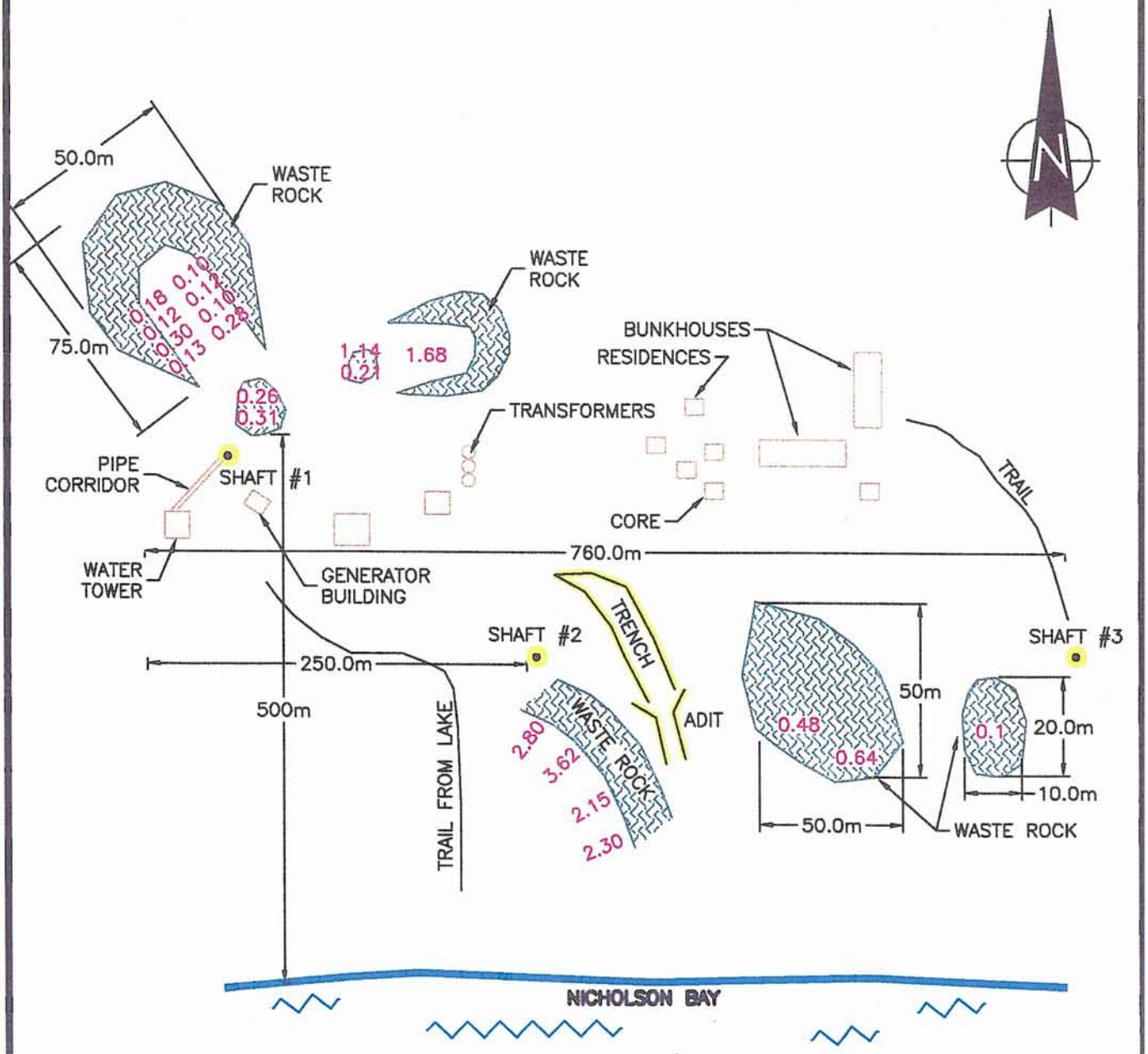
**Deposit Type:** Outcrop


**NOTE:**
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 74 N 8.

# SITE LOCATION PLAN
# CONSOLIDATED NICHOLSON MINES

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.13-1

R3160/FIG6.13-1.DWG




**LEGEND:**

| | |
|---|---|
| Roads/Trails | |
| Mine Workings | |
| Waste Rock | |
| Body of Water | |
| Scrap Material/Debris/Refuse | |
| Building/Foundation | |
| Tailings | |
| Natural Ground Surface | |
| Gamma Readings (μSv/hr.) | 0.25 |
| Water Sample Location | |
| Soil Sample Location | |

**LEGEND:**

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

# CONSOLIDATED NICHOLSON URANIUM MINE – SITE PLAN
## (NOT TO SCALE– DIMENSIONS ARE APPROXIMATE)

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.13–2

R3160/FIG6.13–2.DWG

### 6.13.3 Geology

The area underlying these showings is a bedded sequence of dolomite, dolomitic quartzite, ferruginous quartzite, and mica schist. All are intruded by gabbroic sills and dykes (which are now amphibolite). Four mineralized zones of importance and 2 minor zones of less importance have been recognized and described below. These are fracture and vein-type deposits which have been carbonated and have a variety of different minerals associated with the pitchblende. The mineralization, at this deposit, occurs in 4 main zones and two sub-zones.

Zone 1 occurs on the east side of the property near the west shore of Ann Lake, a small lake which lies due east of Nicholson Bay. Zone 1 is a discontinuous vein-type deposit located on the sheared contact between iron-rich quartzite and dolomitic quartzite-breccia. The zone is exposed over a strike length of 200 ft (60 m) in a series of 7 trenches. The vein strikes 296° and dips 45° northeast. The zone has a maximum width of 1 inch (2.5 cm) and consists of carbonate, pitchblende, chalcopyrite, niccolite, cobalt-nickel and arsenides (eg Rammelsbergite), secondary cobalt and nickel minerals, annabergite and thucolite). Gold has been reported. The zone has been tested by 7 shallow drill holes with inconclusive results. The results obtained from a prospect shaft sunk to explore the zone are unknown.

Zone 1 extension was detected under overburden approximately 1,500 ft (450 m) north-northwest of Zone 1. Stripping revealed a radioactive zone at the contact of quartzite and iron-rich quartzite. The zone has a strike length of 25 ft (7 m) (open at both ends). Secondary uranium minerals occur over a maximum width of 8 ft (2.5 m). Sampling indicated significant uranium, gold and silver values and traces of platinum and palladium over 6 ft (1.8 m). Exploration included 2 diamond drill holes totaling 451 ft (138 m).

Zone 2, which occurs approximately 200 ft (60 m) east of the head of Nicholson Lake, consists of several en echelon fractures and shears in quartzite close to its contact with a iron-rich quartzite-breccia. The vertically dipping, north trending zone has a maximum strike length of 180 ft (55 m). Zone 2 consists of a soft mud-like gouge carbonate-rich material mineralized with pitchblende, specularite, chalcopyrite, pyrite, galena, niccolite, nickel-cobalt arsenides, native silver and gold, tiemanite (HgSe) and dyscrasite (Ag3, Sb). High platinum values have been reported. Lateral development at the 100 ft (30 m) level revealed a few highly radioactive sections but, in general, results were not been encouraging.

Zone 3, (the first minor zone), is located approximately 600 ft (180 m) north of the head of Nicholson Bay. Trenching revealed a small mineralized lens in dolomite near a contact with amphibolite. The mineralization consists of pitchblende, bornite, chalcocite, marcasite and pyrite in a gangue of carbonate, quartz and chlorite. Native silver was reported.

Zone 4 is located approximately 1,600 ft (490 m) northwest of the north end of Nicholson Bay. This 1,100 ft (335 m) long zone consists of several irregular, sub-parallel veins forming a zone that strikes N30° west and dips from vertical to 80° northeast. The zone intersects dipping beds of quartzite, dolomitic quartzite and dolomite and lies from 50 to 100 ft (15 to 30 m) west of and roughly parallel to a contact between dolomitic quartzite and iron-rich quartzite breccia.

On the first level of the Zone 4 mine, there is a 245 ft (75 m) long and 3.8 ft (1.2 m) wide ore shoot. On the second level, one ore shoot graded 0.4% U3O8 across 6 ft (1.8 m) for a length of 90 ft (27 m). Lateral development along a third level, at the presumed downward extension of this zone, did not encounter mineralization of economic interest.

Zone 6 (the second minor zone) is located 300 ft (90 m) north of Ann Lake. Previous exploration on this zone included one small trench. mineralization occurs at the intersection of several discontinuous fractures over a strike length of 12 ft (3.7 m). A chip sample assayed 0.068% U3O8, 0.10 oz/ton Ag and trace amounts of platinum and 0.09% vanadium, (Saskatchewan Industry and Resources, 2002).

More recent drilling to test the zones for Pt, Pd and Au encountered several intersections results of which are listed in the Saskatchewan Industry and Resources Mineral Deposit Index for the property.

### 6.13.4 Exploration History

The Nicholson Property, originally consisting of FLO, JIM, IVEY, DOROTHY, PETER, MARGARET, APEX, and STORM claims, is on the north shore of Lake Athabasca approximately 10 miles (16 km) southeast of Uranium City and 2.5 miles (4 km) east of the former town of Goldfields. The property is said to have been first staked for iron in 1920 and in 1929 re-staked, and explored in 1930 for its base metal potential. In 1935, it was prospected for its gold possibilities and the zone, now known as the Zone 4 was explored by two adits with a total of 350 ft (107 m) of underground workings. In the course of this work uranium stain and pitchblende were discovered, marking the first uranium discovery in the Beaverlodge area.

Shortly afterward the work was suspended and the property lay dormant until 1949. In 1949, prospecting, trenching, and 15 drill holes were completed to re-assess the economic potential of the pitchblende in Zone 4. Prospecting and follow-up diamond drilling (26 holes) were carried out on the other zones at the same time. A shaft, with lateral development on the 100 and 200 ft (30 and 60 m) levels, was sunk to 232 ft (71 m) on Zone 4. A 135 ft (41 m) shaft and 562 ft (171 m) of lateral development on the 100 ft (30 m) level were completed on Zone 2 and a 60 ft (18 m) deep prospect shaft was completed on the Zone 1 extension. Results were not encouraging and subsequent work was carried out on Zone 4.

To the end of 1950, further lateral work was completed on Zone 4 on the first 1,530 ft (466 m) and second 1,340 ft (408 m) levels. In 1951, the shaft was deepened to 325 ft (100 m) and some lateral development work was done on the third level. When this work did not find the downward extension of the ore zone all development work was stopped. The same year Nicholson Mines was reorganized and named Consolidated Nicholson Mines Ltd.

In 1954, Consolidated Nicholson Mines Ltd. contracted the sale of its ore to the Eldorado Mining and Refinement Ltd. to be milled. Work resumed in 1955 and stoping was carried out on the first and second levels of the No. 4 zone shaft. In 1955, 1,114 ft (340 m) of diamond drilling was completed on Zone 1. The results were not encouraging.

In 1956, the contract with the Eldorado mill expired. Eldorado's offer to buy 2,000 tons (1,820 tonnes) of ore at a price 1/3 less than the contract price was rejected. Mining operations ceased, the mine was closed and the mine plant was sold. Between 1955 and the middle of 1956, ore was shipped to the Eldorado mill for custom processing.

Between 1958 and 1959, KLK Mining Company high graded the deposit above the lower adit level. The property was then allowed to lapse.

In 1965, J. McDonald staked the property as the MC claims Nos. 1 to 6. In 1967, Enex Mines Ltd. took over a working option on the claims and completed geological and scintillometer surveys in the early part of 1969. They had exclusive exploration rights until 1973. In the latter part of 1973, Enex Mines completed soil-gas sampling and a bog sample survey on MC claims 3 and 4. In 1970, Consolidated Nicholson Mines Ltd. completed work on that portion of the Nicholson Bay property covered by ML 4760 to 4762. This is known as developed area No. 1. The work consisted of clearing, mapping, sampling and radiometric surveys over Zone 1, Zone 1 extension and Zone 6.

In 1975, the MC claims were converted to ML 5131 with J. McDonald still holding the lease title. In 1975, Enex Resources again optioned the property. Enex completed 8 drill holes totaling 2,025 ft (617 m) to test Zone 4, the main vein, the east contact between iron-rich quartzite and dolomitic quartzite and areas of anomalous bog samples. No mineralization was encountered during the drilling.

Auric Resources (formerly Consolidated Nicholson Mines) scheduled exploration on the Nicholson Bay property in May, 1977. The exploration, included electromagnetic and magnetic surveys, a follow-up radon detection survey and possible diamond drilling targeted to look for uranium deposits along a 2,000 ft (610 m) long overburden covered fault that extends through Zones 1 and 2. The program also searched for extensions to Zone 2.

Between 1987 and 1988, an Eldor Resources (60%) - Mary Ellen Resources (40%) took control of CBS 8204 and NIC claims 1 to 5 (these dispositions covered the mine site). The property was geologically mapped and sampled and 9 drill holes were completed. Between 1987 and 1988, Chancellor Energy Resources Ltd. (50%) and SMDC (50%), under an option from Mary Ellen Resources, completed 26 drill holes (MC87-1 to -9, MC88-10 to -26), radiometrically logged the "Red Zone" (a series of hematized carbonatized calc-silicate diopside rocks), trenched and sampled the 1, 2, and 6 zones, and completed a ground magnetic survey over the Zone 2.

In 1997, Greater Lenora Resources flew an airborne electromagnetic, magnetic, and spectrometer survey over the deposit (AF 74N-0007), (Saskatchewan Industry and Resources, 2002).

### 6.13.5 2001 Inspection-Site Description

Following is the site description as noted during the 2001 inspection.

*6.13.5.1 General*

The Consolidated Nicholson site was inspected on 01 October 2001. The site was accessed by boat via the Goldfields dock. A short 10 minute walk inland accesses the main site where shaft No. 1 and the majority of associated facilities are located.

There is evidence of recent visitation including a new empty cigarette package in one of the bunkhouses. Hardwood flooring from the bunkhouse has been recently removed.

The site has relatively thin vegetation and access is very easy.

The background gamma reading for the site is about 0.5 µSv/hr. Although there are some elevated gamma radiation levels at some of the waste rock piles, the site is spread out over a considerable distance and the background gamma levels are low compared to some of the spot readings.

*6.13.5.2 Mine Workings*

Mine workings include three shafts, a deep trench and an adit at the end of the trench. Two adits were developed at the Zone 4 (by shaft No. 1) in the 1930's. The two adits were sealed with waste rock in 1989 and remain closed.

Shaft No.1 (Zone 4) is located on the west side of the property at 6594014 m N and 645295 m E. The shaft had a wood timber headframe over it, but the headframe was removed and intentionally burned down in 1991. Scrap material was pushed down the shaft and the opening was covered with a concrete pad in 1991. The concrete pad is in excellent condition and there is no sign of subsidence or slumping.

Shaft No. 2 is located at 6593597 m N and 645737 m E and is in the center part of the property near the trench and adit. This shaft has also been covered with a concrete slab. Recent drilling activity in the area has resulted in some debris placed on the cap, making it difficult to locate and monitor; however, the cap appears to be in good shape.

Shaft No. 3 is located on the east side of the property at 6593647 m N and 646239 m E, about 95 m south and 760 m east of shaft No. 1. This shaft is also capped with a concrete pad. The cap is in excellent condition with no signs of slumping or subsidence. The cap is covered with dead vegetation (leaves, etc.) and is difficult to locate.

The trench is located near Shaft No. 2. It is about 20 m long, up to 10 m deep and 5 m wide. At the end of the trench is an adit which is open. The adit had been secured with steel mesh wire in 1991, but the cover has since been removed. The adit is about 2 m by 3 m and is open and dangerous. There was no water evident in the adit.

*6.13.5.3 Waste Rock*

There is an extensive amount of waste rock at the site. Most waste rock is near shaft No. 1 on the west side of the property. There are two main piles near shaft No. 1. The larger of the two is west of the shaft and is about 75 m by 50 m by up to 20 m high. It is deposited on a slope and has steep sides. It has sulphide minerals present and is dolomitic and quartzitic in nature with hematization. This pile likely contains about 50,000 $m^3$ to 75,000 $m^3$ of rock, some of which is fine and appears

to have been crushed, possibly with the intent of using it for ore. Gamma values vary from 0.12 µSv/hr to 0.30 µSv/hr. A smaller pile is located east of the larger pile. It has gamma values of 0.21 to 1.68 µSv/hr. The volume of the smaller pile is about 1,000 $m^3$.

The second pile is located near shaft No. 2 and the trench, in the center of the property, and is about 250 m east and 150 m south of shaft No. 1. This pile is about 50 m x 50 m and 5 m deep. Total volume is therefore about 10,000 $m^3$ to 15,000 $m^3$. Gamma results varied from 0.48 µSv/hr to 0.64 µSv/hr. There was no indication of standing water. It has sulphides and is quartzitic in nature. Vegetation encroachment is occurring only at the sides of the waste rock. The pile has relatively steep slopes (2.5:1), but is generally stable.

The third waste rock pile is located near shaft No. 3. The pile is relatively small (the shaft was only a 25 m deep prospect shaft). The pile is about 10 m x 20 m by 1 m deep for a total volume of about 200 $m^3$. There is no evidence of standing water. Sulphides are present and the rock is quartzitic in nature. The pile is flat and has no steep slopes. Vegetation appears to be gradually encroaching on the waste rock.

Generally, the abundance of sulphide minerals suggests a good potential for acid generation; however, the waste rock is a considerable distance (> 250 m) from the nearest waste body. In addition, there was no visible evidence of acid drainage.

*6.13.5.4 Debris*

There is an extensive amount of debris scattered about the site. The following is a summary of the main types of debris.

- Metal scrap including drill rods, pipe, barrels, wire, steel cable and assorted equipment including electric motors, bolts, and electrical cable;
- Several buildings (15) in various stages of disrepair including good to partially collapsed to totally collapsed; several of the buildings appear to have asbestos panel siding;
- Large electrical transformers; the oil appears to be leaking as shown by the staining on the ground and smell. However, the oil in the transformers was tested in 1991 and was below Federal guidelines for PCB concentrations; and,
- Core storage area.

It is difficult to estimate the total volume of material on site, but a conservative value is 1,000 $m^3$. This does not include wooden buildings. It is assumed for decommissioning purposes, that wooden material will be burned rather than removed from site.

### 6.13.6 History of Previous Inspections

As part of the Abandoned Mines Remedial Action Program, Saskatchewan Environment commissioned the covering of the three shafts, sealing adits with waste rock and securing a steel grate over the raise/adit. All work appears stable with the exception of steel grates over the trench near the No. 2 shaft. Steel grates have been removed. Work was completed in 1989.

### 6.13.7 Risk Assessment Ranking

| | |
|---|---|
| Public Safety Assessment | 16.5 |
| Environmental Assessment | 7 |
| Combined Total Assessment | 23.5 |
| Ranking | 7/22 |

The Consolidated Nicholson site contains several public safety hazards including steep waste rock, high buildings and what appears to be asbestos. Therefore two points were attributed to the "additional public safety risks" category. In addition, one point was attributed to the "additional environmental risks" category due to the abundance of waste rock and miscellaneous debris at the site.

### 6.13.8 Follow-up

Extensive follow-up work is required at the site, primarily to clean the site up and remove public safety hazards.

It is recommended that buildings with asbestos panels have the panels removed for proper disposal. The panels could be sealed in durable containers and dropped down a shaft. The number two shaft or number three shaft could be re-opened. Other debris could be dropped down the shafts as well. The transformers should have the oil drained and removed from site. The transformers could then be dismantled and removed from site in the winter by a skidder and sled and transported to Uranium City for eventual disposal at a landfill, or dropped down one of the shafts at the site.

The majority of the waste rock could be left as is, because to reduce slopes would simply mean spreading it out more, thereby disturbing the vegetation that has established in the area and increasing the potential for acid rock drainage. Samples of waste rock should be collected for analysis to confirm that this approach is appropriate.

The entrance at the end of the trench should be filled with waste rock and portions of the trench filled to reduce the steep slopes.

Photo 6.13-1 Consolidated Nicholson
Shaft No. 1 (Sealed)
October 01, 2001

Photo 6.13-2 Consolidated Nicholson
Shaft No. 2 (Sealed)
October 01, 2001

Photo 6.13-3 Consolidated Nicholson
Shaft No. 3 (Sealed)
Note Metal Handle on Concrete Cap in
Middle of Photo
October 01, 2001

Photo 6.13-4 Consolidated Nicholson
Water Tower
October 01, 2001

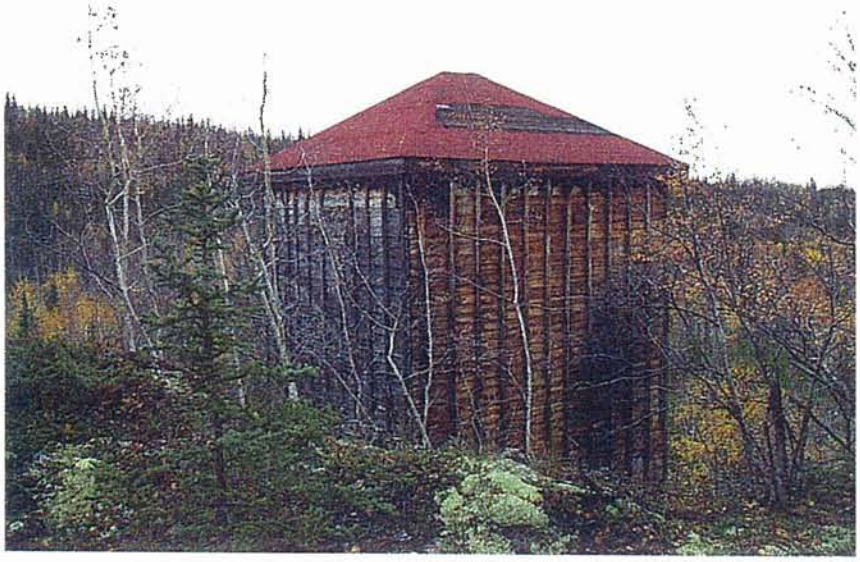


Photo 6.13-5 Consolidated Nicholson
Main Waste Rock Pile Near Shaft No. 1
October 01, 2001

Photo 6.13-6 Consolidated Nicholson
Main Waste Rock Pile Near Shaft No. 1
October 01, 2001

Photo 6.13-7 Consolidated Nicholson
Machine Shop
October 01, 2001

Photo 6.13-8 Consolidated Nicholson
Generator Building
October 01, 2001

Photo 6.13-9 Consolidated Nicholson
Inside Tool Shop
October 01, 2001

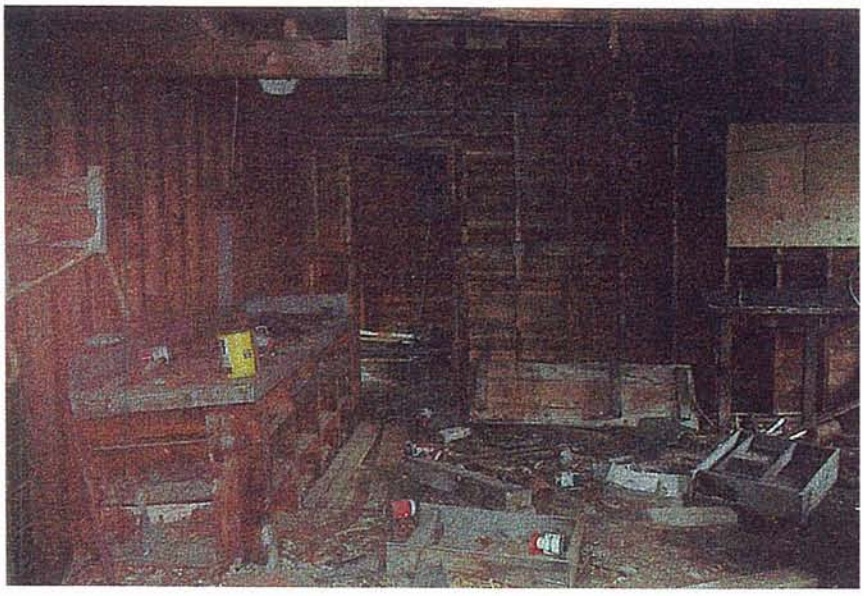


Photo 6.13-10 Consolidated Nicholson
Electrical Substation
October 01, 2001

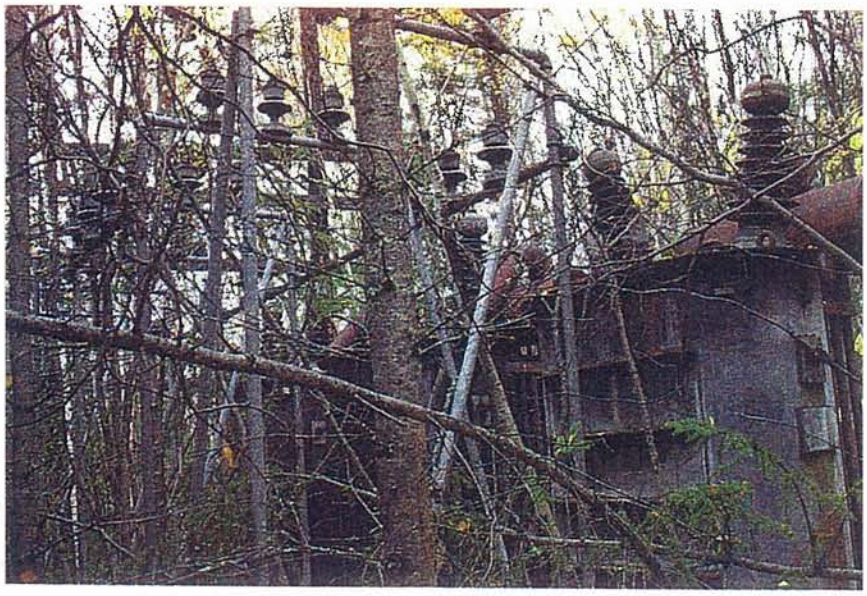
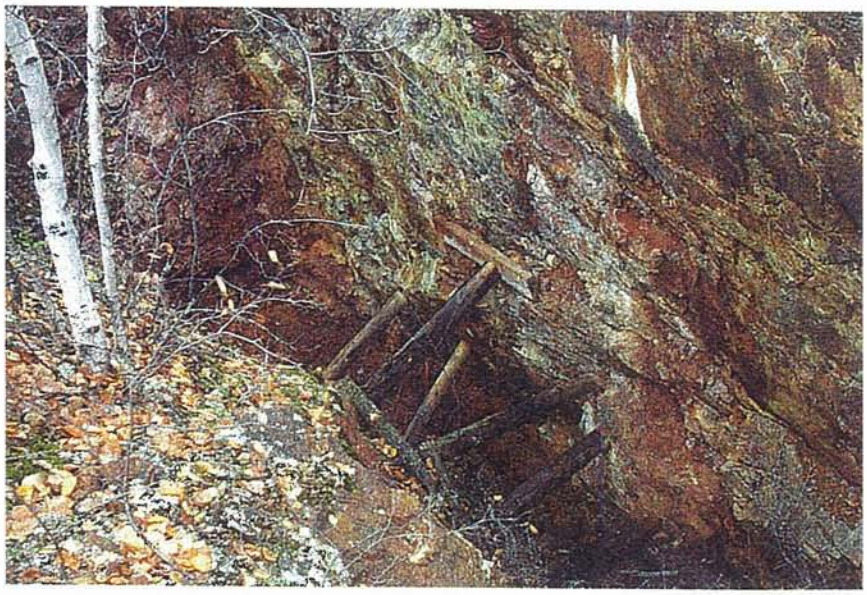


Photo 6.13-11 Consolidated Nicholson
Bunkhouse
October 01, 2001

Photo 6.13-12 Consolidated Nicholson
Trench Leading to Adit
October 01, 2001



## 6.14 Beaverlodge Mines-Mickey Lake

### 6.14.1 Location and Access

Site Inspection: 02 October 2001

Location: 74-N-09-SW
UTM Zone: 12

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 59° 35' 00" lat<br>108° 27' 29" long | 6607756 m N<br>643540 m E | 59° 34' 59" lat<br>108°27' 26" long | 6607718 m N<br>643916 m E |

* Locations recorded by GPS during Year 2 field program
** Location obtained from Saskatchewan Mineral Deposit Index

The site is located on the south shore of Mickey Lake, about 10 km northeast of Uranium City. The site is accessible by float plane, by driving to the dock on the east side of Mickey Lake and boating to the site, or by snowmobile in the winter from Uranium City along an established trail.

The site location is shown in Figure 6.14-1. The site plan is shown in Figure 6.14-2. Photographs 6.14-1 to 6.14-6 show the site.

### 6.14.2 Property Information and Ownership

**Saskatchewan Mineral Deposit Index Number:** 1305

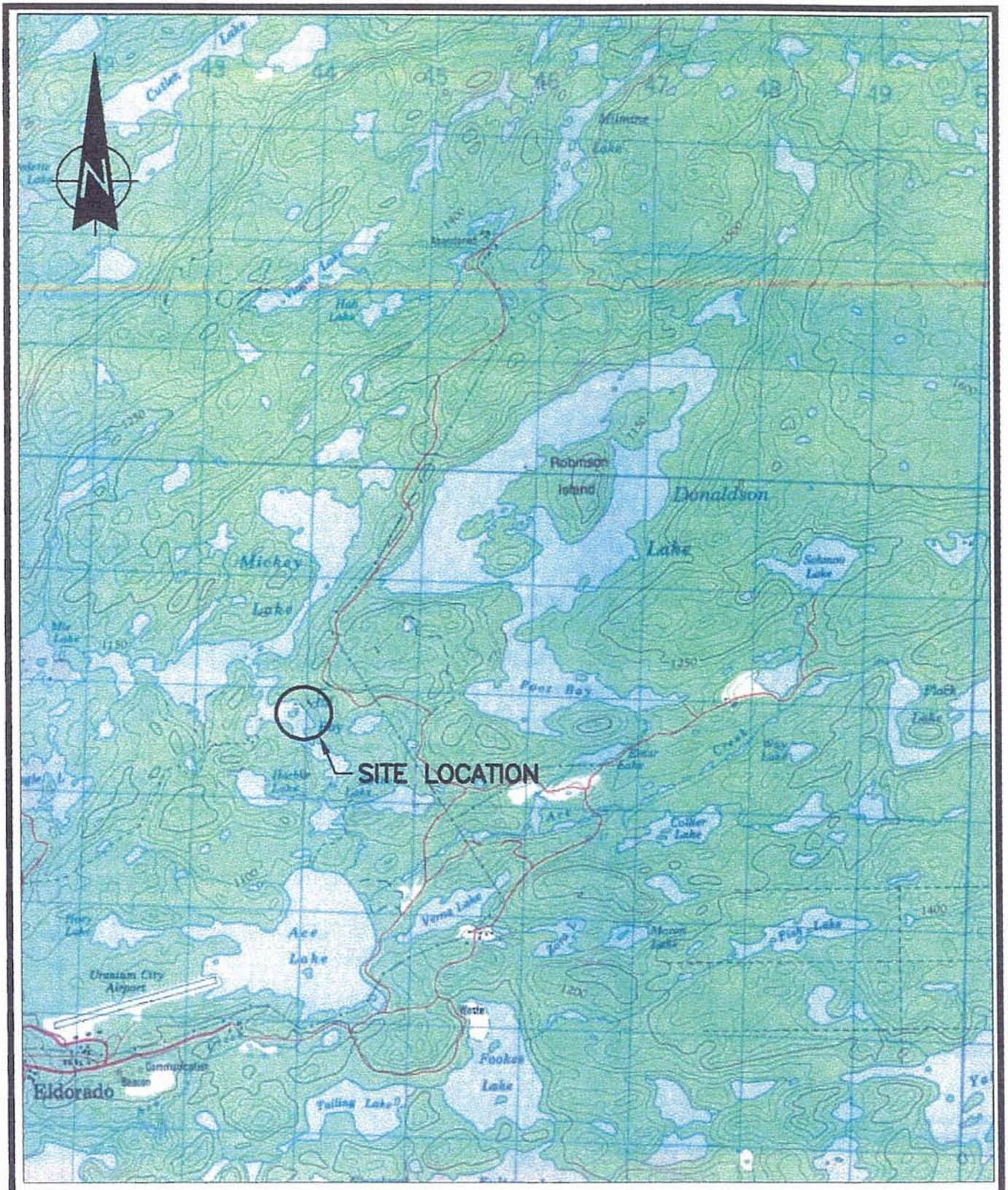
**Property:** (formerly: CBS 8192; BAR 5-9 claims)

**Location:** Mickey Lake area

**Owner(s):** Open – see Section 6.14.4 for previous owners

**Commodity:** U **Associated Commodities:** Cu; Pb; Se; Bo; Ml

**Deposit Type:** Trench

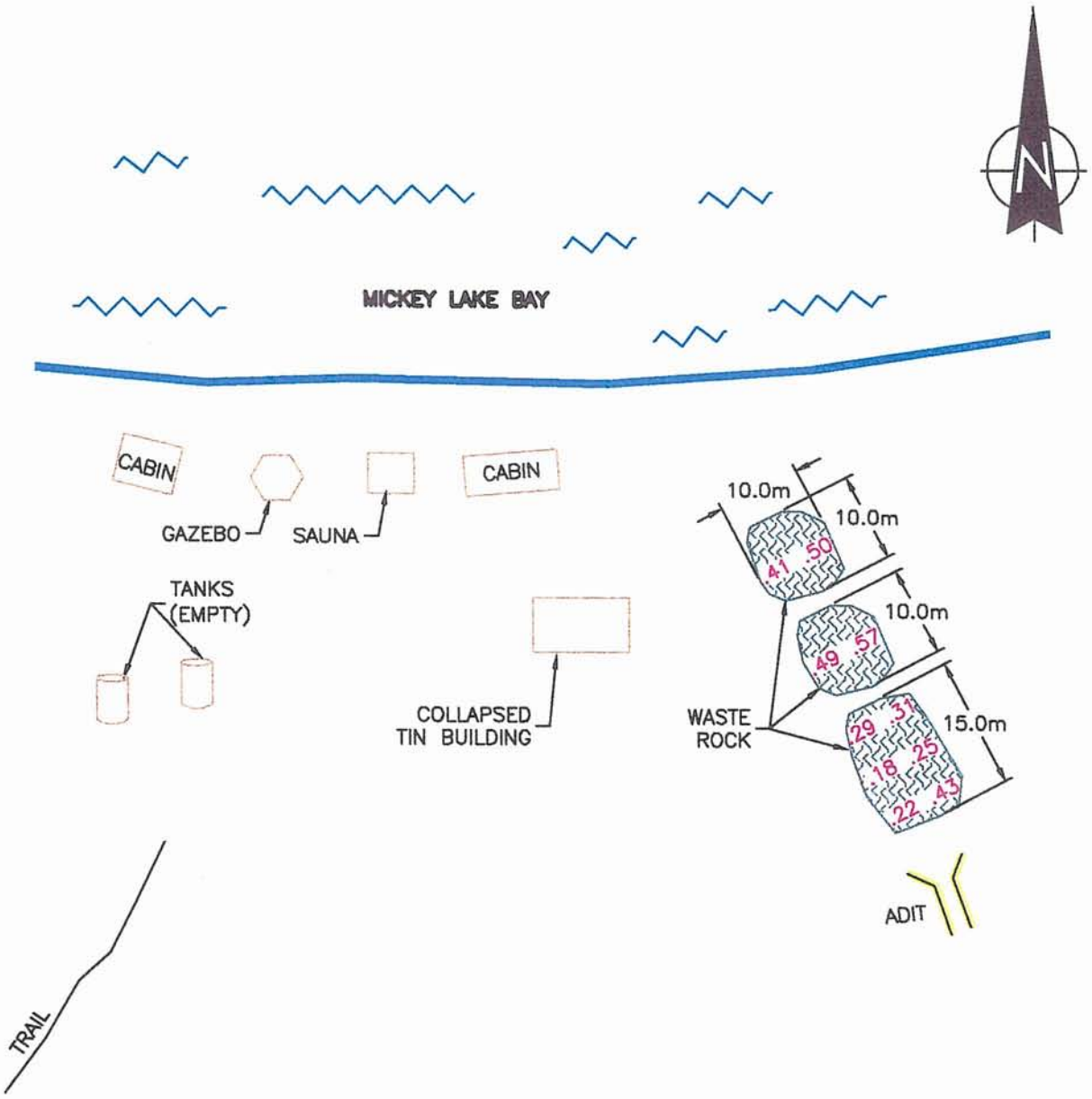



**NOTE:**
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 74 N 9.

# SITE LOCATION PLAN
# BEAVERLODGE ADIT–MICKEY LAKE

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.14–1

R3160/FIG6.14–1.DWG




**LEGEND:**

| | |
|---|---|
| Roads/Trails | |
| Mine Workings | |
| Waste Rock | |
| Body of Water | |
| Scrap Material/Debris/Refuse | |
| Building/Foundation | |
| Tailings | |
| Natural Ground Surface | |
| Gamma Readings (µSv/hr.) | 0.25 |
| Water Sample Location | |
| Soil Sample Location | |

**LEGEND:**

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

# BEAVERLODGE ADIT – SITE PLAN
## (NOT TO SCALE– DIMENSIONS ARE APPROXIMATE)

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.14–2

R3160/FIG6.14–2.DWG

### 6.14.3 Geology

This is a deposit of complex mineralogy with underground development. The deposit is a fault-controlled carbonate-pitchblende-bearing vein.

The BAR 5-9 claims are situated on the west side of the south arm of Mickey Lake and are underlain by an open synclinal fold that plunges 30° southwest. The limbs of the fold consist largely of mafic rocks particularly amphibolite, chlorite schist, meta-argillite and their granitized equivalents, and the core of the fold is occupied by metasomatic granite and granitized quartzitic rocks.

Several thin, northwest-trending diabase dykes cut the sequence.

The Main Zone, named Zone No. 5, extends from the base of the scarp at the south end of the westerly bay in the south arm of Mickey Lake, and has been traced across the top of the scarp for about 400 ft (122 m) on a bearing of 315°. The zone dips from 60° to 80° southwest and consists of several branching fractures that are filled with pods and veins of quartz, calcite, hematite and in places, pitchblende and secondary uranium minerals. The best mineralized parts of the zone occur where fractures cut ungranitized mafic rocks. The zone is mainly confined to the northwest limb of the syncline but to the southeast it extends for about 50 ft (15 m) into the core of the fold where it feathers out. To the northwest, the zone passes under overburden at the west end of the aforementioned bay in Mickey Lake and its extension in this direction is not known. About 750 ft (229 m) east of Zone No. 5, a 1 to 4 ft (0.3 to 1.2 m) wide sinuous fracture zone in granitized amphibolite strikes north 3° west across the axial trace of the syncline parallel to the shoreline of Mickey Lake. The dip of the zone is variable; in places fractures are near-horizontal but over much of its exposed length the zone dips from 40° to 60° southwest.

Fractures are filled with chlorite, hematite, calcite and quartz accompanied locally by pods and veins of pitchblende and secondary uranium minerals.

The zone has been trenched at intervals and tested by 30 diamond drill holes spaced along a strike length of about 450 ft (137 m). Drill results are not known. At the southeast end, the zone is truncated by a northeast-trending, overburden-filled draw and to the northwest it passes beneath overburden, (Saskatchewan Industry and Resources, 2002).

### 6.14.4 Exploration History

The Main Zone was trenched in 1951 and tested for a strike length of about 400 ft (122 m) by a number of drill holes spaced 10 ft (3 m) apart and drilled to intersect the zone at a vertical depth of 30 ft (9 m) in 1952. Drill results are not known.

In 1953, a 400 ft (122 m) long adit was driven from the base of the scarp and the zone explored by a drift. This disclosed an ore shoot 133 ft (40 m) long by 2.5 ft (0.75 m) wide. In the same year a winze was collared at the north end of the zone with the intention of sinking it at an inclination of 45° diagonally through the ore body to a vertical depth of 110 ft (33 m), but it is reported that this was not completed. Shortly afterwards exploration was terminated on the property due to a change in management.

C.H. Hewat and H. Hemmerich high graded the underground part of the zone during 1958 to 1959 when about 60 tons (54 tonnes) of marginal-grade ore were extracted and shipped to the Eldorado Mill. During this period, the surface portion of the deposit was high graded by A. Turek and H. Halleran who deepened some of the existing trenches and extracted about 30 tons (27 tonnes) of ore.

On 28 March 1987, Rod Dubnick staked the Beaverlodge Uranium adit area as CBS 8192. In July of 1987, Dubnick completed mapping, prospecting and sampling in the immediate adit area. No significant precious metal values were returned. On 01 September 1990, CBS 8192 was allowed to lapse.

In 1997, Greater Lenora Resource Corporation flew a helicopter-borne electromagnetic, magnetic, and spectrometer survey over the showing, (Saskatchewan Industry and Resources, 2002).

### 6.14.5 2001 Inspection-Site Description

Following is the site description as noted during the 2001 inspection.

*6.14.5.1 General*

The Beaverlodge site was inspected on 02 October 2001. Access to the site was gained by driving to the boat dock on the east side of the lake and canoeing to the site.

The site is located on the south shore of Mickey Lake and is very visible and easy to locate.

Vegetation is moderate. There are signs of recent visitation as the site is used as a retreat for a Uranium City resident.

The background gamma reading for the site is about 0.4 μSv/hr.

*6.14.5.2 Mine Workings*

There is one adit on the east side of the property about 50 m from the shore line. The adit is about 4 m x 3 m and is open and faces to the north towards Mickey Lake. A wooden door is attached to the adit, but is deteriorated and open.

There was no open water in the adit. There are some signs of rock falls and instability in the audit.

*6.14.5.3 Waste Rock*

A small amount of waste rock is located just outside the adit opening towards Mickey Lake. The waste rock is in three mounds of 15 m, 10 m and 10 m in length and all about 10 m wide and 6 m high. Total volume is about 1,000 to 1,700 $m^3$. Sideslopes are about 4:1 and do not pose a safety hazard.

Gamma readings for the waste rock varied from 0.18 µSv/hr to 0.57 µSv/hr. The waste rock is relatively fine in nature and appears to have been crushed, perhaps for shipment as ore.

There is no standing water associated with the waste rock. Vegetation is encroaching on the sides but not on the top.

Minor visible sulphides were noted suggesting minimal acid generation potential. The waste rock is granitic and ultramafic in nature.

*6.14.5.4 Debris*

There is a small amount of debris on the site. A mine building is located just west of the adit. The building is constructed with metal and tin and has collapsed. Debris in the building includes metal (cook stove, pipe, mine car and rails).

There are two empty fuel tanks located south of the adit.

*6.14.5.5 Site Buildings*

There are four buildings on site that appear to be used as a retreat for a Uranium City resident. The buildings include two log cabins, a log sauna and an open gazebo.

No attempt was made to enter the buildings as they appear to be private dwellings. However, all appeared in good shape and do not present any environmental or public safety risk.

### 6.14.6 History of Previous Inspections

Mueller (1978) inspected the site on 27 October 1976.

Following is a summary of Mueller's observations.

At the time of the inspection, the site was held by D. Melnyk as claim block CBS 2361. At the time of high-grading, the site was held by Beaverlodge Uranium Mines Ltd. It is estimated that about 60 tons (54 tonnes) of ore was removed from the site.

One aluminum building 30 by 20 ft (9.1 by 18.2 m) remained on site. At the time, the building was solid and the cottage owners used it for storage.

Litter included mine cars, iron rails steel piping, minor loose building material and about 400 to 500 tons (360 to 455 tonnes) of waste rock.

The adit is 200 ft (60 m) from the two summer cabins. The adit was described by Mueller as 200 ft (60 m) in length trending into the hillside at 270°. The adit had a birch door, but an opening was cut into the door to gain access. Mueller recommended the adit be cemented over.

Vegetation was encroaching quite well. The waste rock supported some small spruce and alders.

### 6.14.7 Risk Assessment Ranking

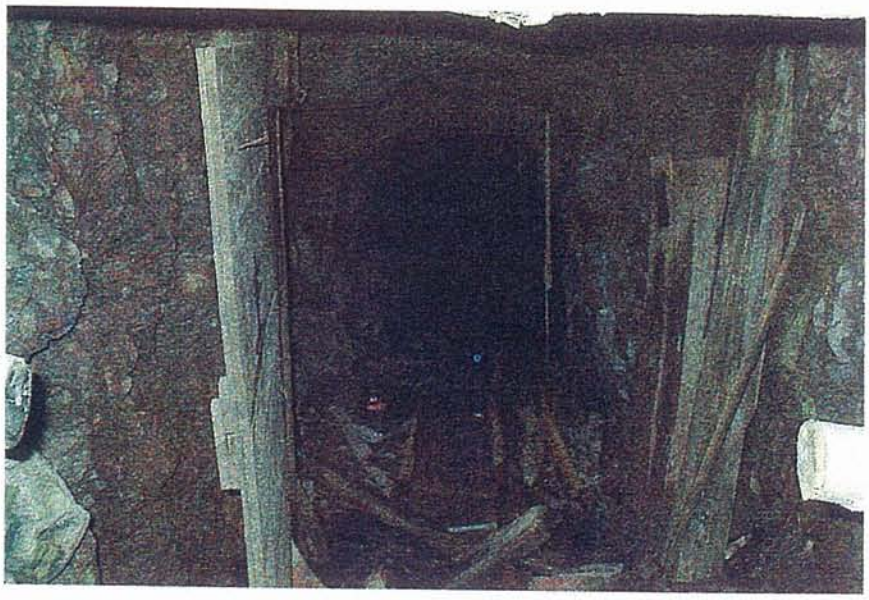
| | |
|---|---|
| Public Safety Assessment | 10.9 |
| Environmental Assessment | 3 |
| Combined Total Assessment | 13.9 |
| Ranking | 14/22 |

The Beaverlodge site is used as a recreational site by a Uranium City resident. Given this fact and that there is an open adit at the site, one point was attributed to the "additional public safety risks" category.

### 6.14.8 Follow-up

Minimal work at the site is recommended. The collapsed tin building could be dismantled and all debris could be pushed into the adit. The adit could then be blasted shut. Alternatively, iron rails could be permanently secured to the rock or the adit entrance sealed with cement.

Photo 6.14-1 Beaverlodge Adit
October 02, 2001



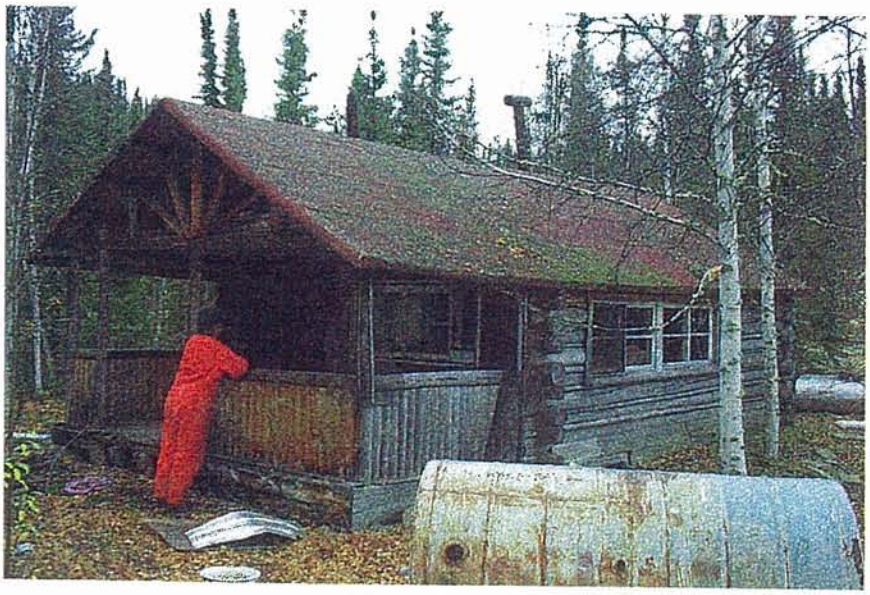


Photo 6.14-2 Private Cabin at
Beaverlodge Site
October 02, 2001

Photo 6.14-3 Small Shed Being Used for
Storage
October 02, 2001

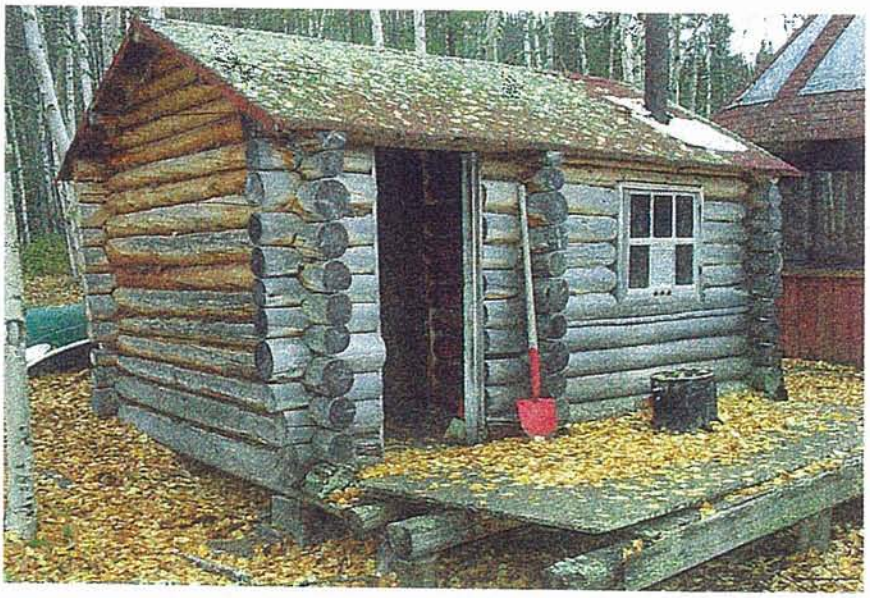


Photo 6.14-4 Private Cabin at
Beaverlodge Site
October 02, 2001

Photo 6.14-5 Main Waste Rock Pile
Extending Our From Adit
October 02, 2001

Photo 6.14-6 Dilapidated Mine Building
Near Adit
October 02, 2001

## 6.15 Athona Mine

### 6.15.1 Location and Access

Site Inspection: 02 October 2001

Location: 74-N-08-NW
UTM Zone: 12

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 59° 26' 48" lat<br>108° 29' 14" long | 6592481 m N<br>642469 m E | 59° 26' 47" lat<br>108°'29' 11" long | 6592241 m N<br>642444 m E |

* Locations recorded by GPS during Year 2 field program
** Location obtained from Saskatchewan Mineral Deposit Index

The Athona site is located on the south end of Goldfields Bay on Lake Athabasca. Site access is by vehicle, boat from the Goldfields dock, float plane or snowmobile.

The site location is shown in Figure 6.15-1. The site plan is shown in Figure 6.15-2. Photographs 6.15-1 to 6.15-6 show the site.

### 6.15.2 Property Information and Ownership

**Saskatchewan Mineral Deposit Index Number:** 1257

**Property:** S-103646 (formerly: CBS 305; LUCKY-WILLY claim group)

**Location:** Neiman Bay (SE)

**Owner(s):** Greater Lenora Exploration Ltd. (50%) - Mary Ellen Resources Ltd. (50%), see Section 6.15.4 for previous owners

**Commodity:** Au **Associated Commodities:** Zn; Pb; Cu; As; Ag

**Deposit Type:** Outcrop

### 6.15.3 Geology

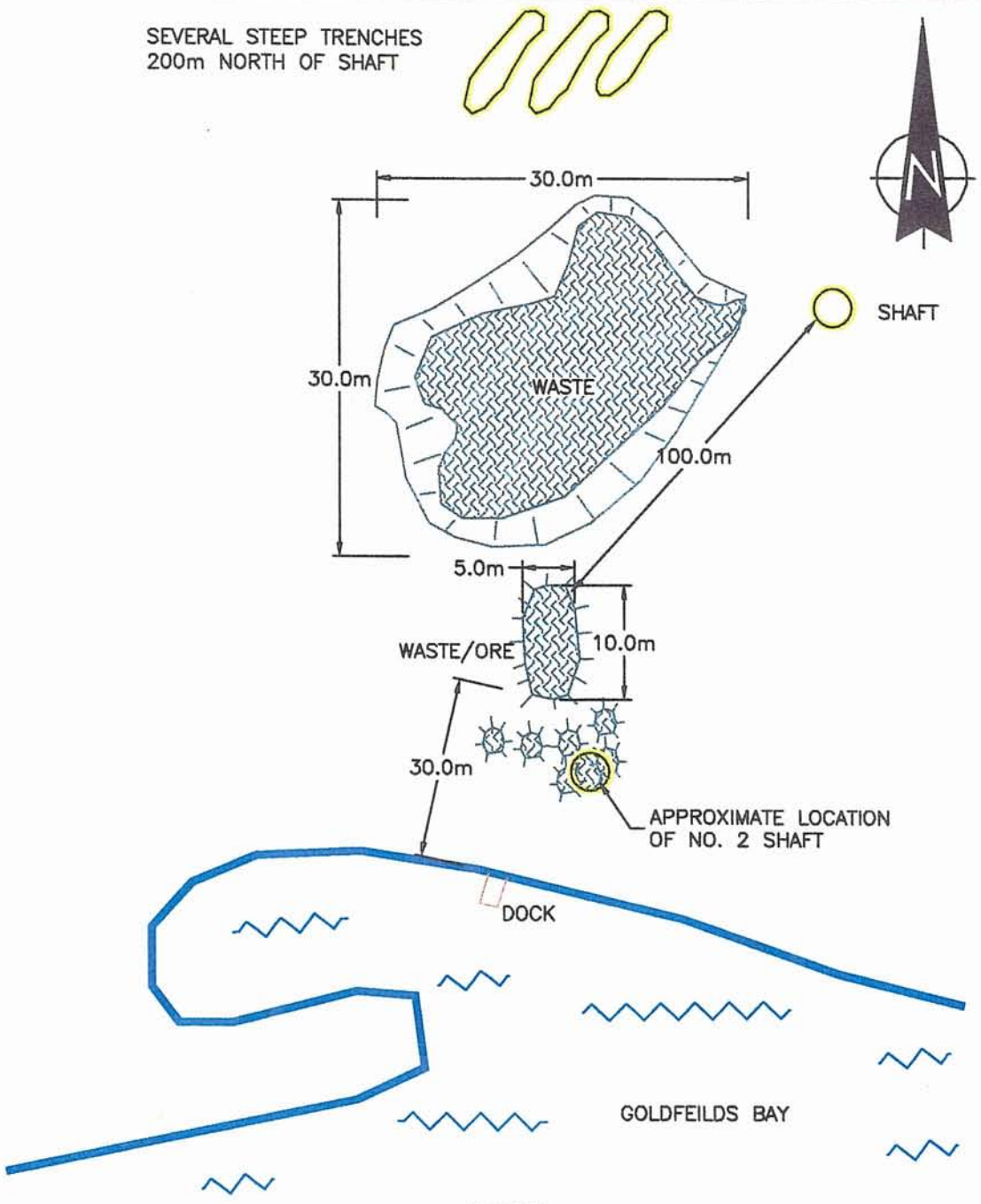
The area is underlain by a granite body (Athona Granite) which separates two bodies of barren gabbroic amphibolite. The sill-like upper amphibolite dips flatly to the west faulted contacts on the east and west sides. The lower amphibolite dips flatly to the west and has a faulted contact


**NOTE:**
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 74 N 8.

# SITE LOCATION PLAN
# ATHONA GOLD MINE

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.15–1

R3160/FIG6.15–1.DWG




LEGEND:

- Roads/Trails
- Mine Workings
- Waste Rock
- Body of Water
- Scrap Material/Debris/Refuse
- Building/Foundation
- Tailings
- Natural Ground Surface
- Water Sample Location
- Soil Sample Location

LEGEND:

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

ATHONA GOLD MINE – SITE PLAN
(NOT TO SCALE– DIMENSIONS ARE APPROXIMATE)

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.15–2

R3160/FIG6.15–2.DWG

with the foot wall gneiss. Both the amphibolite and granite strike north 30° west. The foot wall gneiss consists of well foliated, locally quartz veined, barren felsic gneiss which was derived from a greywacke protolith.

The Athona Granite consists of an unfoliated, sheared (chlorite filled), porphyroblastic unit which varies in composition from granite to monzonite to diorite. The principle gangue minerals occurring in the granite are microperthite, feldspar, quartz, chlorite and rare tourmaline. The Athona Granite hosts the 020°-trending auriferous quartz veins which form this deposit.

The gold mineralization is confined to two separate areas of quartz veining (the Main and East Zones) in association with 1% pyrite and minor sphalerite and galena. Visible gold is rare. Individual host quartz veins are discontinuous and rarely more than a few centimeters wide. The main ore shoots, which occupy zones of linear brittle deformation (as opposed to the shatter deformation found at the Box Mine), are formed by a series of vein sets which consist of en echelon stringers, veins, and offshoots. The West or Main Zone consists of a series of 020° to 030° trending, 80° northwest dipping, narrow, auriferous quartz veins which form a up to 80 ft (24 m) wide by 400 ft (122 m) zone. The Main Zone mineralization, which lies wholly within the Athona Granite, continues to the south until the granite is cut off and capped by the upper amphibolite. At the north end, the Main Zone overlies the lower amphibolite. The quartz veins host small amounts of sphalerite and galena which are present as streaks or fine grained masses. Pyrite occurs as disseminated cubes in the granite. Chalcopyrite, pyrrhotite, and native gold occur mainly in the quartz veining, but are also associated with chlorite in the granite.

The East Zone system (or Central Zone), which is located near the fault east of shaft No. 1, includes the 0° to 30°-trending H, K, and L veins. This zone, which is less extensive than the Main Zone, is similar in attitude and mineralogy to the Main Zone.

In 1987, Greater Lenora Resources Corporation optioned the Box and Athona properties from Cominco Ltd. Work indicated that the joint properties contained an estimated 1.23 million oz. Au, (Saskatchewan Industry and Resources, 2002).

### 6.15.4 Exploration History

The mine is situated on the LUCKY-WILLY Group of 14 claims which were staked in 1934 by Great Bear Lake Mines Ltd., following the discovery of gold on the adjoining Box property of Cominico of Canada Ltd. Work consisted of extensive trenching and diamond drilling totaling 24,097 ft (7,345 m) in 1935 which was successful in locating a number of gold occurrences. Later in the same year, work began on the sinking of 2 shafts; one on the main zone (No. 1), and one

located 800 ft (244 m) south of the main zone (No.2). The No.1 shaft is a 3 compartment shaft which had been sunk to a depth of 278 ft (85 m) with levels at 125 ft (38 m) and 250 ft (76 m), as well a winze was lowered from the 250 ft (76 m) level to the 378 ft (115 m) level. The No.2 shaft was sunk to a depth of 112 ft (34 m), with a 100 ft (30 m) winze from the 100 ft (30 m) level. Also in 1935, the name of the company was changed to Athona Mines Ltd. It was decided to contract a pilot mill with a daily capacity of 15 tons (13.7 tonnes) to do bulk sampling of the various zones. Development work to the end of 1938 was estimated to have cost about $600,000. Operations ceased early in 1939.

The reasons given for ending operations were, although sufficient development work had been done to bring the mine into production, no arrangements had been made with the Box property for treatment of ore on a custom basis, and no source of power was available on the property for a mill. In 1939, the probable and possible ore reserves were estimated for the Main Zone and probable ore reserves were given for Zone 3.

Between 1952 and 1953, Pole Star Mines Ltd. controlled the WILL 1-9 claims. Pole Star completed two holes close to SMDI 2163 that intersected minor scheelite.

By 1967, the showing was under Mokta CBS 305. Mokta completed an airborne scintillometer survey and ground follow-up mapping and prospecting. In 1970, Norcan Mines completed 2 drill holes and radiometric prospecting on the CBS.

In 1987, Greater Lenora Resource Corporation optioned the Box and Athona properties from Cominco Ltd. In 1988, Greater Lenora completed a pre-feasibility reserves calculation of the joint deposits. Between 1987 and 1988, the Saskatchewan Mining and Development Corporation (merged with Eldorado Nuclear in 1988 to form Cameco) grab sampled the deposit trenches. In 1989, work consisted of on-site metallurgical testing, bulk sampling, and 3,199 m of reverse circulation drilling on the Box property and 1,037 m of reverse circulation drilling on the Athona property. In 1990, Greater Lenora Resources announced new ore reserves calculations for the deposit (Kreiging method of calculation and a 0.015 oz./ ton cut-off). The Athona pit reserves were released at the same time. In 1992, Greater Lenora Resources calculated the combined reserves for the combined Box and Athona deposits. In the same year, RJK Mineral Corporation listed the reserves as 4,500,000 tonnes grading 0.05 oz./ton Au. At the end of 1994, Greater Lenora released a revised reserves calculation for combined Box-Athona. Between 1994 and 1995, 111 drill holes were completed on the deposit and an environmental study was done. In 1995, a partnership involving. Greater Lenora Resource Corporation completed 17 drill holes and an environmental impact study on the Box-Athona minesites.

In May of 1996, Greater Lenora Resources issued a new substantially lower reserves combined calculation (labeled a resource calculation) for Box-Athona.

In 1997, Behre Dolbear Company Inc. completed an in depth ore reserve audit and estimated an in-situ all category resource for the combined Box-Athona deposits. In this year they staked the deposit as S-103646. At the end of 1997, Pearson, Hoffman, & Associates completed a resource evaluation of the Box Deposit. They estimated the Athona Deposit to contain at least 150,000 ounces of gold. In 1997, they flew an airborne electromagnetic, magnetic, resistivity, and spectrometer survey over the deposits.

On 25 July 2001, Glacier Resources International acquired a 50% equity in Greater Lenora Resources, (Saskatchewan Industry and Resources, 2002).

### 6.15.5 2001 Inspection-Site Description

*6.15.5.1 General*

The Athona site was inspected on 01 October 2001. Access was gained by driving to the Goldfields boat launch and boating to the site.

The site is moderately vegetated. The site is easy to find and access.

Recent signs of visitation include extensive trenching about 200 m north of the shaft.

*6.15.5.2 Mine Workings*

There are two shafts at the site. The No. 1 shaft is partially closed with a steel frame brace covered with plywood. The cap has deteriorated and the opening is visible and accessible. A dilapidated steel chain link fence surrounds the shaft, but the fence is partially torn down making access to the shaft easy.

The second shaft was located south of the No. 1 shaft near the shore of Goldfields Bay. The second shaft was filled in with cuttings from a reverse circulation drilling program in the 1990's. An assessment of the area confirmed that the No. 2 shaft appears to be secure.

There is no evidence of shaft dewatering lines, standing water or evidence of discharged water.

Several large trenches are located about 200 m north of the No. 1 shaft. The trenches appear recent. Large and fragmental waste rock is spread out adjacent to the trenches.

*6.15.5.3 Waste Rock*

An extensive amount of waste rock is located in two main areas; near the shaft and just off the shoreline of Goldfields Bay.

The shaft waste rock is steep sloping and is about 30 m by 30 m by 20 m high. Total volume is about 20,000 to 25,000 $m^3$. The waste rock is quartzitic in nature with extensive quartz stringers, and visible sulphides suggesting acid generation potential.

There is no vegetation encroachment.

The slopes of the waste rock are steep (1.5 or 2:1) and present a public safety issue.

The second waste rock deposit is near the shore about 100 m southwest of the shaft. There are a series of small piles, with a total of about 10,000 $m^3$. The nature of the waste rock is similar to that of the shaft waste rock. The piles are fine and have been crushed with the possible intent that they were to be shipped off the site as ore (hence its location near the shoreline).

*6.15.5.4 Debris*

There is no debris on the site.

### 6.15.6 History of Previous Inspections

The site has been subject to several recent investigations including feasibility studies and Environmental Impact Statements for possible future development of the site in conjunction with the Box minesite.

### 6.15.7 Risk Assessment Ranking

| | |
|---|---|
| Public Safety Assessment | 10 |
| Environmental Assessment | 3 |
| Combined Total Assessment | 13 |
| Ranking | 16/22 |

### 6.15.8 Follow-up

Work at the site should focus on securing a permanent concrete cap on the shaft opening. Although the waste rock slopes are steep, to flatten them would require extensive spreading of waste rock resulting in additional land disturbance. An additional investigation should be conducted to determine advantages and disadvantages of re-sloping the waste rock, including an assessment of acid rock drainage potential and revegetation success.

If the site is not developed in the future, the trenches should be backfilled and leveled with waste rock that originated from the trenches.

Photo 6.15-1 Athona Shaft
October 01, 2001

Photo 6.15-2 Athona Shaft
October 01, 2001

Photo 6.15-3 Athona Waste Rock Pile
October 01, 2001

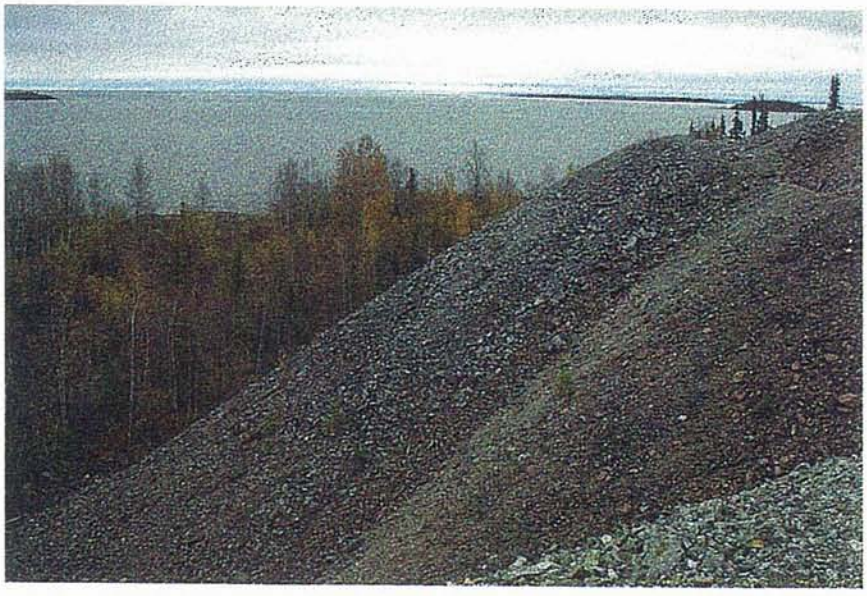


Photo 6.15-4 Athona Waste Rock Pile
October 01, 2001

Photo 6.15-5 Trenches North of Athona Shaft
October 01, 2001

Photo 6.15-6 Waste Rock/Ore Near Goldfields Bay
October 01, 2001

## 6.16 Box Mine

### 6.16.1 Location and Access

Site Inspection: 01 October 2001

Location: 74-N-07-NE
UTM Zone: 12

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 59° 27' 22" lat<br>108° 31' 17" long | 6593460 m N<br>640493 m E | 59° 27' 21" lat<br>108°' 31' 14" long | 6592876 m N<br>640386 m E |

* Locations recorded by GPS during Year 2 field program
** Location obtained from Saskatchewan Mineral Deposit Index

The Box site is located on the south shore of Lake Athabasca about 15 km southeast of Uranium City. Site access can be made by vehicle although the road periodically becomes flooded and washed out. Alternatively, access can be by boat from Bushell Inlet or the dock at Goldfields, or by float plane.

There is a slight variation between the measured location and the location provided in the Saskatchewan Mineral Deposit Index. This is likely due to the large area over which the site is located. The location reading taken during the 2001 field program was from the main shaft area.

The site location is shown in Figure 6.16-1. The site plan is shown in Figure 6.16-2. Photographs 6.16-1 to 6.16-15 show the site.

### 6.16.2 Property Information and Ownership

**Saskatchewan Mineral Deposit Index Number:** 1210a

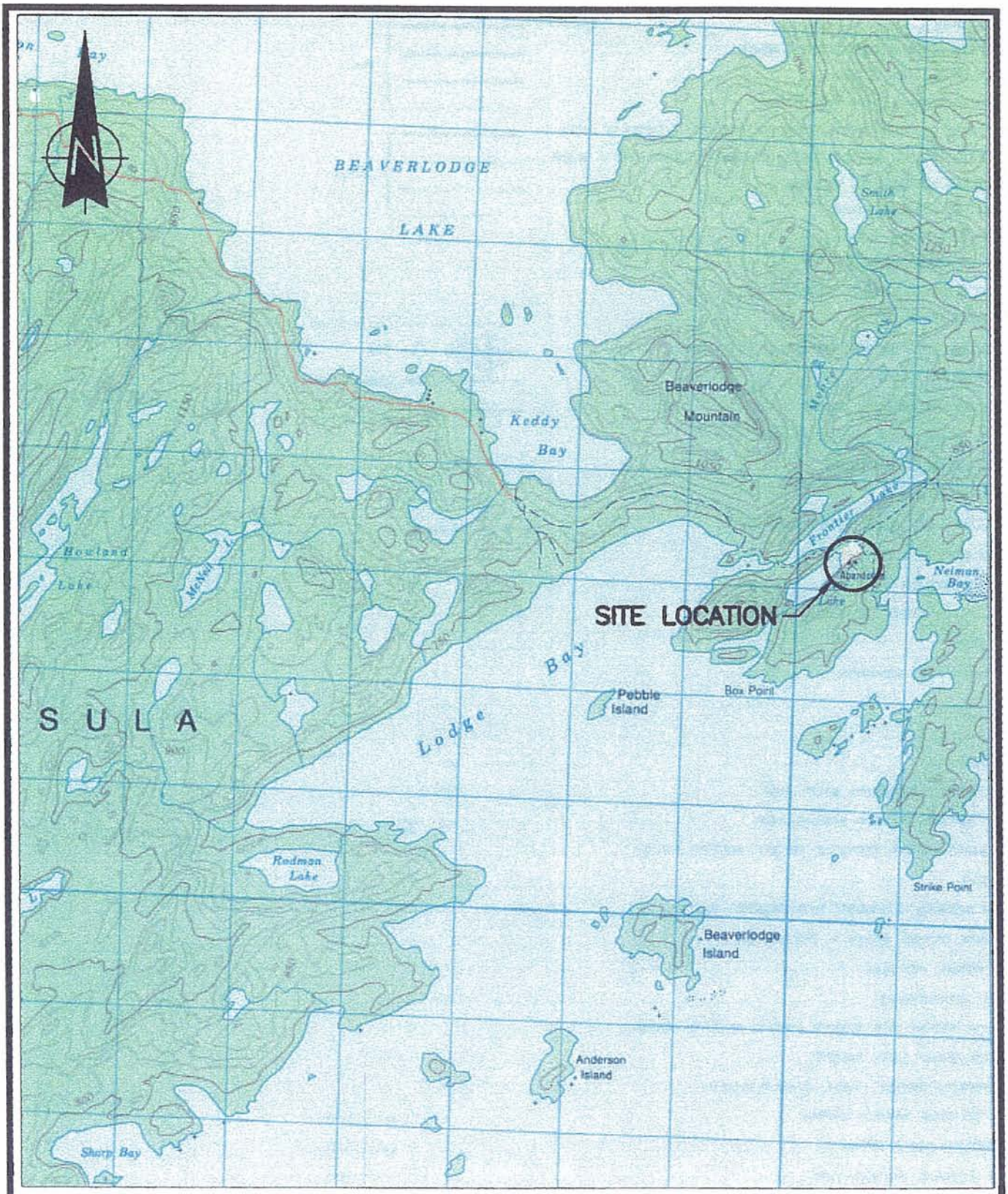
**Property:** ML 4998 (formerly VIC Claim No. 2)

**Location:** West of Goldfields

**Owner(s):** Cominco-Greater Lenora Resources Corporation-Mary Ellen Resources Ltd., see Section 6.16.4 for previous owners.

**Commodity:** Au **Associated Commodities:** Pb; Zn; Cu; U

**Deposit Type:** Outcrop

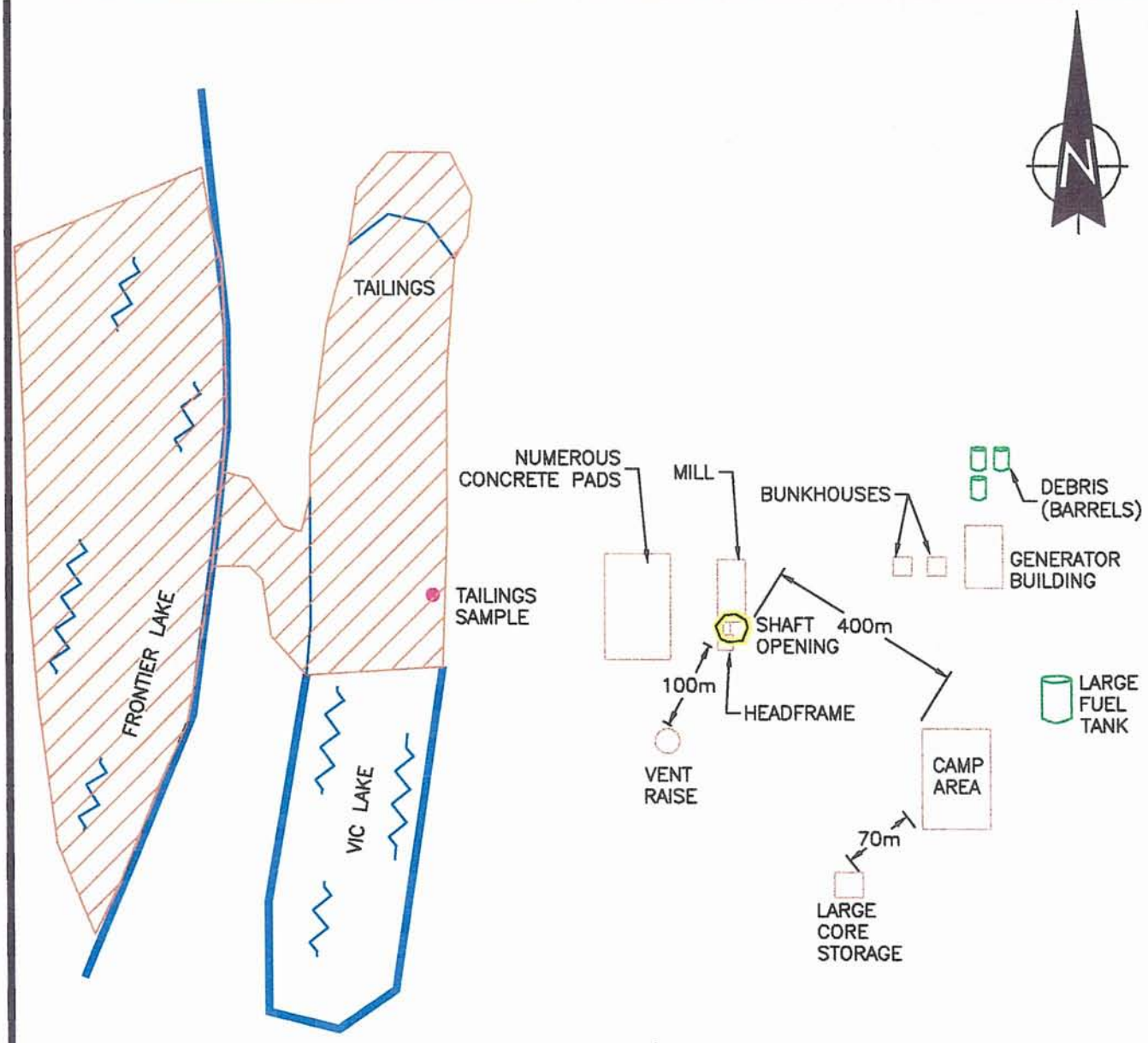



**NOTE:**
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 74 N 7.

# SITE LOCATION PLAN
# BOX MINE

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.16-1

R3160/FIG6.16-1.DWG




LEGEND:

- Roads/Trails
- Mine Workings
- Waste Rock
- Body of Water
- Scrap Material/Debris/Refuse
- Building/Foundation
- Tailings
- Natural Ground Surface
- Water Sample Location
- Soil Sample Location

LEGEND:

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

# BOX MINE – SITE PLAN
(NOT TO SCALE– DIMENSIONS ARE APPROXIMATE)

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.16–2

R3160/FIG6.16–2.DWG

### 6.16.3 Geology

The ore body of the Box Gold Mine is hosted by a granitic sill-like body that contains abundant albite. The sill-like body, which is 2,000 ft (610 m) long and an average 120 ft (37 m) wide, intrudes granitized quartzose metasediments of the Tazin Group. The sill and its enclosing rocks strike northeast and dip 42° southeast. The mine is located on the west limb of the Goldfields synclinorium.

The host Box Granite sill is described as being an arcuate, lensoidal, reddish, locally porphyroblastic, homogenous granite composed of quartz, perthite, plagioclase, muscovite, and minor secondary chlorite. The sill, which dips 35° to 42° southeast, varies in width from an average of 36 m to a maximum width of 53 m.

This host sill is cut by a stockwork of quartz veins which contain pyrite, galena, sphalerite, chalcopyrite and free gold. There are two generations of auriferous veining. The earlier veins occur as two major sets with a stockwork of anastomosing offshoots. One set, which is confined to the foot wall, approximately parallels the strike and dip of the Mine Granite. These veins are rarely auriferous. The second set strikes north 10° west and dips subvertically. The gold occurs as free gold, as inclusions and coatings on pyrite, rarely in association with chalcopyrite, and even more rarely in association with sphalerite and galena. Lesser gold concentrations occur as specks in the vein quartz and adjacent granite; probably in a manner similar to the occurrences at the Athona property. Minor radioactive anomalies occur in the Mine Granite associated with narrow fractures that have a strike length of a few feet. A veinlet of pitchblende was noted in one of these fractures and fragments of pitchblende were noted south of the No. 2 shaft.

The deposit is known for having a non-uniform distribution of gold. Higher grades appear to be generally associated with increased vein density and with increased sulphide content. The blocks and pods of high grade ore are of sufficient size that they can be selectively mined, (Saskatchewan Industry and Resources, 2002).

### 6.16.4 Exploration History

The Box property, VIC group of 17 claims and one fraction, was staked in 1934 by Tom Box and Gus Nyman for the Consolidated Mining and Smelting Company of Canada Ltd. The property is located about 0.75 miles (1.2 km) west of the former town site of Goldfields.

After a preliminary sampling and diamond drilling (35 holes), No.1 shaft was begun in July 1935. It was a 2 compartment shaft inclined 42° to the southeast following the contact of the surrounding

rocks. Shaft No. 2 was started at the same year, 1,280 ft (390 m) northeast of No.1 along the strike of the rocks. Between the two shafts, 3 levels at depths of 100 ft (30 m), 300 ft (90 m), and 500 ft (150 m) have been driven. Lateral development and diamond drilling has been done on all 3 levels. A 1,000 tons (910 tonnes) per day mill was constructed and a 3,300 hp. unit was installed in a 6,000 h.p. hydroelectric power plant built at Wellington Lake to run the mill at Box Mine, 22 miles (35 km) away. Up to June 1939, when the mill commenced production, it was estimated that $4,000,000 including $1,500,000 for the power plant, was spent on the property.

Initial development work by the company indicated a large volume of ore averaging about $4.80 per ton ($5.27 per tonne). Further development work showed definite signs that the value of the ore was considerably less and could not be mined at anything like the grade estimated. Deposit reserves were listed at the end of 1939. The mine operated from June 1939 to May 1942. The operations were suspended because of shortage of manpower caused by World War II.

Saskatchewan Environment (1989) reports that the mill operated at a capacity of about 1,000 tons (910 tonnes) per day between 1939 and 1942. Limited information suggests gold was recovered by gravitational and amalgamation processes and possibly using a cyanide leach process. A total of 64,066 ounces of gold was recovered from 1,418,320 tons (1,290,671 tonnes) of ore.

After 1949, the company supplied power developed at the Wellington Lake plant to the property of Eldorado Mining and Refining (1944) Limited, situated north of Beaverlodge Lake.

In 1968, Dejour Mines Ltd. completed detailed geological mapping and radiometric prospecting. The work discovered a number of radioactive fractures on Box Mine VIC claim No. 2. In the same year, a small amount of diamond drilling was completed to test the fracture system. One hole intersected pitchblende filled fractures that assayed 14.0% U3O8 and 0.66% U3O8 over 6 inches (15 cm), respectively.

The head frames and mill were dismantled in 1976. The Box Property was covered by ML 4998.

In 1987, Greater Lenora Resource Corporation optioned both the Box and Athona properties from Cominco Ltd. In 1988, the Saskatchewan Mining and Development Corporation completed drill hole VI-88-1 at the north end of Vic Lake, near the mine dump and took a series of grab samples on adjoining CBS 5664. Drill hole LB-88-3 was completed under Neiman Bay to test for an extension of the Box Mine granite. Gold values were encountered in diamond drill hole LB-88-3. In the same year, Greater Lenora completed a pre-feasibility ore reserves calculation, using 1934 to 1988 data.

In 1989, Greater Lenora completed on-site metallurgical testing, bulk sampling and 3,199 m of reverse circulation drilling on the Box property and 1,037 m reverse circulation drilling on the Athona property.

In 1990, Greater Lenora Resources announced new reserves for the deposit. The reserves were calculated using the Krieging and the inverse distance weighing, and polygonal methods.

In 1992, Greater Lenora Resources recalculated the combined reserves for the Box and Athona deposits. RJK Mineral Corporation also listed the Box Mine reserves.

In 1994, they released the results of drill holes B9-109 to -150. These infill drill holes were designed to test the deposit below the level of the existing mine workings (press release). Between 1994 and 1995, delineation holes B95-151 to 250 and an Environmental Impact Study were completed on the deposit. The Box reserves were re-calculated at this time.

In 1995, 17 drill holes and an Environmental Impact Study was completed on the Box-Athona mines. In October 1995, the combined reserves for Box-Athona were published. The combined reserve of the Box-Athona Deposits was also published. The Box Mine is open in all directions and the Athona Mine is open to the southwest.

In 1996, Greater Lenora announced a new, lower combined reserves calculation for Box-Athona deposits (labeled a resource calculation). In 1997, Behre Dolbear completed an ore reserves audit published reserves for the combined Box-Athona deposits. In 1997, Pearson, Hoffman & Associates completed the following resource evaluation of the Box Mine. In the same year, they flew an airborne electromagnetic, resistivity, magnetic, and spectrometer survey over the property.

In 1999, Greater Lenora Resources announced intentions to proceed with a small-scale development and production plan which will focus on open pit mining a part of the Box Deposit. An Environmental Impact Statement for the proposed project was submitted.

On 20 August 2001, Greater Lenora Resources announced that Glacier Resources had acquired a 50% equity in Greater Lenora. They stated that an environmental impact study had been completed and Gekko of Australia tried simple gravity separation of Box ore and received excellent recoveries. Greater Lenora also concluded that the Box Mine is an unconformity type Au-PGE deposit that is similar to the Coronation Hill deposit in Australia, (Saskatchewan Industry and Resources, 2002).

### 6.16.5 2001 Inspection-Site Description

Following is the site description as noted during the 2001 inspection.

*6.16.5.1 General*

The Box site was inspected on 01 October 2001. Site access was by boat from the dock at Goldfields.

The area is relatively flat with numerous outcrops. Vegetation is moderate to sparse.

Signs of recent visitation are numerous including tire tracks on the tailings, recent debris, but particularly the camp (from recent exploration drilling).

*6.16.5.2 Mine Workings*

The mine workings consist of two shafts. The main shaft is readily identifiable and is located near the steel remnants of the headframe. The shaft is inclined and is open. There does not appear to have been any recent attempts to close or seal the main shaft.

A vent raise about 100 m south east of the shaft has been sealed. Records indicate that a second shaft exits about 350 m north east of the main shaft; however, the second shaft could not be located and it is likely that it has been sealed.

*6.16.5.3 Waste Rock*

Waste rock is spread out over the site. Saskatchewan Environment and Public Safety (1989) reports that 1.4 million tons (1.27 million tonnes) of ore was processed. There is an extensive amount of waste rock spread over the site. It is therefore difficult to estimate the volume of waste rock associated with the site.

*6.16.5.4 Tailings*

The tailings are located west of the shaft. Tailings were deposited in Vic Lake and spilled over into Frontier Lake. Saskatchewan Environment and Public Safety (1989) reports that levels of most metals were not unusual. Lead and copper levels were slightly high in the slimes but low in the coarse tailings. No sulphide analyses were done, but the pH of the tailings was 2.3 and 3.7 for the coarse and slimes, respectively. No acid production tests were done.

As part of the Year 2 inspection, tailings samples were taken from the east side of the tailings. Analytical results are provided in Table 6.16-1.

**Table 6.16-1**
**Box Mine Tailings Analysis – East Side – 01 October 2001**

| Parameter | Units | Value | Parameter | Units | Value |
|---|---|---|---|---|---|
| Ag | ppm | 0.4 | Mg | % | 0.14 |
| Al | % | 0.26 | Mn | ppm | 35 |
| As | ppm | 24 | Mo | ppm | 3 |
| B | ppm | <10 | Na | % | 0.04 |
| Ba | ppm | 20 | Ni | ppm | 8 |
| Be | ppm | <0.5 | P | ppm | 70 |
| Bi | ppm | <2 | Pb | ppm | 52 |
| Ca | % | <0.01 | S | % | 0.05 |
| Cd | ppm | <0.5 | Sb | ppm | <2 |
| Co | ppm | <1 | Sc | ppm | <1 |
| Cr | ppm | 84 | Sr | ppm | 2 |
| Cu | ppm | 39 | Ti | % | <0.01 |
| Fe | % | 1.17 | Tl | ppm | <10 |
| Ga | ppm | <10 | U | ppm | <10 |
| Hg | ppm | <1 | V | ppm | 7 |
| K | % | 0.12 | W | ppm | <10 |
| La | ppm | 20 | Zn | ppm | 16 |

Analysis show the tailings contain elevated concentrations of arsenic, chromium, copper, lead, iron, lanthanum and phosphorous, in comparison with the abundance of trace elements in the continental crust (Table 6.18-5).

*6.16.5.5 Debris*

A considerable amount of debris is spread out over the site. The primary areas of debris include the shaft area where remnants of the headframe and mill remain. There are several buildings to the northeast. Two small bunkhouses appear to have asbestos siding panels.

A large approximately 10,000 gallons (45,000 litres) fuel tank is located east of the headframe. It is not known if the tank contains fuel; however, there are no signs of leakage from the tank.

There are several (approximately 100 in total) 45 gallon (200 litre) drums scattered about the site, but with a large number of the total located north of the generator building and near the shaft. The barrels are old and rusted and do not contain any liquid.

The generator building is located east of the shaft. The generator building contains about one hundred 200 litre drums full of rock chips from the reverse circulation drilling program conducted by Greater Lenora Resources.

Near the exploration camp are two core storage facilities. Both are in a deteriorating condition. Several core racks have tipped and core is spread on the ground. The larger of the two core storage areas is about 70 m southwest of the camp area, and the second is close by the camp.

The headframe, mill and generator building are situated on concrete pads.

It is difficult to estimate the total volume of debris at the site. A major cleanup is required to remove the headframe, mill, ancillary facilities, and debris.

### 6.16.6 History of Previous Inspections

The site has been inspected on several previous occasions.

Environment Canada collected tailings samples and lake sediments in 1978. The Saskatchewan Research Council collected coarse and fine tailings in 1981.

In addition, the site has extensive monitoring and baseline data gathering over the past 1 to 10 years as part of the preparation of an Environmental Impact Statement on behalf on Greater Lenora Resources. An extensive amount of information exists on tailings quality, lake water quality, waste rock characterization and wildlife. Given the extensive and current data base for the site, it was decided additional monitoring was not necessary.

### 6.16.7 Risk Assessment Ranking

| | |
|---|---|
| Public Safety Assessment | 19 |
| Environmental Assessment | 18 |
| Combined Total Assessment | 37 |
| Ranking | 2/22 |

The Box site contains numerous public safety hazards and is easily accessible. Therefore three points were attributed to the "additional public safety risks" category. In addition, one point was attributed to the "additional environmental risks" category due to the presence of unconfined tailings.

### 6.16.8 Follow-up

Extensive follow-up work is required at the site.

The headframe and mill remains should be dismantled and the shaft opening and any other opening permanently sealed. Given the condition and accessibility of the headframe, it poses a severe public safety hazard.

Remaining work should focus on removal of asbestos panels from the old bunkhouses and secure disposal down the shaft, burning wooden buildings, disposal of concrete down the shaft, and removal of all other debris; including spilled core, barrels and scrap metal.

The tailings are acid generating, based on pH values for the tailings reported by Saskatchewan Environment and Resource Management (1989). The tailings could be consolidated into one mass in Vic Lake and covered with waste rock. However, this would require further assessment to determine potential environmental impacts.

In the spring of 2000, Saskatchewan Environment requested that Greater Lenora Resources address safety concerns associated with the site. To date, these concerns have not been addressed.

There is record of an adit on Vic Lake that accesses the underground workings. No attempt was made to locate the adit because at the time of the inspection, the information regarding the presence of the adit was not available. Additional attempts should be made to locate and assess the adit.

Photo 6.16-1 Box Mine Headframe
October 01, 2001

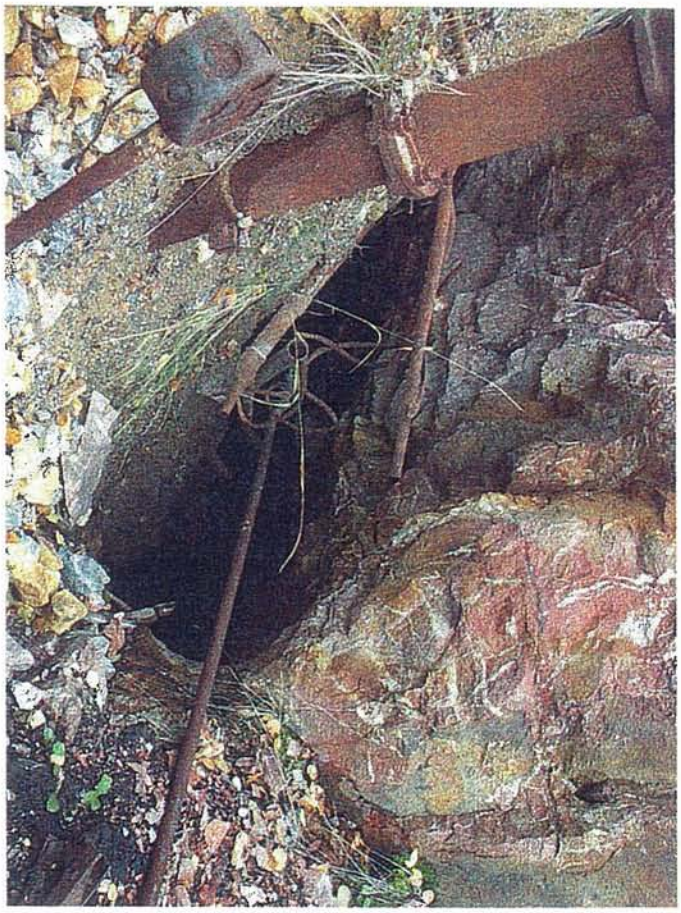


Photo 6.16-2 Box Mine Shaft Opening
October 01, 2001

Photo 6.16-3 Box Mine Mill Building Frame
October 01, 2001

Photo 6.16-4 Box Mine Mill Debris
October 01, 2001

Photo 6.16-5 Box Mine Tailings and Headframe
October 01, 2001

Photo 6.16-6 Box Mine Tailings Area
October 01, 2001

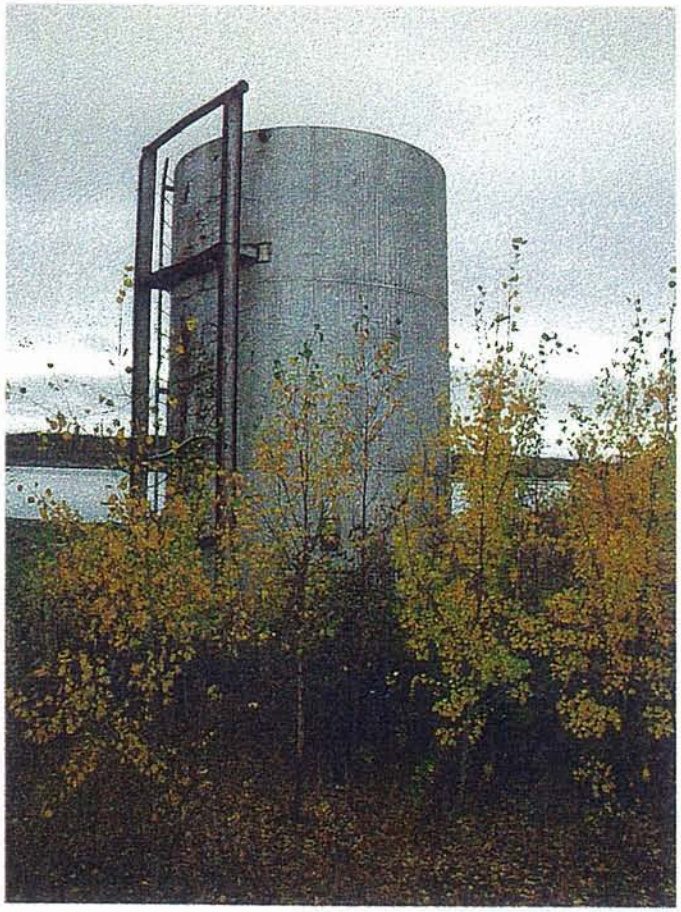


Photo 6.16-7 Large Fuel Tank Near Current Box Mine Exploration Camp

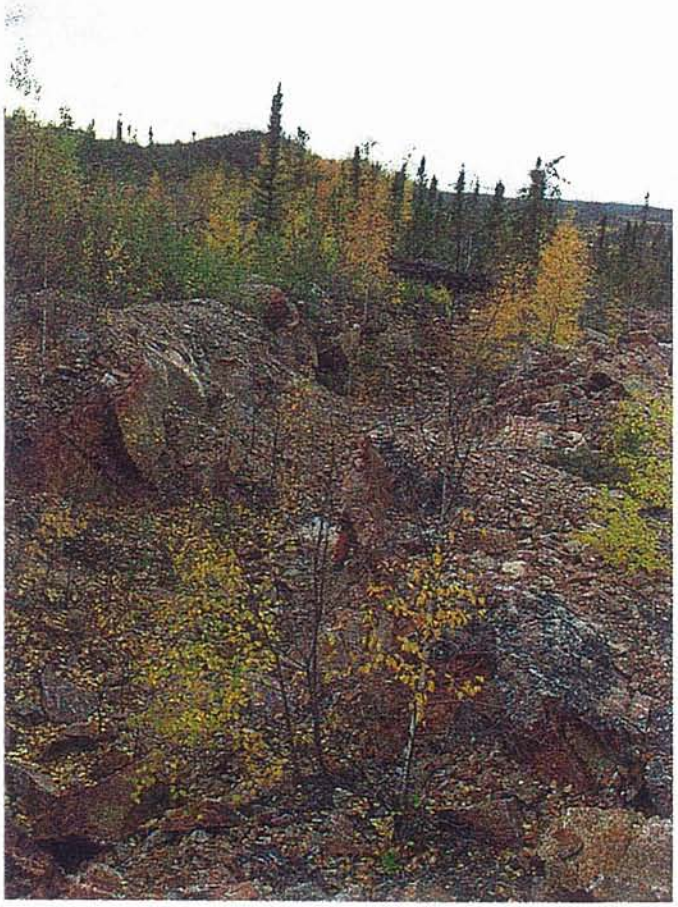


Photo 6.16-8 Trench Near Box Mine Shaft Area October 01, 2001

Photo 6.16-9 Covered Raise October 01, 2001

Photo 6.16-10 Fuel Drums Near Headframe
October 01, 2001

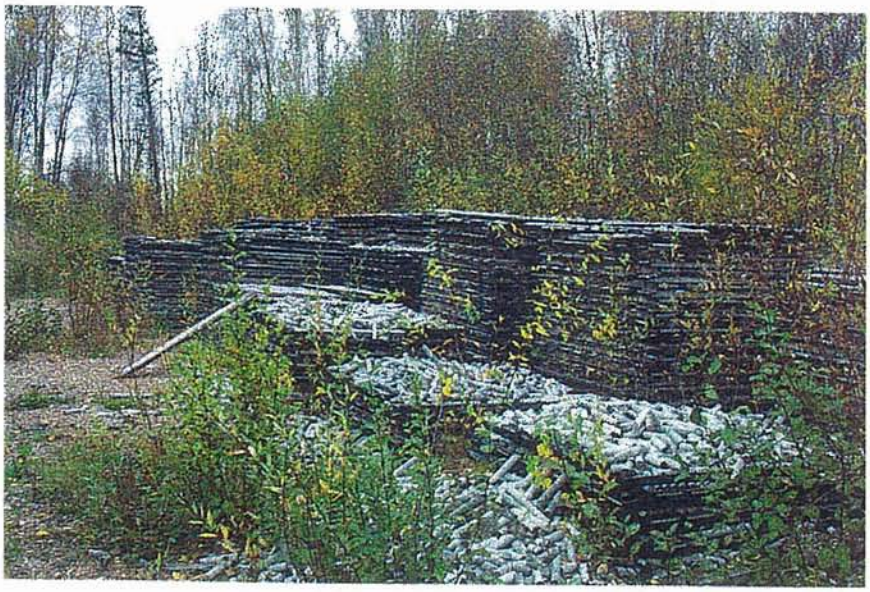


Photo 6.16-11 Delapidated Core Storage Near Current Exploration Camp
October 01, 2001

Photo 6.16-12 Trailer at Current Exploration Camp
October 01, 2001

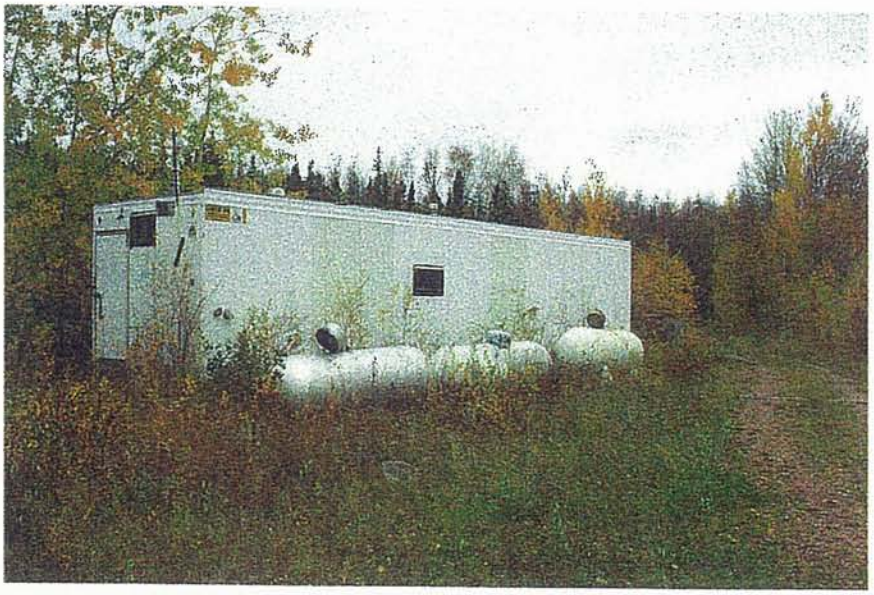
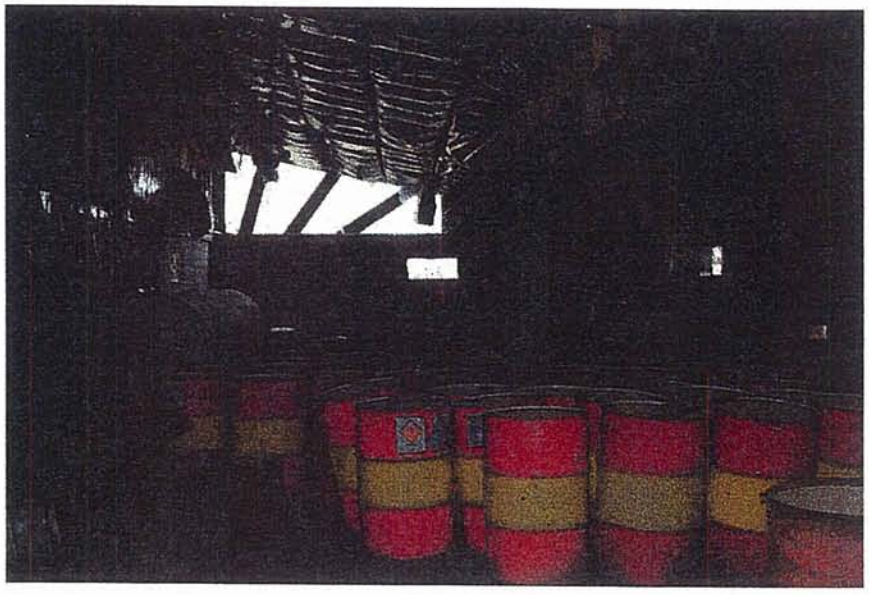


Photo 6.16-13 Core Storage and Current Exploration Camp (Background)
October 01, 2001

Photo 6.16-14 Abandoned Generator Building
October 01, 2001

Photo 6.16-15 Drums of Rock Chips From Recent Reverse Circulation Drilling Program
October 01, 2001



## 6.17 Rix Athabasca No. 7 Zone

### 6.17.1 Location and Access

Site Inspection: 02 October 2001

Location: 74-N-08-NW
UTM Zone: 12

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic | UTM | Geographic | UTM* |
| N/A<br>N/A | N/A<br>N/A | N/A<br>N/A | 6592241 m N<br>642444 m E |

* Location obtained from Saskatchewan Mineral Deposit Index

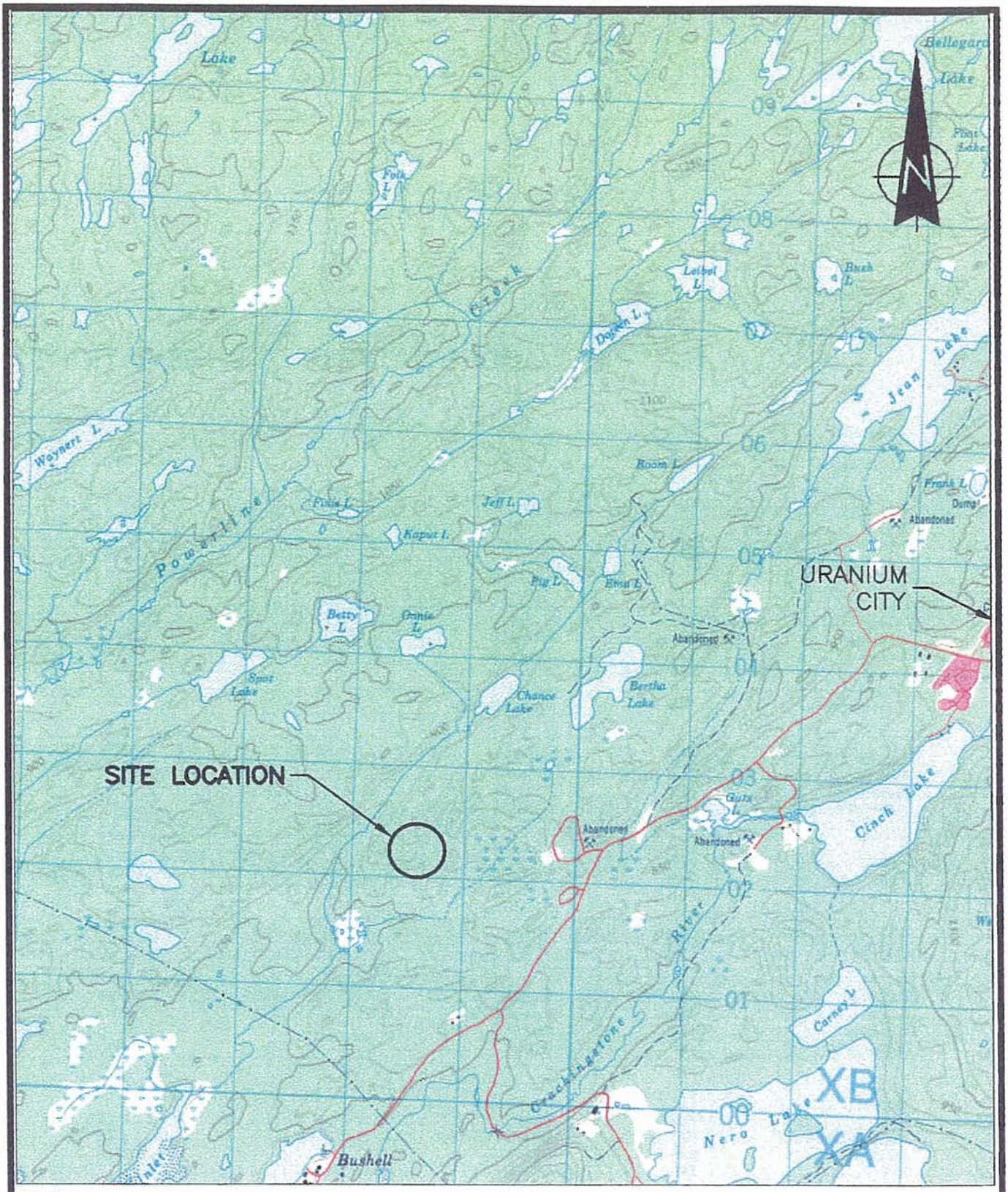
The Rix Athabasca No. 7 Zone is recorded as being located near Chance Lake west of Uranium City (Figure 6.17-1).

The site is recorded as having 10 trenches developed along the strike of the deposit in 1950 by Rix Athabasca Uranium Mines. In 1958, a short adit was driven from the base of trench No. 1 towards trench No. 2.

An extensive search of the area was unsuccessful in locating any trenches or an adit. It is possible that being located close to Uranium City and having good access, the trenches and adit were filled in.

The Conservation Officer for the area notes that he has hiked and walked through the area on several occasions and is not aware of any trenches or adit. In addition, Mr. James Augier and Ms. Bernadette Knox went back to the area on two separate occasions and did not locate an adit although some partially filled in trenches may have been located.

Follow up work should focus on going back to the site of the potential trenches and re-evaluating the site.




**NOTE:**
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 74 N 10.

# SITE LOCATION PLAN
# RIX ATHABASCA NO. 7 ZONE

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.17-1

R3160/FIG6.17-1.DWG

## 6.18 Rottenstone Mine

### 6.18.1 Location and Access

Site Inspection: October 17, 2001

Location: 74-A-07-SW

UTM Zone: 13

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 56° 20' 41" lat<br>104° 49' 37" long | 6244461 m N<br>510697 m E | 56° 20' 41" lat<br>104° 49' 35" long | 6244248 m N<br>510817 m E |

* Locations recorded by GPS during Year 2 field program

** Location obtained from Saskatchewan Mineral Deposit Index

The Rottenstone site is located on the southeast shore of Rottenstone Lake, about 145 km north of La Ronge.

The site is accessible by float plane landing on the shore of Rottenstone Lake opposite the site.

The site location is shown in Figure 6.18-1. The site plan is shown in Figure 6.18-2. Photographs 6.18-1 to 6.18-12 show the site.

### 6.18.2 Property Information and Ownership

**Saskatchewan Mineral Deposit Index Number:** 0958

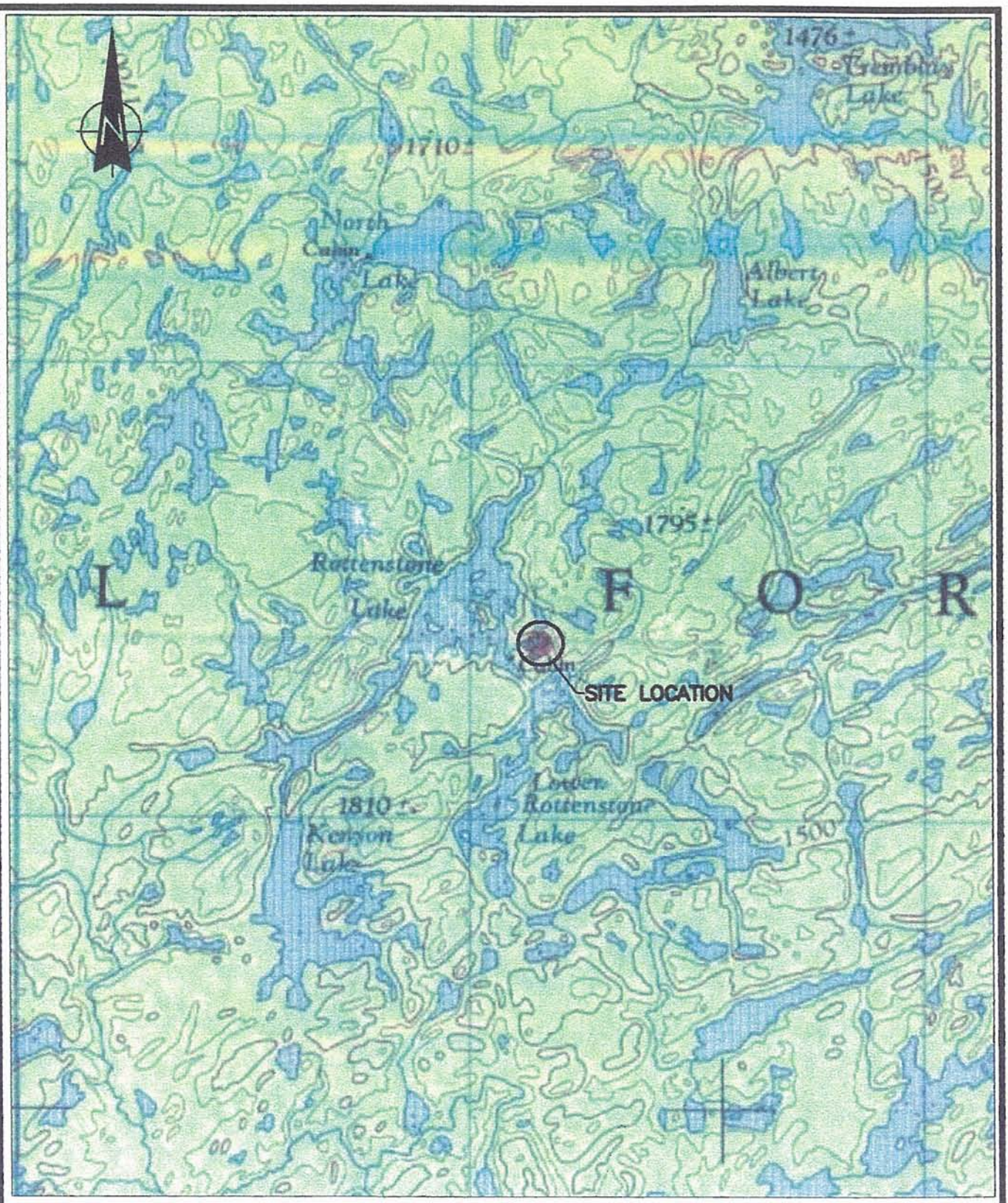
**Property:** ML 5057 (formerly: Canadian Occidental Permit 4; ML 4; PAL-PLAT; VIA)

**Location:** Rottenstone Lake - near southwest shore

**Owner(s):** Uravan Minerals (optioned from Claude Resources) ML5037, see Section 6.18.4 for previous owners

**Commodity:** Ni **Associated Commodities:** Cu; Pt; Pd; Pn; Au; Ag

**Deposit Type:** Outcrop

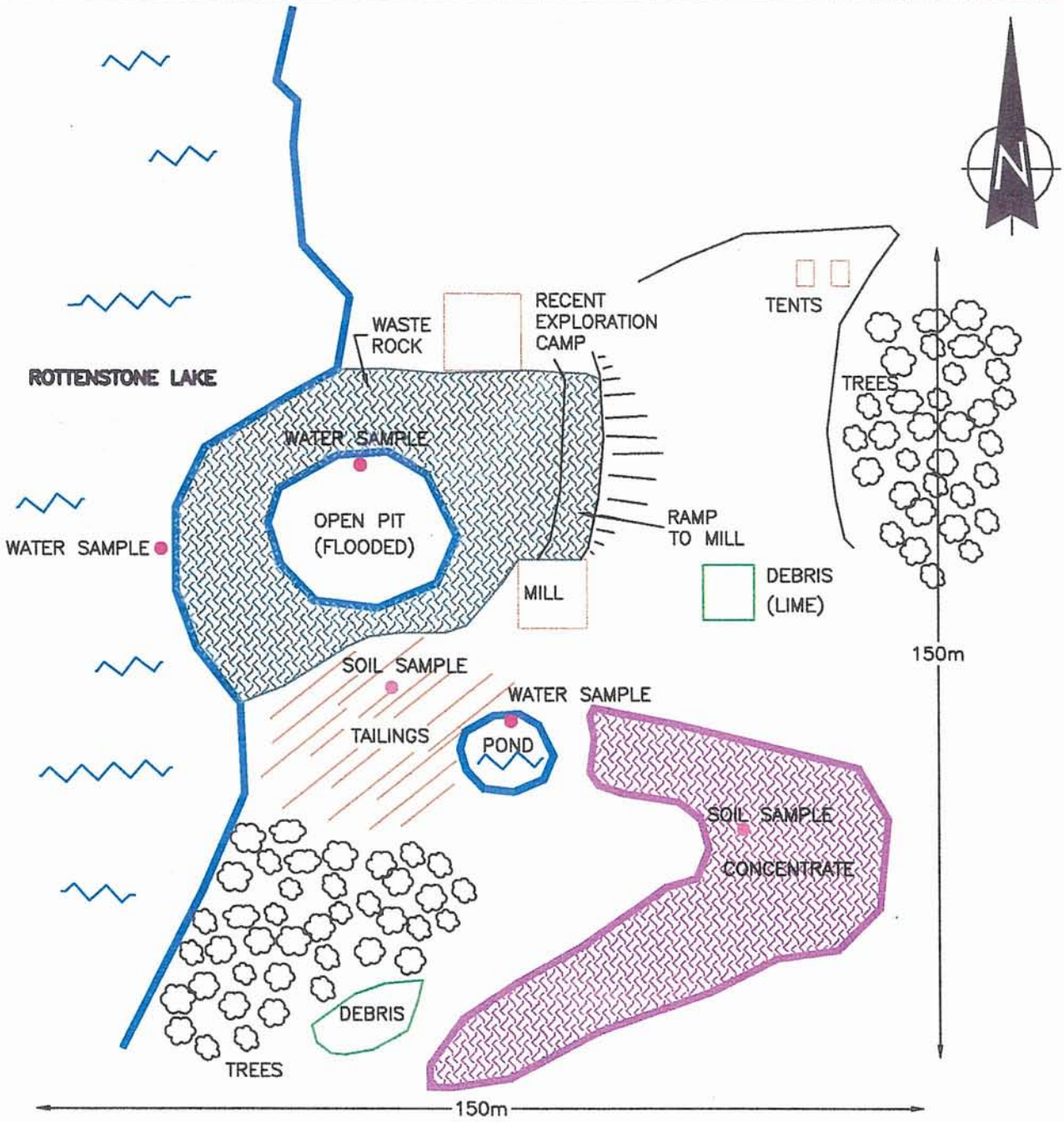



**NOTE:**
DRAWING DEVEOLPED FROM SCANNED NTS MAP 74 A.

## SITE LOCATION PLAN
## ROTTENSTONE MINE

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.18–1

R3160/FIG6.18–1.DWG




**LEGEND:**

| | |
|---|---|
| Roads/Trails | |
| Mine Workings | |
| Waste Rock | |
| Body of Water | |
| Scrap Material/Debris/Refuse | |
| Building/Foundation | |
| Tailings | |
| Natural Ground Surface | |
| Water Sample Location | |
| Soil Sample Location | |

**LEGEND:**

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

## ROTTENSTONE MINE – SITE PLAN
## (NOT TO SCALE– DIMENSIONS ARE APPROXIMATE)

**CLIFTON ASSOCIATES LTD.** **PROJECT NO: R3160** **FIGURE NO: 6.18–2**

R3160/FIG6.18–2.DWG

### 6.18.3 Geology

The Rottenstone Ni-Cu Mine, originally termed the "Hall Showing" or the Hall Deposit, is located near the southeast shore of Rottenstone Lake approximately 145 km north-northeast of La Ronge.

The country rock, in the Hall Deposit area, consists of "Kisseynew-type" granite gneiss (migmatite) that contains numerous rafted inclusions of older rocks. These inclusions are either biotite schist or pyroxenite - with the biotite schist inclusions being more common. The inclusions occur as lenses and angular blocks that vary in size from a few feet across to over 200 ft (60 m) across. One of these pyroxenite inclusions hosts the Hall deposit.

The Hall Deposit pyroxenite host rock is better called a harzburgite-orthopyroxenite synclinal roof-pendant or inclusion that lies within a northeast trending band of migmatites. The shallow, flat-lying body is approximately 180 ft (55 m) long, 121 to 164 ft (37 to 50 m) wide and 26 to 39 ft (8 to 12 m) thick. The body dips 30° to the east. The deposit is a dome-shaped outcrop 150 ft (46 m) in diameter, rising 30 ft (9 m) above lake level. Sulphides constitute approximately 45% of the rock.

Mineralization consists of finely disseminated pyrrhotite, violarite (Ni2Fe2S3), annabergite, chalcopyrite and bornite that occur as intimately associated masses. The masses contain lesser amounts of flame-like grains of pentlandite ((Fe,Ni)S)3, sperrylite (PtAs2), sphalerite, cubanite (CuFe2S3), and minor pyrite and malachite. The gangue, which consists of serpentine, olivine, hypersthene, chlorite, siderite and cordierite, contains magnetite and less commonly graphite. The Rottenstone or Hall Deposit is unique in terms of its content of Pt-Pd and Au. The ore is higher grade in these precious elements than the classic PGE deposits such as the Merensky Reef Deposit and the UG2 Chromite Deposit.

In 1999, Uravan completed 9 holes on the deposit.

The Geological Survey of Canada sampled the 10 to 12 bands of mineralization in the deposit. This sampling returned mean values of 6.28% Ni, 5.31% Cu, 0.35 oz./ton Pt, 0.16 oz./ton Pd and 0.07 oz/ton Au.

A similar, though smaller, deposit (the Tremblay-Olson Deposit) occurs approximately 1 mile (1.6 km) southwest of this showing (see Saskatchewan Mineral Deposit Index #959).

The Island Showing, which is located on a small island 600 m (0.37 mile) north-northwest of the Rottenstone Mine, consists of anomalous Cu-Ni mineralization within a small body of massive, fine to medium-grained, black pyroxenite which is cut by rare chalcopyrite-bearing quartz veins. Finely disseminated pyrrhotite mineralization within the pyroxenite has been traced over a 3 m strike length. Assays from grab samples taken at the showing site returned up to 60 ppb Pt, 285 ppb Pd, and 1218 ppm Ni. One sample of quartz with chalcopyrite veining returned 4.36% Cu. Normal Cu-Ni values were below 1,000 ppm, (Saskatchewan Industry and Resources, 2002).

### 6.18.4 Exploration History

The showing was originally noted by First Nations as a large, 30 ft (9.1 m) hill of 'rottenstone' and was brought to the attention of traders.

In 1928, the area of the showing was staked by G. and R. Hall, for Hall Whitmore Mines Ltd. In 1929, the property was optioned to Consolidated Mining and Smelting Co. of Canada Ltd. Work indicated that the ore body occurs as a shallow, flat-lying lens 180 ft (55 m) long, 120 ft (37 m) wide and 30 ft (9 m) thick, occupying a shallow synclinal fold in sedimentary gneisses. Ore reserves for the deposit were published. Nineteen holes were completed; 15 were barren and 4 contained mineralization.

Consolidated Mining estimated that the lens contained 40,000 tons (36,400 tonnes) of ore averaging 1.81% Ni and 1.01% Cu. They felt that the deposit was too small to be developed economically at that time, and the option was dropped the same year.

In 1945, two grab samples were taken from the deposit. They returned assays of 0.07% and 2.07% Cu and 4.29 and 4.27% Ni, respectively.

In 1946, J.B. Mawdsley mapped the area in detail. Mawdsley completed ore microscopy of the Hall Deposit, the Tremblay-Olson Deposit and the Red Hill Deposit. The claims covering the Hall Deposit lapsed in 1948.

In 1950, V.J. Studer staked the VIA claim group over the Hall Deposit. In 1951, Cape Copper Mines Ltd. acquired the property.

In 1952, Cape Copper completed 14 X-ray drill holes, totaling 749 ft (228 m). It is believed a further 350 ft (107 m) of drilling was completed for which there is no assessment work (Beck, 1959). In 1953, Cape Copper completed detailed geological mapping of the area and ground magnetic surveys over the deposit.

In 1954, Trans-Dominion Mining and Oil Corporation acquired the property. They completed 19 drill holes, totaling 2,867 ft (874 m) and flew an airborne magnetic survey that covered 100 square miles (256 square km) in the vicinity of the Hall Deposit. This work indicated that there was no extension to the Hall pyroxenite and that there were no proximal anomalies.

In 1957, Sico Mining Corporation (Pre-Cam Exploration and Development Ltd.) obtained a mineral lease over much of the Rottenstone area that included the Hall Deposit. Further drilling, in the Hall Deposit area, located a pyrrhotite zone to the northwest of the Hall Deposit. The zone contained barren sulphides in a sedimentary gneiss. Ground prospecting of airborne anomalies, located to the west of Rottenstone Lake, located further pyrrhotite ± graphite. Ground magnetic and electromagnetic surveys were conducted and the one follow-up drill hole completed intersected a diabase dyke.

In 1959, the Hall Deposit was held in trust as ML No. 4 by W.T. Knox for Sico Mining Corporation. Ground electromagnetic and magnetic surveys were completed. Sico completed 17 drill holes. The core was assayed for Au, Ag, Cu, Ni, Pt and Pd. In 1960, Sico completed a further 9 holes in the immediate area and completed a detailed electromagnetic and magnetic survey that was used to determine a northeast plunge for the Hall Deposit. A further 6 holes, 3 of which intersected good widths of Cu-Ni, were completed on the deposit. Sico allowed ML 4 to lapse.

During operations, the mill operated at a capacity of about 100 tons (91 tonnes) per day. A concentrate was produced using grinding, cyclones and flotation. The mill operated during the warmest seven months of the year. Work at the site occurred from 1966 to 1968. Metal recovery included gold, copper, nickel, platinum palladium and silver. The concentrate was stockpiled and removed during the winter by truck over a winter road.

In 1962, B.R. Richards re-staked the deposit as PAL 1-3 and PLAT No. 1 claims. Two short holes, totaling 69 ft (21 m), were drilled on the deposit. Between 1965 and 1968, Rottenstone Mining Ltd. open pit mined the Hall Deposit. Plans were made to mine the Tremblay-Olsen Showing but this was never carried out. In 1973, four drill holes were completed. Cu and Ni assays varied between 1.03% to 5.88% and 0.75% to 4.75%. The property was returned to Rottenstone Mining.

In 1975, C.F. Gilboy mapped the deposit area.

Between 1985 and 1988, C. Dunn completed a biogeochemical survey for the Geological Survey of Canada which covered the showing. In 1985, Claude Resources Incorporated acquired ML 5057. In 1986, Bec International completed a ground electromagnetic and magnetic survey over the deposit and Fleck Resources Ltd. completed geological mapping, prospecting, rock sampling, and ground very low frequency electromagnetic (VLF-EM) and magnetic surveys over the deposit. Partridge Contracting Inc. completed a VLF-EM survey in the immediate showing area in the same year. In 1988, Claude Resources acquired the property and completed a ground electromagnetic and magnetic survey over the deposit. Between 1987 and 1988, Claude completed ground VLF-EM and magnetic surveys over the mine grid.

In 1990, a partnership involving Claude Resources Inc. and Inco Exploration completed further geological mapping, prospecting, and rock sampling over the deposit. In 1991, the partnership completed a ground UTEM (large loop time domain electromagnetic) survey which covered the deposit.

In 1997, Claude Resources completed prospecting and channel, soil, and till sampling in the immediate mine vicinity.

In 1998, Uranco Minerals Ltd. optioned the property from Claude Resources. Prior to acquiring the property, Uravan had completed a high resolution airborne magnetic and VLF-EM survey. Between 1998 and 1999, Uravan completed ground Transient Electromagnetic (TEM) surveys immediately around the deposit and a helicopter-assisted biogeochemical survey. This was followed up by a 9 hole Phase I drill program to test the on-strike area immediately to the northeast of the open pit. Drill holes RL99001, 2, 8, and 9 were completed at the open pit, (Saskatchewan Industry and Resources, 2002).

### 6.18.5 2001 Inspection-Site Description

Following is the site description as noted during the 2001 inspection.

*6.18.5.1 General*

The Rottenstone site was inspected on 17 October 2001. The site was accessed by float plane landing on the shore of Rottenstone Lake just opposite the site. A wooden dock is present.

Recent activity at the site includes exploration drilling. A camp and drilling equipment are at the site. Newspapers in one of the tents are dated July 2001.

The site is spread out over a small area and consists of remnants of a mill, flooded open pit, mill tailings, mill concentrate, and a variety of debris spread around the site.

A drilling camp is on site and consists of six airtight tents north of the pit, a drilling rig located on the tailings, a small lubricant storage shed, a storage shed with batteries miscellaneous drilling equipment and supplies, propane tanks, drums of fuel and recent core. It appears Uravan Minerals is the company doing the exploration.

East of the pit is the remnants of the mill. The mill was constructed of jackpine logs and is still standing, although in a deteriorating condition. There is a metal ore feed structure at the base. A waste rock ramp leads up to the mill.

A small pond of water exists on the tailings which is located south of the mill.

*6.18.5.2 Mine Workings*

The mine site includes a single open pit. Saskatchewan Environment and Public Safety (1989) reports, the pit is 40 m by 50 m by 8 m deep. The pit is flooded with water that is green-blue in color.

A water sample from the edge of the pit was taken. Analytical results are provided in Table 6.18-1.

Field measurements were as follows:

| | |
|---|---|
| Date: | 17 October 2001 |
| Time: | 12:40 p.m. |
| pH | 5.6 |
| Conductivity: | 772 µS/cm |
| Temperature: | 6.3°C |

The pit water is mineralized with nickel, tin, aluminum, cobalt, copper and zinc. Several other metals were above detection level. Major metals including calcium, iron, potassium, magnesium and sodium are high.

**Table 6.18-1**
**Rottenstone Mine Site - Site Water Quality - 17 October 2001**

| Parameter | Units | Rottenstone Pond Result | Rottenstone Lake Result | Rottenstone Pit Result | SSWQO [1] |
|---|---|---|---|---|---|
| **Total Trace Metals** | | | | | |
| Silver (Ag) | mg/L | 0.0026 | <0.004 | 0.0093 | 0.01 |
| Aluminum (Al) | mg/L | 34 | <0.2 | 1.48 | |
| Arsenic (As) | mg/L | <0.01 | <0.01 | <0.01 | 0.05 |
| Boron (B) | mg/L | 0.042 | <0.02 | 0.085 | |
| Barium (Ba) | mg/L | 0.0062 | 0.015 | 0.031 | 1 |
| Beryllium (Be) | mg/L | <.01 | <0.01 | <0.01 | |
| Bismuth (Bi) | mg/L | 0.0711 | <0.001 | <0.001 | |
| Cadmium (Cd) | mg/L | 0.0027 | <0.002 | 0.0027 | 0.001 |
| Cobalt (Co) | mg/L | 0.796 | <0.002 | 0.477 | |
| Chromium (Cr) | mg/L | 0.0693 | <0.008 | <0.008 | 0.02 |
| Copper (Cu) | mg/L | 32.4 | 0.017 | 2.22 | 0.01 |
| Molybdenum (Mo) | mg/L | 0.0014 | <0.001 | <0.001 | |
| Nickel (Ni) [2] | mg/L | 30.3 | 0.0221 | 22.9 | 0.025 |
| Phosphorous (Ph) | mg/L | <0.001 | <.001 | <0.001 | |
| Lead (Pb) | mg/L | <0.05 | <0.05 | <0.05 | 0.02 |
| Antimony (Sb) | mg/L | <0.008 | <0.008 | <0.008 | |
| Selenium (Se) | mg/L | <0.004 | <0.004 | <0.004 | 0.01 |
| Tin (Sn) | mg/L | 0.561 | 0.028 | 0.245 | |
| Strontium (Sr) | mg/L | 0.013 | <0.006 | <0.006 | |
| Titanium (Ti) | mg/L | 0.0052 | <0.001 | 0.0106 | |
| Thallium (Th) | mg/L | 0.0041 | <0.001 | <0.001 | |
| Vanadium (V) | mg/L | <0.002 | <0.002 | 0.003 | |
| Zinc (Zn) | mg/L | 0.377 | <0.04 | 0.183 | 0.05 |
| **Total Major Metals** | | | | | |
| Calcium (Ca) | mg/L | 48.9 | 2.8 | 50.1 | |
| Potassium (K) | mg/L | 5.3 | 0.8 | 12.2 | |
| Magnesium (Mg) | mg/L | 67.5 | 1.2 | 63.5 | |
| Sodium (Na) | mg/L | 5 | 1 | 7 | |
| Iron (Fe) | mg/L | 20.4 | 0.076 | 0.397 | 1 |
| Manganese (Mn) | mg/L | 2.34 | 0.016 | 2.33 | |
| Zirconium (Zr) | mg/L | 0.0189 | <0.006 | <0.0006 | |

(1) Unless noted, the value is the Specific Surface Water Quality Objective for the Protection of Aquatic Life and

(2) The Surface Water Quality Objective for Nickel is 0.025 mg/L where hardness $\leq$ 100 mg/L ($CaCO_3$)
The Surface Water Quality Objective for Nickel is 0.100 mg/L where hardness < 100 mg/L ($CaCO_3$)

Water samples from various locations at the Rottenstone site were also obtained by Saskatchewan Environment in 1981, 1986 1988 and 2000. Table 6.18-2 is an average of the analytical results from the four sampling episodes.

**Table 6.18-2**
**Historical Water Quality - Rottenstone Site**

| | Location | | | |
|---|---|---|---|---|
| Parameter (mg/L) | Mine Pit (4 samples) | Rottenstone Lake Near Tails (3 samples) | Rottenstone Lake Mid Lake (3 samples) | SSWQO [1] |
| PH | 4.0 | 7.14 | 7.3 | |
| TDS | 833 | 23 | 20 | |
| Sulphate | 587 | 4.6 | 2.5 | |
| Calcium | 65 | 3.1 | 2.1 | |
| Iron | 0.47 | 0.24 | 0.067 | 1.0 |
| Cobalt | 0.79 | <0.003 | <0.001 | |
| Chromium | <0.005 | <0.001 | <0.002 | 0.02 |
| Copper | 2.85 | 0.008 | 0.009 | 0.01 |
| Nickel [2] | 42.0 | 0.16 | 0.023 | 0.025 |
| Zinc | 0.37 | 0.08 | 0.009 | 0.05 |

(1) Specific Surface Water Quality Objective for the Protection of Aquatic Life and Wildlife
(2) Specific Surface Water Quality Objective for Nickel is 0.025 mg/L where hardness < 100 mg/L (CaCO3)
Specific Surface Water Quality Objective for Nickel is 0.100 mg/L where hardness < 100 mg/L (CaCO3)

Saskatchewan Environment and Public Safety (1989) reports, that based on the above data, the concentrations of silver, arsenic, beryllium, bismuth, silver, molybdenum, phosphorous, lead, selenium, vanadium, tungsten, zirconium, uranium and radium-226 are very low (likely less than detectable) in the pit and lake. Chloride, cadmium and titanium are also in low concentrations in the pit and lake. In Rottenstone Lake, only nickel and zinc are in concentrations that exceed the Specific Surface Water Quality Objectives for the Protection of Aquatic Life and Wildlife (Saskatchewan Environment and Resource Management, 1997). The pH of the lake is near neutral and indicates that acid generation from the tailings is being buffered. The lake was field tested for pH in 1981 and 1988 with results of 6.8 and 6.2, respectively.

Rottenstone Lake was sampled as part of the 2001 inspection. The results are shown in Table 6.18-1.

Field measurements for Rottenstone Lake were as follows:

| | |
|---|---|
| Date: | 17 October 2001 |
| Time: | 1:00 p.m. |
| pH | 7.1 |
| Conductivity: | 28 µS/cm |
| Temperature: | 5.4°C |

Water quality in Rottenstone Lake indicates that although there are detectable concentrations of metals, all metals are low and there are no apparent environmental concerns. Copper was the only parameter which exceeded Specific Surface Water Quality Objectives for the Protection of Aquatic Life and Wildlife (Saskatchewan Environment and Resource Management, 1997). Previous studies in 1981 and 1988 indicated that Rottenstone Lake may be trending to more acidic conditions; however, samples from 2001 show a pH of 7.1 which suggests this may not be the case.

Hydraulic gradient conditions between the pit and Rottenstone Lake are unknown, and it is not certain if the lake drains into the pit or the pit drains to the lake.

*6.18.5.3 Waste Rock*

There is an extensive amount of waste rock on site spread about the open pit, and up a ramp leading the former mill building.

The majority of waste rock is on land, with a small amount in Rottenstone Lake. It is difficult to determine the volume of rock in the lake.

Generally, the waste rock is extremely oxidized, and has the appearance of being acid generating. There is no vegetation on waste rock.

It is unknown how much waste rock exists on site; however, taking the dimensions of an open pit of 50 m by 40 m by 8 m deep (conical shape with a flat bottom and 2:1 sideslopes), the total volume of broken waste rock would be about 15,000 to 18,000 $m^3$.

The waste rock is heavily oxidized and appears to be acid generating. The rock heavily fractured in nature (hence the term 'Rottenstone').

A sample of waste rock was taken and analyzed for it's acid generating potential. The sample was collected by taking rock samples of various types and compositing the sample into one.

Table 6.18-3 provides the analytical results.

**Table 6.18-3**
**Acid Base Accounting - Rottenstone Waste Rock**

| Analyte | Value |
|---|---|
| Paste pH | 6.8 |
| % Sulphate | 0.09 |
| % Sulphide | 4.02 |
| % Total S | 4.11 |
| CO2 % Inorganic | 0.2 |
| Maximum Potential Acid | 128 |
| Neutralization Potential | 12 |
| Net Neutralization Potential | -116 |
| Ratio NP/MPA | 0.09 |
| Fizz Test | 1 |

A document entitled "Mine Rock Guidelines - Design and Control of Drainage Water Quality" (Saskatchewan Environment and Resource Management - April, 1992) provides guidelines for assessing acid rock drainage potential. The guidelines state that a sample is theoretically net acid generating if the net neutralizing potential (NNP) is less than 0. Samples with less than a 1:1 (neutralizing potential (NP) to acid potential (AP)) or MPA are probably also acid generating. The results from Table 6.18-3 clearly indicate that the waste rock is acid generating (NNP=-116 and NP/MPA=0.09).

*6.18.5.4 Tailings*

The tailings mass is located south of the pit on the south side of the property. The tailings mass is about 150 m in diameter and are void of any vegetation and appear to be acid generating.

A water sample from the small pond of water on the tailings was taken. Results are provided in Table 6.18-1.

Field measurements for Rottenstone Lake were as follows:

| | |
|---|---|
| Date: | 17 October 2001 |
| Time: | 12:15 p.m. |
| pH | 5.97 |
| Conductivity: | 1.370 µS/cm |
| Temperature: | 3.3 °C |

From Table 6.18-1, it can be seen the tailings pond water contains elevated concentrations of cobalt, nickel, copper and aluminum and is similar to that of the pit water. Calcium, potassium, magnesium, sodium, iron and manganese are also elevated.

To the east of the tailings is a mass of concentrate spread out over an area of about 75 m by 75 m.

In 1988 and 2000, Saskatchewan Environment and Resource Management sampled the tailings and concentrate. Results are provided in Table 6-18-4.

As expected, the data shows the tails have elevated concentrations of several metals including chromium, copper, iron, magnesium, nickel, and zinc.

The tailings and concentrate were also sampled in 2001. Results are shown in Table 6.18-5. The analysis shows elevated concentrations of several metals including arsenic, barium, bismuth, cobalt, chromium, copper, manganese, nickel, phosphorous, lead, vanadium and zinc. The results were generally consistent with the data from the 1988 and 2000 samples. Generally, the concentrate contains elevated concentrations of gold, bismuth, cobalt, chromium, copper (>10,000 ppm), iron, nickel, phosphorous, lead, sulphur, and zinc when compared to average concentrations in the earth's continental crust (Table 6.18-5).

*6.18.5.5 Debris*

An extensive amount of debris litters the site. Three large fuel tanks are located near the concentrate. The tanks appear empty and are partially buried. Other debris includes the remnants of the mill, scrap metal, rubber, lime, scrap wood, core and barrels.

It is difficult to estimate the total volume of debris; however, it likely is in the range of 500 to 750 $m^3$. There does not appear to be any hazardous debris, with the exception of the lime.

### 6.18.6 History of Previous Inspections

Several previous inspections have likely occurred at the site. Most recently, Saskatchewan Environment conducted inspections in 1981, 1986, August 1988 and August 2000.

### 6.18.7 Risk Assessment Ranking

| | |
|---|---|
| Public Safety Assessment | 13 |
| Environmental Assessment | 23.5 |
| Combined Total Assessment | 36.5 |
| Ranking | 3/22 |

**Table 6.18-4**
**Rottenstone Tailings and Concentrate - Historical Analysis**

| Parameter | Location | | | | | | |
|---|---|---|---|---|---|---|---|
| | Rottenstone Tails | | | | | Rottenstone Concentrate | |
| | August 25/88 Surface | August 17/00 5 cm Depth | August 17/00 10 cm Depth | August 25/88 20 cm Depth | August 25/88 40 cm Depth | August 17/00 | August 25/88 |
| Al2O3 % | 4.2 | | | 4.3 | 4.4 | | 1.7 |
| Fe ppm | | | | | | | |
| Fe2O3 % | 16.84 | | | 21.32 | 22.52 | | 40.56 |
| CaO % | 0.97 | | | 0.78 | 0.88 | | 0.34 |
| Mg ppm | | 48800 | 76700 | | | 5000 | |
| MgO % | 15.66 | | | 15.18 | 12.79 | | 2.91 |
| K2O % | 0.59 | | | 0.63 | 0.62 | | 0.31 |
| Na ppm | | 160 | 400 | | | 60 | |
| Na2O % | 1.28 | | | 1.5 | 1.48 | | 0.98 |
| Ca ppm | | 580 | 1500 | | | 110 | |
| Ba ppm | | 37 | 47 | | | 1.6 | |
| Ni ppm | 1,119 | 470 | 3,600 | 1,387 | 2,600 | 1,000 | 4,370 |
| Pb ppm | 2 | 8 | 8 | 2 | 2 | 56 | 68 |
| Al ppm | | 7600 | 12500 | | | 730 | |
| Au ppb | | | | 0.42 | | | 1.56 |
| As ppb | | <0.2 | <0.2 | | | <0.2 | |
| Hg ppm | <0.05 | 2.1 | 1.9 | <0.05 | <0.05 | 34 | <0.05 |
| Mo | 5 | <0.5 | <0.5 | 5 | 5 | 1.9 | 5 |
| P2O5B % | 0.05 | | | 0.05 | 0.05 | | ND |
| Zn ppm | 82 | 25 | 45 | 102 | 107 | 33 | 141 |
| Cd ppm | 10 | 5.1 | 5.4 | 13 | 13 | 12 | 25 |
| Co ppm | 42 | 9.8 | 65 | 42 | 73 | 24 | 114 |
| Mn ppm | | 140 | 320 | | | 53 | |
| MnO % | 0.069 | | | 0.07 | 0.072 | | 0.028 |
| Cr ppm | 1,197 | 490 | 600 | 1,183 | 1,176 | 100 | 296 |
| K ppm | | 5,800 | 4,900 | | | 260 | |
| V ppm | 40 | 17 | 23 | 42 | 44 | 6.1 | 39 |
| Ba ppm | | 39 | 47 | | | 1.6 | |
| Be ppm | 1 | 1.5 | 1 | 1 | 1 | <0.5 | 1 |
| Cu ppm | 1,800 | 1,600 | 1,500 | 1,680 | 2,270 | 14,100 | 18,800 |
| Ti ppm | | 350 | 520 | | | 37 | |
| TiO2 % | 0.1 | | | 0.1 | 0.11 | | 0.04 |
| Zr ppm | 46 | 5.5 | 7.7 | 49 | 44 | 5.4 | 37 |
| Y ppm | 1 | | | 1 | 1 | | 1 |
| La ppm | 11 | | | 14 | 15 | | 17 |
| Th ppm | 3 | | | 3 | 3 | | 6 |
| Sr ppm | 41 | 15 | 4.5 | 50 | 46 | 1.7 | 36 |
| Phosphorous ppm | | 180 | 210 | | | 30 | |
| Sulphate, Acid Soluble (%) | | 4.3 | 4.36 | | | 7.22 | |
| Sulphide ppm | | 14,200 | 55,800 | | | 155,000 | |
| Sulphur (%) | | 2.85 | 7.03 | | | 17.9 | |
| Acid Neut g $CaCO_3$/kg | | 6.3 | 41.2 | | | <0.5 | |
| Acid Producing g $CaCO_3$/kg | | 44.3 | 174 | | | 484 | |
| Net Acid Generation | | 38 | 133 | | | 484 | |
| pH, Paste pH units | | 2.78 | 6.43 | | | 2.01 | |

**Table 6.18-5**
**Rottenstone Tailings and Concentrate -17 October 2001 Analysis**

| Analyte | Units | Location | | Abundance of Minor and Trace Elements in the Continental Crust [1] |
|---|---|---|---|---|
| | | Rottenstone Tailings Near Lake | Concentrate | |
| Ag | ppm | 2.00 | 28.20 | 0.07 |
| Al | ppm | 0.76 | <0.01 | |
| As | ppm | 20.00 | 50.00 | |
| B | ppm | <10 | <10 | 10 |
| Ba | ppm | 50.00 | 20.00 | 425 |
| Be | ppm | 0.50 | 0.50 | 2.8 |
| Bi | ppm | <2 | 42.00 | 0.17 |
| Ca | % | 0.08 | 0.02 | |
| Cd | ppm | <0.5 | 0.50 | 0.2 |
| Co | ppm | 23.00 | 22.00 | 25 |
| Cr | ppm | 445.00 | 73.00 | 100 |
| Cu | ppm | 1,150.00 | >10000 | 55 |
| Fe | % | 11.85 | >15.00 | |
| Ga | ppm | 10.00 | <10 | 15 |
| Hg | ppm | <1 | <1 | 0.08 |
| K | % | 0.40 | 0.14 | |
| La | ppm | <10 | <10 | 30 |
| Mg | % | 3.98 | 0.19 | |
| Mn | ppm | 145.00 | 75.00 | |
| Mo | ppm | <1 | 6.00 | 1.5 |
| Na | % | 0.02 | 0.03 | |
| Ni | ppm | 697.00 | 569.00 | 75 |
| P | ppm | 200.00 | 160.00 | |
| Pb | ppm | 26.00 | 146.00 | 12.5 |
| S | % | 0.94 | >10.00 | |
| Sb | ppm | <2 | <2 | 0.2 |
| Sc | ppm | 3.00 | <1 | 22 |
| Sr | ppm | 9.00 | 7.00 | 375 |
| Ti | % | 0.05 | 0.02 | |
| Tl | ppm | <10 | 10.00 | 0.45 |
| U | ppm | <10 | <10 | 2.7 |
| V | ppm | 23.00 | 16.00 | 135 |
| W | ppm | <10 | <10 | 1.5 |
| Zn | ppm | 26.00 | 46.00 | 70 |

**(1) From Henderson, Paul, 1982. Inorganic Geochemisty. Pergamon Press, Toronto**

The Rottenstone site contains public safety hazards including a high structure and chemicals. The site is an active exploration site and therefore one point was attributed to the "additional public safety risks" category. In addition, 0.5 points was attributed to the "additional environmental risks" category due to the presence of unconfined tailings, concentrate and waste rock close to the shoreline.

### 6.18.8 Follow-up

Extensive follow-up is required at the site. The primary concerns are the proximity of the pit to Rottenstone Lake, the tailings and the mill concentrate, and to a lesser extent, the waste rock.

Previous (Saskatchewan Environment and Public Safety, 1989) work suggested the pit could be filled with debris, concentrate and waste rock. Although the pit is close to Rottenstone Lake, this is likely the best scenario in order to remove the concentrate from the surface where it can become wind blown and mobilize metals to the environment. A waste rock cover on the pit would isolate the concentrate. Attempts should be made to determine the direction of the groundwater gradient between the pit and Rottenstone Lake. If the pit is draining toward the lake, then the concept of filling the pit with concentrate should be re-evaluated.

Lime should be mixed with the top layer of the tailings.

A plan should be developed to decommission the tailings and piles of waste rock above the high water mark of the lake. For the tailings, this could include neutralizing them in an attempt to promote vegetation encroachment, burial, or placing them in the pit.

Waste rock presently along the shoreline and above the high water mark for the lake should also be relocated to an area such as the pit. The advantage associated with disposal of the tailings, concentrate and waste rock within the flooded pit is the significant reduction in acid generating potential that results due to the low oxygen levels in the water, compared to on the surface.

Other combustible, wooden and rubber debris should be burned. Scrap metal should be pushed into the pit, or buried.

Photo 6.18-1 Aerial View of Rottenstone Site
October 17, 2001

Photo 6.18-2 View of Concentrate Area From Ramp
October 17, 2001

Photo 6.18-3 Discarded Fuel Tanks
October 17, 2001

Photo 6.18-4 Scrap Metal
October 17, 2001

Photo 6.18-5 View of Mill From
Concentrate Area
October 17, 2001

Photo 6.18-6 Small Tailings Pond
October 17, 2001

Photo 6.18-7 Core Storage Facility From Recent Exploration Program
October 17, 2001

Photo 6.18-8 Current Exploration Program Campsite
October 17, 2001

Photo 6.18-9 View of Open Pit Looking South
October 17, 2001

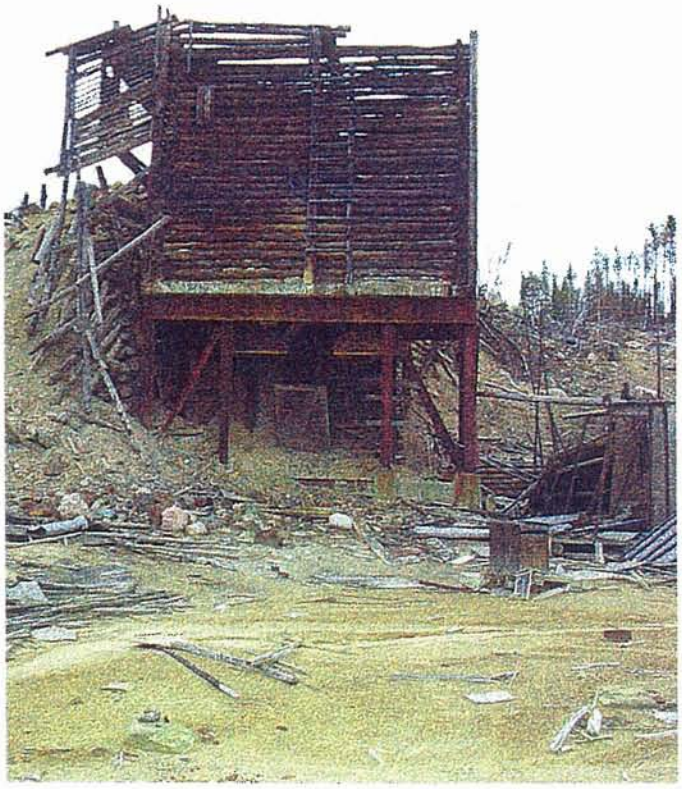


Photo 6.18-10 Mill Remnants
October 17, 2001

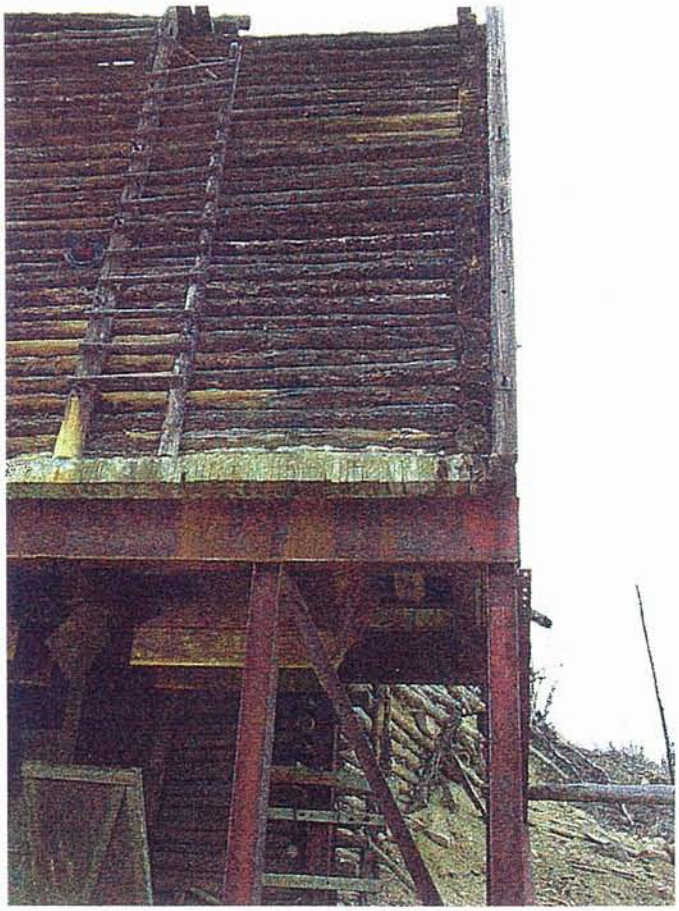


Photo 6.18-11 Close-up of Mill Remnants
October 17, 2001

Photo 6.18-12 View of Tailings Area From Top of Loading Ramp
October 17, 2001

## 6.19 Preview Lake Mine

### 6.19.1 Location and Access

Site Inspection: October 18, 2001

Location: 73P-07-NW

UTM Zone: 13

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 55° 24' 56" lat<br>104° 49' 04" long | 6141051 m N<br>511536 m E | 55° 24' 56" lat<br>104°'49' 02" long | 6140558 m N<br>511783 m E |

* Locations recorded by GPS during Year 2 field program

** Location obtained from Saskatchewan Mineral Deposit Index

The Preview Lake Site is located on the southwest shore of Preview Lake, about 45 km northeast of La Ronge. The site is accessible by float plane landing on Preview Lake. Although vegetation is very thick in the area, the site is identifiable by some debris located on the shore of Preview Lake.

The site location is shown in Figure 6.19-1. The site plan is shown in Figure 6.19-2. Photographs 6.19-1 to 6.19-6 show the site.

### 6.19.2 Property Information and Ownership

**Saskatchewan Mineral Deposit Index Number:** 0754

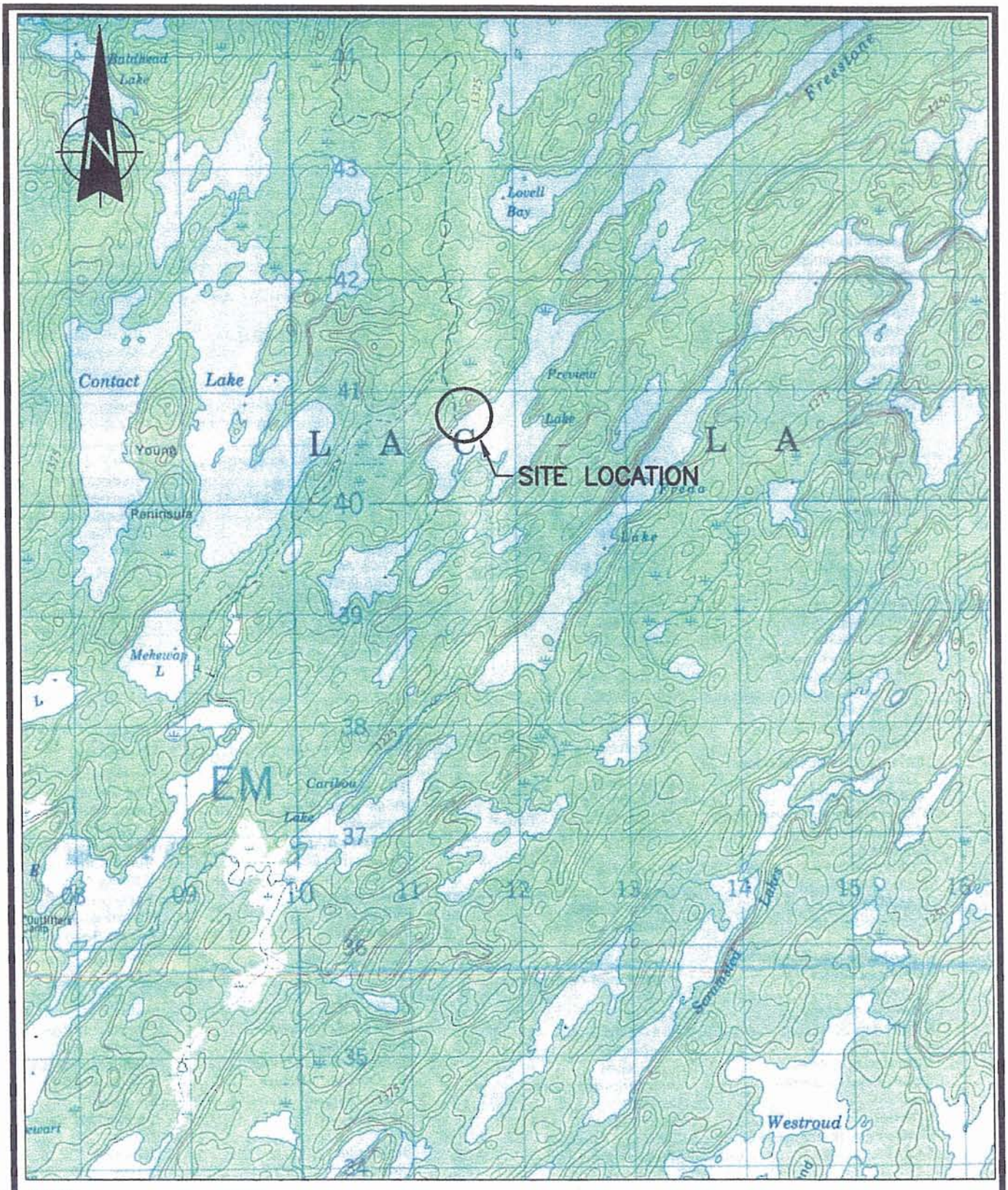
**Property:** ML 5428 and 5429 (was: CBS 6330 and VEE clms; VIC 1-4 clms; MIC clms)

**Location:** Preview Lake area: Preview West grid

**Owner(s):** Cameco – ML-5428 and ML-5429, see Section 6.19.4 for previous owners

**Commodity:** Au **Associated Commodities**: As; Cu; Py; Ag

**Deposit Type:** Outcrop

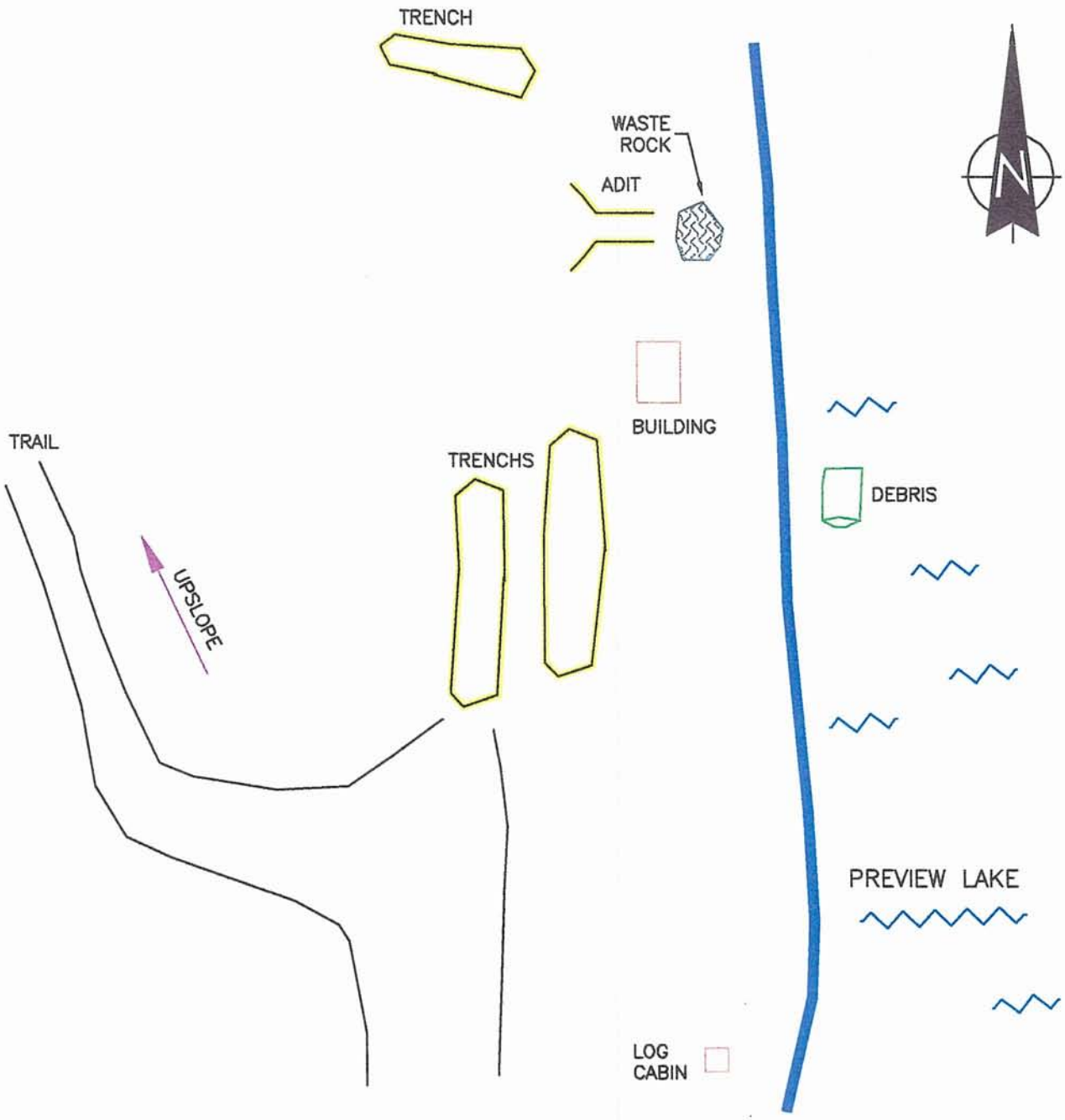



**NOTE:**
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 73 P 7.

# SITE LOCATION PLAN
# PREVIEW LAKE MINE

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.19–1

R3160/FIG6.19–1.DWG




LEGEND:

Roads/Trails
Mine Workings
Waste Rock
Body of Water
Scrap Material/Debris/Refuse
Building/Foundation
Tailings
Natural Ground Surface
Water Sample Location
Soil Sample Location

LEGEND:

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

# PREVIEW LAKE MINE – SITE PLAN
(NOT TO SCALE – DIMENSIONS ARE APPROXIMATE)

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.19–2

R3160/FIG6.19–2.DWG

### 6.19.3 Geology

The showing consists of two zones of mineralization; the Preview North Zone 1,800 ft (548.6 m) northeast of the southwestern corner of the lake near the center of the western shore, on the lake shore, and the Preview South Zone (also called the Pap C Zone), 1,000 ft (305 m) southwest of the southwest corner of the lake. Both zones occupy the same northeast-striking stratigraphic horizon.

The mineralization at both the north and south zones consists of disseminations and stringers of pyrite-pyrrhotite, arsenopyrite and rare chalcopyrite in quartz veins, and iron carbonate in a thin band of 'iron formation' (mainly iron sulphide impregnated felsic and calc-silicate gneisses and schists) in a thick sequence of volcanic tuffs.

The North Zone, which has a drill-proven strike length of 350 ft (106 m), consists of mineralized shear that hosts two en echelon zones that plunge steeply to the northeast. The zone occurs along a sheared feldspar porphyry which forms the contact between a gabbroic sill and greywacke. Quartz, and in places carbonate form rodded and boudinaged veins and folded veins as well as later fracture fillings in sheared supracrustal rocks. The mineralized quartz veins locally contain free gold, but the gold occurs principally with the disseminated pyrite-arsenopyrite mineralization. The mineralization is associated with minor dragfolds along the sheared contact.

Initially the combined potential of the two sub zones in the North Zone was 200 to 250 tons (182 to 228 tonnes) per vertical ft (596 to 746 tonnes per meter) at a weighted average grade of 0.35 to 0.40 oz./ton Au. Between 1960 and 1963, further drilling was completed and the cross-cut was sampled. This work returned erratic high values up to 4.54 oz./ton Au over 0.6 m, but the work could not prove any continuity to the high-grade mineralization.

A short distance north of the Preview North Zone, fine-grained pyrite-pyrrhotite mineralization is found within felsic gneisses and pyrite-pyrrhotite-arsenopyrite mineralization is hosted by chlorite schist. Pyrite hosted by quartz veins occurs within mafic schists and gneisses occurs south of the North Zone. Samples from these sites returned 0.005 to 2.67 oz./ton Au 0.1 to 0.21 oz./ton Ag and 0.05 to 0.09% Cu.

The Preview South Zone is exposed in a series of up to 25 trenches over a strike length of 250 m. The South Zone mineralization is hosted by a sheared gabbroic sill that intrudes felsic volcanics and volcaniclastics. The dominant shear trend is 045°. The mineralization is found within a series of northeast trending, shear-hosted, concordant quartz veins within the gabbro.
Pyrite-arsenopyrite and rare chalcopyrite mineralization are found within the quartz veins and

within the adjacent sheared gabbro. Locally, arsenopyrite forms massive veins up to 30 cm wide. Initially, the potential of the South zone was given as 130 tons (118 tonnes) per vertical foot (388 tonnes/meter) that graded 0.5 oz./ton Au. The grade was probably lower due to the narrow width of the zone and due to the fact that the zone was irregular and discontinuous. A sample sent to Ottawa returned 0.505 oz./ton Au, 0.10 oz./ton Ag and 0.09% Cu, (Saskatchewan Industry and Resources, 2002).

### 6.19.4 Exploration History

In 1937, the AW group was staked for the Legend Group to cover gold mineralization to the west of Preview Lake. Two zones were included in this staking, the Preview North and Preview South zones.

In 1938, Preview Mines Limited acquired the property. In 1939, the property was optioned by Cominco. Both companies trenched the showings. Nine holes, totaling 1,434 ft (437 m), were drilled over a strike length on the Preview North Showing and the property was geologically mapped. The option was subsequently allowed to lapse.

In 1938-41, Preview Mines Ltd. held the property. Various samples were collected at this time and gave the assays listed above. A sample of the ore was sent to the Department of Mines in Ottawa for test milling and cyanidation. The sample returned 2.69 oz./ton Au, 0.21 oz./ton Ag and 0.07% Cu. Tests indicated excellent recovery potential for 4 to 90 micron gold. Following this, Preview Mines set up a 5 ton (4.5 tonne) mill and began small-scale high grade open pit mining on the Preview North and Pap North zones. In December of 1941, one gold brick was produced.

Approximately 1500 to 2000 tons (1,365 to 1,820 tonnes) of ore were taken from the Preview North zone in 1946 and 14 tons (13 tonnes) were high-graded by hand sorting ore, producing an average of 0.71 oz/ton Au. One gold brick was produced in 1946. Work was discontinued in 1946 due to hazardous mining conditions. In 1948, the original claims lapsed. In 1949, A. Studer staked the VIC claims over the area VIC claim No. 1 covered the Preview North Zone and claim VIC No. 4 covered the Preview South zone (also called the Pap C Zone). The area was geologically mapped and sampled. In 1952, a magnetic survey was completed over the VIC 1-12 claims.

In 1957, the showings were staked as the J.P. and H.B. Groups and later the MIC claims for Rio Canadian Exploration Company. In 1957-58, Studer Mines conducted ground electromagnetic and magnetic surveys over the area. In 1957, Rio Canadian Exploration staked areas nearby not already covered and conducted airborne and ground electromagnetic and magnetic surveys.

In 1959, the Studer Mines claims were optioned to Westfield Minerals who did some geological mapping and then let the option lapse.

In 1960-63, Contact Gold Mines (in 1969 renamed Contact Ventures Ltd.) held the property. They completed airborne geophysical surveys, prospecting and drilled 6 holes on the Preview North Showing. An 80 ft (24 m) adit and two short cross-cuts were blasted on the North Zone. The North Zone was sampled and assayed. The work resulted in the publication of reserves in 1963.

On 01 March 1975, Cameco staked the Preview North Showing as the VEE claims (S-95283).

In 1977, the VIC 1 + 2 claims of V.J. Studer covered part of the area.

On 01 January 1978, the Saskatchewan Mining and Development Corporation (SMDC – now Cameco) staked the Preview South Showing as CBS 6330. In 1979, SMDC completed a regional basal till sampling survey over CBS 6330 and the VEE claim No. 2. In 1980, SMDC completed a high level electromagnetic survey (HLEM) and magnetic surveys over the showing. Two chip samples taken from the Preview adit returned 3.01 and 0.62 ppm Au and two samples taken from Preview South returned 5.70 and 0.30 ppm Au. Grid 5 was geologically mapped.

On 15 December 1984, SMDC converted CBS 6330 to ML 5428 and on 12 March 1984, the VEE claims were converted to ML 5429. In 1985, SMDC completed HLEM and magnetic surveys over the showing. Three drill holes (PR85-7 to 9) were completed on the Preview South Zone.

In 1986, Windarra Minerals Ltd. and Uranerz Exploration and Mining Limited made an agreement to acquire a respective 20% and 30% interest in the property. In the same year, the partnership completed detailed mapping, prospecting, and rock and soil sampling over the C zone.

In 1987, SMDC geologically mapped and sampled the area from the PAP SW zone through the PAP A and B zones to the PAP C (Preview South) Zone. One grab sample of massive arsenopyrite taken from the Preview North adit returned 1.67 oz./ton Au and grab samples from the PAP C returned up to 0.63 oz./ton Au.

In 1988, Windarra transferred 100% of it's interest in the property to Westward Explorations Ltd. In the same year, SMDC became Cameco and further mapping, prospecting, stripping and rock and bulk till sampling was completed on the Preview North and PAP C Zones.

In 1996, the partners completed grid geological mapping and sampling over the Preview North and South Zones and stripping, two trenches, trench mapping and sampling at the Preview North Showing. Samples from the trenches on the Preview North Zone returned up to 1.39 g/t Au. In the following year, drill holes PRV97-36 to PRV97-38 were completed on the Preview North Zone, (Saskatchewan Industry and Resources, 2002).

### 6.19.5 2001 Inspection-Site Description

Following is the site description as noted during the 2001 inspection.

*6.19.5.1 General*

The site was inspected on 18 October 2001. Site access was gained by float plane landing on the south shore of Preview Lake.

The site is located immediately off shore and is identifiable by some debris, including a boiler vessel lying in Preview Lake.

Vegetation is thick, however access to and around the site is not difficult.

Some flagging on some of the trees suggests recent visitation.

*6.19.5.2 Mine Workings*

The site contains an adit with dimensions of 2 m by 1 m wide. The adit is located on the north side of the property, about 15 m from the shoreline. The adit is open and there does not appear to have been any previous attempts to close it, although it appears to be partially closed as a result of slumping rock. There is no evidence of water discharge from the adit.

There is about a 5 to 8 m vertical cliff leading straight down to the adit entrance.

Upslope from the adit to the west is a small open pit about 5 m in diameter and 3 to 5 m deep. The pit cuts into the hillside where two ends of the pit taper off. There does not appear to be any environmental concerns to the open pit. The trenches are relatively shallow and easily recognized when approached, and public safety is therefore not a concern.

Some small trenches are located just northeast of the adit. The biggest of the trenches is about 10 m long, by 2 m wide and 3 m deep. The trenches are heavily ingrown and do not present any environmental or public safety concern. Another trench is located about 20 m south of the adit. This trench is about 18 m by 2 m by 2 m.

*6.19.5.3 Waste Rock*

Waste rock is located outside the adit. The pile is about 4 m wide, 5 m long and extends out from the adit opening. Total volume is about 1,000 $m^3$. The waste rock is a black biotite-hornblende schist with some quartz stringers and no visible sulphides. The slopes of the waste rock are shallow. Some vegetation is encroaching on the waste rock.

Near the open pit is another waste rock pile about 30 m long. It is difficult to estimate the volume of waste rock at the pit because the bottom cannot be identified.

*6.19.5.4 Debris*

A moderate amount of debris is scattered about the site. Debris includes remains of a mill building, including a boiler vessel in Preview Lake, scrap wood, rusted steel mill parts, scrap metal and sheeting and scrap lumber. There did not appear to be any asbestos or other type of insulation in the boiler.

There was no evidence of tailings observed at the site, which is consistent with previous Saskatchewan Environment findings.

### 6.19.6 History of Previous Inspections

Saskatchewan Environment and Public Safety (the predecessor to Saskatchewan Environment) conducted an assessment of the site in 1988. The results from the assessment are included in the report entitled 'Abandoned Mines with Tailings' (Saskatchewan Environment and Public Safety, 1989). The observations and recommendations from the previous assessment are similar to those noted during the 2001 assessment.

In 1988, Saskatchewan Environment and Public Safety obtained water samples from three separate locations within Preview Lake. It was concluded that Preview Lake water quality is normal for a northern Saskatchewan lake, except for a few parameters. Arsenic and nickel were slightly elevated near the mine site but were below Specific Surface Water Quality Objectives (SSWQO) for the Protection of Aquatic Life and Wildlife (Saskatchewan Environment and Resource Management, 1997). Zinc was also slightly above SSWQO values.

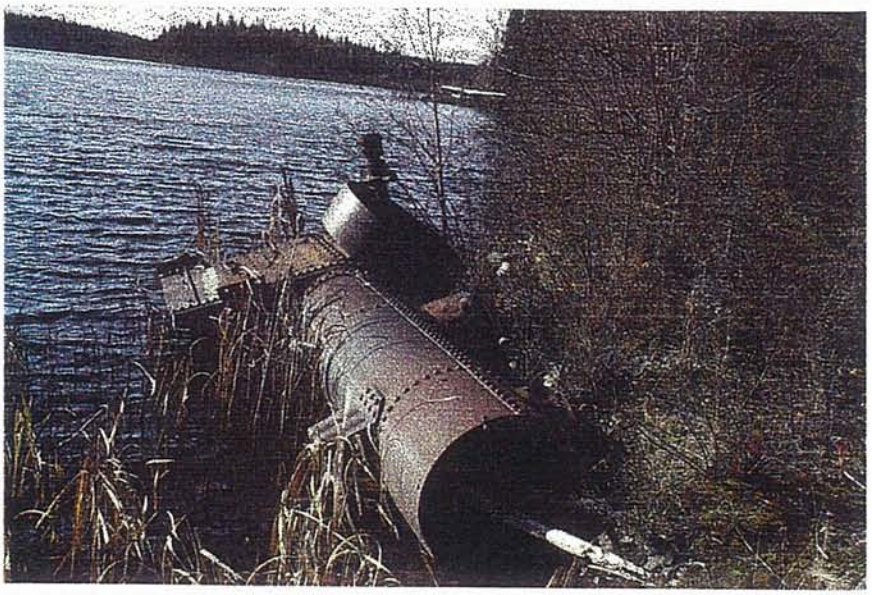
### 6.19.7 Risk Assessment Ranking

| | |
|---|---|
| Public Safety Assessment | 10.5 |
| Environmental Assessment | 5 |
| Combined Total Assessment | 15.5 |
| Ranking | 11/22 |

### 6.19.8 Follow-up

The primary follow-up activities should focus on a general clean up of the site including removal of metal debris from Preview Lake, pushing waste rock into the adit, and filling some of the trenches with waste rock. The metal debris should be disposed of in one of the trenches or the open pit and then covered with waste rock. Consideration should be given to either transporting the boiler to La Ronge for disposal at a landfill or disposing of it on site, such as in the adit.

Photo 6.19-1 Debris on Shore of Preview Lake Near Adit
October 18, 2001



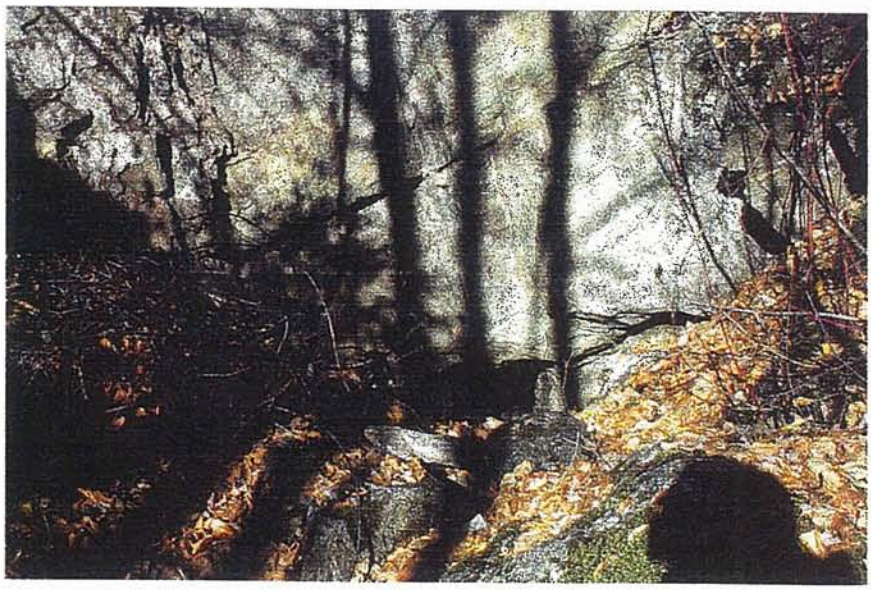


Photo 6.19-2 Preview Lake Adit
October 18, 2001

Photo 6.19-3 Dilapidated Cabin at South End of Property
October 18, 2001

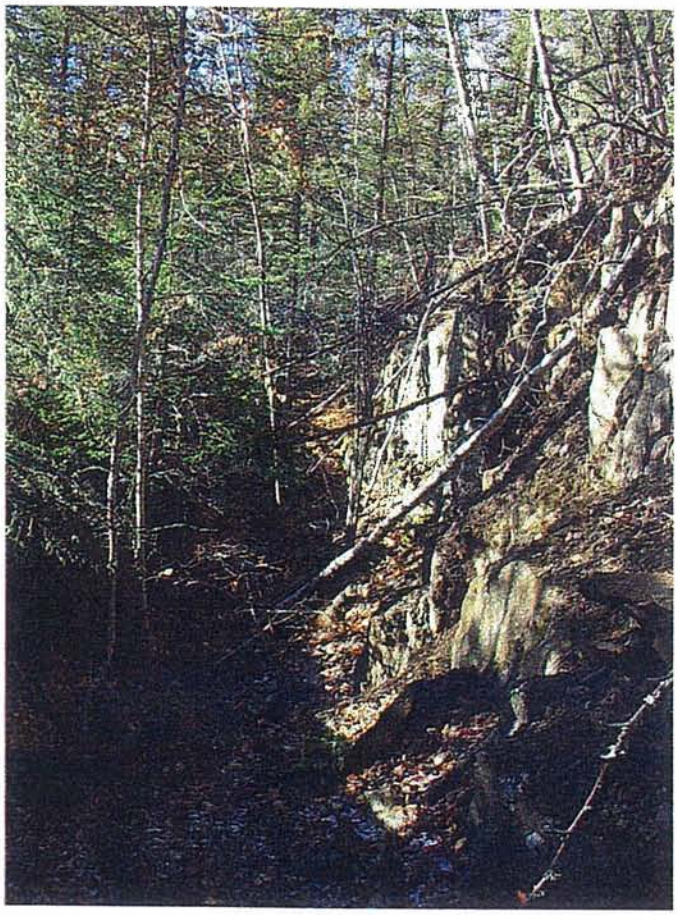


Photo 6.19-4 Preview Trench Upslope From Adit
October 18, 2001

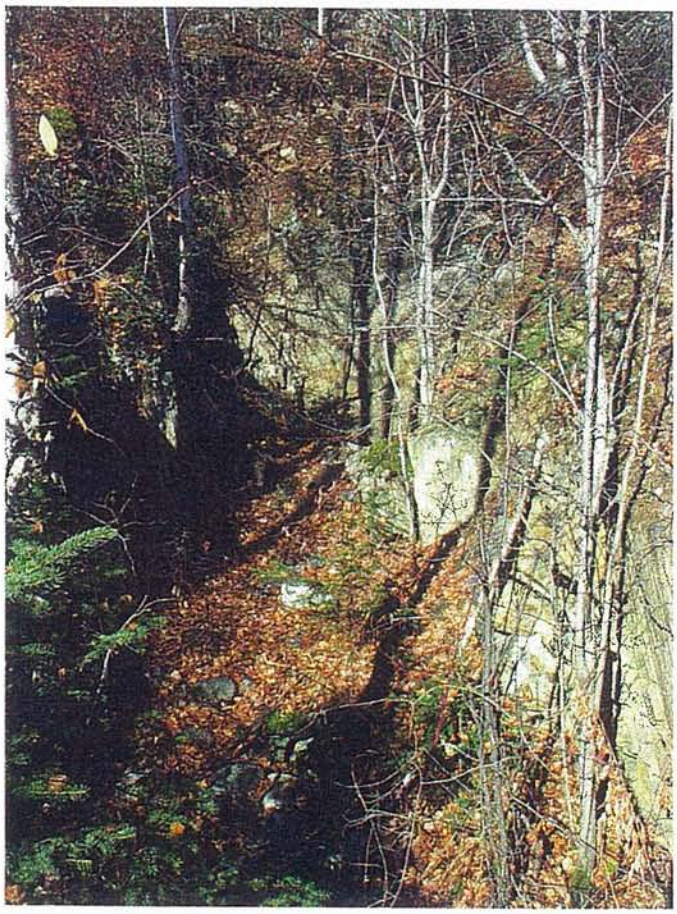


Photo 6.19-5 Preview Trench Upslope From Adit
October 18, 2001

Photo 6.19-6 Preview Lake Main Waste Rock Pile
October 18, 2001

# 6.20 La Ronge Uranium Mine

## 6.20.1 Location and Access

Site Inspection: October 02, 2001

Location: 73P-08-NW
UTM Zone: 13

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 55° 24' 25" lat<br>104° 27' 51" long | 6140208 m N<br>533929 m E | 55° 24' 25" lat<br>104° 27' 49" long | 6141809 m N<br>532914 m E |

* Locations recorded by GPS during Year 2 field program
** Location obtained from Saskatchewan Mineral Deposit Index

The La Ronge site is south of the southwest shore of Drope Lake about 65 km northeast of La Ronge.

The site is accessible by float plane landing on Drope Lake.

The site location is shown in Figure 6.20-1. The site plan is shown in Figure 6.20-2. Photographs 6.20-1 to 6.20-9 show the site.

## 6.20.2 Property Information and Ownership

**Saskatchewan Mineral Deposit Index Number:** 0805

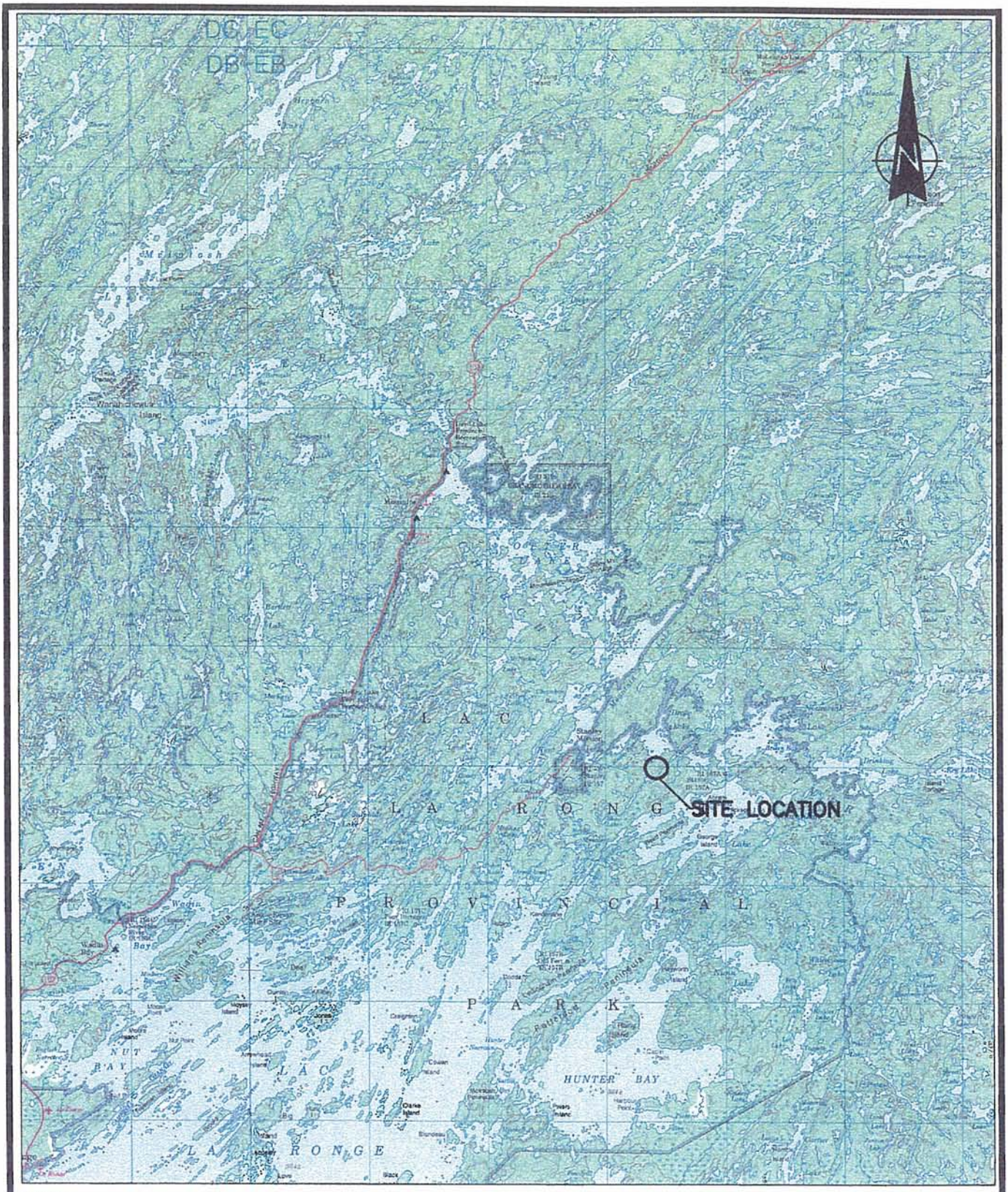
**Property:** (formerly: CBS 636 & Drope claim No. 1)

**Location:** Drope-Nistowiak Lake area

**Owner(s):** Open, see Section 6.20.4 for previous owners

**Commodity:** U **Associated Commodities:** None

**Deposit Type:** Outcrop

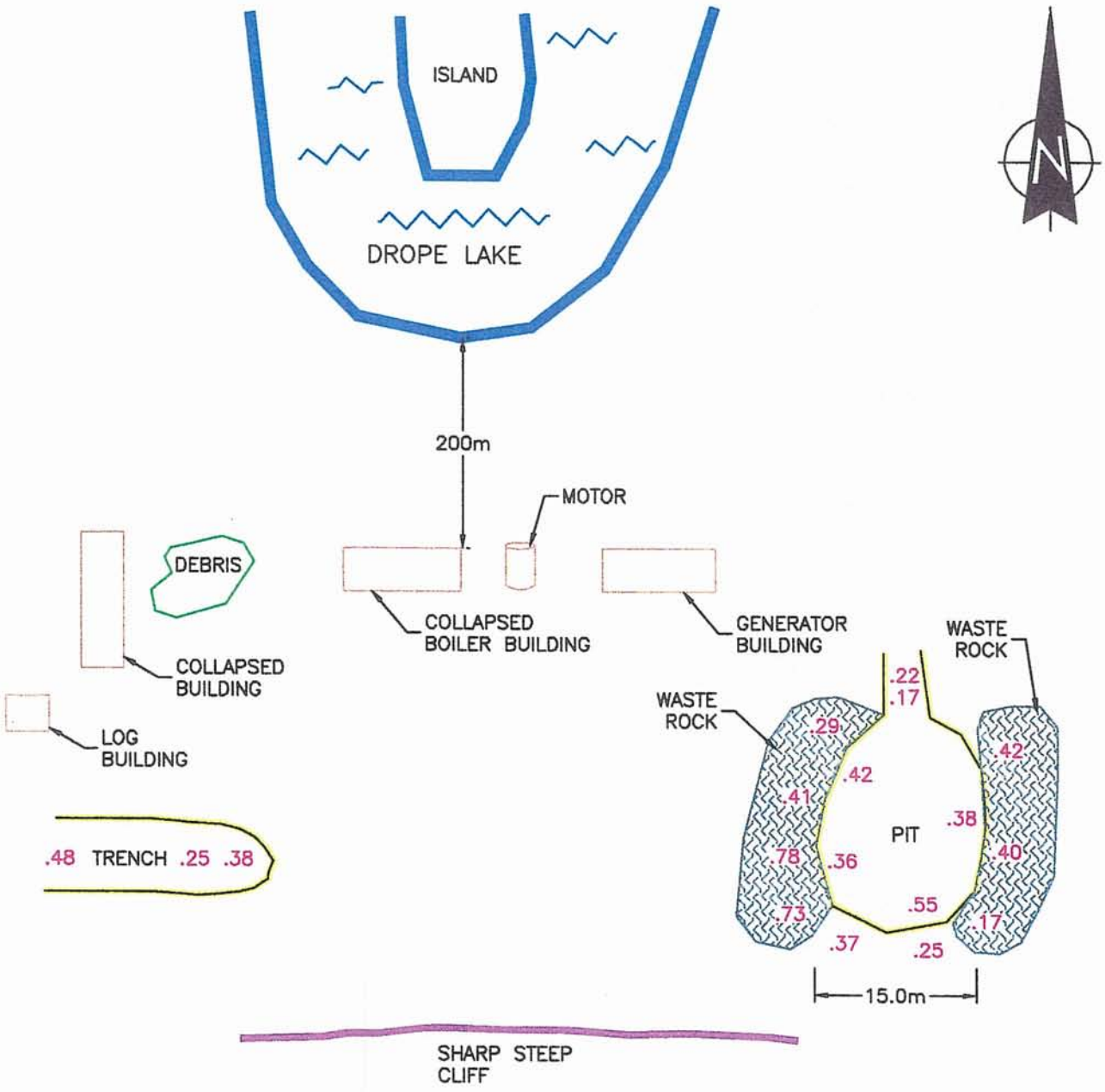



**NOTE:**
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 73 P.

# SITE LOCATION PLAN
# LA RONGE URANIUM MINE

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.20–1

R3160/FIG6.20–1.DWG




LEGEND:

| | |
|---|---|
| Roads/Trails | |
| Mine Workings | |
| Waste Rock | |
| Body of Water | |
| Scrap Material/Debris/Refuse | |
| Building/Foundation | |
| Tailings | |
| Natural Ground Surface | |
| Gamma Readings (μSv/hr.) | 0.25 |
| Water Sample Location | |
| Soil Sample Location | |

LEGEND:

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

# LA RONGE URANIUM MINE – SITE PLAN
(NOT TO SCALE – DIMENSIONS ARE APPROXIMATE)

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.20–2

R3160/FIG6.20–2.DWG

### 6.20.3 Geology

Radioactive pegmatite was found in the area north of Lac la Ronge by L.N. McArthur late in 1946.

Numerous dykes and sills of pegmatite, many of which contain radioactive minerals, are present in the Drope Lake area and south to the shore of Lac la Ronge. A large flat-lying pegmatite sill is exposed 300 ft (91 m) south of the south end of Drope Lake intruding schists and gneisses of the Archean La Ronge Domain. The pegmatite trends northeasterly, varies from 80 to 250 ft (24 to 76 m) in thickness and contains a band of anomalous radioactivity exposed over a surface width of 400 ft (122 m) and a length of 1000 ft (305 m). Mineralization consists of becquerelite, leibigite and uranophane and uraninite in association with the more highly fractured sections of pegmatite. Minor occurrences flank the main pegmatite 600 to 1,000 ft (183 to 305 m) away.

Eighty-six occurrences, mainly areas of uranium stain, were noted over a northeast length of 7,400 ft (2,255 m) stretching from the mouth of the Montreal River on Lac La Ronge to Drope Lake. Diamond drilling in 1967 returned unencouraging results averaging 0.15 lb/ton U3O8 equivalent. Values ranged erratically from 1.5 to 2 lb/ton U3O8, (Saskatchewan Industry and Resources, 2002).

### 6.20.4 Exploration History

L.N. McArthur, after finding radioactive pegmatite in 1946, formed a partnership in 1948 with W. A. Richardson. A 25 mi² (65 $km^2$) concession was granted to the two men by the Saskatchewan government. This was subsequently acquired by La Ronge Uranium Mines Ltd. which staked 45 claims to protect the more interesting areas and held a total of 154 claims in the area. A radioactive survey over a wide area returned readings that ranged from 2 to 28 times background and indicated large tonnages of low-grade material. In 1951, 24 radioactive occurrences were known and by 1954 numerous trenches had been excavated, sampling carried out, and 11 diamond drill holes completed and logged radiometrically. Ultimately, 86 radioactive occurrences were located.

In 1954, trenching, pitting, and bulk sampling on 6 limited areas, south of the southwest bay of Drope Lake, indicated the reserves listed above. A mill test was run and owing to the low grade of the ore it was decided to use a new method of extraction, the 'Pochon' process instead of acid leach to increase recoveries. A pilot mill extraction plant and ancillary buildings were set up and in 1954, 65 tons (59 tonnes) of ore were milled. Production only averaged 0.3 lb/ton (0.15 kg/tonne)

and the mill was closed. No further production was reported. In 1956, work on the property ceased and the claims and buildings were allowed to revert to the crown.

In 1967, Drope Lake Explorations Ltd. acquired 1,800 acres comprising CBS 636 and the DROPE No. 1 claim covering the main portion of the old La Ronge Uranium property, and purchased the buildings on the property from the Saskatchewan government. Ground radiometric, and geological mapping surveys of the area were conducted and 11 diamond drill holes, totaling 2,172 ft (662 m) were completed. Grades and tonnages were not encouraging and returned the results listed above. The Drope Lake Explorations Ltd. was changed to Drope Lake Metals & Holdings Ltd. in 1970; CBS 636 and the DROPE No. 1 claim were allowed to lapse in 1977.

### 6.20.5 2001 Inspection-Site Description

Following is the site description as noted during the 2001 inspection.

*6.20.5.1 General*

The site was inspected on 18 October 2001. Site access was gained by float plane landing on Drope Lake followed by a short 5 minute walk inland. Signs of recent visitation included discarded fishing equipment and a broken metal cooler.

Vegetation in the area was moderate to thick. The site is located about 100 m in from the shore of Drope Lake.

Background gamma levels for the site were about 0.45 µSv/hr.

The main features of the site include mill remnants, a small amount of waste rock and an open pit.

*6.20.5.2 Mine Workings*

The open pit is located on the east side of the property about 100 m east of the mill buildings. The pit is heavily in-grown with vegetation and is difficult to locate. Gamma readings from inside the pit varied from 0.17 µSv/hr to 0.42 µSv/hr. The pit is about 15 m in diameter and 5 m deep and has a small trench or ramp leading into it from the north.

There was no indication of water ponding or discharge from the pit.

Safety hazards associated with the pit are low. Entering and leaving the pit is easy as it has shallow slopes and rounded eroded edges making it more of a large topographic depression than a steep sided open pit.

A relatively large trench is located about 20 m south of the mill buildings. The trench is about 10 m long, 10 m deep and 3 m wide. It has steep sides and can be considered a public safety risk. Gamma readings in the trench varied from 0.25 to 0.48 µSv/hr.

*6.20.5.3 Waste Rock*

There is no prevalent waste rock pile on the site. Some waste is located at the perimeter of the open pit. Total volume is 100 $m^3$ to 200 $m^3$. The rock is pegmatite in nature. Gamma values varied from 0.17 µSv/hr to 0.78 µSv/hr. The waste rock does not appear to present a safety or environmental concern.

*6.20.5.4 Debris*

Debris at the site includes dilapidated buildings, concrete foundations and machinery.

The boiler building is collapsed and the boiler vessel is exposed. The boiler building platform is about 5 m by 4 m. It has a concrete foundation with steel frame and sheeting construction. The boiler and associated piping is rusted but does not appear to be an environmental or public safety concern.

Ten metres east of the boiler building is a generator building. A rusted motor is located between the boiler and generator buildings. The generator building is about 4 m by 5 m with a concrete foundation and footings.

A small amount of debris is located near the generator building, including steel piping, sheet metal, scrap wood, some electrical parts and a small transformer.

About 50 m west of the generator building is a larger collapsed building and a small log structure. The larger building is about 4 m by 5 m and has a concrete foundation. Scrap material around this building includes wood and scrap metal.

### 6.20.6 History of Previous Inspections

Saskatchewan Environment inspected the site in October 1988 and August 2000. The observations from the previous inspections were similar to those from the 2001 inspection. Gamma radiation levels recorded during the 1998 inspection ranged from 0.3 to 0.7 µSv/hr at the buildings, rubble pile and waste rock. The gamma levels from the pit ranged from 0.8 µSv/hr to a maximum of 1.6 µSv/hr.

### 6.20.7 Risk Assessment Ranking

| | |
|---|---|
| Public Safety Assessment | 13.45 |
| Environmental Assessment | 4 |
| Combined Total Assessment | 17.45 |
| Ranking | 9/22 |

The La Ronge site contains public safety hazards including delapidated buildings and steep trench slopes. Given the site appears to be visited by tourists/fishermen, one point was attributed to the "additional public safety risks" category.

### 6.20.8 Follow-up

The primary follow-up at the site is the disposal of buildings and a general clean-up. There does not appear to be any environmental concerns. The most significant issues appear to be public safety due to the poor condition of the buildings and the steep trench.

Remedial work should focus on placing debris in the open pit and covering with waste rock if sufficient volumes of material are available.

Photo 6.20-1 La Ronge Trench
October 18, 2001

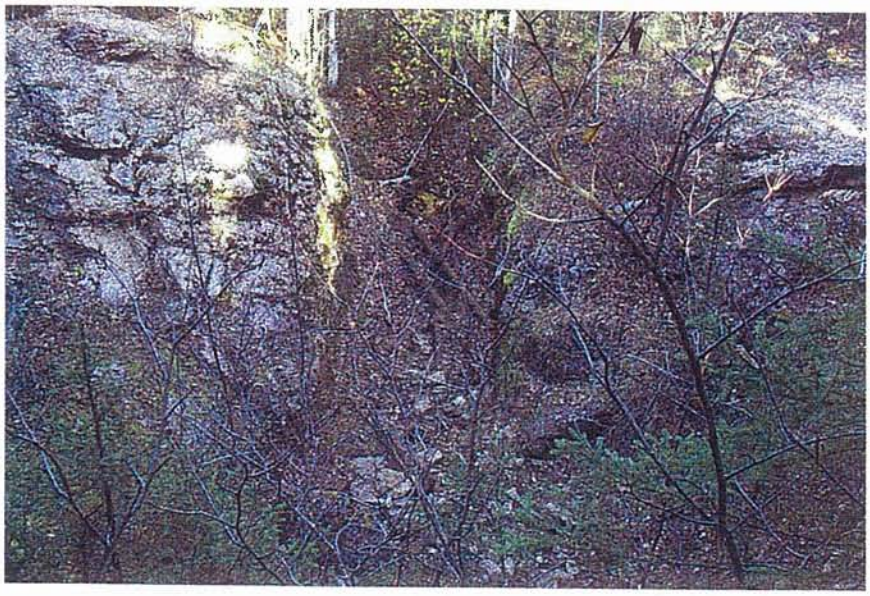


Photo 6.20-2 La Ronge Open Pit
October 18, 2001

Photo 6.20-3 Small Generator
October 18, 2001

Photo 6.20-4 Steam Generator
October 18, 2001

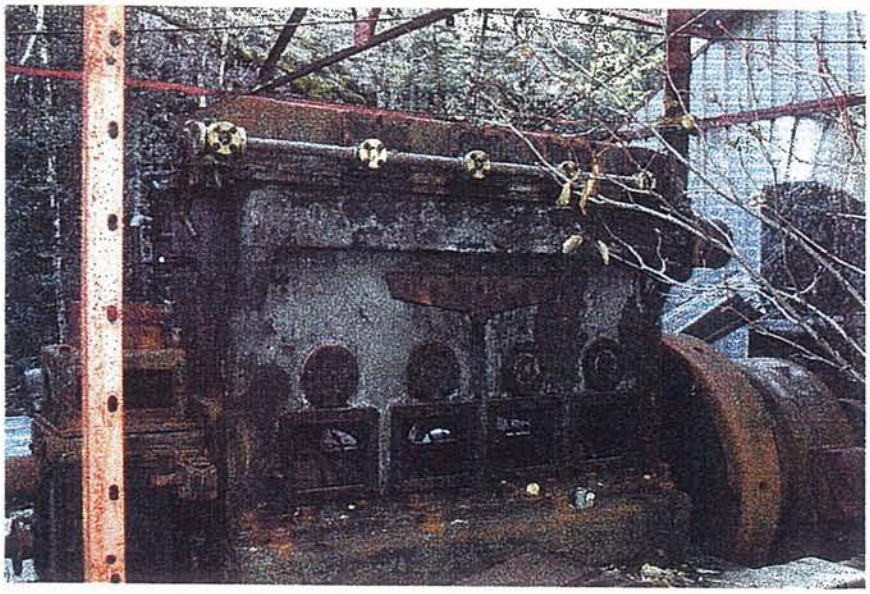


Photo 6.20-5 Dilapidated Metal Frame
and Sheeting Building
October 18, 2001

Photo 6.20-6 Dilapidated Building and
Concrete Foundation
October 18, 2001

Photo 6.20-7 Pressure Vessel
October 18, 2001

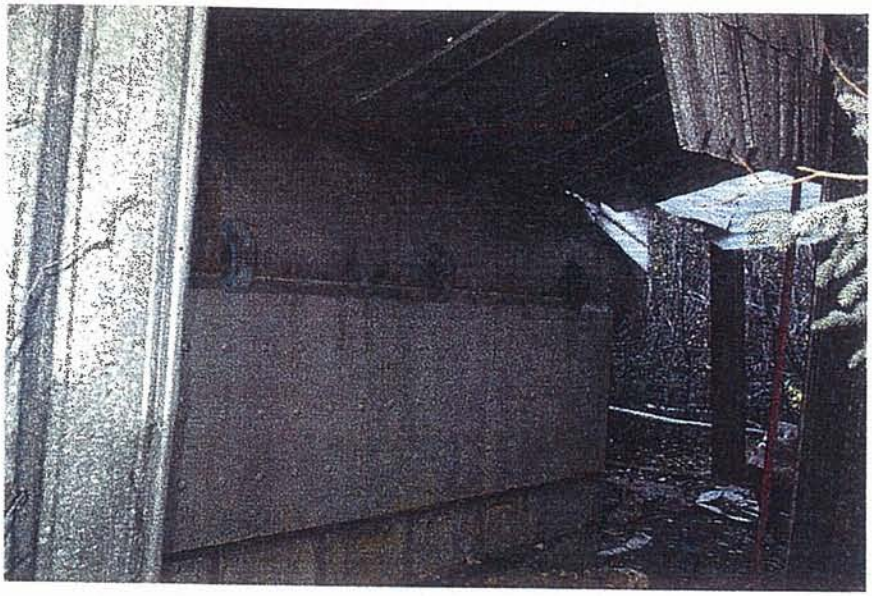



Photo 6.20-8 Aerial View of Site
(From SERM-August 11, 2000)

Photo 6.20-9 Aerial View of Site
(From SERM-August 11, 2000)

## 6.21 Pitching Lake Mine

### 6.21.1 Location and Access

Site Inspection: 18 October 2001

Location: 73P-08-NE
UTM Zone: 13

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM* |
| N/a | N/a | 55° 26' lat<br>104° 08' long | 6143538 m N<br>554485 m E |

* Location obtained from Saskatchewan Mineral Deposit Index

The Pitching Lake site is located on both sides of Hunter Falls between Boland Lake and Mathieu Bay on Pitching Lake and about 85 km northeast of La Ronge. The site is accessible by float plane. A Shaft is located on the southeast side of Hunter Falls and an adit is located on the southwest side of Mathieu Bay.

The site location is shown in Figure 6.21-1. The site plan is shown in Figure 6.21-2. Photographs 6.21-1 to 6.21-6 show the site.

### 6.21.2 Property Information and Ownership

**Property:** S-103167 (formerly: EXP-TB, STEN-P.C.; Fall claims; Niven claims)

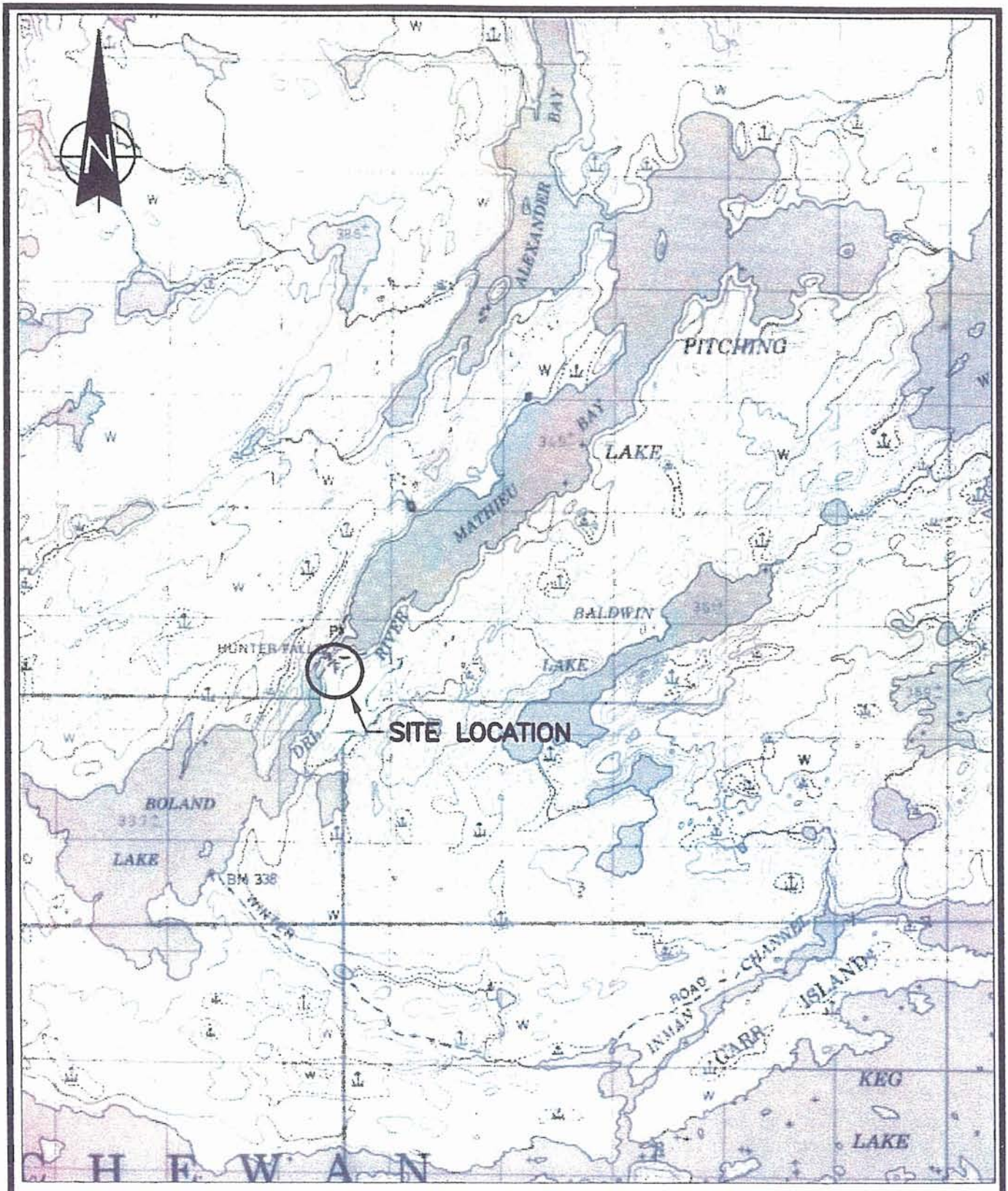
**Saskatchewan Mineral Deposit Index Number:** 0801

**Location:** Pitching Lake Area

**Owner(s):** Claude Resources Incorporated (30%)-Dome Gold Syndicate (70%), S-103167. See Section 6.21.4 for previous owners

**Commodity:** Cu **Associated Commodity:** Gf; Az; Bo; Ml

**Deposit Type:** Outcrop

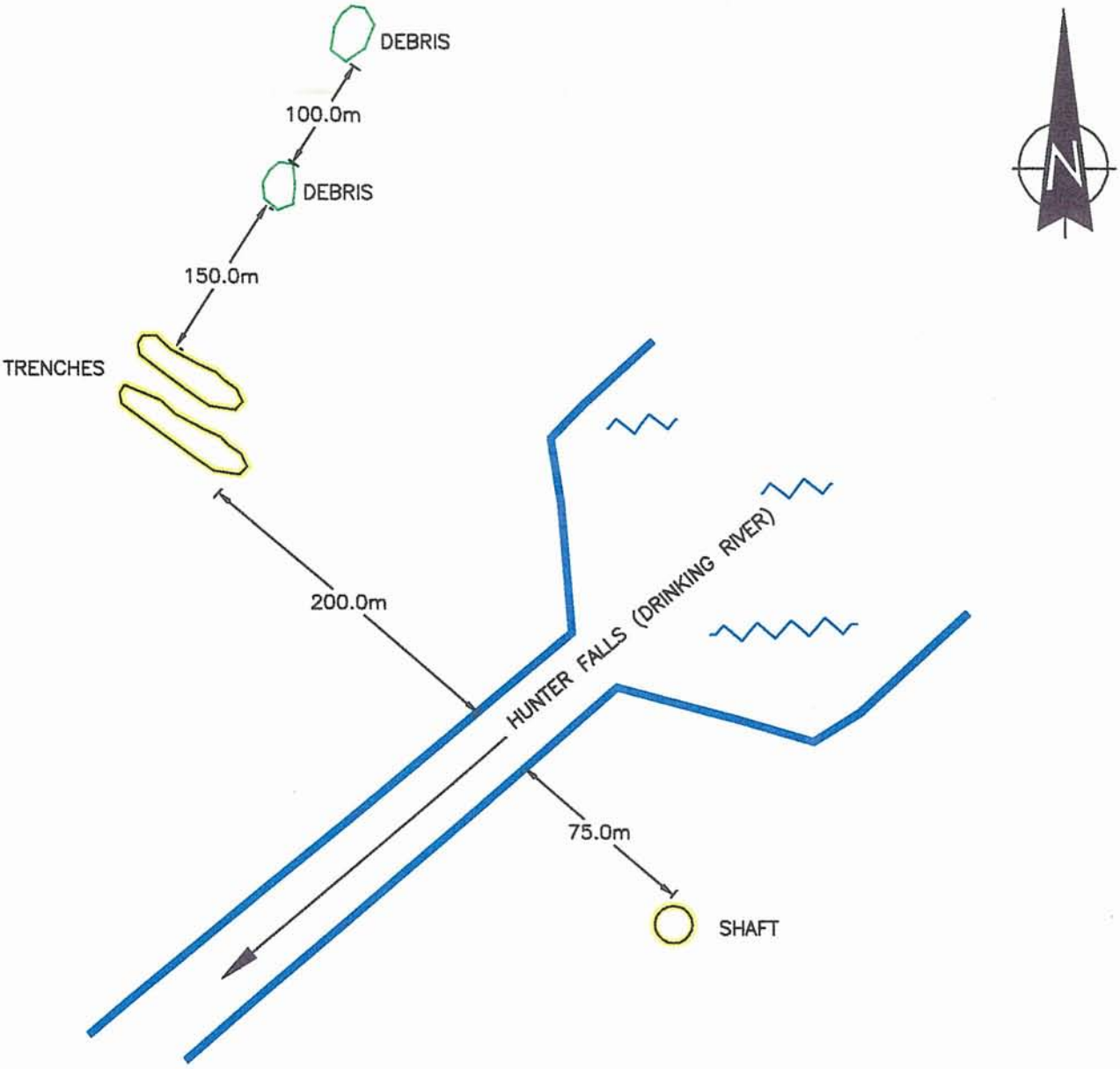



**NOTE:**
DRAWING DEVEOLPED FROM
SCANNED NTS MAP 73 P 8.

## SITE LOCATION PLAN
## PITCHING LAKE MINE

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.21–1

R3160/FIG6.21–1.DWG




LEGEND:

Roads/Trails
Mine Workings
Waste Rock
Body of Water
Scrap Material/Debris/Refuse
Building/Foundation
Natural Ground Surface
Tailings
Water Sample Location
Soil Sample Location

LEGEND:

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

PITCHING LAKE – SITE PLAN
(NOT TO SCALE– DIMENSIONS ARE APPROXIMATE)

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.21–2

R3160/FIG6.21–2.DWG

### 6.21.3 Geology

The showing consists of several zones of sulphide mineralization located at the southwest end of Pitching Lake.

The area of the showing is underlain by a northeast-plunging synclinal band of Archean hornblende schists and inter-banded sedimentary rocks which were originally impure limestones, intruded by granitic rocks to the east and west. The showings are associated with layers and lenses of calc-silicate gneisses in high strained hornblende gneisses and schists. These rocks form the immediate hanging wall to the Guncoat Thrust; an internal high strain zone within a nape of Paleoproteroic supracrustal and granitoid rocks. The host rocks occupy a northeast plunging synform formed subsequent to the thrust event which emplaced the napes. Three zones of sulphide mineralization have been outlined as part of a broad band on the northwest limb of the syncline on the west side of Drinking River and Pitching Lake. This band extends for 3.5 miles (5.6 km) from a point on Boland Bay to the south, to the east shore of Alexander Bay to the north and is now exposed in over 20 trenches and numerous gossaned outcrops.

The mineralization occurs as disseminations to massive stringers and irregular lenses of pyrrhotite and as pods and irregular lenses of pyrrhotite and pyrite. Copper mineralization, in the form of chalcopyrite, bornite, malachite and azurite occurs mainly in the southern half of the zone. The mineralization occurs in an intensively sheared and locally folded band of hornblende gneiss. The main zones consist of the A Zone, a gossan zone at the foot of Hunter Falls on the Drinking River, which has been extensively trenched (main trench No. 3) and which has a shaft on it. Two samples taken from the trenches, in 1924, returned assays of 0.05% and 1.30% Cu. The majority of the drilling was completed on the A Zone. The drilling indicates that the surface showing forms part of the head of a copper-bearing ore shoot of irregular shape. From a surface strike length of 80 ft (24 m) the shoot lengthens to 400 ft (122 m) at a depth of 120 ft (37 m) and has an average grade of 2.01% Cu over 18 ft (5.5 m). At a depth of 300 ft (91m) the shoot shortens to a strike length of 75 ft. (23 m) averaging 2.24% Cu over 13 ft (4 m). From 400 to 500 ft (122 to 152 m) the shoot is 17 ft (5 m) wide with a length of 100 ft (30 m) grading 8.03% Cu. The A Zone dips 35° to 60° east and plunges to the south.

Seven holes were drilled in the vicinity of the A Zone, and intersected disseminated to massive pyrite-pyrrhotite and minor chalcopyrite over a true width of 20 to 30 ft (6 to 9m). Zone B and Zone C, lie 1 mile (1.6 km) and 2 miles (3.2 km) respectively north-northeast of the A Zone. Both the B and C zones consist of narrow lenses and irregular pods of semi-massive to massive sulphide that assay low in copper values. Pyrrhotite predominates over pyrite and chalcopyrite is present in only trace amounts. At the A Zone, pyrite predominates over pyrrhotite and graphite is present.

Another minor zone, outlined by geophysics, occurs to the west of Zone B. This zone is capped by a gossan and contains pyrrhotite, chalcopyrite and bornite. Trenching has traced the zone for 1,600 ft (488 m) over an average width of 100 ft (30 m), (Saskatchewan Industry and Resources, 2002).

### 6.21.4 Exploration History

Sulphide mineralization in the Pitching Lake area has been explored periodically for many years. Very little information on the work performed early in the century is available. The first record on file indicates work prior to 1924 on the NIVEN claims which consisted of trenching and sampling gossan zones on the west shore of the lake.

In 1928, Churchill Minerals Ltd. held a group of claims covering the showing; these lapsed, and in 1952 the main showing was re-staked as the FALL group of 8 claims which were allowed to lapse in 1953.

In 1954-55, the Sten and P.C. claim groups were staked to cover the prospect, and in 1955, Glen Uranium Mines Ltd. (now Canmindex Mines Ltd.) acquired 50 claims, including the Sten and P.C. claim groups, centered on the main A zone. In 1956-57, air and ground geophysical surveys, trenching and other surface work was carried out. By March 1957, 32,575 ft (9,929 m) of drilling had been done in 53 holes on the property; trenching had been done on all known mineralized zones, and a large pit about 178 ft (54 m) long, 65 ft (20 m) wide and 20 ft (6 m) deep had been excavated on the A Zone, the site of the original discovery, just west of Hunter Falls.

During the winter of 1956-57, a shaft was started on the A Zone and sunk to a depth of 42 ft (13 m). An adit was driven for 235 ft (72 m) to test the B Zone, 1 mile (1.6 km) north of the A Zone on the west shore of Pitching Lake, at depth. This work indicated the reserves of the A Zone to be as reported above.

In 1957, Gresham Exploration Ltd. completed an airborne electromagnetic survey over the showing area.

The Rio Tinto Mining Company of Canada Ltd. optioned the property in 1957. In 1958, the claims lapsed and the ground was re-staked as the EXP and TB groups by J.G. McAlphine of Laronex Mining & Exploration Co. Ltd.

In 1961, B.R. Richards conducted ground electromagnetic and magnetic surveys of the area for Laronex and in 1963 the geology of the property was mapped. During the latter survey several of the trenches were sampled; trench 1A on the shore of Boland Bay gave 0.09 to 6.84% Cu. In 1962, deposit reserves were calculated. In 1966, Laronex Copper Mines Ltd. (Laronex Mining renamed) completed the electromagnetic coverage of the area.

In 1967, 7 holes were drilled in the vicinity of the A Zone, 3 holes near trench 1 and 1A on Boland Bay and one hole on a conductor, for a total of 1,697 ft (517 m). The drilling returned the intersections listed above.

Dominion Geophysics Ltd. inspected the property briefly in 1967. No further work was done and the last of the claims lapsed in 1971.

On 25 February 1984, Claude Resources Inc. staked the showing as S-103167. In 1986, Claude completed ground electromagnetic and magnetic surveys in the general area.

In 1987, Cogema Canada Ltd. completed a program of geological mapping, prospecting, and rock sampling in the general area. In the same year, Claude geologically mapped the immediate showing area, resampled the existing trenches and completed a soil sample survey over the showing. The soil samples returned a maximum 1,373 ppm Cu, 723 ppm Zn and a maximum of 5 ppm Au. World Geoscience Corporation completed an airborne high resolution VLF-EM and magnetic survey over the property.

In the fall of 1988, a Claude Resources Incorporated (30%)-Dome Gold Syndicate (70%) partnership completed grid prospecting and rock and soil sampling of the grid that covers the adit. Anomalous copper values were returned in the vicinity of the adit and anomalous Mo was returned from samples taken from a pegmatite, (Saskatchewan Industry and Resources, 2002).

### 6.21.5 2001 Inspection-Site Description

*6.21.5.1 General*

The site was inspected on 18 October 2001. Site access was gained by float plane landing on southwest shore of Mathieu Lake. The area is rugged and heavily vegetated. The area is located near a canoe portage and there are signs of recent visitation.

*6.21.5.2 Mine Workings*

The site contains a shaft, adit and two trenches. The shaft is located on the opposite site of Hunter Falls from the adit. The shaft was not inspected during this inspection, but was inspected in August 2000 by Saskatchewan Environment personnel.

The shaft is located about 75 m to 100 m directly inland from Hunter Falls on the east side.

The shaft is open but has headframe timbers and metal scraps jammed in the opening. Concrete footings are present. The shaft does not presently pose a public safety risk, aside from the metal debris.

Attempts were made to locate the adit on the west side of Hunter Falls. The adit is recorded as being located about one mile north of the shaft on the west side of Hunter Falls. The shaft was sealed with a metal frame in 1990 as part of Saskatchewan Environment's 'Abandoned Mines Remedial Action Program.' The adit could not be located.

Two trenches were located on a small ridge about 200 m upslope from Hunter Falls. The trenches are 20 m in length, 5 m wide and about 1 m deep. There is a small amount (about 100 $m^3$) of waste rock associated with the trenches. The waste rock is a dark amphibolite gneiss.

*6.21.5.3 Debris*

There is a small amount of debris around the shaft including 45 gallon (200 litre) drums.

A considerable amount of debris was located on the west side of Hunter Falls about 150 m north and 150 east of the trenches. A second area of debris is located about 200 m north and 150 m east of the trenches.

The debris primarily includes rusted barrels (about 50 in total) and a small amount of scrap metal and lumber.

### 6.21.6 History of Previous Inspections

The site was inspected by Saskatchewan Environment personnel in August, 2000. The shaft area was inspected and results are as discussed above. Saskatchewan Environment personnel could not find suitable helicopter landing areas to access the adit area. An aerial survey could not locate the adit.

The adit was sealed in 1990 as part of Saskatchewan Environment's 'Abandoned Mines Remedial Action Program'.

Sabina (1987) describes the Pitching Lake occurrence, however, there is no mention whether or not site inspections were carried out.

### 6.21.7 Risk Assessment Ranking

The adit was sealed with a metal grate. Although the adit was not located, the following risk assessment assumes that there is minor openings at the adit in order to provide a conservative ranking.

| | |
|---|---|
| Public Safety Assessment | 10.5 |
| Environmental Assessment | 3 |
| Combined Total Assessment | 13.5 |
| Ranking | 15/22 |

The Pitching Lake site contains a partially open shaft adjacent to a popular canoe portage. Therefore, one point was attributed to the "additional public safety risks" category.

### 6.21.8 Follow-up

Follow up work should include further attempts to locate the adit. The adit was sealed in 1989 with a steel grate secured to the entrance and is likely still secure; however, this should be confirmed.

Although the shaft does not presently pose a public safety risk, the entrance may become open again in the future. In order to seal the shaft, it will be necessary to burn the wood debris or remove it.

The shaft should be sealed with a concrete cap or filled in with debris and rock.

Photo 6.21-1 Debris on East Side of
Hunter Falls
October 18, 2001

Photo 6.21-2 Trench Upslope From
Hunter Falls-East Side
October 18, 2001

Photo 6.21-3 Pitching Lake Shaft
(From SERM-August 11, 2000)

Photo 6.21-4 Aerial View of Hunter Falls
(From SERM August 11, 2000)

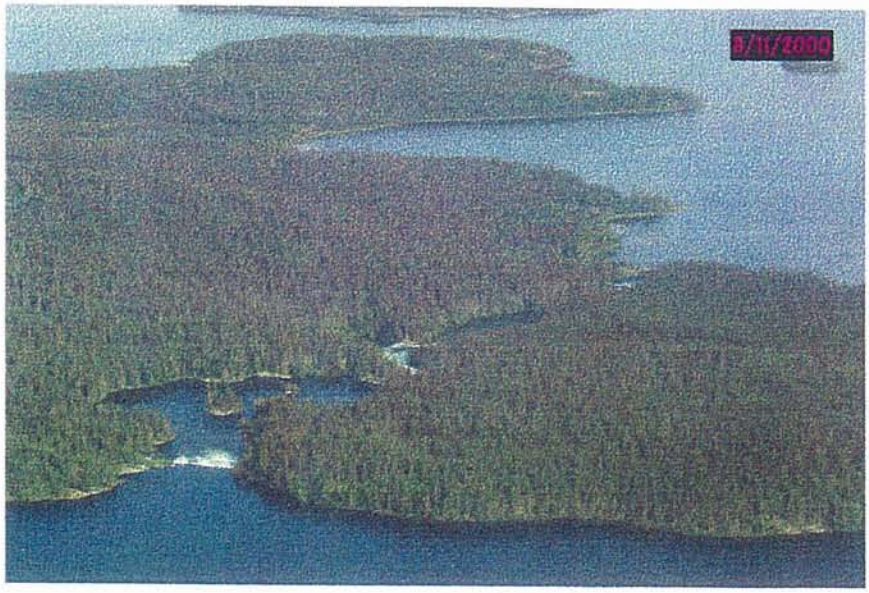




Photo 6.21-5 Aerial View of Hunter
Falls-Shaft Located to Right of Falls
(From SERM August 11, 2000)

Photo 6.21-6 Aerial View of Hunter
Falls-Shaft Located to Left of Falls
(From SERM August 11, 2000)

## 6.22 Jahala Lake Mine

### 6.22.1 Location and Access

Site Inspection: 18 October 2001

Location: 73-P-1NE

UTM Zone: 13

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 55° 12' 04" lat<br>104° 15' 45" long | 6117419 m N<br>546940 m E | 55° 12' 04" lat<br>104° 15' 43" long | 6118635 m N<br>547722 m E |

* Locations recorded by GPS during Year 2 field program

** Location obtained from Saskatchewan Mineral Deposit Index

The Jahala Lake site is located on the northeast side of Lee Lake between Lawson Lake and Rhodes Lake and about 68 km east-northeast of La Ronge. The site is accessible by float plane landing on the east shore of Lee Lake. The area is extensively covered by deadfall. For future trips to the site, docking on the northern tip of Lee Lake would be desirable and would minimize walking distance to the site.

There is a slight discrepancy between the measured location coordinates obtained from during the 2001 field program and the coordinates taken from the Saskatchewan Mineral Deposit Index. The reason for this discrepancy is unknown.

The site location is shown in Figure 6.22-1. The site plan is shown in Figure 6.22-2. Photographs 6.22-1 to 6.22-6 show the site.

### 6.22.2 Property Information and Ownership

**Property:** (formerly:CBS 3128; WS Claim 26; BOLAND claim 3; RAD No. 3; SRS 1-8

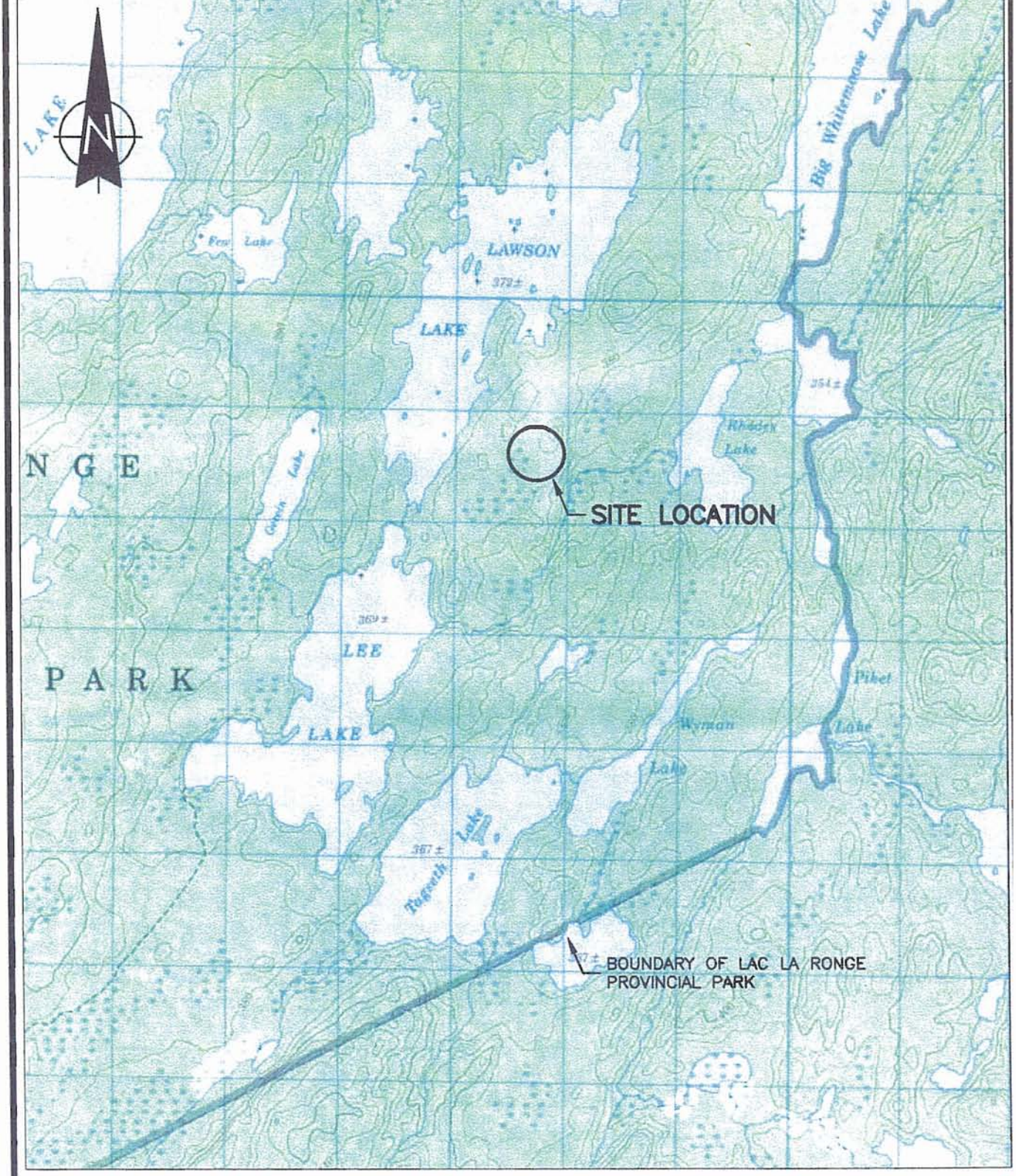
**Saskatchewan Mineral Deposit Index Number:** 0720

**Location:** Lee (Jahala) Lake area

**Owner(s):** Crown Reserve 679 – La Ronge Provincial Park, see Section 6.22.4 for previous owners

**Commodity:** U **Associated Commodities** Cu; REE; Se; Y; La; Nb; Zr; Cf; At

**Deposit Type:** Drill hole

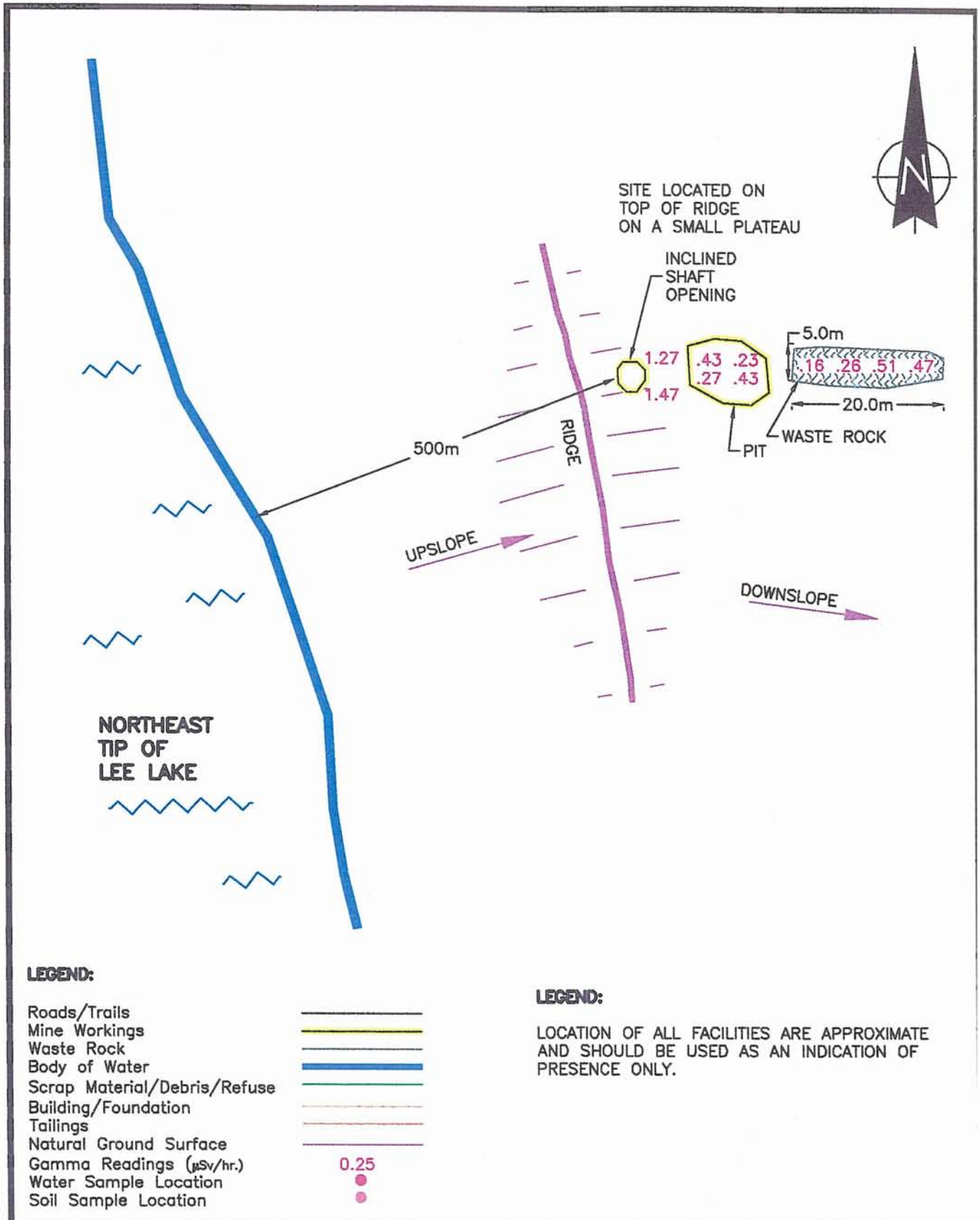



**NOTE:**
DRAWING DEVEOLPED FROM SCANNED NTS MAP 73 P 1.

# SITE LOCATION PLAN
# JAHALA LAKE MINE

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.22–1

R3160/FIG6.22–1.DWG




**LEGEND:**

| | |
|---|---|
| Roads/Trails | |
| Mine Workings | |
| Waste Rock | |
| Body of Water | |
| Scrap Material/Debris/Refuse | |
| Building/Foundation | |
| Tailings | |
| Natural Ground Surface | |
| Gamma Readings (μSv/hr.) | 0.25 |
| Water Sample Location | |
| Soil Sample Location | |

**LEGEND:**

LOCATION OF ALL FACILITIES ARE APPROXIMATE AND SHOULD BE USED AS AN INDICATION OF PRESENCE ONLY.

# JAHALA LAKE – SITE PLAN
## (NOT TO SCALE – DIMENSIONS ARE APPROXIMATE)

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 6.22–2

R3160/FIG6.22–2.DWG

### 6.22.2 Geology

The area of the showing is underlain by quartzofeldspathic metasediments with some interbedded metagreywacke, quartz-hornblende gneiss and amphibolite. Granitic intrusives and pegmatite sills and dykes are locally present. The uranium mineralization occurs in the outer zone of a zoned pegmatite 700 ft (213 m) long and 400 ft (122 m) wide which dips 45° west concordant to the surrounding amphibolites. Massive uraninite occurs in bands up to 2 inches (5 cm) thick for a width of 18 ft (5.5 m) and a length of 105 ft (32 m) in the outer selvedge or biotite schist zone which surrounds the pegmatite. Beyond this zone the uraninite is euhedral and disseminated forming crystals up to 1.24 inches (3 cm) in diameter. Sabina reported the presence of xenotine as well as allanite [(Ce,Ca,Y)(Al,Fe)3(SiO4)3.OH], abundant monazite [(Ce,La,Nb,Th)(PO4,SiO4)], zircon, zoisite, titaniferous magnetite, goethite, coffinite, curite, kasolite and uranophane. The secondary uranium minerals were noted particularly in fracture zones and in concentrations of biotite. Pyrite was noted as coatings on fractures and joint surfaces as well as disseminations in the amphibolite; chalcopyrite occurs as fine disseminations.

Sampling of the main surface zone (the wall zone of the pegmatite) over a 3.1 ft (1 m) width in 1950 indicated 0.504% U3O8. The uraniferous zone was traced for 105 ft (32 m) over an average width of 4 to 5 ft (1.2 to 1.5 m); chip samples from the zone assayed up to 2.4% U3O8. A second minor showing, named the North Jahala Showing, was located 0.80 mile (1.29 km) to the northeast of the Main Jahala Showing on BOLAND claim No. 14.

In 1990, D. Macdougall sampled the Ridge Pegmatite, which is located on the ridge which separates Jahala Lake from Tagseth Lake, and the Tagseth Pegmatite which is located on the west shore of Tagseth Lake, (Saskatchewan Industry and Resources, 2002).

### 6.22.3 Exploration History

The showing was first noted in 1949 by R.B. Ford and R.T. Claus (two university of Wisconson students), who noted uranium mineralization on the northeast shore of Jahala (Lee) Lake. Subsequently, the RAD 1-8 and SRS 1-8 claim groups were taken out to cover the area. Trenching, blasting, detail geological mapping and sampling were reported on the RAD No. 3 claim on a 700 ft (213 m) by 400 ft (122 m) pegmatite.

The ground was re-staked by the Pioneers Contractors Ltd. as the RB group of 4 claims and the BOLAND 3-18 claims. In 1952, while trenching and examining the original RAD 3 mineralization, W.A. Boland discovered the Main Showing pegmatite vein and staked it as BOLAND claim No. 3. Jahala Lake Uranium Mines acquired the BOLAND claims in 1952 and

the RB claims in 1953. The main showing was covered by the BOLAND No. 3 claim. The area was trenched and mapped and drilled (25 holes totaling 1,872 ft (570 m). A 45° inclined shaft was sunk to 120 ft (37 m) along the contact and tonnage reserves were estimated.

No further work on the property was reported and the claims lapsed.

In 1966, the LEE No. 1 Claim covered the area which was prospected for feldspar. W.B. Dunlop carried out a radiometric survey over the showing area in 1968. In 1969, Vargus Mines Ltd. carried out geological mapping and a radiometric survey in the area. Six holes were drilled. No further work in the claims were reported and the property was allowed to lapse. By 1985, Walter Shupe had staked the Main Zone as WS claim No. 26. He optioned the claim to Golden Ram Resources Ltd. who re-examined and re-logged the existing core from 6 old drill holes. The shaft area was stripped, trenched and geologically mapped. Shupe submitted a structural analysis on the area in 1977. The property was dropped.

In 1985, SMDC surrounded the showing area with the Whitemoose Project claims (CBS 3128). In 1986, a SMDC-Uranerz Exploration and Mining joint venture completed an helicopter borne very low frequency electromagnetic survey and magnetic survey and a follow-up gold exploration program of geological mapping, prospecting and lithogeochemical and biogeochemical sampling. Gold values returned were minimal.

CBS 3128 lapsed 01 December 1989, (Saskatchewan Industry and Resources, 2002).

### 6.22.5 2001 Inspection-Site Description

Following is the site description as noted during the 2001 inspection.

*6.22.5.1 General*

The site was inspected on 18 October 2001 and was accessed by landing on the east side of Lee Lake. Lee Lake is apparently also called 'Jahala Lake'. The site is at the top of a ridge on the northeast side tip of Lee Lake and is easily spotted from the air due to the presence of waste rock on the ridge.

From the lakeshore, it takes about 30 to 45 minutes to walk to the site. A forest fire has recently gone through the area and there is extensive deadfall making walking very difficult and somewhat dangerous due to the many protruding sharp tree stumps and branches.

The area is experiencing good vegetation re-growth, particularly jackpine and birch.

There was no sign of recent visitation.

Background gamma values for the mine site were about 0.50 µSv/hr.

*6.22.5.2 Mine Workings*

There is a single 45° inclined shaft at the site. The shaft is located on the west side of the waste rock pile. The shaft opening faces to the east. The adit is open and there does not appear to have been any attempt to close the opening. The shaft opening is similar to an adit opening and is about 3 m high by 2 m wide. There is some dried mud at the mouth of the shaft suggesting there has been water in the shaft at some previous time. There was no water in the shaft at the time of the inspection.

Gamma values near the shaft varied from 1.27 µSv/hr to 1.47 µSv/hr.

*6.22.5.3 Waste Rock*

A small amount of waste rock exists outside the shaft opening. The waste rock is located to the east of the shaft opening. A small pit exists between the waste rock and the shaft. The pit is approximately 4-5 m in diameter with gentle side slopes. The pit is not considered to be a public safety risk. Gamma values around the pit vary from 0.13 µSv/hr to 0.43 µSv/hr.

The waste rock is about 20 m long by 5 m wide and 3 m high. Total volume is about 300 to 400 $m^3$.

The waste rock is a biotite schist, amphibolite and pegmatite in nature. There were a minor amount of visible sulphides present.

Gamma values vary at the waste rock from 0.16 µSv/hr to 0.51 µSv/hr.

Near the shaft is a small pile of coarse waste rock which appears to have been used as a marker or claim post.

Neither waste rock occurrence presents a concern.

*6.22.5.4 Debris*

There is no debris at the site.

### 6.22.6 History of Previous Inspections

Sabina (1987) describes the occurrence, although there is no indication of whether or not a site visit was made.

### 6.22.7 Risk Assessment Ranking

| | |
|---|---|
| Public Safety Assessment | 7.5 |
| Environmental Assessment | 3 |
| Combined Total Assessment | 10.5 |
| Ranking | 18/22 |

### 6.22.8 Follow-up

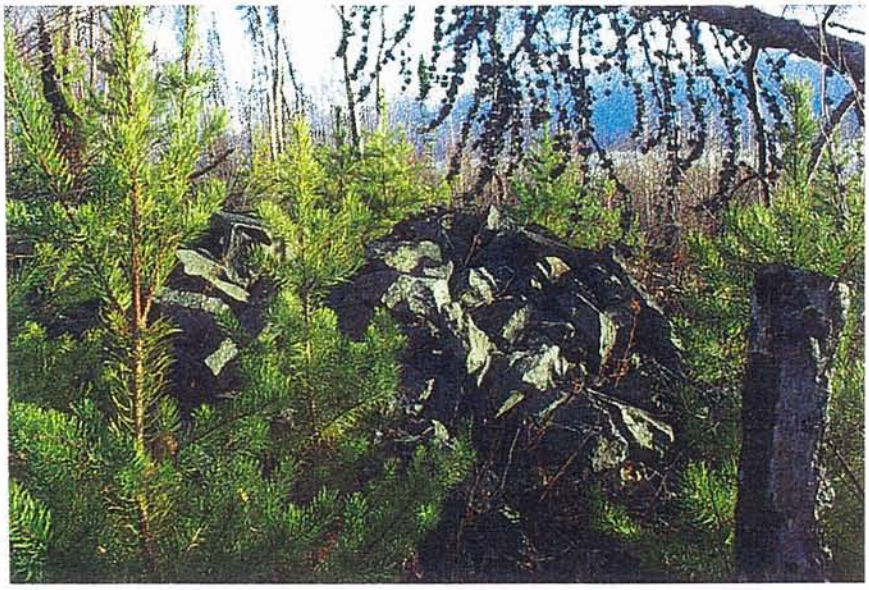
There is little follow-up work required at the site. Given the remoteness and difficulty in accessing the site, it is likely there will be minimal people visiting the site. In addition, the shaft is at a 45° decline and does not present a significant safety at the present time.

Remedial work should be restricted to securing the shaft by filling the entrance with waste rock or installing a metal grate type covering.

Photo 6.22-1 Aerial View Of Jahala Lake
(Lee Lake) Site
October 18, 2001

Photo 6.22-2 Heavy Deadfall From
Forest Fire-Jahala Lake Shoreline
October 18, 2001

Photo 6.22-3 Waste Rock Debris Near
Shaft
October 18, 2001



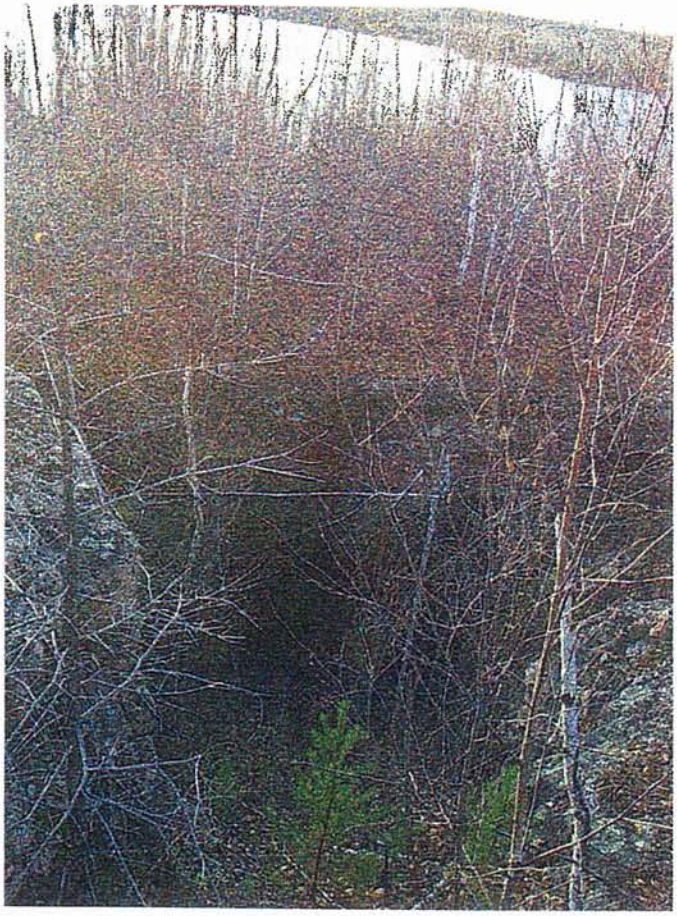


Photo 6.22-4 Jahala Lake Shaft
October 18, 2001

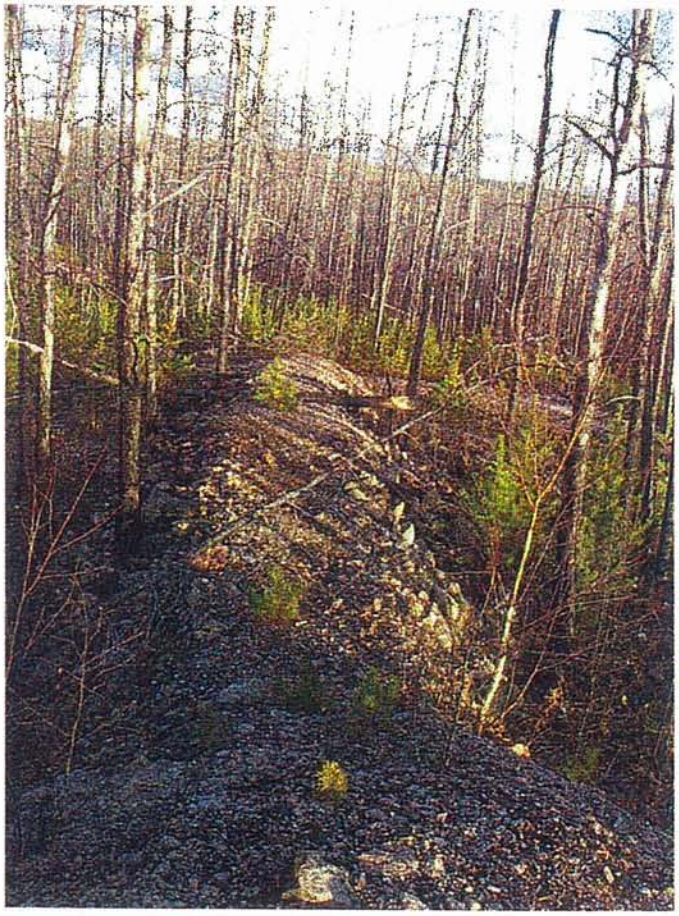


Photo 6.22-5 Main Waste Rock Pile
October 18, 2001

Photo 6.22-6 Close-up of Jahala Lake Shaft
October 18, 2001

## 6.23 Sensitivity Analysis

As part of the inspection program, a sensitivity analysis was completed. The purpose of the sensitivity analysis was to inspect a site that was assessed as part of last years, (Year 1) program. The site chosen was the Rix-Athabasca Smitty Mine west of Uranium City.

The site was inspected and the results compared to the assessment done on the same site last year. This provided an indication of whether or not the assessment criteria and methodology for the two years are comparable. This step was necessary because judgement is necessary in assessing and prioritizing the environmental and public safety risks at the sites, particularly because the two programs were completed by different auditors.

In the event it became apparent that differences in methodology or judgement appeared to exist, this factor would be identified, and considered as part of this years site ranking.

The ranking given to the site from last years program was 16.7/5. The ranking from this years program was 13.2 for public safety risks and 4 for environmental risks for a total of 17.2.

Generally, the assessment scoring was very close for all categories with no more than 1 point differential on any category. This suggests that similar judgement and assessing skills were used during last year's and this year's program

# 7.0 Gunnar and Lorado Site Summaries

This section provides a summary of important public safety and environmental items that should be considered during the detailed planning for the decommissioning and reclamation of the Gunnar mine site and Lorado mill site. There is a significant amount of operational history and site characterization information that has been generated over the years with regard to these sites.

The scope of this abandoned mine assessment program in northern Saskatchewan did not provide for additional field investigations of the Gunnar and Lorado sites. Consequently, the summary provided is based on existing information available within the public realm and from Saskatchewan Environment staff.

Figure 7.1 shows the site locations in relation to the decommissioned Eldorado Beaverlodge operation and Uranium City.

## 7.1 Gunnar Mining Limited

### 7.1.1 Location and Infrastructure

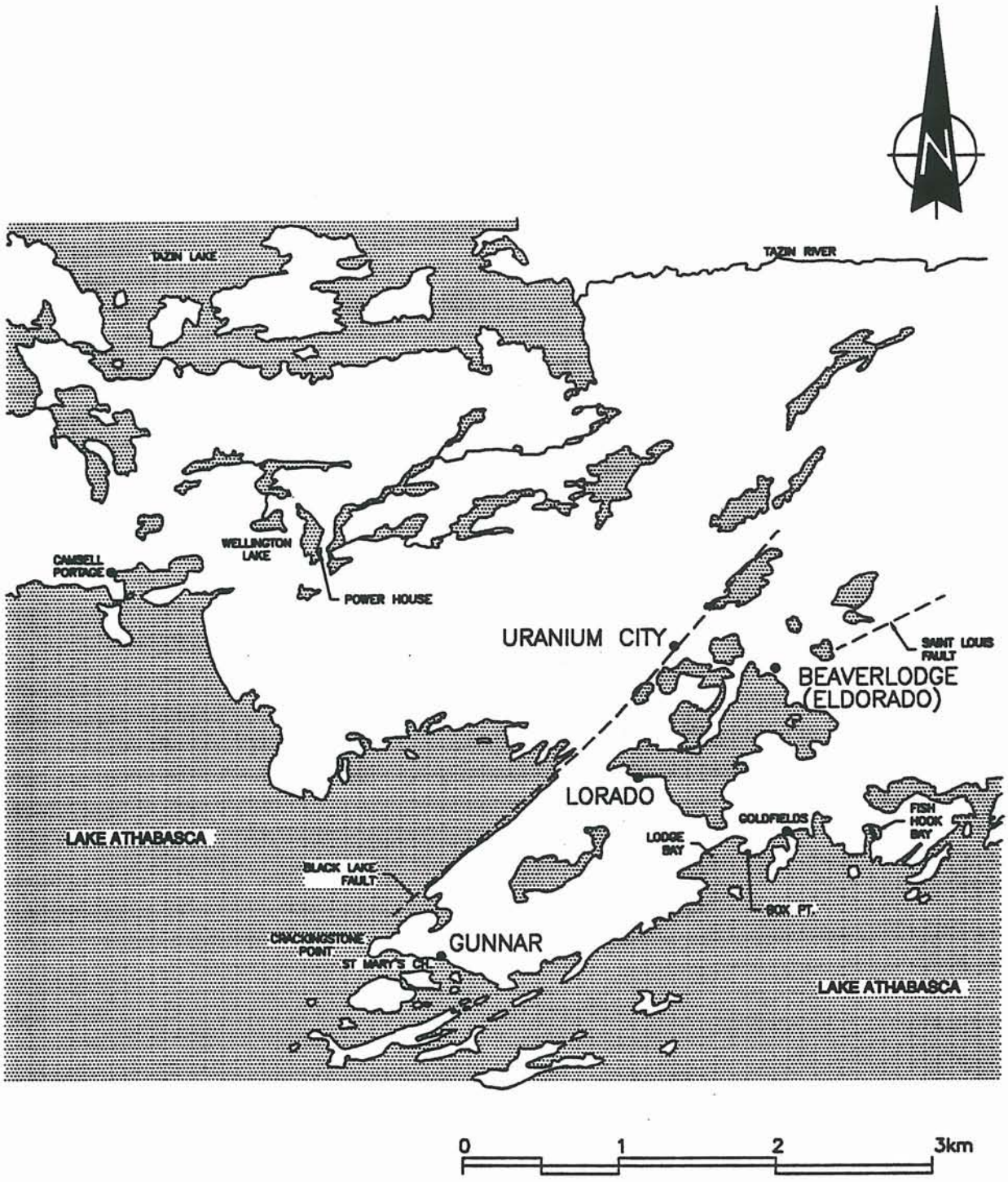
The Gunnar mine/mill site is located on the southern tip of the Crackingstone Peninsula approximately 25 km southwest of Uranium City. This abandoned uranium production facility is on the north shore of Lake Athabasca, which in turn drains by way of the Slave River and the Mackenzie River into the Arctic Ocean.

The site is remote and not accessible by road. The mine/mill operation was designed and constructed to be self-sufficient with occasional barge and air supply. Consequently there are approximately two dozen operational support buildings with associated mine/mill infrastructure that remains in place.

Figure 7.1.1 shows an overview of the Gunnar site in relation to Lake Athabasca.

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 59° 23' 01" lat<br>108° 53' 03" long | 6584679 m N<br>620192 m E | 59° 23' lat<br>108° 53' long | 6584727 m N<br>620456 m E |

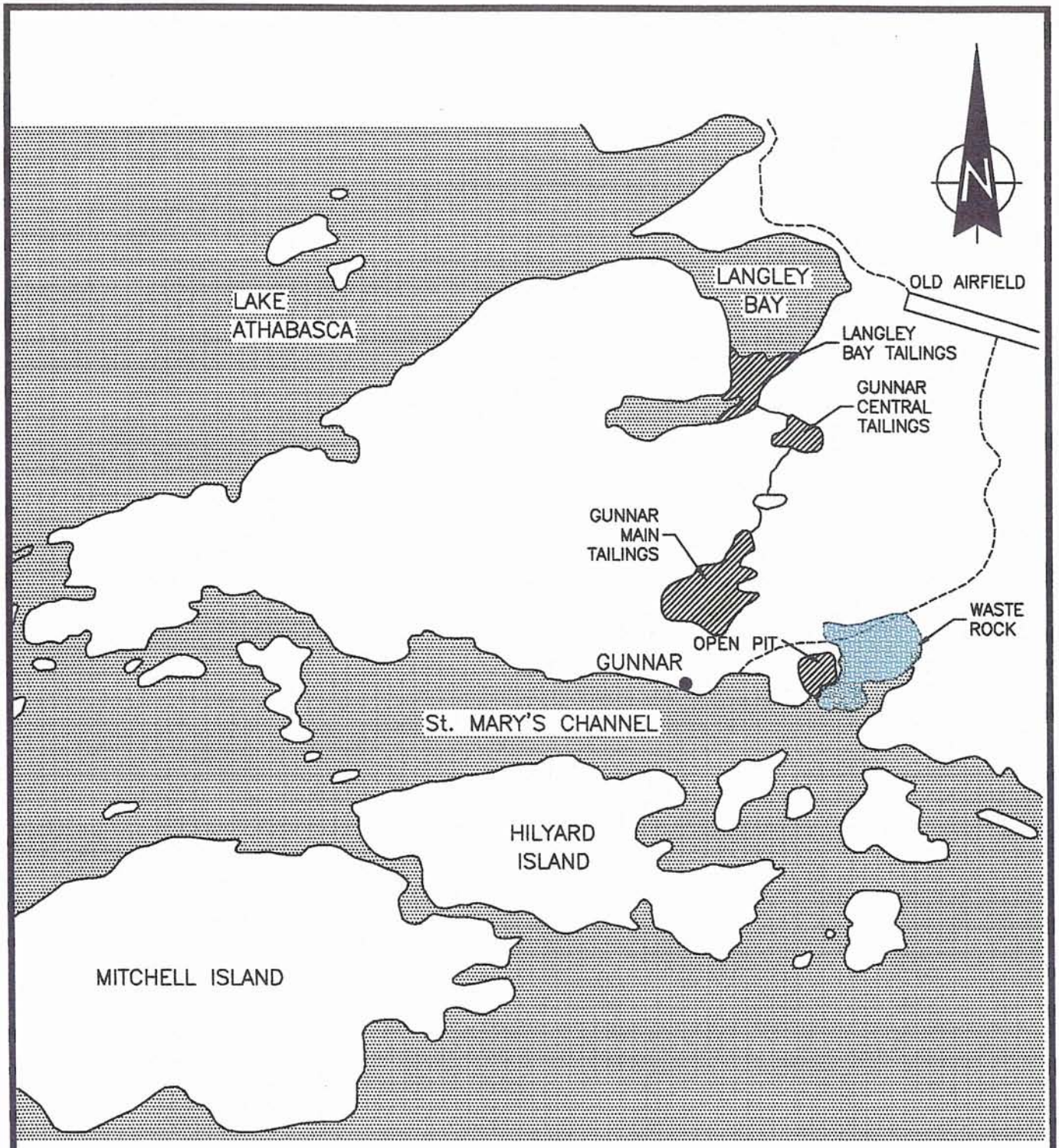
* Converted from NAD 27 readings using Natural Resources Canada online geodetic conversion program
** Location obtained from Saskatchewan Mineral Deposit Index




THE BEAVERLODGE MINING AREA

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 7.1

R3160/FIG7.1.DWG




GUNNAR SITE

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 7.1.1

R3160/FIG7.1.1.DWG

### 7.1.2 Site Ownership

**Saskatchewan Mineral Deposit Index Number:** 1206 **Index #:** U 1

**Property:**

**Location:** St. Mary's Channel-Crackingstone Peninsula

**Owner(s):** Open, see Section 7.1.4 for previous owners

**Commodity:** U **Associated Commodities:** Ur; Cu; Pb; Cs; Hm; Il

**Deposit Type:** Drillhole **NMI #:** 513576

### 7.1.3 Geology

The Gunnar Uranium Mine is located on the tip of Crackingstone Peninsula.

The mine area is underlain by north 70° east/45° southeast-trending, Aphebian age, well banded, fine-grained, uniformly brown paragneiss. The paragneiss consists of alternating, up to 1 ft (0.3 m) thick light (90 quartz-feldspar plus biotite, hornblende, and muscovite plus minor epidote, sphene, iron sulphides and andradite garnet) and up to 50 ft (15 m) thick dark (a similar rock which contains up to 30% biotite and hornblende) bands. The paragneiss, which is commonly veined with fine epidote stringers, is overlain conformably by the Gunnar Granite - a sequence of coarse-grained, pink- to orange-weathering, granitized microcline augen and porphyroblastic gneisses and metasomatic granite. The Gunnar Granite contains large elongate zones of alteration which are quartz-depleted, calcite-enriched and albitized. These tabular zones of alteration of low-quartz granitic rock have been named 'albite syenite' by the mine geologists. In places, the calcite has replaced quartz producing a 'calcite' syenite. Calcite has locally been leached out leaving a pitted vuggy rock called a 'sponge rock'.

The albitized granite host rock was subjected to severe brecciation. Three sets of non ore bearing faults converge in an area immediately southwest of the deposit. The St. Mary's Channel Fault is northwest-southeast/65° to 70°southwest trending normal right hand fault which has a displacement of up to 150 m. The fault trace, which occurs on the paragneiss-syenite contact, consists of an up to 30 m wide zone of alteration, mud and breccia. The Fraser Fault is an east-west/45° south trending, right hand normal fault with a displacement of up to 800 m. The Zeemel Fault is a west-trending strike fault which merges with the Fraser Fault at the ore body to form a broad zone of alteration and brecciation above the hanging wall of the deposit. A fourth older 40 to 55° southwest dipping fault, which predates both syenitization and ore emplacement, parallels the St. Mary's Channel Fault. There are 2 sets of jointing at the deposit. The first strikes

north-south and dips subvertically and the second trends north 70° east 50° to 60° southeast. Movement along these joints is approximately 1 to 2 m. Both albite alteration and ore emplacement appear to follow these joint systems.

The main ore body, which lies under 6 m to 20 m of muskeg and varved clays, consists of a sub-circular pipe-like body within brecciated and albite-altered 'syenite' which is up to 450 ft (137 m) in diameter. The long axis of the pipe plunges 45°in a direction of 010° to 015° east for a length of 671 m. At a depth of 300 m, the ore has thinned and virtually disappeared. Below 350 m, the ore pipe is lenticular and parallels the local strike. Two smaller parallel satellite ore bodies occur on the west flank of the main ore body. The larger of the two is 25 m in diameter and extends down-plunge for 180 m.

The ore bodies consist of pitchblende, present as small (up to 5 cm wide) veins and patches, uranophane, and, near the surface, yellow secondary uranium minerals. Both sooty and lustrous varieties of pitchblende, the primary ore-forming mineral, are present as small veinlets, breccia infillings, cavity infillings, fracture plane coatings, and as disseminations throughout the host 'syenite'. Uranophane and beta-uranophane have a similar occurrence within the ore body. The secondary yellow uranium minerals occur as incrustations on pitchblende and as surface coatings on fractures near the surface of the ore body. Specular hematite, ilmenite, pyrite, chalcopyrite, and galena occur as scattered grains within chlorite or carbonate. Galena also occurs as minute stringers within the pitchblende. A single 4 cm wide vein of chalcocite was located, (Saskatchewan Energy and Mines, 2001).

### 7.1.4 Exploration History

In 1952, Albert Zeemel, while prospecting for Gunnar Mines, discovered radioactive boulders in a muskeg close to St. Mary's Channel. After staking and prospecting the site, 11 inclined drill holes, totaling 2,400 ft (732 m), were completed. The drill program outlined a widespread zone of pitchblende-bearing mineralization in the bedrock immediately beneath the muskeg.

The deposit was delineated with 179 vertical holes, totaling 70,000 ft (21,340 m), which were completed on a 75 x 75 ft (23 m x 23 m) square grid pattern. This work outlined an ore body about 450 ft (137 m) in diameter, plunging from surface to a depth of 1,100 ft (335 m) below the shoreline of Lake Athabasca, and estimated to contain 4,000,000 tons (3,640,000 tonnes) of ore grading 0.2%.

Production commenced in September 1955 and from this date until 1958; ore was mined solely from an open pit. By the end of 1959 a shaft had been sunk 1,905 ft (580 m). From 1961 onwards, the production came exclusively from the underground part of the operation. Underground mining continued until October 1963 when the ore body became depleted, and the mine closed in 1964.

In 1964, New Joburke Exploration Ltd. obtained a working permit on the Gunnar property to do more exploration. Further drilling was completed to search for additional possible ore, (Saskatchewan Industry and Resources, 2002).

### 7.1.5 Operational History

The Gunnar uranium deposit was discovered in 1952. Site development, construction and mining followed with mill production commencing in 1955. Initial mining consisted of an open pit mine immediately adjacent to St. Mary's channel of Lake Athabasca. The surface mine evolved to an underground operation in 1957, which remained in production until mine/mill closure in 1964. A headframe, large maintenance buildings and an administration complex supported the mining operation. The pit and underground mine were flooded that same year, by allowing water from Lake Athabasca to flow into the pit by way of a small channel.

The mill utilized sulphuric acid for the leaching of uranium with an ion exchange magnesia precipitate for product recovery. Two acid plants and various buildings are situated adjacent to the mill.

Mill wastes, primarily made up of slurried tailings, were pumped via pipeline up onto the ridge above the mine/mill facility and discharged into Mudford Lake. Once this basin was full of tailings, a small bedrock ridge was removed in order to allow the tailings to flow down gradient into a local topographic low. This area eventually filled with tailings, at which time the location overtopped and flowed down slope into Langley Bay of Lake Athabasca. Consequently, there are three unconfined tailings deposits that have historically entered or drained into Lake Athabasca. The estimated volume of tailings is 4.4 million tonnes arising from an average ore grade of 0.175% $U_3O_8$.

Two waste rock piles, containing an estimated volume of 2.8 million $m^3$, are situated south east of the open pit.

At the time of closure, the site was abandoned. A watchman was maintained on site for a period of time to assist the salvage of some equipment and buildings, which were transported for further use in the Uranium City area. The majority of the site facilities remain on site. All are in an extensive state of disrepair and all have been heavily vandalized or scavenged.

### 7.1.6 Items of Concern

From a risk management perspective, the following areas warrant particular attention.

#### *7.1.6.1 Environmental Considerations*

The Gunnar **tailings** are unconfined and continue to contribute a contaminant loading to the local environment. The tailings mass has a large inventory of radionuclides that are associated with the uranium decay series. Normal segregation of the tailings at the time of discharge and during gravity distribution resulted in the majority of the slimes having made their way to Langley Bay. This fine portion of the tailings typically carries a higher concentration of residual radionuclide, metal and chemical contaminants. The tailings are generally neutral to slightly acidic. With regard to the three exposed areas of the tailings mass, there has been extensive wind erosion and radon dissemination in concert with approximately 40 years of leaching from the tailings area to the local watershed. Natural revegetation of the tailings mass is occurring in areas where there is sufficient retained moisture.

The **waste rock** piles remain in their abandoned state immediately adjacent to Lake Athabasca. These piles contain elevated levels of uranium and Pb-210. Two small intermittent streams are transporting radionuclides from the waste rock disposal area to Lake Athabasca.

The **open pit** remains in a flooded condition. Water quality in the top of the pit has met Specific Surface Water Quality Objectives for the Protection of Aquatic Life and Wildlife (Saskatchewan Environment and Resource Management, 1997) during the past samplings events; however, radionuclide concentrations are elevated. The pit is considered 'meromictic' which basically means that the bottom layer of pit water is naturally chemically separated from the upper layer. The concentration of contaminants is significantly higher in the bottom of the pit (5 to 7 times for some parameters) than the surface. There does not appear to be surface flow from the pit to Lake Athabasca as surface flow from the pit seems to seep into the waste rock channel between the pit and lake, before reaching Lake Athabasca.

There are a number of **hazardous materials** present at the site. These relate to miscellaneous residual chemicals, reagents and supplies that were required for the mine/mill operation For example there are:

- Sulphur piles near the mill;
- Reagents and chemicals in the mill/laboratory buildings (examples are: ammonium hydroxide, calcium hydroxide, carbon tetrachloride, crocidolite asbestos, ethyl acetate, magnesium oxide, sodium hydroxide, triuranium octoxide, vanadium pentoxide pellets); and,
- Small pile of residual ore referred to as 'yellowcake'.

Monitoring results indicate that there has been a localized impact on the surrounding environment due to the release of radionuclides.

*7.1.6.2 Public Safety*

The greatest risk to public safety relates to the extensive state of deterioration of the mine/mill facilities and support infrastructure. For example, the headframe is a high structure that is readily accessible to adventuresome climbers. There are no safety or access prevention measures in place. However, warning signs were installed at the entrances to most buildings, including the access to the headframe, by Saskatchewan Environment in 2001. The Gunnar site is easily accessible by float equipped aircraft and lies adjacent to a frequently traveled boat route on Lake Athabasca. Consequently, the level of risk associated with these dangerous conditions is further elevated due to the potential visitation of "tourists".

There are low level radiological hazards present at the site. The tailings and waste rock have residual "hot spots" that have not been remediated. This also holds true for specific areas within the mine/mill buildings.

Another risk to human health relates to the extensive use of asbestos at the site. This material is not viewed as a significant hazard to the occasional visitor; however the presence of this material will require the application of specific occupational health and safety procedures during the demolition of the site buildings and infrastructure.

Also, during past inspections by Saskatchewan Environment staff some pit wall sloughing along the west and northwest sides of the open pit has been observed.

### 7.1.7 Inspections

The site is monitored by Saskatchewan Environment on a regular basis.

### 7.1.8 Risk Assessment Ranking

Although the Gunnar site was not inspected as part of the 2001 activities, a risk assessment ranking was developed based on a review of available documentation.

| | |
|---|---|
| Public Safety Assessment | 22 |
| Environmental Assessment | 28.5 |
| Combined Total Assessment | 50.5 |
| Ranking | 1/22 |

The Gunnar site contains numerous public safety hazards and environmental concerns and is very accessible by tourists and fishermen. Therefore, three points were attributed to the "additional public safety risks" category and three points were attributed to the "additional environmental risks" category.

### 7.1.9 Follow-up

Extensive decommissioning and clean-up is required at the Gunnar site. The province of Saskatchewan is currently negotiating an agreement with the Federal Government (Natural Resources Canada) to cost share the decommissioning of the site.

The Canadian Nuclear Safety Commission (CNSC) has given the province until December 2004 to establish a CNSC license for this site.

## 7.2 Lorado Mill

| NAD 83 | | NAD 27 | |
|---|---|---|---|
| Geographic* | UTM* | Geographic* | UTM** |
| 59° 31' 11" lat<br>109° 48' 09" long | 6598536 m N<br>567757 m E | 59° 31' 11" lat<br>109° 48' 06" long | 6600350 m N<br>630350 m E |

* Converted from NAD 27 readings using Natural Resources Canada online geodetic conversion program
** Location obtained from NTS Mapsheet 74N/10 Edition 3

### 7.2.1 Location and Infrastructure

The Lorado mill site is located about 8 km south of Uranium City on the west side of Nero Lake (Figure 7.2.1). The Lorado mine site is located about 4 km south of the mill site.

The Lorado mill was operated by Lorado Mines Ltd. from 1957 to 1960 and was designed to treat ore from the Lorado Mine and from smaller satellite mines in the region, including the Cayzor mine, Rix Leonard Mine, and the Cinch Lake Mine. The mine and mill were closed in 1961 due to a lack of feeder ore from the Lorado mine and the satellite mines.

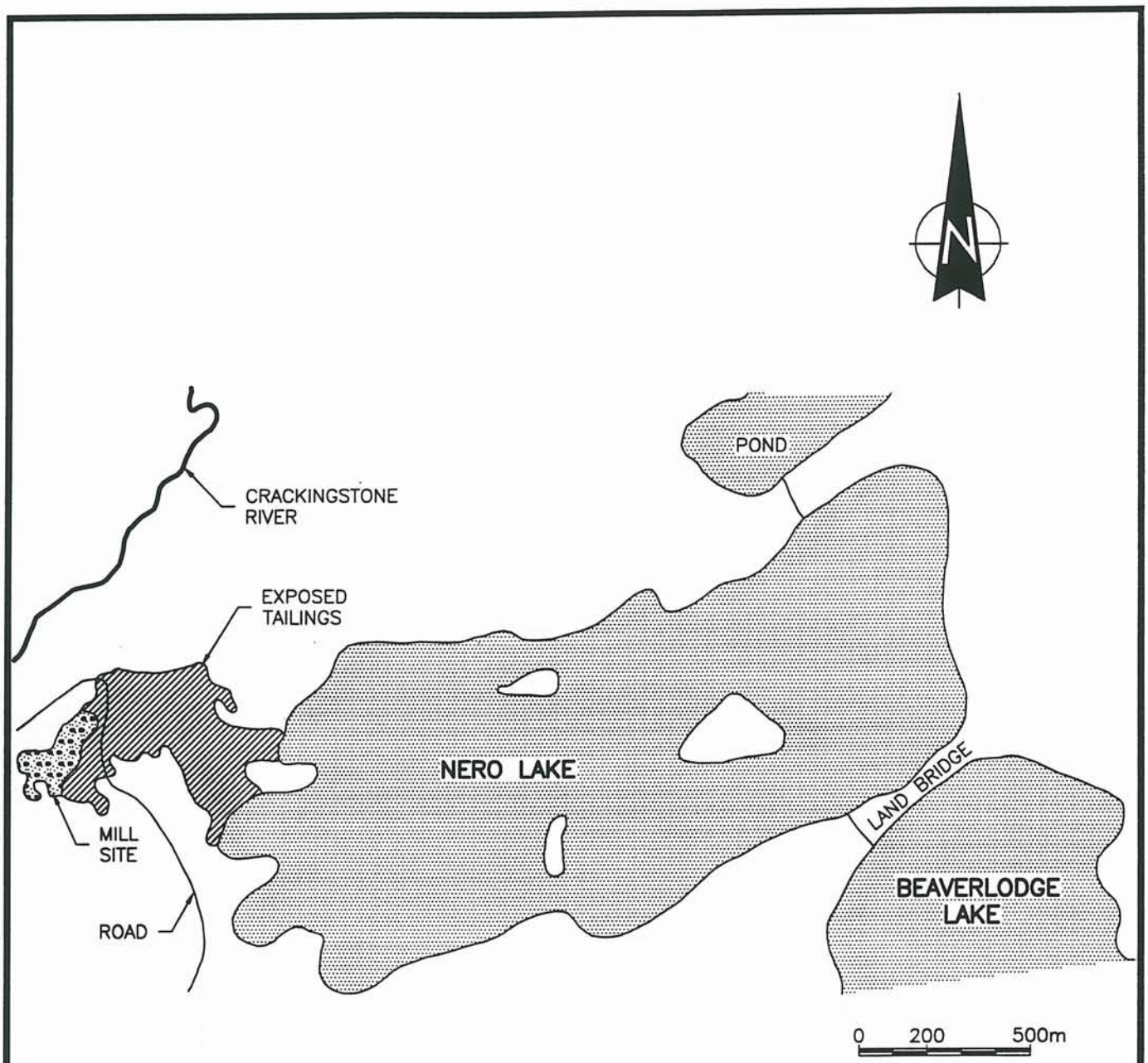
The Lorado mill was designed to process up to 750 tonnes of ore per day; however, the actual amount of ore processed was significantly less due to depleting ore reserve shortages and milling problems. At the end of production, the Lorado mill was estimated to have processed 380,000 tonnes of ore (Beak, 1989). The ore processed was variable in composition due to the difference in ore types coming from the various mines.

Tailings from the mill were deposited on the ground and into Nero Lake adjacent to the mill. At the end of operations, the tailings had covered an area of about 14 hectares, including the tailings submerged in Nero Lake.

Ore was hauled from the Lorado mine and satellite mines for processing at the mill.

### 7.2.2 Milling Process

The Lorado mill was initially designed to process 635 tonnes of ore per day and was expanded to process 750 tonnes per day. The treatment of the ore consisted of a sulphuric acid leach and an ion exchange process for uranium extraction.




LORADO MILL SITE

CLIFTON ASSOCIATES LTD. PROJECT NO: R3160 FIGURE NO: 7.2.1

R3160/FIG7.2.1.DWG

Many problems were encountered during the milling process. The mine used pyrite mined from near the ore body to manufacture the sulphuric acid used in the leaching process; however, the leaching process required more acid than had been estimated and the quantities of pyrite mined were not sufficient to satisfy the quantities of acid required. In 1958, the acid plant was converted from a pyrite consuming plant to one which operated on the burning of sulphur.

The crushing plant at the mill used a jaw crusher to initially pulverize the ore. The crushed rock was sieved and the finer material was passed through to trippers where the pyrite was separated from the ore. The ore was then sent to a rod mill for further crushing into finer material.

When the finely crushed ore entered the leach plant, it was ground and discharged into classifiers. Overflow material was discharged to a 'splitter box' from where it was sent to 'thickeners' to be thickened with water and chemicals. The thickeners were two 50 ft (15 m) diameter tanks.

After the thickened ore left the thickeners, it was pumped to a series of eight 18 by 20 ft (5.5 by 6 m) leaching tanks, each of which agitated the thickened pulp by use of compressed air. Sulphuric acid was added to the solution in the first leaching tank to maintain a constant pH. Sodium chlorate was also added to the first leaching tank as an oxidant at a rate to ensure an excess of oxidant in the pulp.

After leaving the last thickener, the leached pulp (treated material that contains both extracted uranium and barren or waste material) was filtered and clarified to remove the pyrite and waste material. The extracted uranium was then passed through a series of ion-exchange columns where the uranium adsorbed onto the resin material in the columns. The resin material was treated to remove the uranium through a precipitation process. The final product was 'yellowcake' or uranium concentrate. Waste material containing the barren ore and pyrite was discharged as tailings.

### 7.2.3 Current Status of the Lorado Mill Site

#### *7.2.3.1 General*

Considering the Lorado mill was abandoned with no significant decommissioning activities, it existed for several years much as it did when it was abandoned. From the time of closure the condition of the mill deteriorated due to vandalism and the effects of nature. The mill was eventually completely dismantled in 1990. The remaining concern at the site is with the tailings which continue to lie on the ground surface from where they become wind blown, generate acid

and leach metals to the ground and surface water. Numerous studies have been performed on the area to determine the effect the tailings have on water quality, wildlife and vegetation.

*7.2.3.2 Lorado Tailings*

The tailings at the Lorado Mill Site are currently located immediately adjacent to Nero Lake (Figure 7.2.1). Whiting et. al., (1982) estimates there is a total of 500,000 $m^3$ of tailings of which 42% (210,000 $m^3$ is below the surface of Nero Lake with the remaining 58% (290,000 $m^3$) above ground. Beak (1989) estimates there was 380,000 tonnes of ore milled. The tailings are acid producing which is not unexpected given the large amounts of sulphuric acid used in the milling process. The pyrite (used to manufacture the acid) in the tailings is oxidizing and is creating sulphuric acid that is draining into Nero Lake. The tailings are also subjected to wind and surface water erosion.

The tailings are composed of up to 4 m of silt and sand overlying peat. Sands occur at the top of the pile, at higher elevations, and the tailings become finer grained with depth, with the silts occurring at the base of the pile. The oxidized zone of the tailings pile varies in thickness form a low of 0.1 m to a high of 2.2 m (Whiting et. al., 1982).

Three possible seepage paths from the tailings have been identified (Whiting, et. al., 1982). A groundwater flow path that leaves the pile in the direction of the nearby Crackingstone River Valley was calculated to flow at a maximum velocity of 24 $m^3$/day; however, there was no evidence of seepage into the river valley.

The two other seepage paths flow in an easterly and southeasterly direction, likely draining into Nero Lake. It is estimated that the combined maximum possible seepage rates are approximately 12 to 13 $m^3$/day.

The concentration of $Ra^{226}$ in the tailings collected near the mill was 215 pCi/g (Ruggles et. al., 1978).

*7.2.3.3 Nero Lake*

Lorado tailings were deposited in a low area near the shore of Nero Lake. Eventually the low area was filled, and the tailings extended into Nero Lake , forming a beach. Some of the tailings were deposited below the surface of the lake, but about 50% to 60% remained exposed at the surface. The tailings beach covers about 14 hectares. The beach is acid generating and the drainage from the tailings has depressed the pH of Nero Lake to 3 and lower.

A study performed in 1976 was conducted jointly by the Environmental Protection Service of Environment Canada and the Saskatchewan Department of Environment (currently Saskatchewan Environment). The study collected samples of water, zooplankton and sediment from abandoned mines in the Uranium City region in an attempt to understand the effects the abandoned sites have on the environment. The data showed that discharges of waste into Nero Lake had severely affected water quality. The pH was 3.5, acidity was 272 mg/L (sulphates) chloride 61 mg/L and Ra-226 72 Ci/L.

A study performed in 1978 entitled 'A study of Water Pollution I - The Vicinity of Two Abandoned Uranium Mills in Northern Saskatchewan' (Ruggles, et. al., 1978), revealed that the water quality of Nero Lake has suffered substantially due to the presence of the Lorado tailings. Ruggles found water quality parameters that closely matched those measures in 1976. High concentrations of sulphate (1,100-1,500 mg/L), chloride (51-61 mg/L), calcium (2-00 mg/L), magnesium (120-150 mg/L), iron (5.5-5.95 mg/L), sodium (48-50 mg/L0, potassium (4.7-4.9 mg/L), zinc (0.28-0.31 mg/L) and lead (0.042-0.051 mg/L) were found in Nero Lake. The lake has a pH of between 3.3 and 3.4 and there was no presence of alkalinity. These results are very typical of acid rock drainage.

The same study identified that the flushing rate of Nero Lake is very slow as there are no defined inlets to the lake. This lack of inlets implies that there are no natural buffering mechanisms available to offset the acid production of the waste.

Radionuclide levels found in Nero Lake were high with Radium-226 concentrations ranging from 45 to 62 pCi/L; Lead-210 concentrations ranging from 48-56 pCi/L and Uranium ranging from 0.66 to 0.99 parts per million (ug/g). Thorium-230 was also present in a wide variation of concentrations (8.8-61 pCi/L).

In summary, the acid draining from the tailings into Nero Lake have resulted in the destruction of the natural alkalinity of the water and a low pH, caused a reduction in the diversity of the planktonic and benthic communities of the lake, and increased the concentration of radionuclides in the water. The invertebrate communities of Nero Lake were restricted to those tolerant of an acidic environment. The dense growth of aquatic moss on the bottom of Nero Lake are acting as a concentration sink for radionuclides in the lake system. These radionuclides are eventually making their way into Beaverlodge Lake (Ruggles, et. al., 1978).

*7.2.3.4 Beaverlodge Lake*

Beaverlodge Lake is separated from Nero Lake by a narrow bridge of land. The bridge is very porous and allows movement of water between the two lakes. A localized effect on the water quality in Beaverlodge Lake is evident from a plume of water moving from Nero Lake to Beaverlodge Lake. The plume can be readily identified from the air and appears to be caused by the precipitation of metals (such as aluminum) when the water from Nero Lake reaches Beaverlodge Lake. The lower pH values on Nero Lake dissolves the metal; however, when the plume enters the high pH waters of Beaverlodge Lake, the metals come out of solution and are precipitated as solid elements. A number of white, reddish brown and black rocks exists along the shore of Beaverlodge Lake along the bridge. An analysis of the staining indicates that the white precipitate is generally composed of aluminum with lesser amounts of iron, sodium and silicate. The reddish brown precipitate appearing on surficial rocks is also apparent under the white coating on the submerged rocks. There is no significant occurrence of radium-226 in either of the precipitates. The precipitate is high in uranium (Whiting, et. al., 1982).

The pH of Beaverlodge Lake ranged from 7.3 to 7.7 and the alkalinity ranged from 61 to 65 mg/L (Ruggles, et. al., 1978). Radium-226 and lead-210 concentrations ranged from 1.3-1.9 pCi/L and 2.5-3.5 pCi/L, respectively. Uranium concentrations ranged from 0.13 to 0.27 parts per million (mg/L). The concentration of thorium-230 ranged from 1.1-31 pCi/L and appeared to be more concentrated near the surface.

The concentrations of radium-226 and thorium-230 found in the sediment of Beaverlodge Lake were low near the land bridge and increased with distance away from Nero Lake. This appears to indicate that radionuclides and metals in the acidic water of Nero Lake precipitated when introduced to Beaverlodge Lake.

The stratigraphy of the bridge is described by Whiting et. al., (1982). The base is a pink till overlain by a lower gray silt. The lower gray silt is overlain by a gray till. The gray till is overlain by an upper gray silt. The upper gray silt is overlain by a postglacial silt. The postglacial silt is overlain by a layer of peat.

Whiting et. al. (1982) hypothesized that the till layers control the rate of water entering Beaverlodge Lake from Nero Lake. It is possible that the pink till and an assumed zone of crushed bedrock immediately below it provide a path of groundwater flow from Nero Lake into Beaverlodge Lake. The pink till is a calcareous material that has the potential to neutralize some of the contaminants transmitted through the bridge. The peat near the surface has the potential to absorb some of the radionuclides.

There are a number of ways that water from Nero Lake can enter Beaverlodge Lake. Migration can occur through a partially collapsed culvert that exists underneath the road on the top of the bridge, or by water splashing over the bridge during high water levels, or as groundwater seepage through the upper till fill and the lower pink till. An investigation of the bridge of land roadway between the lakes was undertaken by a consultant working for Saskatchewan Environment in 2001. The investigation concluded that the culvert does not ensure peak flood events can be readily and safely passed from Nero Lake to Beaverlodge Lake. As a result, it was concluded that "there is a significant risk that the roadway/dam can be overtopped, which may lead to a rapid down cutting of the roadway/dam and the discharge of a large volume of acidic water into Beaverlodge Lake" (SRK, 2001).

*7.2.3.5 Public Safety*

The primary and public safety consideration at the Lorado Mill Site is the presence of unconfined tailings which pose a gamma radiation concern. Wind blown tailings also present a public safety consideration due to the mobile nature of the fine tailings and their ability to be transported great distances by the wind. From an environmental perspective, the primary consideration is the presence of radionuclides and heavy metals having the potential to enter the environment via the groundwater system and to then remerge in downstream water bodies. This has the potential to cause the migration of contaminants to downstream receptors including humans and wildlife, although there are no areas immediately downstream of the tailings that are populated with people.

The mill buildings were dismantled in 1990 and buried with waste rock and do not pose an environmental or public safety concern.

### 7.2.4 Risk Assessment Ranking

Although the Lorado Mill Site was not inspected as part of the 2001 activities, a risk assessment ranking was developed based on a review of available documentation.

| | |
|---|---|
| Public Safety Assessment | 10.5 |
| Environmental Assessment | 18.5 |
| Combined Total Assessment | 29 |
| Ranking | 5/22 |

Due to the presence of unconfirmed radioactive tailings and the easy access to the site, three points was attributed to the "additional public safety risks" category. In addition, three points were

attributed to the "additional environmental risks" category, due to the acidic and unconfirmed nature of the tailings.

### 7.2.5 Follow-up

Follow-up work at the Lorado Mill Site should include an evaluation of practical methods to isolate and cover the tailings. In 2001, Saskatchewan Environment posted signs warning of the radioactive nature of tailings.

The Province of Saskatchewan is currently negotiating an agreement with the Federal Government (Natural Resources Canada) to cost share the decommissioning of the site.

The Canadian Nuclear Safety Commission (CNSC) has given the province until December 2004 to establish a CNSC license for this site.

# 8.0 Follow up Work

## 8.1 General

This section discusses the follow-up activities suggested for future assessment work in the Uranium City, Creighton and La Ronge regions.

## 8.2 Uranium City Region

Although attempts were made to locate all major features at all sites in the Uranium City region listed in Section 6.0, some additional work is suggested. Table 8.1 provides a list of sites that should have additional work completed in the future in order to complete the assessments.

Following is a description of the follow up work in the Uranium City region.

**Table 8.1**
**Sites to be Assessed in the Uranium City Region**

| Site | Status |
|---|---|
| Box Mine | Check presence/status of Adit on Frontier Lake |
| New Mylamaque | Check status of adit on north side of Laird Island |
| Don Henry Mine | Confirm status of shaft |
| Rix Athabasca | Check presence/status of site |
| Cenex Mines Ltd. | Check presence/status of another shaft (potentially flooded). This site was assessed in Year 1. |
| Amax-Athabasca | Check for presence/status of a large trench. This site was assessed in Year 1. |
| Neely Lake | Check status of prospect shaft. |

**Box Mine**

The Box Mine contains an adit about half way up the east shore of Vic Lake and upslope from Vic Lake. The adit apparently accesses the underground workings. No records of the adit could be found and it is not listed in the Saskatchewan Mineral Deposit Index. Additional work should include attempts to locate and assess the adit.

**New Mylamaque**

The New Mylamaque site contains an adit on the north shore of Laird Island on Tazin Lake (Figure 6.4-2). Additional work should include attempts to locate and assess the adit.

**Don Henry Mine**

The Year 2 inspection of the Don Henry mine was completed. The area was recently subject to a forest fire. The shaft was not located due to the heavy deadfall resulting from the fire. Small trenches were found. Additional work should focus on attempting to locate and assessing the shaft.

**Neely Lake**

The Neely Lake Gold Site is located 16 km northeast of Uranium City at the southwest end of Neely Lake. Saskatchewan Energy and Mines (1984) reports a small prospect shaft was sunk in 1935-36. The presence and status of the shaft should be checked.

**Rix Athabasca**

The Rix Athabasca site could not be located after extensive searches of the area. It is assumed that given the sites proximity and easy access to Uranium City, the shaft and other mine related facilities have been partially cleaned up. Follow-up work should involve further investigation to determine the status of the site.

## 8.3 La Ronge Region

The Pitching Lake site was inspected in Year 2. The adit was decommissioned in 1990 by Saskatchewan Environment by securing a steel grate to the opening. The adit could not be located in Year 2. Follow-up work should include attempts to locate and assess the adit.

## 8.4 Creighton Region

Several sites in the Creighton Region have been identified as requiring assessments. The only site in the region to be assessed was the Western Nuclear site which was completed in Year 1.

A search of the entire Saskatchewan Mineral Deposit Index for the 63K and 63L mapsheets was completed. There are 469 records in the two mapsheets. Each record was examined to determine the exploration history. The vast majority of the sites exploration history is characterized by surface diamond drilling or some type of surface sampling program by trenching or soil sampling.

Only those sites that had records of adits, open pits or shafts were identified as requiring follow up work. These sites are listed in Table 8.2.

Follow up work at the sites in Table 8.2 should include attempts to locate the site and assess and prioritize the sites in the same manner that was done as part of the Year 1 and Year 2 programs.

**Table 8.2**
**Sites to be Assessed in the Creighton Region**

| Site Name | Saskatchewan Mineral Deposit Index Number | Issue |
|---|---|---|
| Ace Deposit | 0171 | Trenches |
| Amisk Syndicate Mine | 0104 | Adits and Trenches |
| Amisk (Beaver) Gold Mines | 0090 | Adit and Trenches |
| Beaver Mine | 0098 | Shaft and Trenches |
| Birch Lake Mine | 0113 | Shaft/Waste Rock |
| Coronation Mine | 0023 | Shaft/Waste Rock |
| Flexar Mine | 0117 | Shaft/Waste Rock |
| Graham Mine | 0296 | Shaft/Waste Rock/Mill/Trenching |
| Hannay(Bessie Island) Deposit | 2200 | Trenching |
| Henning Maloney Mine | 0006 | Shaft/Trenching/Waste Rock |
| Lucky Strike Mine | 0102 | Pit/Trenching/Waste Rock |
| Phantom Lake Mine | 0009 | Shaft/Mill/Waste Rock/Tailings |
| Namew Lake | n/a | Waste (Saskatchewan portion only) |
| Newcor Mine | 0005 | Shaft/Mill/Tailings |
| Prince Albert Mine | 0086 | Shaft/Mill/Waste Rock/Tailings |
| Sonora Deposit | 0094 | Trenching |
| Star Occurrence | 0165 | Trenching |
| Vista (Bootleg) Mine | 0011 | Adit/Waste Rock/Tailings |
| Waverly Island Occurrence | 0093 | Trenches/Shaft (?) |
| Wekatch Gold Mines | 0021 | Shaft/Trench |
| Dion Lake North Copper Showing and Shaft | 0025 | Shaft |
| SYE/Sunset Exploration Shaft | 0096 | Shaft |
| Bearcat Showing and Prospect Shaft | 0160 | Shaft |
| Otonadah Lake Copper Showing and Exploration Shaft | 0301 | Shaft |
| Laurel Lake North Gold Zone | 2133 | Decline |

Note: Some of the identified sites may not be abandoned and./or may have been decommissioned by the owner/operator. Additional research will confirm the 'status' of each site

# 9.0 Conclusions and Recommendations

Rehabilitation recommendations are provided for each site. The recommended course of action is based on a combination of environmental and public safety risks.

Several sites present a serious aesthetic concern; however, given the remoteness of most sites and the desire to deal with public safety and the desire to deal with environmental protection, it is recommended that aesthetic issues be addressed on the basis of available resources.

Cleanup of aesthetic issues may cost significant money with little benefit to public safety or environmental protection.

At some of the sites, not all features were located. It is recommended that attempts to locate these features (adits and shafts) be made as part of next year's program or as resources allow (e.g. if Saskatchewan Environment personnel are in the area).

It is important to note that ownership of exploration sites changes frequently in Saskatchewan. Every effort should be made to verify ownership status with current data prior to decommissioning work.

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Site information was obtained from the sources listed in the report and site assessments. Clifton Associates Ltd. accepts no responsibility for any deficiencies or inaccuracies in the information provided in this report that are the direct result of intentional or unintentional misrepresentations, errors or omissions of the information reviewed.

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# Appendix A

| | | | | |
|---|---|---|---|---|
| **Site Name** | #15 Gulch Mines | | | |
| **Site Location** | **NAD 83** | | **NAD 27** | |
| | **Geographic** | **UTM** | **Geographic** | **UTM**** |
| | 59° 26' 44" lat<br>108° 31' 40" long | 6591616 m N<br>621279 m E | 59° 26' 43" lat<br>108° 31' 37" long | 6591440 m N<br>621255 m E |
| 74 N 7-NW | **Description**<br>20 km SW of Uranium City on SE shore of Black Bay. | | | |
| **Operator** | 1953 - New Bidlamagie Mines Ltd. & Gulch Mines Ltd.<br>1953-57 - Shaft & underground work from Adit<br>1967-68 - Gunnex 'Gulch - mapping. / 1974 - Radiometric Surv | | | |
| **Date of Site Audit** | Sept 29, 01 | **Weather**<br>Clear, Sunny, Warm<br>10-15°C | **Audited By**<br>Greg Vogelsang | |
| **Date of Operations** | Various activities from 1953 - 1974<br>- Mined from 1953-57 | | | |
| **Type of Mine** | **1 Mineral** Uranium | | **2 Mineral** Cu, Pb, Cu, Ni, As. | |
| **Type of Operation** | **Mining High Grading** ✓ | **Mining & Concentrate** | **Mining & Milling** | **Trenching/Other** |
| **Current Accessibility of Site** | **1 Difficult (Float Plane)** | **2** Boat | **3** | **4 Easy (Road)** |
| **Evidence of recent Visitation** | Yes | | | |
| **Surrounding Environment** | The site is on a steep rock face off the SE shore of Black Bay on Lake Athabasca. The local area is very rugged with a prominent escarpment inland from the site - about 500' foot rise. Site is very visible from L. Athabasca | | | |
| **Background Gamma Levels** | 1.0 mSv/hr. | | | |
| **Mining Methods** | **Underground** | **Open Pit** | **Trenching** | **Other** |

**Note: UTM Coordinates for NAD 27 are taken from Saskatchewan Energy and Mines Mineral Deposit Index

## *Underground*

| *Name/Number* | *Description* | | |
|---|---|---|---|
| | Adit. | | |
| *Location* | About 30 m in from Shoreline | | |
| *Dimensions* | 4m high x 3m wide | | |
| *Status (open/closed)* | Open | | |
| *Stability of Closure* | None | | |
| *General Condition* | Poor. | | |
| *Liquid Discharges at Time of Audit* | None | | |
| *Evidence of Previous Flooding/Discharge* | Standing water in adit. | | |
| *Evidence of Slumping-Description* | Rock falls from Roof | | |
| *Support Buildings* | Dilapidated Wooden Shacks. | | |
| *Additional Comments* | Adit is open - standing water. Shaft located in adit - not checked - unsafe. | | |
| *Risk to Environment* | *1 (low)* 3 | *2* | *3 (high)* |
| *Risk to Wildlife* | *1 (low)* 2 | *2* | *3 (high)* |
| *Risk to Public Safety* | *1 (low)* 3 | *2* | *3 (high)* |

## *Open Pit*

| *Open Pit No./Name* | *1* | *2* | *3* |
|---|---|---|---|
| *Specific Location* | | | |
| *Dimensions* | | | |
| *Stability* | | | |
| *General Condition* | | | |
| *Liquid in Pit/Description Samples?* | | | |
| *Evidence of Previous Flooding/Discharge* | | | |
| *Evidence of Slumping* | | | |
| *Support Buildings* | | | |
| *Extent and Type of Natural Vegetation Encroachment* | | | |
| *Additional Comments* | | | |
| *Risk to Environment* | *1 (low)* | *2* | *3 (high)* |
| *Risk to Wildlife* | *1 (low)* | *2* | *3 (high)* |
| *Risk to Public Safety* | *1 (low)* | *2* | *3 (high)* |
| *Other Information* | | | |

## *Waste Rock*

| | | | |
|---|---|---|---|
| ***Description*** | Main Pile | | Smaller pile |
| ***Location*** | North Side of Property | | South side of property. |
| ***Extent*** | 75m x 30m avg depth - 5-10m | | 15m x 5m x 2m |
| ***Stability of Pile*** | steep slopes | | ~~Great~~ 2:1 Slopes. |
| ***Geology*** | quartzite/ muscovite/K'spar | Sericitic → | → |
| ***ARD Potential*** | No visible Sulphides | → | → |
| ***Gamma Results*** | .66 - 2.61 uSv/hr. | | .09 - .15 uSv/hr |
| ***Extent and Type of Natural Vegetation Encroachment*** | None. | | None. |
| ***Additional Comments*** | Main pile extends down to Lake level. Steep (2:1) slopes. | | |
| ***Risk to Environment*** | *1 (low)* 2 | *2* | *3 (high)* 1 |
| ***Risk to Wildlife*** | *1 (low)* 1 | *2* | *3 (high)* 1 |
| ***Risk to Public Safety*** | *1 (low)* 3 | *2* | *3 (high)* 2 |
| ***Other Information*** | Gulch site is close to shore line and easily seen. It is seen by tourists (fishing) who are leaving Bushell to and boating to the South - High public Risk. | | |

## *Tailings Disposal Area*

| | | | |
|---|---|---|---|
| ***Description/Location*** | | | |
| ***Estimate Extent*** | | | |
| ***Estimate Depth*** | | | |
| ***Estimate Volume*** | | | |
| ***Type of Containment Structures*** | | | |
| ***Stability of Containment Structures*** | | | |
| ***Summarize Tailings Chemistry*** | | | |
| ***Potential for Acid Generation*** | | | |
| ***Gamma Results*** | | | |
| ***Evidence of Wind/Water Erosion of Tailings*** | | | |
| ***Extent and Type of Natural Vegetation Encroachment*** | | | |
| ***Risk to Environment*** | *1 (low)* | *2* | *3 (high)* |
| ***Risk to Wildlife*** | *1 (low)* | *2* | *3 (high)* |
| ***Risk to Public Safety*** | *1 (low)* | *2* | *3 (high)* |
| ***Other Information*** | | | |

## *Additional Containment Works*

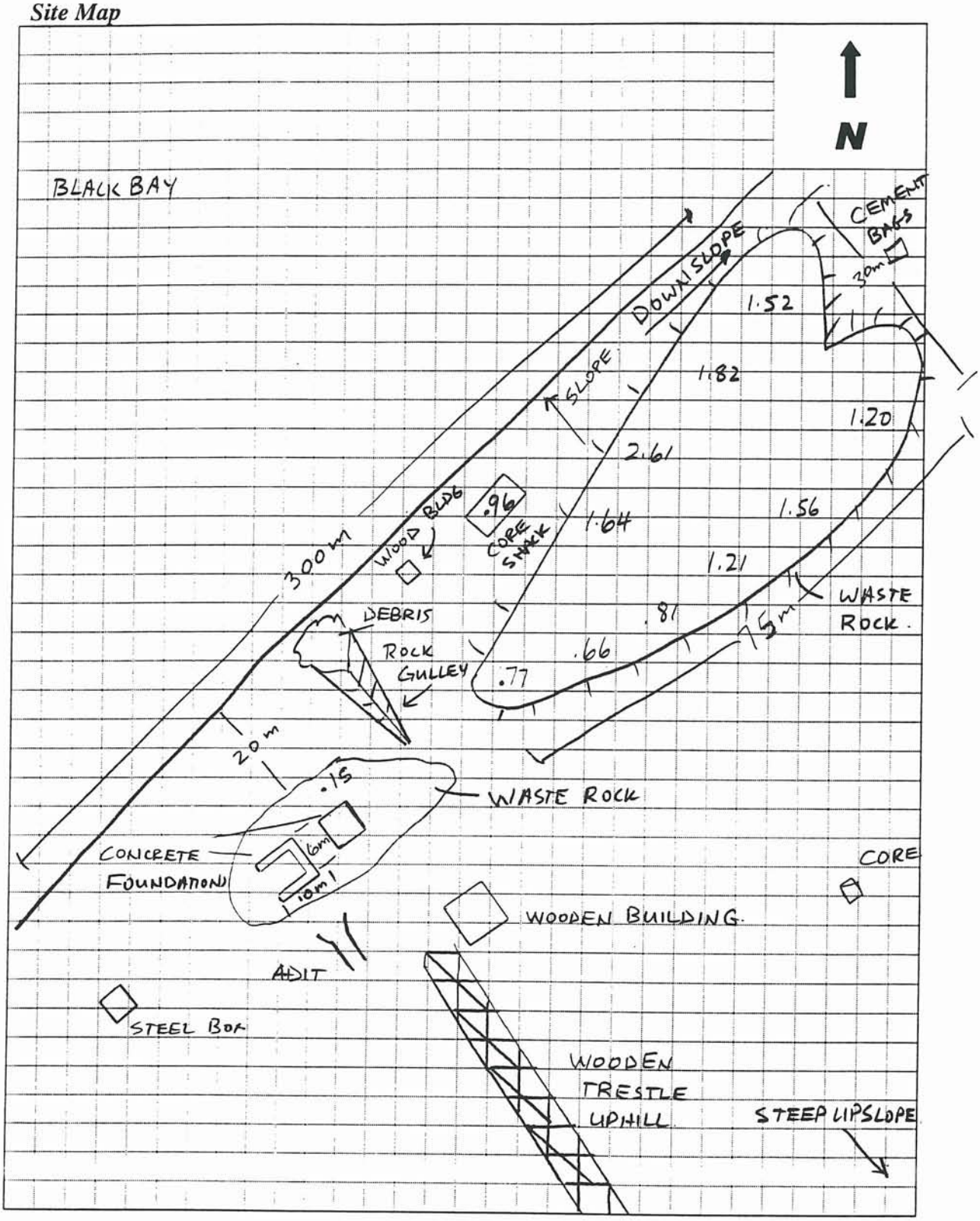
| | | | |
|---|---|---|---|
| *Description/Type* | | | |
| *Location* | | | |
| *Extent* | | | |
| *Condition* | | | |
| ***Drill Holes*** | | | |
| *Location (s)* | | | |
| *Dry or Liquid Discharges* | | | |
| *Drill Core Storage (Gamma results)* | | | |
| *Location(s)* | | | |
| *Estimate Extent and Quantity* | | | |
| *Method of Storage* | | | |
| *General Condition* | | | |
| ***Waste Disposal Sites*** | | | |
| *Location* | | | |
| *Estimate Extent and Volume* | | | |
| *General Condition* | | | |
| *Risk to Environment* | *1 (low)* | *2* | *3 (high)* |
| *Risk to Wildlife* | *1 (low)* | *2* | *3 (high)* |
| *Risk to Public Safety* | *1 (low)* | *2* | *3 (high)* |
| *Other Information* | | | |

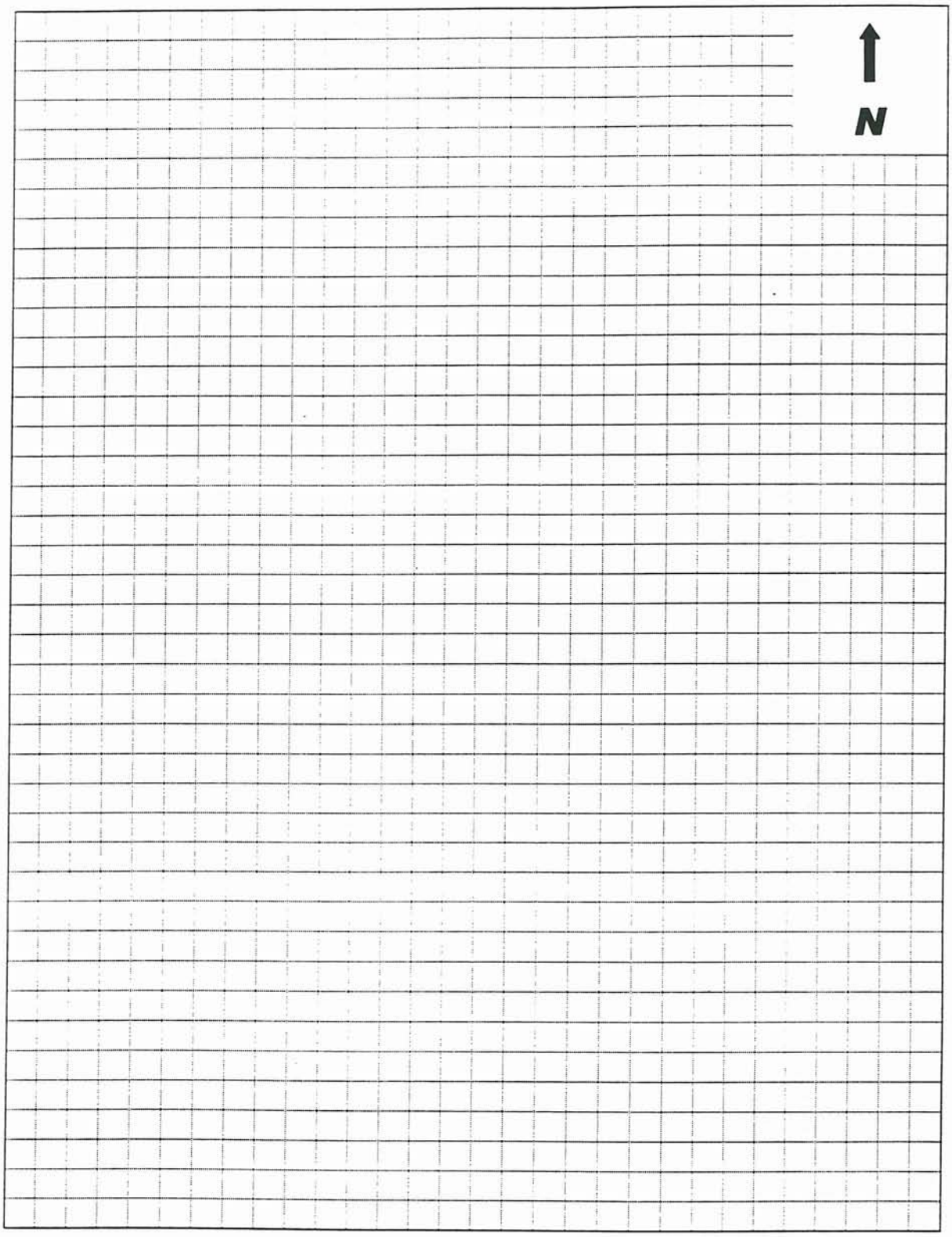
## *Buildings*

| | | | |
|---|---|---|---|
| ***List Buildings Still Present*** | Numerous | | |
| ***Estimate Size*** | | | |
| ***Type of Construction*** | Wooden Frame. | | |
| ***Condition of Structures*** | Poor- Collapsed. | | |
| ***Evidence of Asbestos in Construction*** | None | | |
| ***Contents*** | Debris- metal / wood / barrels | | |
| ***Electrical Transformers*** | None | | |
| ***Fluorescent Light Fixtures*** | None | | |
| ***Stability*** | Poor | | |
| ***Risk to Environment*** | ***1 (low)*** / | ***2*** | ***3 (high)*** |
| ***Risk to Wildlife*** | ***1 (low)*** / | ***2*** | ***3 (high)*** |
| ***Risk to Public Safety*** | ***1 (low)*** 2 | ***2*** | ***3 (high)*** |
| ***Additional Comments*** | There are 4-5 wooden collapsed buildings. No environmental hazards are evident. Concrete foundations are present just outside the audit. | | |
| ***Other Information*** | | | |

| | | | |
|---|---|---|---|
| ***Scrap Material*** | | | |
| ***Type*** | Various | | |
| ***Estimate Amount*** | 500 $m^3$ | | |
| ***Risk to Environment*** | ***1 (low)*** 1 | ***2*** | ***3 (high)*** |
| ***Risk to Wildlife*** | ***1 (low)*** 1 | ***2*** | ***3 (high)*** |
| ***Risk to Public Safety*** | ***1 (low)*** 2 | ***2*** | ***3 (high)*** |
| ***Residual Chemical on Site*** | | | |
| ***List Type*** | Cement | | |
| ***Estimate Volume of Each*** | 50x50lb bags. | | |
| ***Type of Storage*** | Bags. | | |
| ***Type of Containment (if any)*** | None | | |
| ***Risk to Environment*** | ***1 (low)*** 1 | ***2*** | ***3 (high)*** |
| ***Risk to Wildlife*** | ***1 (low)*** 1 | ***2*** | ***3 (high)*** |
| ***Risk to Public Safety*** | ***1 (low)*** 1 | ***2*** | ***3 (high)*** |
| ***Mine Dewatering*** | Yes | | |
| ***Locate Discharge if Possible*** | Discharge line led to Shoreline - Black Bay. | | |
| ***Additional Comments*** | Assorted debris on site includes steel drums, steel rails, metal ore car, lumber, scrap wood, concrete foundations, Core Wooden trestle leading upslope. | | |
| ***Other Information*** | Extensive amount of debris scattered about the site. | | |

## Site Map


N
BLACK BAY
CEMENT BAGS
30m
DOWNSLOPE
1.52
SLOPE
1.82
1.20
2.61
.96
CORE SHACK
1.64
1.56
300m
WOOD BLDG
1.21
WASTE ROCK.
DEBRIS
.81
75m
ROCK GULLEY
.66
.77
20m
.15
WASTE ROCK
CONCRETE FOUNDATION
6m
10m
CORE
WOODEN BUILDING.
ADIT
STEEL BOX
WOODEN TRESTLE UPHILL
STEEP UPSLOPE


N