PHASE I ENVIRONMENTAL SITE ASSESSMENT
FORMER RAMBLER MINE PROPERTY
BAIE VERTE, NEWFOUNDLAND

SUMMARY

Davis Engineering & Associates Ltd. (DEAL) was commissioned by the Provincial Department of Natural Resources (DNR) to conduct a Phase I Environmental Site Assessment of the Former Rambler Mines Property in Baie Verte, Newfoundland and Labrador. Based on a review of information supplied by the Client as well as observations made during the site investigation, the property assessment has revealed the following:

- The regulatory review uncovered details of impacts to water courses downstream of the Tailings Area, including South Brook. These impacts have reportedly caused the mortality of fish in the area, while numerous tests conducted by Environment Canada indicate that the concentrations of metals and low pH are acutely lethal to rainbow trout and salmo gairdneri.

- Paint was noted as peeling from structures at all three sites investigated. The paint peeling from abandoned machinery, walls and debris, may be a potential source of lead contamination.

- Several structures on site are built with acid leaching waste rock from the mining operations. Uses of the waste rock include but are not limited to construction of roads connecting the mining sites, construction of dykes, and site grading.

- A sampling program implemented by Jacques Whitford Environmental Limited (JWEL) in 2003 indicated areas of soil around Building #2 at the East Mine site impacted by PCBs (exceeding CCME criteria). Also, several swabs taken from the PCB Storage Area inside Building #2 indicated impacts to the floor and walls. To date, there is no knowledge of additional soil/water /swab/concrete core samples being taken or completion of contamination delineation as recommended by JWEL.

- Staining was noted in both buildings at the East Mine site, however staining on the exterior of the buildings was not ascertained due to the snow cover. Stains found in the PCB storage area (Building #2) have been tested in previous studies and indicate concentrations of PCBs above applicable guidelines.

- Potential asbestos siding was noted on Building #2 on the East Mine site. Potential asbestos based piping and elbows was noted at the Raymo Processing Facility. Appropriate precautions should be taken when removing and disposing of any potential asbestos containing materials.

- Numerous drums were noted near the Raymo Processing Facility. These drums were

found empty and did not contain labels. A large rusting drum containing an unknown substance was found in the sample storage room of Building #2 at the East Mine site.

- Hazardous chemicals including but not limited to cyanide, copper sulfate and zinc sulfate were used at the Raymo Processing Facility. Storage of these chemicals continued on site after the facility was abandoned and were removed in 1999.

- An abandoned above ground storage tank was noted at the Raymo Processing Facility. The tank was not accessible during the investigation and as such the contents could not be determined.

- All dykes and pond liners in the tailings area were not assessed due to the amount of snow covering the areas. Further inspection is required when access is restored after the winter.

- A site wide Phase II Intrusive Investigation is recommended for the property, consisting of a series of test pits and monitor wells and the subsequent collection of soil, groundwater, surface water and sediment samples. The level of effort for the Phase II program for each study area is outlined in Section 11.0.

The potential concerns noted during the Phase I ESA are summarized in Table 1.

Table 1: Summary of Findings

Potential Sources of Contamination	Findings	Recommended Remedial Action/Due Diligence
Lead	Potential lead based products are present at the site in the form of lead based paint. No batteries were located on site.	A paint sampling program at select areas of the site is recommended.
Urea Formaldehyde Foam Insulation (UFFI)	No evidence of UFFI was documented during the assessment.	None
Polychlorinated Biphenyls (PCBs)	-PCBs were historically stored in Building #2 at the East Mine site. -All PCBs appear to have been removed from the East Mine site. -Impacts to the interior and exterior of Building #2 were reported by Jacques Whitford Environmental Limited (JWEL). Sampling, delineation and remediation actions recommenced by JWEL have not yet been completed.	A Phase II sampling program consisting of swab/concrete core/surface and soil samples is recommended for this area.

Potential Sources of Contamination	Findings	Recommended Remedial Action/Due Diligence
Asbestos	-Potential asbestos siding was found to be used on Building #2. -Potential asbestos based elbows and piping were found at Raymo Processing Facility.	In general, the asbestos containing materials pose no threat to the local environment or workers unless the fibres are released to the air through cutting, scraping or crushing. Special precautions should be taken if any repair work or maintenance is required on the asbestos containing materials.
Noise and Vibrations	Noise and vibration associated with heavy equipment operation is assumed to have been a concern when mining operations were ongoing, however it is not currently considered an issue.	None
Electromagnetic Frequencies	High voltage transmission lines are located in close proximity to the subject property (the lines generally run along Route 414). No elevated electromagnetic frequency levels have been documented for the site.	None
Radon	No evidence was collected during the site assessment to indicate that radon is a concern on this property.	None
Aboveground Fuels and Chemicals	-A number of empty rusty drums (generally of unknown contents) were found near the Raymo Processing Facility adjacent to the Tailings Pond. -A drum of unknown contents was found in the sampling storage room of Building #2. -An unidentified above ground storage tank was noted at the Raymo Processing Facility.	-Remove drums and contents for proper disposal. -Conduct a Phase II test pit and surface sampling program to delineate the vertical and horizontal extent of soil contamination near the Raymo Processing Facility.
Underground Fuels and Chemicals	The existence of several tanks was discussed in interviews with personnel knowledgeable about the site, however the locations are unknown.	Attempt to recover documentation on the whereabouts of the tanks.
Air emissions	Air emissions from heavy equipment operations and machinery is not currently expected at the site.	None
Ozone Depleting Substances (ODSs)	No ODSs documented during the site visit.	None
Mercury	Mercury-containing thermostats typically contain a small glass vial containing mercury. No mercury containing thermostats were identified during the assessment.	None
Mould	No significant mould growth was noted during the investigation.	None
Pesticides / Herbicides	No evidence was collected during the assessment to indicate the use of pesticides or herbicides on this property.	None

Potential Sources of Contamination	Findings	Recommended Remedial Action/Due Diligence
Surrounding Property Usage - Historical and Present	Several surrounding properties are still under mining lease. Concerns at the surrounding property include hazardous wastes, underground/aboveground fuel tanks, unmarked drums, collapsing buildings and PCB storage. Recreation in the area includes fishing and cabins.	None
Spills and stain areas	Stains were noted in Building #1 and Building #2 at the East Mine Site. Building #2 has confirmed PCB stains containing concentrations above applicable guidelines.	Conduct a sampling and analysis program consisting of swab and concrete core samples.
Waste Management	-Scrap vehicles, empty drums and other debris are stored near the Raymo Processing Facility. -Former employees indicate that waste was shipped off site to Baie Verte for disposal or was burned near the Tailings Area.	A Phase II sampling program is recommended in this area to determine potential contamination of soil, and/or groundwater.
Hazardous Materials	-Hazardous materials including, but not limited to cyanide, copper sulfate and zinc sulfate were used at the Raymo Processing Facility. -Sulphide bearing waste rock from the mining operations was used to construct roads connecting the mining sites, dykes and site grading.	Conduct additional intrusive work at the site to determine potential impacts to the site and off-site properties.

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1.0 INTRODUCTION

1.1 General

Davis Engineering and Associate Ltd. (DEAL) was contracted by the Provincial Department of Natural Resources (DNR) to conduct a Phase I Environmental Site Assessment of the Former Rambler Mine Property in Baie Verte, Newfoundland. The site is located off Highway 414 approximately 15 km east of Baie Verte. The site consists of five mines, numerous bodies of water, a large tailings area, several excavated pits, collapsing buildings and machinery. There are two areas located on the property that are outside the scope of work for this investigation. They consist of the large area located north of Route 414 (Ming Main Mine and Ming West Mine), and the area surrounding Rambler Main Mine located east of the tailings. A general location plan for the study area is included as Figure 1 and a site plan is included as Figure 2. As well, Appendix C contains an aerial map of the study areas provided by the client (Map #2).

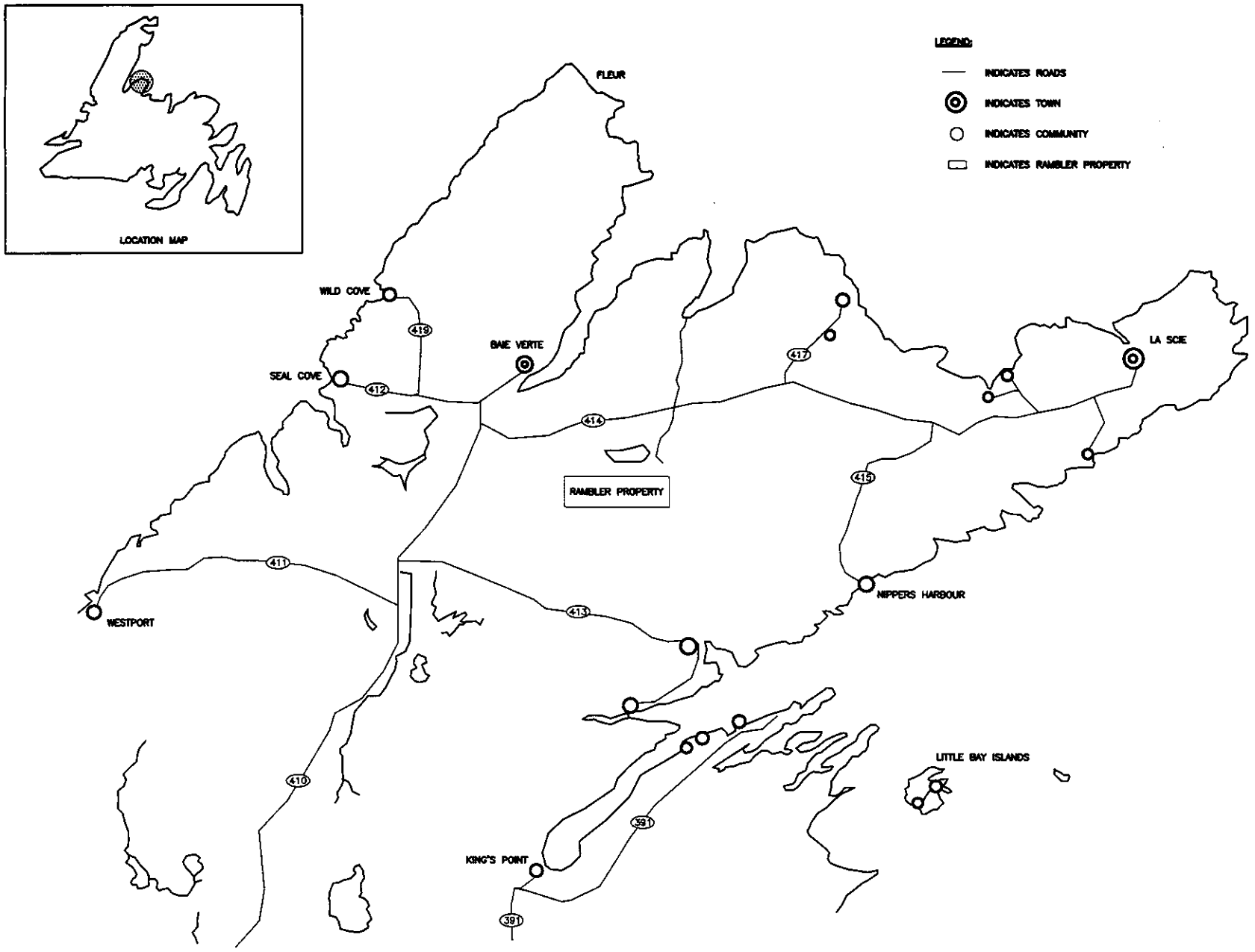
1.2 Scope of Work

The Phase I Environmental Site Assessment carried out on this property is based on the CSA Standard Z768-01, "Phase I Environmental Site Assessment (Phase I ESA)". The assessment consisted of a walk-through inspection, personnel interviews, historical review and report preparation.

The purpose of the assessment was to document specific items of concern noted in the Client Terms of Reference (hazardous building materials, staining, spills, etc.), and to advise DNR on any other relevant areas of potential environmental concern, including risk to human health and safety associated with materials, substances or nuisances discovered during the assessment and evaluation. The Phase I ESA will help to reduce the uncertainty about potential environmental liabilities and provide a basis for further investigation of the property. The Phase I ESA does not typically involve the selection or implementation of any measuring, sampling, analytical, or remediation activities, however recommendations for further investigation are included as part of the scope of this study. These activities would normally be included in Phase II and/or Phase III ESAs.

Limitations to the current study included the following:

- The work performed in this report was carried out in accordance with the Standard Terms of Conditions made as part of our contract. The conclusions presented herein are based solely upon the scope of services, time and budgetary limitations described in our contract.



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PHASE 1 ESA
FORMER RAMBLER MINE
PROPERTY
BAIE VERTE,
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FIGURE 1:

LOCATION PLAN

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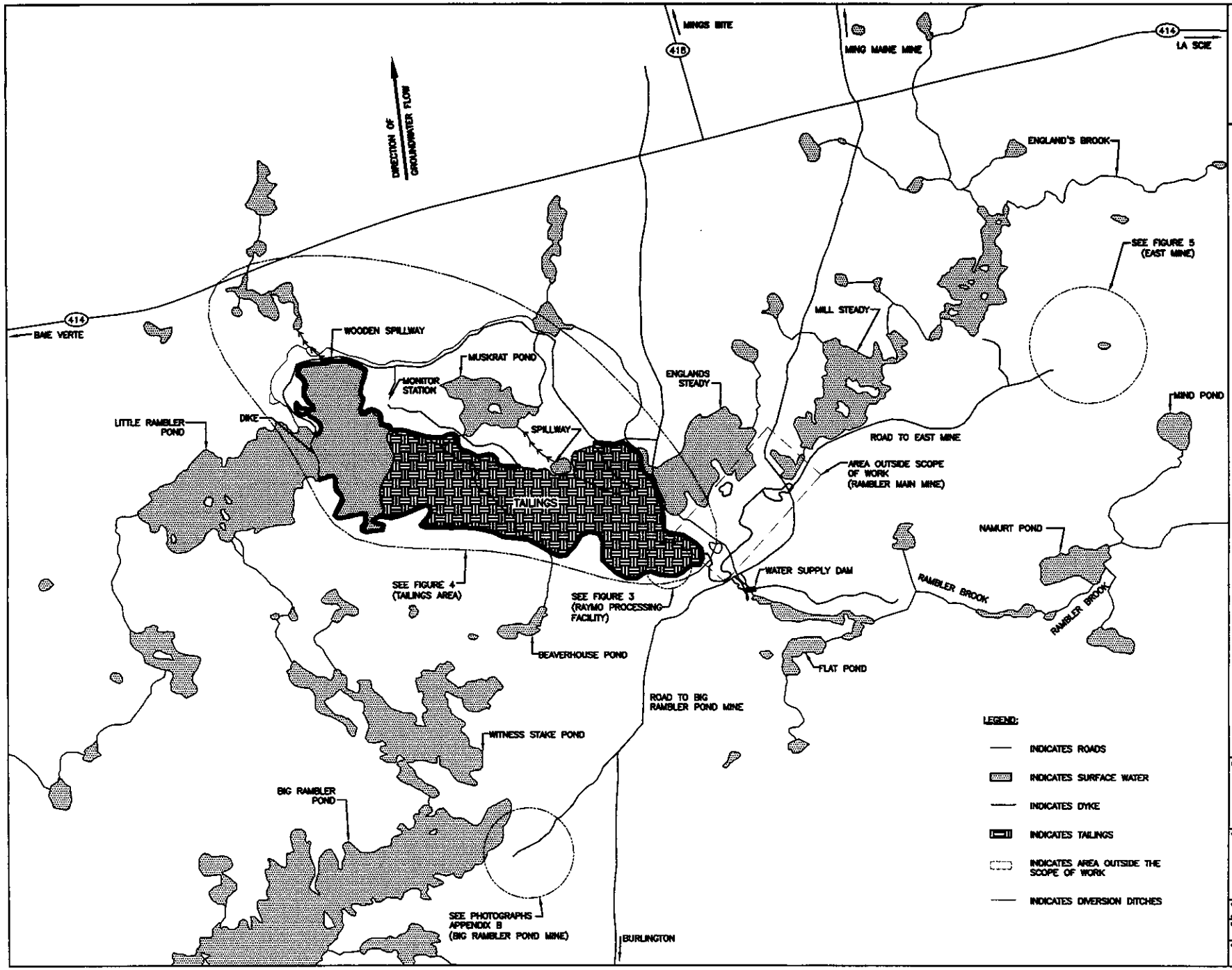

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BAIE VERTE, NL & LAB.

FIGURE 2:
SITE PLAN

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- The services performed and outlined in this report were based, in part, upon visual observations of the site and attendant structures. Our opinion cannot be extended to portions of the site which are unavailable for direct observation reasonable beyond the control of DEAL.

- The site history research performed herein relies on information supplied by others, such as local, provincial and federal agencies. No attempt has been made to independently verify the accuracy of such information.

- The conclusions of this report are based in part, on the information provided by users of the site (i.e. former workers, staff, etc.). This information is assumed to be correct.

- The site was completely snow covered during the investigation which limited a proper visual inspection of the property.

1.3 Methodology

Sections 1.3.1 through to Section 1.3.3 indicates the methods which were undertaken to complete this Phase I Assessment.

1.3.1 Walk-Through Inspection

The objective of the walk-through inspection was to visually identify potential environmental problems and/or areas for further investigation. All of the study area was accessible to DEAL during the site visit however the property was completely snow covered during the time of the site inspection. The area under investigation encompasses two mines, a large tailings area, excavated pits, collapsing buildings and processing machinery. For reporting purposes, the site will be divided into 5 areas:

1. East Mine

2. Big Rambler Pond Mine

3. Tailings Area

4. Raymo Processing Facility

5. Acid Generating Access Roads

1.3.2 Personnel Interviews

Interviews with personnel knowledgeable of the site were carried out to obtain or confirm information on potential environmental concerns related to the property. Furthermore, personnel from the following agencies were contacted for information used to complete this report:

1. Provincial Department of Environment, Inland Fish & Wildlife Division, St. John's.
2. Department of Natural Resources.
3. Department of Government Services and Lands
   - Government Services Centre, Grand Falls.
   - Crown Lands, St. John's.
   - Air Photo and Map Library, St. John's.
   - Registry of Deeds and Companies, St. John's.
   - Provincial Archives, St. John's.
4. Town of Baie Verte.
5. Miners Museum, Baie Verte.

Conversation Records are included in Appendix A.

1.3.3 Historical Review

The historical review was conducted to collect data on past activities on the site that could be interpreted as contributing to existing contamination. The historical review included a review of aerial photographs, geological maps, topographic maps and regulatory information. A review of files maintained by the Department of Natural Resources was also carried out.

The Provincial Archives in St. John's maintains Fire Insurance mapping of various areas of the Province for the years 1880, 1893, 1914, 1925, 1946, 1957 and 1964. Insurance maps indicate the location of underground storage tanks or other utilities that represent potential insurance risks for a particular property. No Fire Insurance mapping for the subject site was available at the Provincial Archives in St. John's.

2.0 SITE DESCRIPTION

There were five (5) areas of the property assessed during the current program. As noted in Section 1.3, these areas include the East Mine, the Big Rambler Pond Mine, the Tailings Area, the Raymo Processing Facility and the Acid Generating Access Roads.

The tailings area consists of a large lined pond where spent mine waste was stored. The Raymo Processing Facility is located adjacent to the Tailings Area. Water run-off from the tailings area is collected in a reagent pond. At the time of the site visit, the tailings pond was entirely covered with ice and snow. The adjacent Raymo Processing Facility consists of a conveyer belt system, vats, screening equipment, a storage tower and a partly torn down building housing electrical utilities. This facility was used for gold extraction from the tailings using cyanide. Most structures at the facility are rusty and collapsing. At the time of the site visit, old piping/elbows, gyprock, car wrecks and steel drums was scattered around the Processing Facility. Figure 3 shows the detail of the processing facility site and Figure 4 shows the details of the Tailings Area.

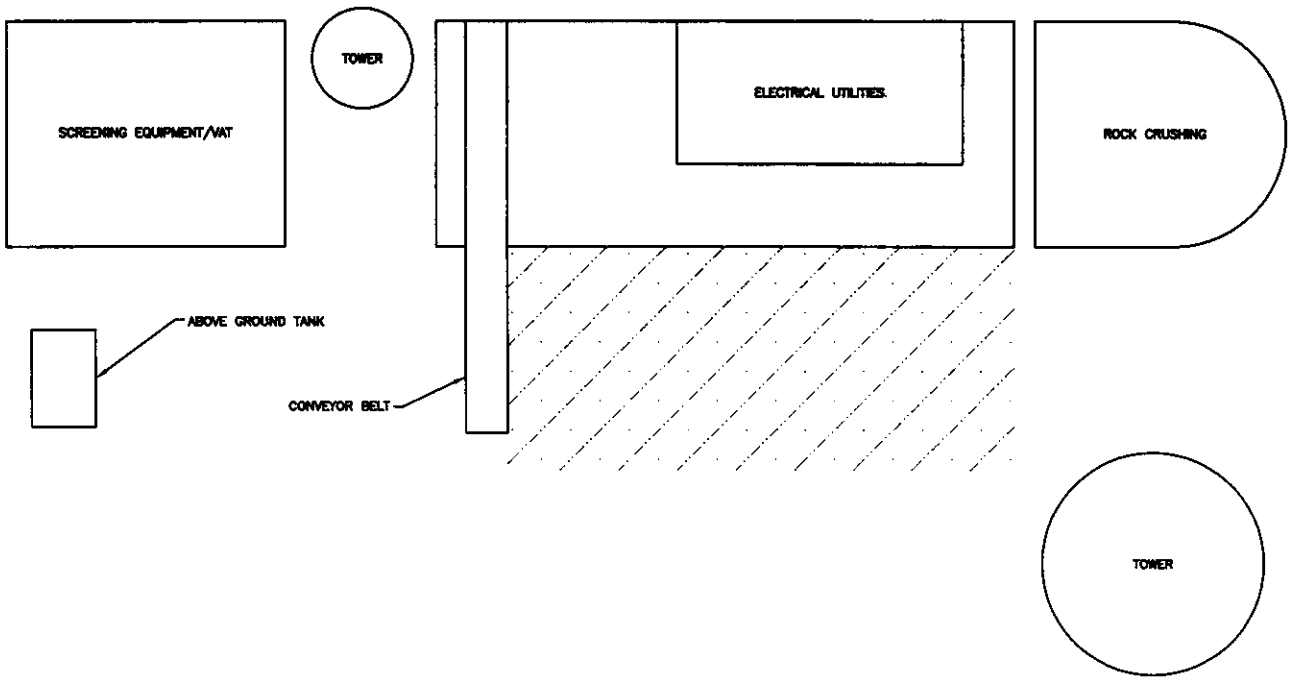
The East Mine Site is located approximately 1.5 km east of the Rambler Main Mine and consists of an open mine shaft and two buildings. The structural integrity of the Building #1 is unknown as mined ore was left on top of the building over the collapsed screening equipment and the entire building leans to one side. Located at one end of the building is a small open hole accessing what is assumed to be the mine shaft. Building #2 appears to be deteriorated and contains old sample containers, rusty drums, and several pieces of machinery historically used at the site for hoisting activities. One area of the building was once used for PCB Storage, however documentation suggests that all PCBs have been removed. A high pressure air tank is located at the rear of the building. A site drawing of the East Mine area is included as Figure 5.

The Big Rambler Pond Mine is located adjacent to Big Rambler Pond approximately 2 km southeast of the Rambler Main Mine and consists of an open pit and mine shaft. The open pit was accessible, however it was covered with ice and snow at the time of the site visit. At the time of the investigation it was unclear as to the exact location of the mine, due to the snow conditions. Located near the open pit was partially buried debris and a partially built cabin. Several other cabins are located in the Big Rambler Pond area.

Behind the bunkhouses on the Main Mine site is a small pump house and reservoir. This pump house was historically used to pump water from the small pond also located behind the bunkhouses. The pump house appeared to be in good condition however access to the building was hampered by snow cover.

It is reported that sulphide-bearing waste rock from the mining operations was used for grading and construction of all roads on site connecting the mining areas. The dyke constructed north of the Tailings Area and across Little Rambler Pond have also been identified as potentially containing low grade acid leaching ore. At the time of the site visit, it was impossible to determine the expanse of roads built with acid generating material due to snow covered conditions.

Site photographs taken during the investigation are located in Appendix B. Appendix B also contains recent photographs provided by DNR, taken prior to the site becoming snow covered. (Photographs 1A-14A).



LEGEND:

INDICATES DRUMS, CARS WRECKS, AND DEBRIS

INDICATES BASIN

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FIGURE 3:

RAYMO PROCESSING FACILITY ADJACENT TO TAILINGS POND

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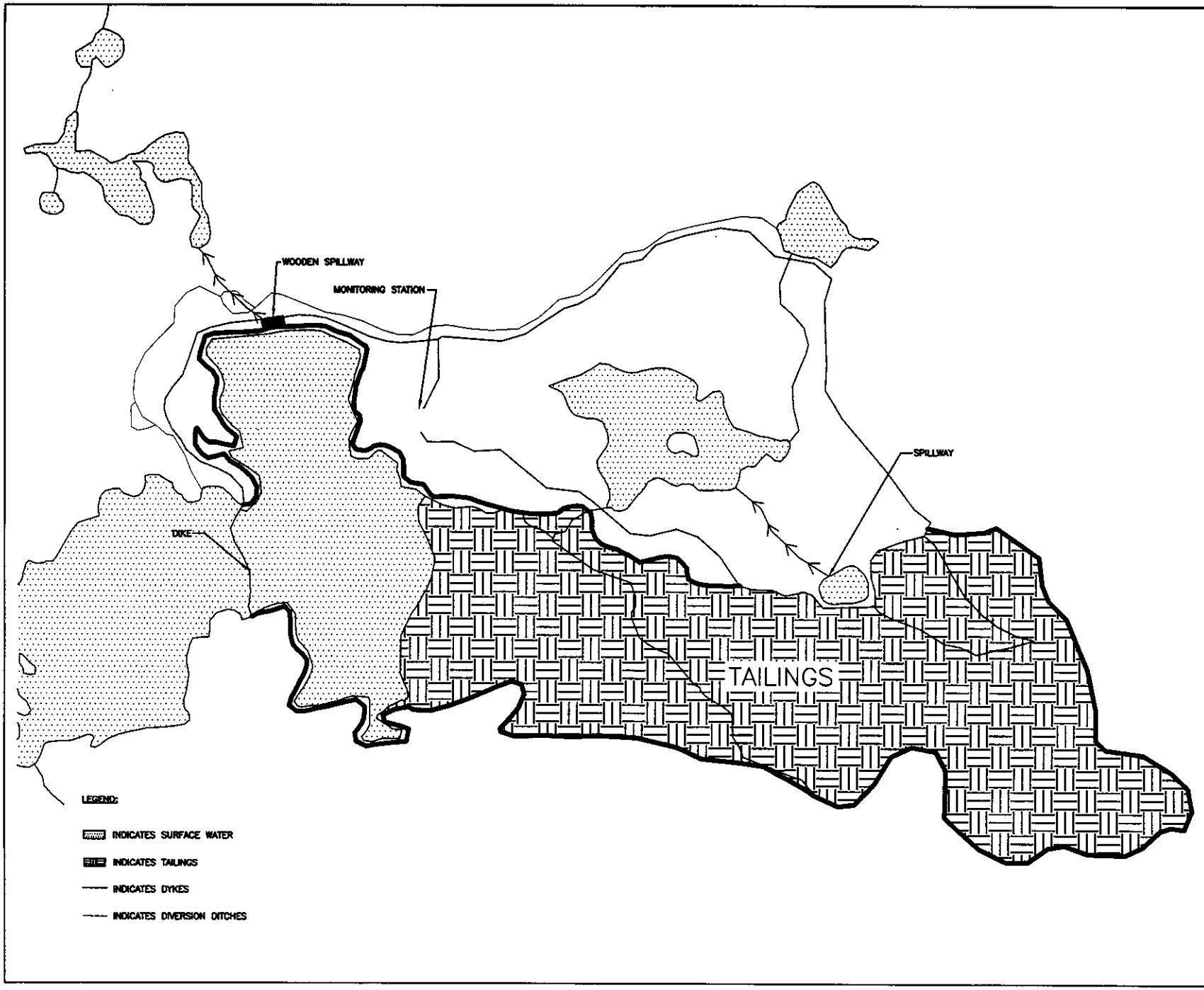

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FIGURE 4:

TAILINGS AREA

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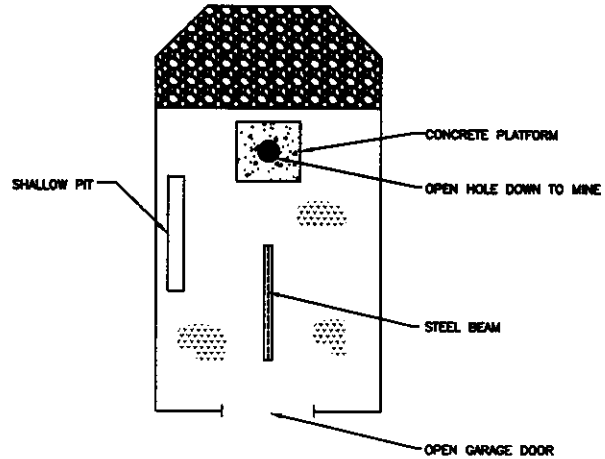
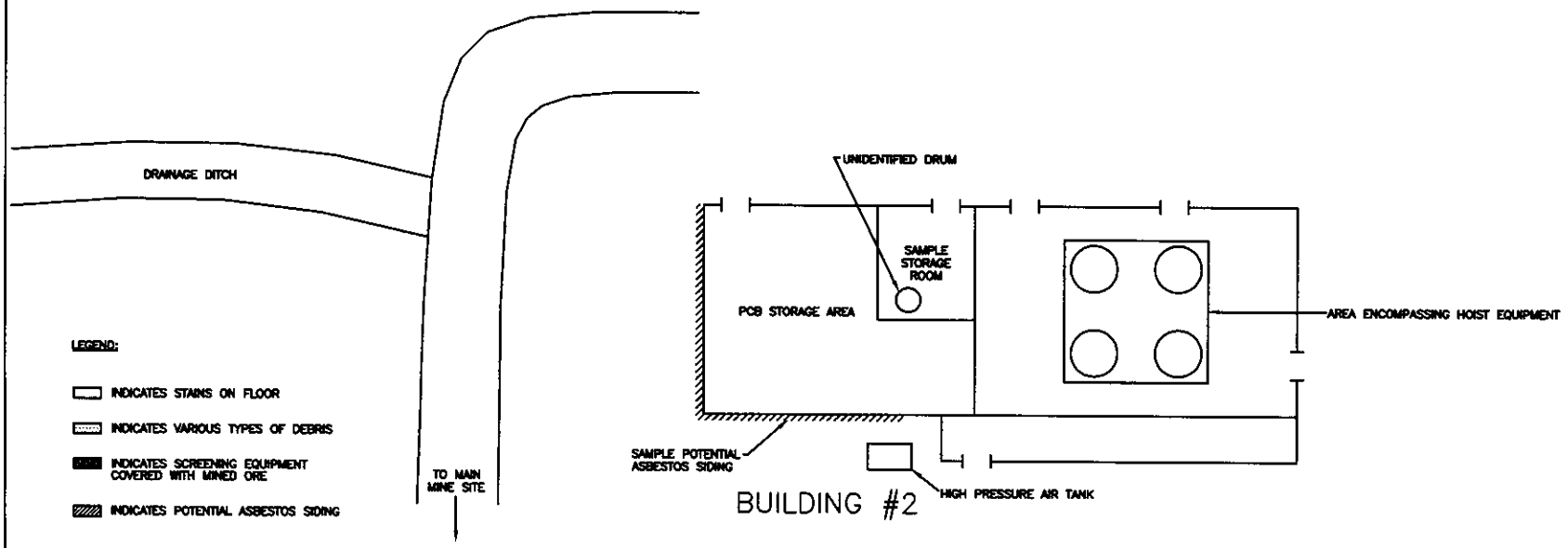
NOTE:

1. SAMPLE ACCESS ROADS AND DITCHES FOR ACID LEACHATE AS NECESSARY.



BUILDING #1



BUILDING #2

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FIGURE 5:

EAST MINE SITE

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3.0 RECORDS REVIEW

3.1 Air Photographs

Air photographs were obtained from the Provincial Air Photograph and Map Library in St. John's. Select photographs are included in Appendix C and all are listed in the table below.

Table 2: Air Photograph Listing

Year Taken	Roll Number	Frame	Scale
1999	99018	203, 205 & 136	1:12,500
1999	99034	88	1:12,500
1983	83030	25, 27	1:12,500
1979	79005	26	1:40,000
1975	24169	18	1:30,000
1966	18884	176	1:15,840
1950	12793	10	1:40,000

There was evidence revealed during the air photograph review to suggest potential environmental concerns related to the subject property. Due to the scale on the available photographs, it was difficult to determine the extent of contamination, however in several of the photographs the pond known as Little Rambler Pond coupled with the area now known as Tailings appeared to be impacted with an unnatural colorful substance. The first sign of impacts to this area are visible in the 1975 photograph. Potential environmental impacts can be seen in the above noted area as well as the East Mine area on color photographs 1979, 1983 and 1999 (Appendix C).

3.2 Title Search

A title search for the study area was completed by the Department of Natural Resources in 2002. This extensive search details the property ownership and liability from 1919 to 2002. The entire property is divided into 13 original sections denoted Areas A-M shown in Figure 6, page 13. The areas involved in this study include Area A (Big Rambler Pond Mine), Area C (the tailings area) and Area E (the East Mine). The transfer of ownership for these areas is noted below:

Area A

Baie Verte Mining Company: full control and liability from 1949 - 1974; transferred rights and liabilities to Consolidated Rambler Mines Ltd. in 1974.

Consolidated Rambler Mines Ltd: acquired full rights and assumed full liability in 1974; part of an agreement with several other companies.

INCO Gold: acquired the rights and title to buildings erected on the land but did not acquire any surface or mineral rights; appears the CROWN claimed the title to these buildings following the reversion as allowed by s. 31 (2) of the *Mineral Act, 1976.*

CROWN: rights to the area reverted to the CROWN in 1987 due to lack of compliance with the conditions outlined in the Mineral Act, 1976, specifically five years of inactivity; area was designated as an exempt mineral land and re-opened for staking.

Petromet: this area was combined with several adjacent properties to form licence 3514 and the full mineral rights were issued in 1988; Petromet assumed full liability until the rights were transferred to NF Exploration Company in 1992.

NF Exploration Company: acquired the rights and assumed full liability in 1992.

Drug Royalty Corporation: the rights under licence 3514, including area A, were conveyed to DRC later in 1992.

NovaGold Resources: acquired full rights/liabilities for the area in 1993.

CROWN: rights to properties covered by licence 3514 reverted to the CROWN in 1993, as allowed by *Mineral Act 1990*, and were designated as exempt mineral lands and reopened for staking; 3514 is divided and mineral licence 4808, which includes the original area A was created.

Area C

Jawtam Key Gold: full control and liability from 1949-1974; transferred rights and liabilities to Consolidated Rambler Mines Ltd in 1974.

Consolidated Rambler Mines Ltd: acquired full rights and assumed full liability in 1974; part of an agreement with several other companies.

INCO Gold: acquired the rights and title to buildings erected on the land but did not acquire any surface or mineral rights; appears the CROWN claimed the title to these buildings following the reversion as allowed by s. 31 (2) of the *Mineral Act, 1976.*

CROWN: rights to the area reverted to the CROWN in 1987 due to lack of compliance with the conditions outlined in the *Mineral Act, 1976*, specifically five years of inactivity; area was

designated as an exempt mineral land and re-opened for staking.

Petromet: this area was combined with several adjacent properties to form licence 3514 and the full mineral rights were issued in 1988; Petromet assumed full liability until the rights were transferred to NF Exploration Company in 1992.

NF Exploration Company: acquired the rights and assumed full liability in 1992.

Drug Royalty Corporation: the rights under licence 3514, including area A, were conveyed to DRC later in 1992.

NovaGold Resources: acquired full rights/liabilities for the area in 1993.

CROWN: rights to properties covered by licence 3514 reverted to the CROWN in 1993 as allowed by *Mineral Act 1990*, and were designated as exempt mineral lands and reopened for staking; area C north of the La Scie Highway was made part of mineral licence 4532 while area C that lies south of the highway was included in mineral licence 4808.

Ming Minerals Inc: area covered by mineral licence 4808 © north) was staked by Ionex on behalf of Ming Minerals Inc in 1994; mining lease 145 was issued to Ming in this area in 1996 and Ming remained in control until the property reverted back to the CROWN in 2002; mineral licence 4532 © south) was awarded to Ming in 1994 and mining lease 141 was issued for that area in 1995 and Ming have remained in control of the area, with full liability, since that time.

Area E

Bernard Norris: granted a fee simple for the area in 1949; held 100% interest and assumed full liability until 1974.

Consolidated Rambler Mines Ltd: acquired full rights and assumed full liability in 1974; part of an agreement with several other companies.

CROWN: rights to the area reverted to the CROWN in 1987 due to lack of compliance with the conditions outlined in the *Mineral Act, 1976*, specifically five years of inactivity; area was designated as an exempt mineral land and re-opened for staking.

Petromet: this area was combined with several adjacent properties to form licence 3514 and the full mineral rights were issued in 1988; Petromet assumed full liability until the rights were transferred to NF Exploration Company in 1992.

NF Exploration Company: acquired the rights and assumed full liability in 1992.

Drug Royalty Corporation: the rights under licence 3514, including area A, were conveyed to DRC later in 1992.

NovaGold Resources: acquired full rights/liabilities for the area in 1993.

CROWN: rights to properties covered by licence 3514 reverted to the CROWN in 1993. As allowed by Mineral Act 1990, and were designated as exempt mineral lands and reopened for staking; 3514 is divided and mineral licence 4808, which includes the original area E, was created.

Ming Minerals Inc: area covered by mineral licence 4808 was staked by Ionex on behalf of Ming Minerals Inc in 1994; mining lease 145 was issued to Ming for this area in 1996; Ming Minerals assumed full liability for this area until the majority of the land, including area E, reverted to the CROWN in 2002. (There is still a 19 ha. area controlled by Ming Minerals under mining lease 145.)

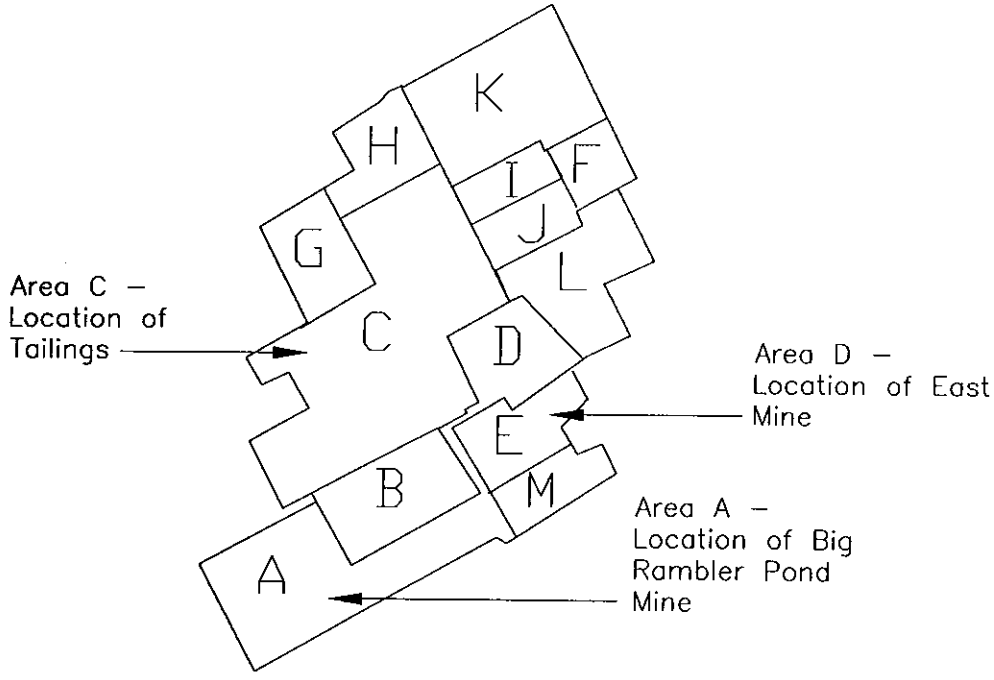


FIGURE 6

3.3 Topographical Maps

Topographic maps indicate that the site is heavily treed other than areas that have been developed for roads, buildings and mining usage. There are two main roads running north to south through the site with smaller roads accessing the east mine and small ponds on site. Several large ponds are located on site including Big Rambler Pond, Little Rambler Pond, Englands Steady, Mill Steady, Witness Stake Pond and Muskrat Pond. The sites under investigation and the surrounding area are not host to any heritage buildings, wilderness/ecological reserves, or wetlands.

The land slopes moderately toward the northeast with the drainage of groundwater following the same direction and eventually draining into Baie Verte Harbor via South Brook. Many abandoned mines and the tailings (waste) area are indicated on the available topographic mapping. A reference topographic map is located in Appendix C (Map #1).

4.0 REGULATORY AGENCY REVIEW

The Government Services Centre (GSC) and Environment Canada were contacted for information pertaining to land use, and any environmental issues of note (spills, fuel storage and use, chemical use, reported incidents, etc.). At the time of submission of this report, information from GSC was not provided.

The records search conducted by Environment Canada did not reveal any information regarding spills, incidents, chemical use or fuel storage at the site. However, information regarding the issues associated with Environment Canada's mandate under the Fisheries Act was uncovered during the search. This information is included in Appendix D and is summarized below:

- In November 2001, Environment Canada released results from tests completed in June 2001 on the Tailings Pond Effluent. Due to an extremely low pH, the effluent was deemed lethal to rainbow trout and possibly in violation of the Fisheries Act.

- In June 2001, grab samples were taken from the discharging effluent from the Tailings Pond. At this time an extremely low pH, and high metals parameters were reported.

Several studies and tests similar to those mentioned above have been completed by Environment Canada on the Tailings Pond Effluent. A limited amount of information was provided by Environment Canada with the indication that other information similar to that provided was available, however all information focuses on the same problems and issues.

5.0 DEPARTMENT OF NATURAL RESOURCES RECORDS REVIEW

A review of all the Department of Natural Resources records was completed. All documentation including correspondence within the Department, Reports and other information is located in Appendix E. The following issues (recorded by date) were noted during the records search:

- On June 10th, 1987 the minutes of a meeting between 3 government employees indicated that there were 2,000,000 tonnes of tailing at the Rambler Site which drains into England's Brook . It also indicated that there are significant problems (liabilities) at the Rambler site, including site rehabilitation and (possibly) high zinc concentrations in the effluent from the tailings pond.

- On August 2, 1989, a bioassay was completed on rainbow trout and salmo gairdneri where they were submerged in the tailings pond effluent. Six (6) tests were completed, each one testing for temperature, pH, dissolved oxygen, conductivity, and overall % mortality. In two of the six tests, the levels tested resulted in 100% mortality. It was concluded that the Tailings Pond effluent was extremely toxic to fish but could be rendered less toxic simply by increasing the pH.

- On June 25th, 1992 a site inspection was conducted by Environment Canada on the property in question. During this inspection, it was discovered that a dyke used to retain tailings and divert uncontaminated water from the tailings area had been breached due to beaver dams in the area. Samples were taken at this time and the waters tested were non-toxic.

- On September 15th, 1992 another site inspection was conducted by Environment Canada. During this visit it was noted that the original dyke breach had worsened and that there was now another dyke breach on the opposite side of the tailings pond. This meant that most of the diverted water was now flowing directly through the Tailings Pond. The sampling results from this site visit are located in Appendix E.

- On April 1st, 1993 bioassay results for two tests on the Tailings Pond effluent showed that in one of the tests with 100% concentration 9/10 rainbow trout perished within 41 hours.

- An inspection of the property in 1995 included the known dyke breach, the spillway for the tailings pond and sample collection. Five samples were taken near the breach and the spillway. Two samples were returned with abnormally high concentrations of metals and acidic pH.

- A study completed in 1995 by J.W. McConnell included sampling several stream sites in the Rambler area in 1993. Results indicated that South Brook was impacted with toxic levels of heavy metals and highly acidic pH.

- An interview was published from the radio program "On The Go" where commentators discussed the Rambler Mine situation with John McConnell, the local scientist who had completed the previously mentioned study in 1995. Some of the main points discussed included fatally high copper levels and acidity in nearby waters. This correspondence is attached in Appendix E.

- On May 23rd, 1996 the Department of Natural Resources carried out an inspection on the Rambler Mine Property. Environmentally related observations included a number of 205 litre steel drums marked "sodium cyanide" in two different locations on the property. At least one of these drums had been damaged and had the top secured with plastic and electrical tape. During this inspection, it was evident that construction activities had commenced before the Environmental Assessment Process had been approved. Under the Environmental Assessment Regulations, no construction or site preparation should have been undertaken. Also noted was the small stream running directly through the property that was supposed to be re-diverted around the open pit area before mining work commenced.

- A memo between two government employees on November 9th, 1998 indicated concern about the amount of precipitate in water outside a settling pond on the Raymo-Elektra site as this indicates an acidic environment.

- On November 9th, 1999, a letter written from Richmont Mines to DOE indicated the following concerns:

    1. Chemicals including cyanide remaining at this abandoned site.
    2. Empty chemical containers with chemical residue present.
    3. Contaminated water being held in leach vats.
    4. Contaminated water being held in the reagent pond.
    5. The many pits dug in the tailings pond provides increased contact area which allows for accelerated acid mine drainage.
    6. The piles of tailings left beside the pits provide for more airborne contaminants.

- On December 6, 1999 reclamation activities commenced for a period of 10 days by a local contractor. The first stage of the reclamation was the clean-up and disposal of used cyanide drums with chemical residue. Drums containing cyanide were being stored in such a way allowing rainwater to dilute the cyanide and the metal in the drums to deteriorate. All drums were thoroughly washed, crushed and transported off site for

proper disposal. Test pits located in the Tailings area were pushed in and leveled to reduce airborne contaminants and improve public safety at the site. Contaminated vat effluent was removed from Vats #1 and #2 and treated through a dilution process. These vats were then filled with material from the tailings and fresh material. The reagent pond was treated with a similar dilution process and eventually filled in. The reagent pond dam and liner were pushed in, buried and leveled. Hazardous chemicals stored on site were transported to Nugget Pond Site for the offloading and storing by trained hazardous waste handling personnel.

- On December 21, 1999 a site visit by two government employees indicated that the liner for Reagent Pond was breached so that water could not collect in that pond. The conglomerated tailings still drained into this area and a sludge remains at the bottom of the pond.

- In 2001 Environment Canada tested the mortality rate of rainbow trout using the water from South Brook. The result was the mortality of all fish used in the experiment and sampling results of a pH of 3.2 and a concentration of 712 parts per billion copper. Also in 2001, 12 samples were taken from the same sites as 1993 and 2000. Many of the areas sampled contained high to toxic levels of copper, zinc, sulfate and pH.

- On September 16, 2002 a site inspection was conducted by the Department of Natural Resources on the Rambler Property including sampling to indicate the quality of drainage and if cyanide was present. Nine (9) water samples were taken from nearby streams and South Brook. The pH of most samples was in acidic vicinity with the majority being between 2 and 5. The cyanide tests indicated just one area (standing water inside a berm at base of tailings pile) had significantly high levels of cyanide. The sample results from this inspection are located in Appendix E.

- In September 2003, Jacques Whitford Environment Limited conducted an assessment on soil, sediment, surface water and floor surface conditions on site with respect to potential PCB impacts. The investigation included installation of five (5) test pits, collection of PCB swab samples and sampling/analysis of soil, sediment and surface water for PCBs. Concentrations of PCBs exceeding CCME criteria were confirmed at one soil sample location near the storage building and six swab samples taken inside the PCB Storage Building. Recommendations to conduct further sampling, delineation and development of a remedial action plan were given at that time.

6.0 POLLUTION PREVENTION DIVISION INFORMATION REVIEW

A records search was also conducted at the Pollution Prevention Division of the Provincial Department of Environment. Information regarding possible pollution issues and environmental

concerns or hazards is summarized below and included in Appendix F:

- A meeting on June 3, 1975 touched upon the following topics:
  - high mercury levels in effluent that Rambler indicated must be of natural occurrences as they do not use any mercury in their processes.
  - vegetation growth from experimental plots of 1974 was poor.

- Vegetation of the tailings, tailings effluent levels and mine abandonment was discussed in a meeting on December 7th, 1978. The experimental plots started in 1974 were deemed unsuccessful and had been discarded. The pH levels in the tailings experienced a seasonal drop from 6 to 3-4. A increase in lime loading was doubled and the pH remained as low.

- Vegetation plots were discussed during a meeting with government employees in November 1979. The tailings vegetation of 1979 gave encouraging results and 5 of 25 acres of tailings were anticipated to be vegetated by 1980.

- On December 9th, 1981, another meeting and inspection of Rambler Mines took place. At this time the tailings vegetation indicated potential growth of 50-70% of one plot and the main dump site had been buried over and graded.

- On October 13th, 1983 an inspection again showed some potential for vegetation growth, however no further vegetation experimentation was to be conducted. At the time of the inspection, various PCB storage areas on site housed transformers with very small leaks.

- From 1976 to 1985 several sampling and assay reports were issued. These reports commonly included high levels of pH and a resulting high toxicity to fish.

- On March 22nd, 1994 a briefing note indicated that a complaint had been filed about a PCB transformer building which had been sold and removed leaving the transformer exposed to the elements. It was confirmed on February 28th, 1994 that the transformer containing 441 gallons of PCB oil was exposed to the elements and had been leaking from a valve at the top of the transformer. The mill building which housed more PCB transformers was fully accessible and in extremely deteriorated condition. At this time a temporary building was constructed to house the PCB transformer, the mill building was secured and a monthly inspection by a local caretaker was to be conducted.

- On August 17, 1994, a site visit was conducted by a government employee to discuss the Rambler Tailings Project. At the time of the site visit, the tailings area had been dug up and equipment for gold recovery was noted on site. Leachate from an existing tailings pile, showing signs of high acid concentration was observed running out freely from

underneath the pile.

- On October 2nd, 2000 an inspection at the Rambler/Raymo/Electra site indicated that a marsh area on the right hand side of the access road had a large patch of 'red' grass along a stream that flowed into the road ditch. The area in question was downstream of the tailings pond and the 'red' grass indicated the possibility of acid drainage.

- Several site inspection reports were uncovered from November 2001, September 2002 and July 2003. The following was observed during these visits:
  - acid generating material was used throughout all sites for road construction and site grading.
  - headframe collapsed and posed safety risk in current condition.
  - tank present behind former PCB storage building.
  - area of noted concern on road to east mine where materials from trucks were dumped.
  - dam (with pump house) still appears to be retaining water.
  - high cyanide results at monitoring well #4 were apparently caused by cyanide coming from the stacked process tailings from the former Raymo operation.

7.0 SITE VISITS AND FINDINGS

An initial walk through of the property was conducted on December 17th, 2004. The initial walk through was conducted by Neil Hunt in the presence of Alex Smith and Ned Vukomanovic of the Department of Natural Resources. A subsequent detailed assessment was carried out by field staff on January 11th & 12th, 2005. A summary of the findings is given in the following sections.

7.1 Lead

Two common sources of lead in buildings are lead paints and lead solder on water pipes.

Lead Paint

In 1976, the lead content in interior paint was limited to 0.5% by weight under the Federal Hazardous Products Act. Potential lead based paint was noted as peeling from the structures (towers, rock crushing drum, screening equipment) at the small processing facility adjacent to the tailings pond. The PCB Storage Building on the East Mine site also had potential lead based paint peeling from the walls. Although it was difficult to ascertain the exact amount of buried metal debris at the Big Rambler Pond site, there is evidence to show that some metal debris containing potential lead based paint, is now partially buried there. No lead containing batteries were found at the study area.

Water Pipe

Copper tubing (for water distribution) generally uses solder containing lead, which can enter the water supply. Typically this only causes a problem for the first two years following the pipes installation, after which a coating of minerals in the pipe forms a barrier between the lead and the water. In order to determine if lead is a problem in the water, it should be tested by a commercial laboratory. The buildings located on site did not appear to have any water distribution systems indicating that lead soldering is not a problem here.

7.2 Urea Formaldehyde Foam Insulation (UFFI)

Urea formaldehyde foam insulation is a thermal insulation product which is injected as a mixture of urea formaldehyde resin, an acidic foaming agent, and a propellant, such as air. The insulation was used in the 1970's most extensively from 1975 to 1978. It was banned in 1980 under the Federal Hazardous Products Act, as a result of health effects associated with the release of formaldehyde gas into buildings. During this period, UFFI was installed in both new and existing buildings by injecting the foam into areas such as behind walls, where it was impractical to provide conventional insulation.

There was no evidence collected during the investigation to suggest that UFFI is a concern at this site.

7.3 Polychlorinated Byphenyls (PCBs)

Polychlorinated biphenyls (PCBs) are synthetic compounds consisting of chlorine, carbon and hydrogen. Their fire resistant and insulating properties made them ideally suited for use as cooling and insulating fluids in industrial transformers and capacitors. The use of PCBs in electrical equipment at the site was not ascertained during the assessment. Provincial environmental authorities should be contacted prior to the decommissioning and disposal of any electrical equipment suspected of containing PCBs.

Most fluorescent light ballasts manufactured before 1979 contain about a teaspoon of concentrated PCBs sealed inside the capacitor. The capacitor is usually surrounded by a tar like potting material and is enclosed in the ballast box. Normal ballast operation does not emit measurable amounts of PCBs, but when an old ballast fails, the capacitor may rupture and leak PCBs. Fluorescent light ballasts were not found in the buildings on site.

A PCB Storage Area was identified in Building #2 at the East Mine site (see photographs 14 and 13A). The extent of PCB Storage in this building is not known, however all PCBs appear to have been removed. Correspondence regarding this building and the contents was noted between parties involved in the transfer of ownership in 1988. During this transfer of ownership, it

appears that the companies involved in the transfer were not willing to accept responsibility for the PCB storage area. Consolidated Rambler Mines was eventually charged with knowingly selling PCB contaminated material and PCB liquids to INCO who were unaware of the PCBs on the property. INCO eventually agreed to monitor and inspect the PCB containing building until it was reverted back to the Department of Environment giving them the responsibility for monitoring, removal and remediation of the area.

As discussed in section 5.0, samples taken by JWEL in 2003 indicated areas of soil around Building #2 impacted by PCBs exceeding CCME criteria. Also, several swabs taken from the PCB Storage Area in Building #2 indicated impacts to the floor and walls. To date, there is no knowledge of additional soil/water /swab/concrete core samples being taken or completion of contamination delineation as recommended by JWEL.

Correspondence related to the PCB storage is located in Appendix E.

7.4 Asbestos

Prior to the 1980s, many construction materials used in buildings contained asbestos. The common use of potentially friable (breakable by hand) asbestos containing materials (ACM) in construction generally ceased voluntarily in the mid 1970s; however, in Newfoundland, the application of asbestos fireproofing material was not prohibited until 1991. Many non-friable asbestos materials are still in production and use. The presence of ACMs poses a concern of occupant exposure to airborne asbestos fibre due to disturbance or deterioration of these materials. Potential asbestos siding was noted on two sides of Building #2 at the East Mine Site. Piping and elbows located at the Raymo Processing Facility are also noted as potentially containing asbestos. No other asbestos was noted on site.

7.5 Fuel Handling and Storage

No underground storage tanks were noted on site, however one above ground tank was noted and numerous abandoned drums were located at two of three of the sites. A description of the storage drums and tanks and approximate locations are indicated below:

- Numerous drums were located adjacent to the tailings area near the Raymo Processing Facility (See photograph 3, Appendix B). These drums were found empty and did not contain labels.

- A large rusting drum containing an unknown substance was found in the sample storage room of Building #2 at the east mine site.

- An above ground tank was found at the Raymo Processing Facility, however access to the

tank was hampered by snow and ice conditions.

- Several personnel interviewed suggested that there may be underground fuel storage tanks located on site, however no underground tanks were noted within the study limits during the investigation.

- Through personnel interviews it was uncovered that used oil was deposited in drums and burned with garbage near the Tailings Area.

7.6 Radon

Radon is a naturally occurring radioactive gas that is created by the radioactive decay of uranium in the Earth's crust. Radon can be found in high concentrations in soils and rocks containing uranium, granite, shale, phosphate and pitchblende.

According to information maintained by the geological survey branch of the Department of Natural Resources, there has been no radon testing completed for the subject property. The geological composition of rock in the Rambler Area is mainly volcanic and sedimentary rocks of island arc affinity. It is underlain by a moderately to steeply northerly dipping sequence of metamorphosed mafic volcanics and volcaniclastics, with lesser amounts of felsics.

Although radon is not considered to be an immediate concern at this site, the only way to conclusively determine if radon is present in high concentrations is to have the site buildings tested.

7.7 Ozone Depleting Substances

The operation, maintenance, decommissioning, and disposal of ODSs is regulated at both the federal and provincial level and must comply with Newfoundland Regulation 120/97, *Ozone Depleting Substances Regulations, and the Code of Practice for the Reduction of Chlorofluorocarbon Emissions from Refrigeration and Air Conditioning Systems*, Environment Canada, EPS 1/RA/2, March 1996.

No refrigeration type units were noted during the investigation and as such, ozone depleting substances are not expected to be a significant concern within the study area.

7.8 Spills and Stains

Staining was noted in both buildings on the East Mine site, however staining on the exterior of the buildings was not ascertained due to the snow cover. Stains found in the PCB storage room (Building #2) have been tested in a previous study. The results indicated that six swab samples

taken from the stained areas contained PCB concentrations that exceeded the applicable limits.

The Government Services Centre (GSC) and Environment Canada were contacted for information regarding possible spills in the area. No information regarding spills in the area was reported.

Table 3 indicates areas of staining within the buildings located in the study area.

Table 3: Areas of Staining

Area	Location	Observation
East Mine Site	Building #2 - PCB Storage Area	Numerous Dark Stains on floor and walls
East Mine Site	Building #1	Stains located throughout the main storage area

7.9 Electromagnetic Frequencies

Although no elevated electromagnetic frequency levels have been documented for the site, high voltage transmission lines are located throughout the subject property (the lines generally run from Route 414 to the Main Mine Area).

7.10 Air Emissions

Air emissions from heavy equipment operations, processing facilities and machinery is expected to have occurred when the site was in use, however this is currently not an issue as the site is abandoned.

7.11 Pesticides/Herbicides

No evidence was collected during the assessment to suggest that pesticides or herbicides were ever used at this site.

7.12 Noise and Vibration

Noise and vibration was most likely a concern while the mining operations were ongoing, however it is not considered a problem currently as all areas under investigation have been abandoned.

7.13 Water and Sewer Services

Water for the processing facilities and other services on site was historically pumped from a small pond located behind the bunkhouses at the Main Mine site. No septic systems are reported to be located within the study area

7.14 Mould

Moulds such as ulocladium and cladosporium are very common airborne molds which are capable of growth on a wide variety of materials. These moulds are not normally considered harmful, although inhalation of large quantities of mould material could cause allergic reactions in persons who are sensitized.

One type of mould often associated with cellulosic materials (paper, wallboard cover) which have suffered major water damage is "Stachybotrys". While some health effects of Stachybotrys exposure are subject to debate in the medical and scientific community, the current consensus appears to be that excessive exposure to this mould should be avoided, and it is considered to be an unacceptable component of the indoor environment.

No significant mould growth was noted on the interior of the buildings during the assessment, however extensive searching for mould in the buildings was not carried out due to the unknown structural stability of these buildings.

7.15 Mercury

Mercury-containing thermostats typically contain a small glass vial containing mercury. No thermostats were found during the walk through investigation.

7.16 Surrounding Property Usage - Historical and Present

Several surrounding properties are currently still under mining lease, however no mining operations were occurring at the time of the site visit. These areas include Ming Main Mine and Ming West Mine to the north of the study area and Rambler Main Mine in the center of the study area. These areas are currently under mining leases 141 and 145 respectively. Due to the close proximity of the Rambler Main Mine to the rest of the site under investigation, a cursory assessment was completed at this site. The area consists of a main mine shaft along with an enclosed processing facility, several collapsing buildings and sheds. Also located at the Main Mine site are falling telephone poles, partially buried debris and a collapsing tailings pipeline structure. There is a security shed containing a sink with copper pipes and peeling paint on the walls and ceiling, both which could contain lead based products. Three underground fuel storage tanks are located near a small shed on the Main Mine site, however they have reportedly been

emptied. Four large buildings on the Main Mine site appeared to be employee lodging, kitchen, cafeteria, and employee offices. The office building appears to be in good condition, however the other three contain collapsing ceilings and caving floors. Hazardous material including chemicals and PCBs are reportedly currently being stored at the Main Mine Site.

South Brook is downstream of Little Rambler Pond and since the collapse of two dykes in this area, cyanide impacted water appears to be flowing into this brook. This water course was once a prosperous salmon fishing ground, however local information suggests that dead fish have been found in the area. Several studies completed by Environment Canada indicate that the tailings effluent is acutely lethal to rainbow trout and salmo gairdneri.

There are also several cabins located near the Big Rambler Pond site as well as one currently being constructed on site near the pond.

7.17 Waste Management

It was noted during the walk through inspection that scrap vehicles, empty drums and other debris are stored near the Raymo Processing Facility adjacent to Tailings Pond. Partially buried debris is also located at both the East Mine site and the Big Rambler Pond site.

Former employees indicate that waste management practices included both shipping off site to Baie Verte for disposal and burning in a waste disposal pit near the Tailings Area.

7.18 Hazardous Materials

At the Raymo Processing Facility several chemicals were used during the gold extraction processes. The most prominent is cyanide, however other chemicals such as copper sulfate and zinc sulfate were also used. These chemicals were stored on site after the Raymo Processing Facility was abandoned and were removed in 1999.

It is reported that sulphide-bearing waste rock from the mining operations was used for grading and construction of all roads on site as well as the dyke north of the Tailings Area and across Little Rambler Pond. Several site investigations have reported vegetation damage along the roads and ditches. During one site investigation by a government employee a large patch of 'red' grass was noted along a stream that flowed into the ditch adjacent the road.

8.0 FACILITY INVENTORY AND DECOMMISSIONING OPTIONS

Three alternatives are available for the decommissioning of buildings and other facilities on site. The first option is to demolish the structure, remove all materials from the property and dispose of it at the proper facilities. A second option is to attempt to salvage the building on site for

future use. If environmental issues are impacting the structures, refurbishing will involve environmental remediation. The third option is 'no action' which involves leaving the structures exactly as they are. The following indicates the structural stability of the structures and the salvageable contents at the sites:

East Mine Site:

- Building #1 at the East Mine site is in very poor condition and could therefore pose a safety hazard.
- Part of the roof has collapsed at Building #1 with the weight of mined ore left in the screening equipment.
- At the rear of the Building #1 is an open shaft leading to the mine that is not properly marked.
- Included in Building #1 is what appears to be an old water heater, a large coil of steel rope and several pieces of timber and steel debris.
- Building #1 leans to one side, undermining its structural stability.
- Building #2 at the East Mine site appears to be deteriorated and is built with both asbestos and aluminum siding.
- Building #2 once housed a PCB Storage area and although all PCBs have been removed, stains that have previously proved to be impacted areas are still evident.
- Building #2 also houses some heavy machinery and steel building supports that may be recyclable.

Tailings and Raymo Processing Facility:

- The Raymo Processing Facility adjacent to the tailings area includes what appears to be a rock crushing machine, two towers, screening equipment, a conveyer belt, an above ground tank and a building partially enclosed with electrical utilities.
- Debris such as rusting metal and piping elbows was scattered throughout the facility and most of the facility was rusting with peeling paint.

Big Rambler Pond Mine:

- Although the site was entirely snow covered during the site visit, there doesn't appear to be anything of salvageable value at this site. Partially buried debris is the only thing that remains at this site.

The costs associated with the three options are as follows:

The condition of the equipment at the Raymo Facility was not determined during the investigation and therefore the costs associated with re-furbishing and/or the market value for

potential re-sale of this equipment could not be determined. It is noted that removing all the equipment from the site, including conveyors, structural steel, towers, etc. is anticipated to cost in the range of $150,000 +/- 30%. In terms of the buildings located at the East Mine, demolition and removal of the structures is anticipated to cost in the vicinity of $200,000 +/- 30% (Given the potential asbestos and PCB issues associated with demolishing Building #2). Refurbishing and/or rebuilding the structures for future use (including addressing all safety issues) is anticipated to be in excess of the demolition and removal option. Since these costs are user dependent and carry future maintenance and liability issues, the costs for this option were not evaluated.

Cost estimates for environmental remediation at each site would depend upon the findings of a subsequent Phase II type intrusive investigation.

The risks associated with taking 'no action' include safety issues surrounding the open mine shaft in Building # 1that is not properly marked and barricaded, environmental issues surrounding the PCB contamination in and around Building #2 and environmental issues concerning the basin adjacent to the Raymo Processing Facility. Taking 'no action' could increase the risk of high future costs related to these issues.

The three options for decommissioning the site structures were evaluated on the basis of operation, site disruption, advantages, limitations, remediation time and costs.

Based on a review of the options for structure decommissioning, it is recommended that all structures on site be demolished and removed from site. Building materials and items within the structures should be salvaged where possible. These include but are not limited to steel beams, aluminum siding, wire rope, metals and piping. Environmental remediation is likely required prior to demolishing Building #2. A Phase II ESA is recommended prior to commencing remediation and demolition activities. A proposed Phase II ESA is detailed in Section 11.0.

9.0 CCME CLEANUP DISCUSSION

When remediating a contaminated site, two basic approaches are considered acceptable to the Newfoundland Department of Environment (NDE): a **criteria or numerical based approach** and a comprehensive, **site specific risk based approach**. The criteria based approach involves a maximum set allowable contaminant concentration in water and soil. The impacted area is then remediated based on these criteria. The risk based approach involves characterization of potential risks, hazards and exposures of receptors to contaminants at the impacted site. In cases where a risk based approach is proposed, the specific methodology to be used (e.g., RBCA - Risk Based Corrective Action) shall be approved by the Department. Subject to change, it is assumed

that a criteria based approach would be taken for the study area, if necessary.

9.1 Site Sensitivity Determination

The site sensitivity shall be determined as follows:

1. Establish the land use of the contaminated site.

2. Establish the land use of adjacent sites that lie in the path of a groundwater and/or contaminant plume.

The Government Service Centre (for the Department of Environment) must approve the site sensitivity for criteria based remediation projects. With respect to the Rambler Mine site, approval would be granted from the regional office in Grand Falls.

9.2 Soil Policy

The Department adopts the CCME Canadian Soil Quality Guidelines for site remediation and all constituents in soil at a remediated site must not exceed the limits set by the CCME. Quantitative limits are outlined in the Canadian Soil Quality Guidelines. Several parameters indicated in these guidelines pertaining the study area (assuming an industrial site classification) include, but are not limited to the following: Benzene (5 mg/kg), Toluene (0.8 mg/kg), Ethylbenzene (20 mg/kg), Xylene (20 mg/kg), Cyanide (8 mg/kg), Lead (600 mg/kg) and Copper (91 mg/kg).

The acceptable TPH levels in soil shall be based on the following site classification as defined by NDE:

1. Class A (Sensitive Site): Any property where there exists an imminent risk to public health and safety. Such sites include all residential and agricultural areas and those that are deemed to have the potential to contaminate a private, municipal, or industrial water supply source (including potential future sources) or are within the boundaries of a Protected Water Supply Area, Ecological Reserve, Sanctuary or other areas that the Minister may designate as sensitive.

2. Class B (Nonsensitive Site): All sites not covered by the Class A description.

Soil exceeding the outlined criteria would be disposed of at soil treatment facilities. Approval shall be obtained from the Government Services Center (for the Department of Environment) prior to reuse or disposal of remediated soils. Soils with less than 1000 mg/kg TPH may be disposed of at a landfill.

9.3 Water Policy

The Department adopts criteria contained in CCME Interim Canadian Environmental Quality Criteria for Contaminated Sites as the limits that will ensure restoration is completed to the satisfaction of the Department for water which is not drinking water. The remediation objectives for surface and groundwater are those identified as the Freshwater Aquatic Life (FAL) criteria.

Several parameters indicated in the FAL Criteria that pertain to the study area include, but are not limited to Cyanide - free (200 µg/l), pH (6.5-8.5), Copper (2-4 µg/l), Iron (300 µg/l) and Lead (1-7 µg/l).

Environmental Control Water & Sewage Regulations limit the discharge of oil or by-products of oil, flammable, explosive, toxic, poisonous or corrosive liquids, solids or gases and other materials. In addition, for discharges to a body of water the Freshwater Aquatic Life criteria apply for BTEX and Lead and a maximum allowable limit of 15 ppm TPH has been adopted.

In assessing the study area, it is likely that a "non-sensitive" site classification will be received by NDE or Government Service Centre (GSC) due to the industrial usage of the study area and adjacent property. If necessary, TPH is soil would be remediated to the Class B criteria (1000 mg/kg) and BTEX, cyanide and other parameters mentioned above, exceeding guidelines in soil would be remediated to Industrial criteria from the *Canadian Environmental Quality Guidelines.* Since groundwater on site and in the vicinity of the site is not used as a source of drinking water, remediation of BTEX, cyanide, PCBs and other parameters mentioned above, exceeding guidelines in groundwater would be remediated (if necessary) based on CCME criteria for the protection of freshwater aquatic life. It is noted that additional intrusive work is required on the property (as noted in Section 11) prior to the implementation of remediation activities. Table 4 shows a summary of the Environmental Criteria specific to the study area.

Table 4:Environmental Criteria Summary

Media	Criteria	Regulation
Soil (hydrocarbons)	Non-Sensitive Site	PPD 97-01, Department of Environment and Conservation
Soil (other)	Industrial	CCME Canadian Environmental Quality Guidelines
Surface Water	FWAL	CCME Canadian Environmental Quality Guidelines
Groundwater	FWAL	CCME Canadian Environmental Quality Guidelines
Oil/By-Product Discharges	Sewage Discharge Guideline	Environmental Control Water and Sewage Regulations, Department of Environment and Conservation

10.0 CONCLUSIONS

Based on information supplied by the Client as well as observations made during the site investigation, the following conclusions have been made:

- The regulatory review uncovered details of impacts to water courses downstream of the Tailings Area, including South Brook. These impacts have reportedly caused the mortality of fish in the area, while numerous tests conducted by Environment Canada indicate that the concentrations of metals and low pH are acutely lethal to rainbow trout and salmo gairdneri.

- Paint was noted as peeling from structures at all three sites investigated. The paint peeling from abandoned machinery, walls and debris, may be a potential source of lead contamination.

- A sampling program implemented by Jacques Whitford Environmental Limited (JWEL) in 2003 indicated areas of soil around Building #2 at the East Mine site impacted by PCBs (exceeding CCME criteria). Also, several swabs taken from the PCB Storage Area inside Building #2 indicated impacts to the floor and walls. To date, there is no knowledge of additional soil/water /swab/concrete core samples being taken or completion of contamination delineation as recommended by JWEL.

- Staining was noted in both buildings at the East Mine site, however staining on the exterior of the buildings was not ascertained due to the snow cover. Stains found in the PCB storage area (Building #2) have been tested in previous studies and indicate concentrations of PCBs above applicable guidelines.

- Potential asbestos siding was noted on Building #2 on the East Mine Site. Potential asbestos based piping and elbows was noted at the Raymo Processing Facility. Appropriate precautions should be taken when removing and disposing any potential asbestos containing siding.

- Numerous drums were noted near the Raymo Processing Facility. These drums were found empty and did not contain labels. A large rusting drum containing an unknown substance was found in the sample storage room of Building #2 at the East Mine Site.

- Several structures on site are built with acid leaching waste rock from the mining operations. Uses of the waste rock include but are not limited to construction of roads connecting the mining sites, construction of dykes, and site grading.

- Hazardous chemicals including but not limited to cyanide, copper sulfate and zinc sulfate were used at the Raymo Processing Facility. Storage of these chemicals continued on site after the facility was abandoned and were removed in 1999.

- An abandoned above ground storage tank was noted at the Raymo Processing Facility. The tank was not accessible during the investigation and as such the contents could not be determined.

- All dykes and pond liners in the tailings area were not assessed due to the amount of snow covering the areas. Further inspection is required when access is restored after the winter.

- A site wide Phase II Intrusive Investigation is recommended for the property, consisting of a series of test pits and monitor wells and the subsequent collection of soil, groundwater, surface water and sediment samples. The level of effort for the Phase II program for each study area is outlined in Section 11.0.

11.0 RECOMMENDED PHASE II ESA PROGRAM

A site wide Phase II Intrusive Investigation is recommended for the property, consisting of a series of test pits and monitor wells as well as soil, groundwater, surface and sediment samples. The level of effort for the Phase II program for each study area is outlined below.

11.1 Raymo Processing Facility

- The construction of a minimum of five (5) test pits is recommended in the debris area southeast of the facility. These test pits should be located down gradient of any drums, car wrecks and other debris in the area to determine whether metal/lead/petroleum hydrocarbon impacts to soil have occurred.
- A suite of eight to ten (8-10) test pits is recommended in the area surrounding the processing facility. Several of these test pits should be installed down gradient of the entire facility, while others should be placed adjacent to the screening, vats and rock crushing equipment as well as in the area of the above ground tank. Processes historically occurring at this site indicate that there is a potential for cyanide/acidic and metals impacts to the soil near the facility.
- Due to potential groundwater impacts three (3) monitor wells are recommended down gradient of the vats, above ground tank and tower.
- A background monitor well is to be installed as determined on site at the time of construction.
- A minimum of two (2) surface samples (water and sediment if necessary) are

recommended for the settling pond in front of the facility.

- A paint sampling and analysis program is recommended to confirm/refute unacceptable concentrations of lead in paint for the machinery at the Processing Facility.

Figure 7 shows the proposed sample locations at the Raymo Processing Facility as described above.

11.2 The Tailings Area

- A suite of monitor wells is recommended for the northern edge of the Tailings Pond and the dyked area of Little Rambler Pond. A minimum of ten (10) monitor wells should be placed down gradient along the perimeter of the Tailings. Two (2) monitor wells are also recommended down gradient of the diversion ditch. These monitor wells will supplement the existing limited information available pertaining to the groundwater impacts to these areas.
- Three (3) surface samples should be collected from Little Rambler Pond, west of the dyke to confirm/refute the presence of contaminants in this pond.
- Three (3) surface samples should be collected on the east side of the dyke near the tailings area and upstream of the wooden spillway to determine the extent of acidic/metals impacts on this area of the Tailings.
- Several samples are recommended in the water courses downstream of both spillways on site as well as their entrance points to Muskrat Pond and South Brook.
- The construction of a suite of test pits within the Tailings Pond is recommended to supplement information gathered from test pits currently installed at this location. The samples collected from these test pits should be analyzed for cyanide, pH and metals to determine the area of greatest impact to the Tailings Pond.

Figure 8 shows the proposed sample locations for the Tailings Pond Area as described above.

11.3 East Mine Site

- A minimum of seven (7) test pits are recommended in the area of Building #1. Test pits should be installed down gradient, in the area of any debris behind the building. Three of these test pits are proposed adjacent to the building where the mined ore sits on the screening equipment at the back of the building. These samples should be analyzed to ensure no impacts to soil have occurred due to the metal and creosote timber debris and mined ore.
- Inside Building #1 a surface soil sample is recommended for the shallow pit to determine the presence/absence of metals and petroleum hydrocarbons.
- In order to supplement existing information regarding PCB contamination in the area of Building #2, several test pits are recommended. The locations of the test pits include six

(6) down gradient of the building on both edges of the drainage ditch. One (1) test pit is also recommended on the northeast corner of the building near the entrance to the PCB Storage room. The samples from these tests pits should be analyzed to determine the vertical and horizontal extent of contamination and estimate of the soil volume requiring remediation.

- Sampling of the siding on the west side of Building #2 is also recommenced to confirm the presence/absence of asbestos.
- As recommended by Jacques Whitford in 2003, a concrete core sample should be collected at areas identified with PCB impacts inside Building #2. Sampling of the concrete core from various depths and the soil if required, should then be analyzed to provide a depth profile of PCB impacts.
- A paint sampling and analysis program is recommended to confirm/refute unacceptable concentrations of lead in paint for the machinery in Building #2.
- Surface samples in the drainage ditch are recommended. Samples taken by JWEL resulted in PCBs not exceeding guidelines, however sediment in the ditch did contain detected levels of PCBs.

Figure 9 shows the proposed sample locations at the East Mine site as mentioned above.

11.4 Big Rambler Pond Site

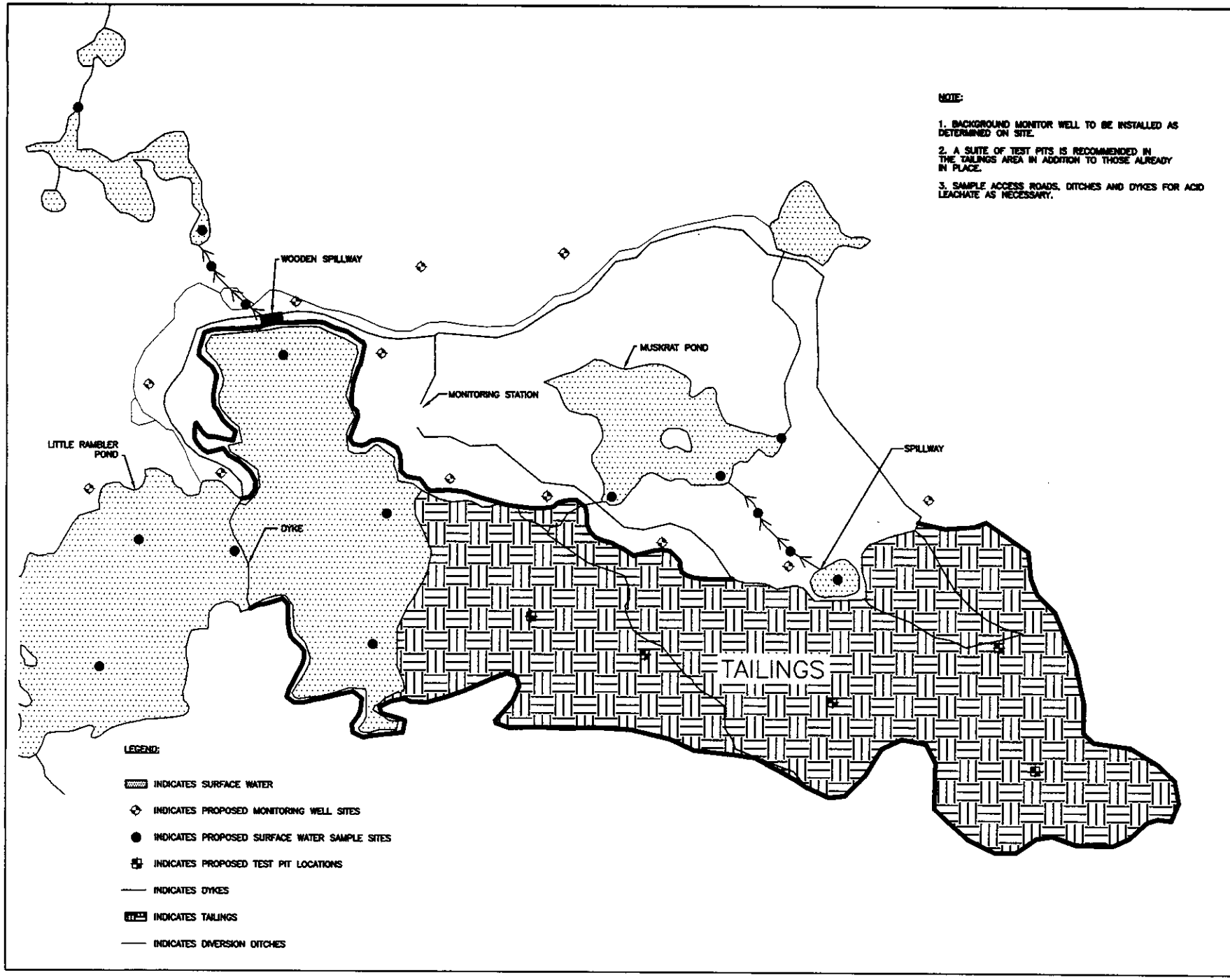
A minimum of five (5) test pits are suggested in the areas of buried debris to determine impacts to soil on site. Surface water samples are also recommended for any open pits as well as Big Rambler Pond near the mining site.

11.5 Acid Generating Access Roads

Several soil samples are recommended to confirm/refute the presence of acid generating material on site. This sampling program should be implemented to areas suspected to be built with the waste rock from the mining operations. These areas should include but not be limited to the following:

- All access roads on site connecting mining areas.
- Dykes north of the tailings and across Little Rambler Pond.
- All ditches adjacent to access roads.
- Areas where it is assumed that site grading occurred.
- Any other visible areas where it is possible that waste rock was used.

The cost associated with the recommended Phase II Sampling Program is $75,000.



Davis Engineering & Associates Limited

PHASE 1 ESA
FORMER RAMBLER MINE PROPERTY
BAIE VERTE, NL & LAB.

FIGURE 8:
RECOMMENDED SAMPLING FOR TAILINGS AREA

4-1038

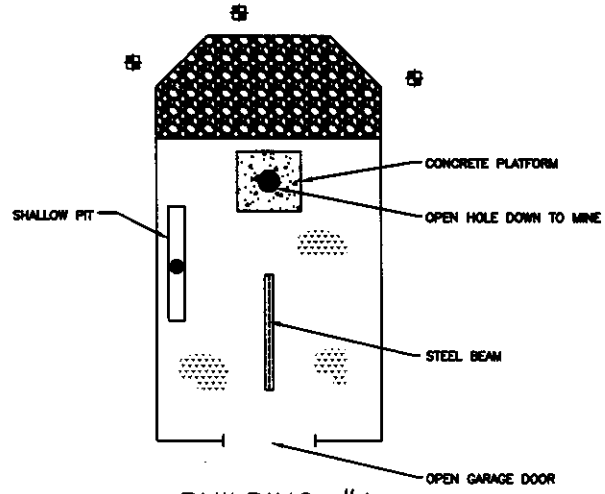
N.T.S.

NOTE:

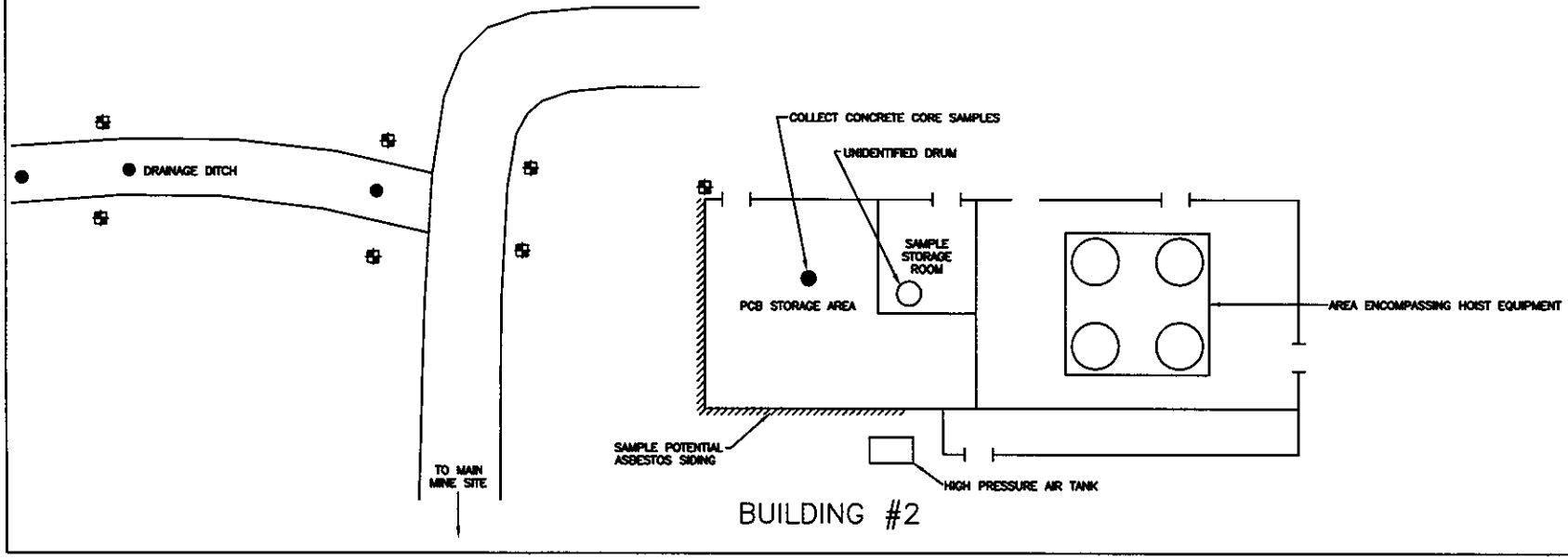
1. SAMPLE ACCESS ROADS AND DITCHES FOR ACID LEACHATE AS NECESSARY.

LEGEND:

- INDICATES STAINS ON FLOOR
- INDICATES VARIOUS TYPES OF DEBRIS
- INDICATES SCREENING EQUIPMENT COVERED WITH MINE ORE
- INDICATES POTENTIAL ASBESTOS SIDING
- INDICATES RECOMMENDED LOCATIONS OF TEST PITS
- INDICATES RECOMMENDED LOCATIONS OF SURFACE SAMPLES
- INDICATES CONCRETE CORE SAMPLE



BUILDING #1



BUILDING #2

Davis Engineering & Associates Limited

N

PHASE 1 ESA
FORMER RAMBLER MINE PROPERTY
BAIE VERTE, NL & LAB.

FIGURE 9:

EAST MINE SITE

4-1038

N.T.S.

12.0 CLOSURE

This report has been prepared for the sole benefit of the Provincial Department of Natural Resources. The report may not be relied upon by any other person or entity without the express written consent of Davis Engineering and Associates (DEAL) and the Department of Natural Resources. Any use which a third party makes of this report, or any reliance on decisions made based on it, are the responsibility of such third parties. DEAL accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Our review and assessment is based on the results acquired using the methodology set out in this report and upon information provided to DEAL by previous employees and agents of the property, which is assumed to be correct. The opinions in this report are given using generally accepted scientific judgement, principles and practices, however, because of the inherent uncertainty in this process no guarantee of conclusion is intended, given or implied. The site was completely snow covered during the investigation which limited a proper visual assessment of the property and surrounding area.

All findings and conclusions stated in this report are based on facts and circumstances as they existed at the time this report was prepared. This report, by definition, is not intended to be exhaustive in scope, nor imply an environmentally risk free site. Any change in fact or circumstances upon which this report is based may adversely affect the expressed findings and conclusion.

Appendix A
Conversation Records

CONVERSATION RECORD FORM

Project Name: ESA, Former Rambler Mine Property

Project Number: 4-1038

Location: Baie Verte, Newfoundland

Date: January 31th, 2005

Time: 9:00am

Completed by: Shannon Mitchell

Contact:

Title:

Phone Number:

Address: Woodstock, Newfoundland

Comments:

indicated to the best of his knowledge the following

1. Worked there for 16 years.
2. Worked underground and as a labourer in the mill.
3. Mill used a flotation system that used chemicals to separate the ore.
4. The waste went into the tailings where there should have been a holding area.
5. Believes some of the waste ran into Little Bay Pond also known by local people as Gid Sacrey's Mill Pond.
6. Not sure what they did with the waste oil but may have buried it on site.
7. Not aware of any spills.

CONVERSATION RECORD FORM

Project Name: ESA, Former Rambler Mine Property

Project Number: 4-1038

Location: Baie Verte, Newfoundland

Date: Febuary 1st, 2005

Time: 4:00pm

Completed by: Lesley Spracklin

Contact:

Title:

Phone Number:

Address: Baie Verte, Newfoundland

Comments:

indicated to the best of his knowledge the following:

1. At Big Rambler Pond, they only excavated material and brought it up to main mine for processing.
2. At east mine site, one building housed the hoist room, the compressor room, and a dry storage room (now known as PCB Storage Area).
3. Drinking water was taken from pond near bunkhouses
4. Water for processing facility taken from another pond near main site and pumped by pump house behind bunkhouses.
5. A septic tank is located near the garage on the main site and a sewer system is located near the bunkhouses.
6. The pipe and pipe structure is tailings pipe that brought the tailings in slurry form from the main processing facility to the tailings pond.
7. Raymo processed the tailings for gold using cyanide in leach vats.
8. Did not know what pond in front of Raymo Facility was.
9. All fuel tanks on main site were emptied.
10. No fuel tanks ever located on east mine site.
11. He knew of dyke being breached near Little Rambler Pond.

CONVERSATION RECORD FORM

Project Name: ESA, Former Rambler Mine Property

Project Number: 4-1038

Location: Baie Verte, Newfoundland

Date: January 31th, 2005

Time: 9:00am

Completed by: Shannon Mitchell

Contact:

Title:

Phone Number:

Address: Clarenville, Newfoundland

Comments:

indicated to the best of his knowledge the following:

1. He did some work for the people who were reprocessing the tailings for gold. (Raymo Processing)
2. He noted severe vegetation damage as far as he could see on both sides of the brook leading from the tailings. Approximately 5-10m on each bank.
3. He believes the brook in question is South Brook.

CONVERSATION RECORD FORM

Project Name: ESA, Former Rambler Mine Property

Project Number: 4-1038

Location: Baie Verte, Newfoundland

Date: January 28th, 2005

Time: 2:50pm

Completed by: Shannon Mitchell

Contact:

Title:

Phone Number:

Address: Woodstock, Newfoundland

Comments:

. indicated to the best of his knowledge the following:

1. He worked with Ming Minerals seven years ago.
2. He worked as a Mill Wright, and later a shift leader.
3. No spills.
4. A fuel tank for the refinery was used.
5. Old oil was pumped into a reservoir that gathered in a tank and then a truck used to pump the oil out and remove it.
6. No herbicides or pesticides.
7. They mined copper, zinc, gold and some lead.
8. The process included:
    - Mine the material.
    - Bring to crushers.
    - Belt the grinding mill.
    - Thin through cyclones
    - Put through flotation system
    - Chemicals such as zantac used.

CONVERSATION RECORD FORM

Project Name: ESA, Former Rambler Mine Property

Project Number: 4-1038

Location: Baie Verte, Newfoundland

Date: January 31st, 2005

Time: 4:00pm

Completed by: Shannon Mitchell

Contact:

Title:

Phone Number:

Address: Baie Verte, Newfoundland

Comments:

indicated to the best of his knowledge the following:

1. He worked from 1972 to 1981.
2. He was hired as a truck driver and mill operator.
3. Worked outside for one year.
4. No fuel spills.
5. Some small tanks on site
   - Located at main site by main office (gas and diesel).
   - Located by small shack where they stored oil/lube (gas and diesel).
6. Chemicals in mill included copper, sulfate, zinc sulfate, lime, xanth.
7. There was a pit used for garbage out towards the tailings. Burning activities occurred here.
8. Used oil was put in drums and probably buried with the garbage.
9. Tailings were run on surface, then covered and extended. Most of the tailings were covered.

CONVERSATION RECORD FORM

Project Name: ESA, Former Rambler Mine Property

Project Number: 4-1038

Location: Baie Verte, Newfoundland

Date: January 28th, 2005

Time: 10:30am

Completed by: Shannon Mitchell

Contact:

Title:

Phone Number:

Address: Ming's Bight, Newfoundland

Comments:

. indicated to the best of his knowledge the following:

1. He worked back in the 1970's.
2. There were no spills on the site.
3. There were tanks at the main site.
4. Machinery was fueled up underground using small tanks.
5. Not aware of any buried materials. If there was anything buried, it would be in a waste pile. There were waste piles at the Boundary Shaft, La Scie Highway and at the east mine site.
6. Most times they returned drums to be refilled.
7. The Tailings run into South Brook.
8. The process included:
   - Taking material from underground.
   - Milling material to concentrate.
   - Chemical use to separate mineral from rock.
   - Shipping in Tilt Cove.
9. Big Rambler pond used for gold.
10. Buried some debris there when the cleanup was done.

11. Have to replace culvert on Ming's Pond a lot. Now they have a plastic one.
12. East Mine stored PCB's.

CONVERSATION RECORD FORM

Project Name: ESA, Former Rambler Mine Property

Project Number: 4-1038

Location: Baie Verte, Newfoundland

Date: January 27th, 2005

Time: 2:50pm

Completed by: Lesley Spracklin

Contact:

Title:

Phone Number:

Address: Baie Verte, Newfoundland

Comments:

indicated to the best of his knowledge the following:

1. His company is currently conducting exploration at the Ming Mine north of the highway.
2. Not aware of any pesticides/herbicides.
3. Not aware of any spills or stains.
4. PCBs still stored in Main Mine building, behind plywood door with lock. They believe the PCBs are stored there by the government or NL Hydro, and not actually stored there from use at the mill. They were told about them purely for knowledge that they were there and to be careful of them.
5. Water comes from small pond that is dammed behind bunkhouses. Not fit to drink, only for flushing toilets, however people used to drink it back when mining was ongoing there.
6. Not aware of any above or below ground fuels or chemicals.
7. Cannot use bunkhouses as they are collapsing.
8. They don't have a disposal site there, any waste they generate is brought back to Baie Verte for regular garbage disposal.

CONVERSATION RECORD FORM

Project Name: ESA, Former Rambler Mine Property

Project Number: 4-1038

Location: Baie Verte, Newfoundland

Date: January 27th, 2005

Time: 2:50pm

Completed by: Lesley Spracklin

Contact:

Title:

Phone Number:

Address: Baie Verte, Newfoundland

Comments:

indicated to the best of his knowledge the following:

1. His company is currently conducting exploration at the Ming Mine north of the highway.
2. The only time they go down into the Main Mine area is when they are storing their core in a shed there.
3. Not aware of any pesticides/herbicides
4. Not aware of any spills or stains however oil is left in drums around the site.
5. PCBs still stored in Main Mine building, behind plywood door with lock. They believe the PCBs are stored there by the government or NL Hydro, ant not actually stored there from use at the mill.
6. Believes there is on site water and sewer services.
7. Not aware of any above or below ground fuels or chemicals.

CONVERSATION RECORD FORM

Project Name: ESA, Former Rambler Mine Property

Project Number: 4-1038

Location: Baie Verte, Newfoundland

Date: January 17th, 2005

Time: 9:30am

Complete by: Shannon Mitchell

Contact:

Title:

Phone Number:

Address: Baie Verte, Newfoundland

Comments:

indicated to the best of his knowledge the following:

1. Site first opened in 1963 for construction and produced in 1964.
2. Not aware of any fuel spills.
3. He was care taker for 11 years after 1982. It closed down in April 1982.
4. All tanks are empty and the fuel was sold in 1982.
5. Three tanks on site:
    1) By maintenance garage
    2) By main office
    3) By boundary shaft
6. A light blue binder exists with information regarding the sizes of the buildings are other areas.
7. Cyanide was used for gold extraction.
8. The cyanide was stored in 45 gallon drums and kept in a tractor trailer near the mill.
9. The cyanide was used mainly in 1996 for two or three months.
10. Not aware of any cyanide spills

11. The cyanide was mixed in a tank, pumped in a circuit and destroyed before being released.
12. No pesticides or herbicides used on site.
13. The tailings run to Baie Verte via South Brook.
14. The East mine would run to Gid's Mill and then on.
15. There is PCB Storage in the east mine. No spills occurred. The government is responsible for the PCB Storage area there.

CONVERSATION RECORD FORM

Project Name: ESA, Former Rambler Mine Property

Project Number: 4-1038

Location: Baie Verte, Newfoundland

Date: January 14th, 2005

Time: 1:30pm

Complete by: Shannon Mitchell

Contact:

Title:

Phone Number:

Address: Baie Verte, Newfoundland

Comments:

indicated to the best of his knowledge the following:

1. The last person to leave the site was Newton Norman.
2. Not aware of any spills on site.
3. Not aware of any PCBs still on site, however there was a storage site there.
4. There is mercury content in the tailings.
5. South Brook runs both ways towards Ming's Bight and Gid's Mill.

CONVERSATION RECORD FORM

Project Name: ESA, Former Rambler Mine Property

Project Number: 4-1038

Location: Baie Verte, Newfoundland

Date: January 14th, 2005

Time: 1:45pm

Complete by: Shannon Mitchell

Contact:

Title:

Phone Number:

Address: Baie Verte, Newfoundland

Comments:

indicated to the best of his knowledge the following:

1. The mines opened in 1962.
2. When the mines closed, they were owned by the Irvings.
3. Fuel spills possibly occurred in the early days of mining there.
4. Numerous tanks are still located on site underground.
5. The cyanide process waste from the Mings side eventually flows into Englands Steady.
6. The cyanide process waste from the Mill side eventually flows into South Brook and Baie Verte.
7. A lot of PCB's were stored on site.
8. Ming Minerals Inc. took over in 1995.
9. No herbicides or pesticides were used on site.
10. A lot of chemicals were used in the mill.
11. Karl Boone does inspections on the property.

CONVERSATION RECORD FORM

Project Name: ESA, Former Rambler Mine Property

Project Number: 4-1038

Location: Baie Verte, Newfoundland

Date: January 18th, 2005

Time: 9:10am

Complete by: Shannon Mitchell

Contact:

Title:

Phone Number:

Address: Mings Bight, Newfoundland

Comments:

indicated to the best of his knowledge the following:

1. He was employed at the mines starting in the early 1960's before the mine started.
2. He looked after the plant after it had shut down.
3. He was a chip sampler (underground)
4. No fuel spills occurred.
5. No herbicides or pesticides were used on site.
6. Fuel tanks on site included regular gasoline tanks ≈1000 gallons.
7. The use of cyanide commenced in 1995.
8. The tailings area flows throughout South Brook
9. No PCB spills occurred on site as the drums are sealed, marked and closely monitored.
10. Raymo Processing Inc. extracted gold from the tailings. This process included using a lot of cyanide that would flow into the Rambler tailings.
11. Most contaminants would be underground.
12. Not aware of asbestos, however there may be some on piping.

CONVERSATION RECORD FORM

Project Name: ESA, Former Rambler Mine Property

Project Number: 4-1038

Location: Baie Verte, Newfoundland

Date: January 18th, 2005

Time: 9:30am

Complete by: Shannon Mitchell

Contact:

Title:

Phone Number:

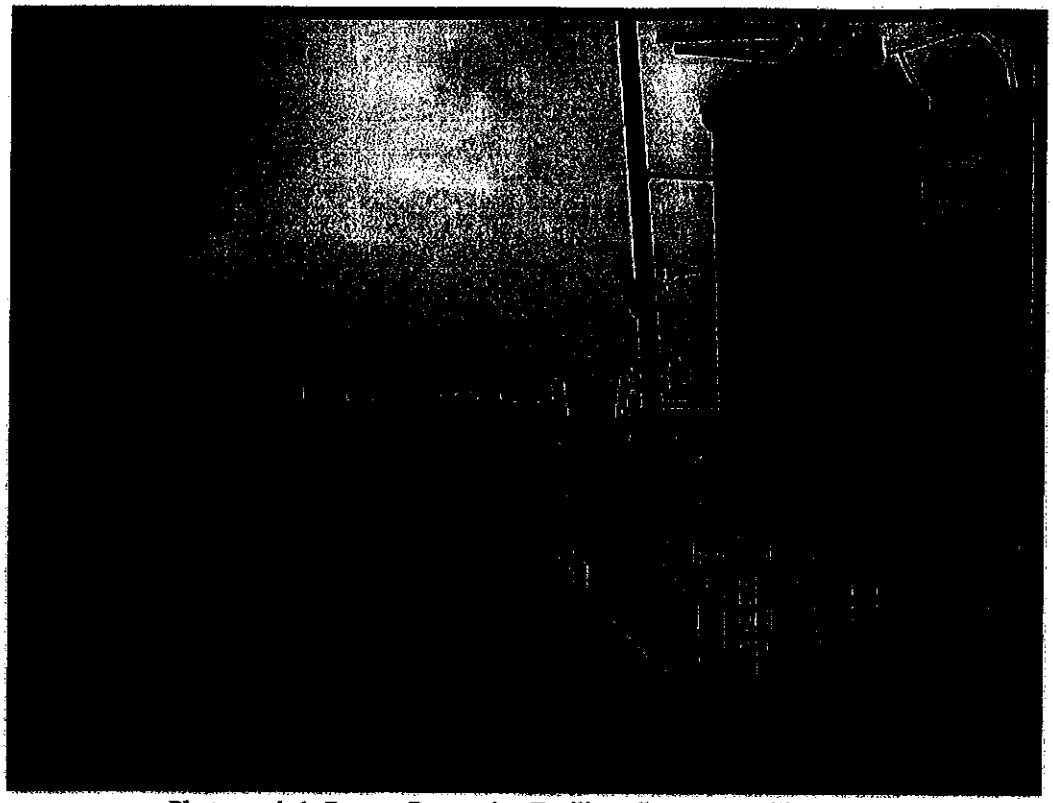
Address: Baie Verte, Newfoundland

Comments:

indicated to the best of his knowledge the following:

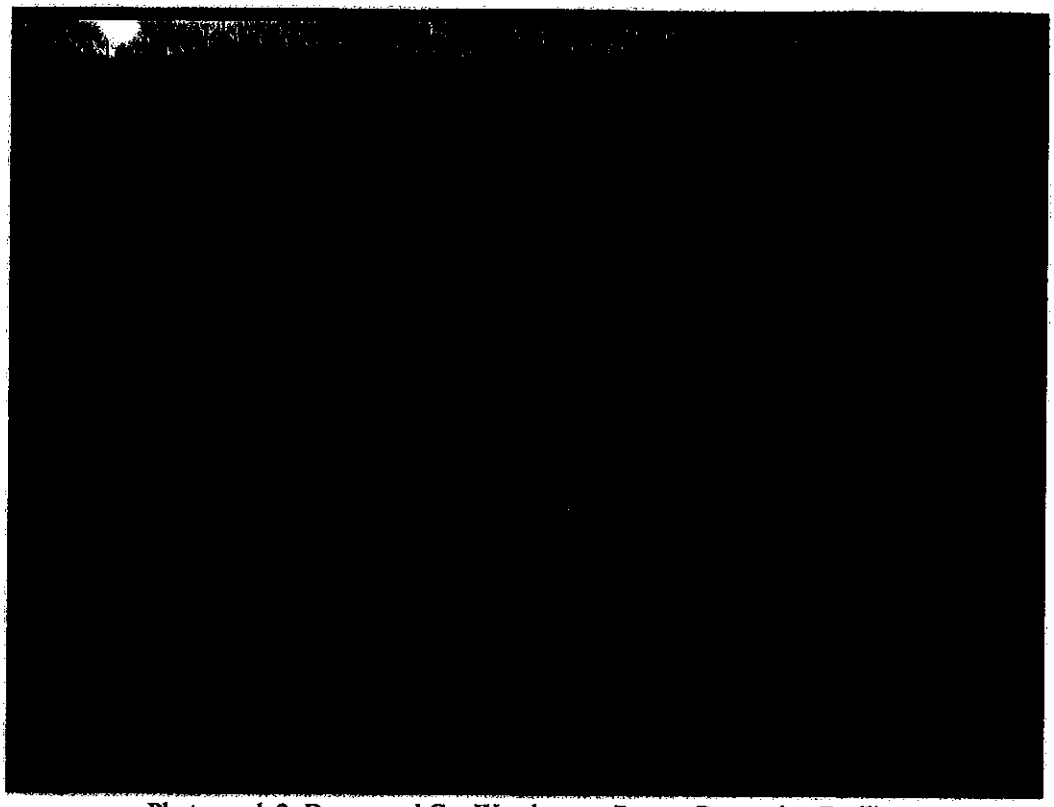
1. He was employed at the mines from 1978 until 1982 and again with Ming Minerals in 1995.
2. No fuel spills occurred.
3. The tailings ran off into South Brook.
4. PCBs were stored there but no spills occurred.
5. There was an approximately 4000 gallon underground tank and an above ground diesel tank near the main office.
6. During the Rambler Mine days, all tanks were usually stored underground.

Appendix B
Site Photographs



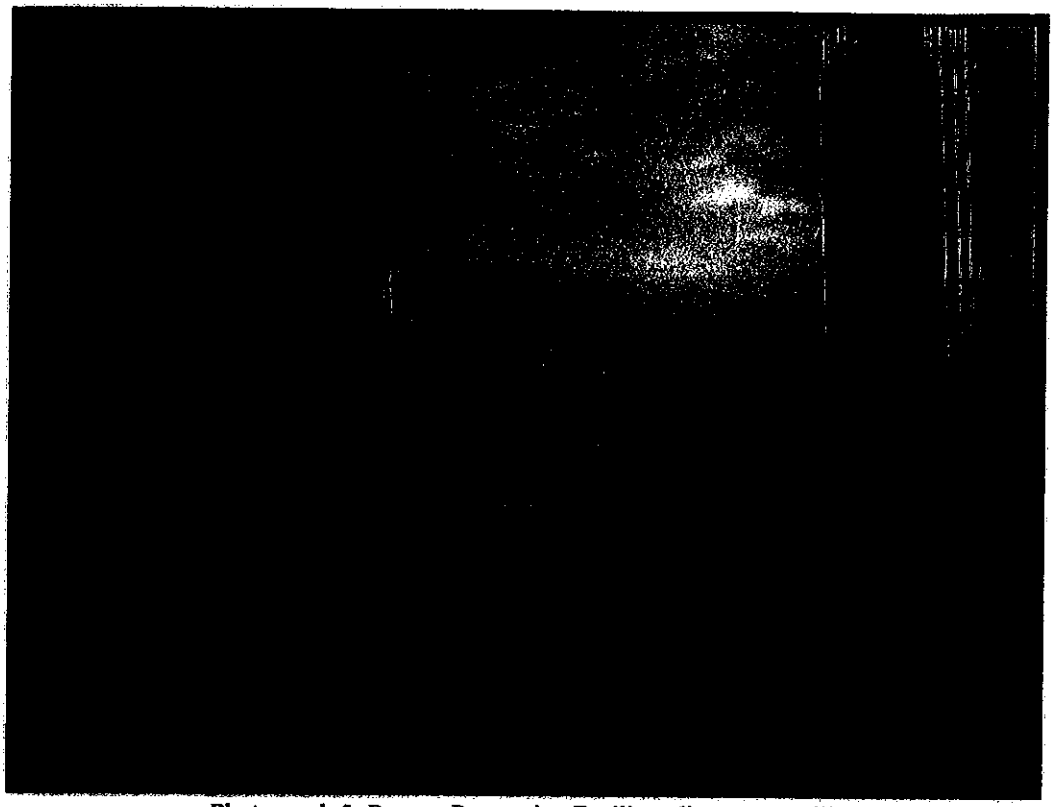
Photograph 1: Raymo Processing Facility adjacent to Tailing Pond

Photograph 2: Raymo Processing Facility adjacent to Tailings Pond

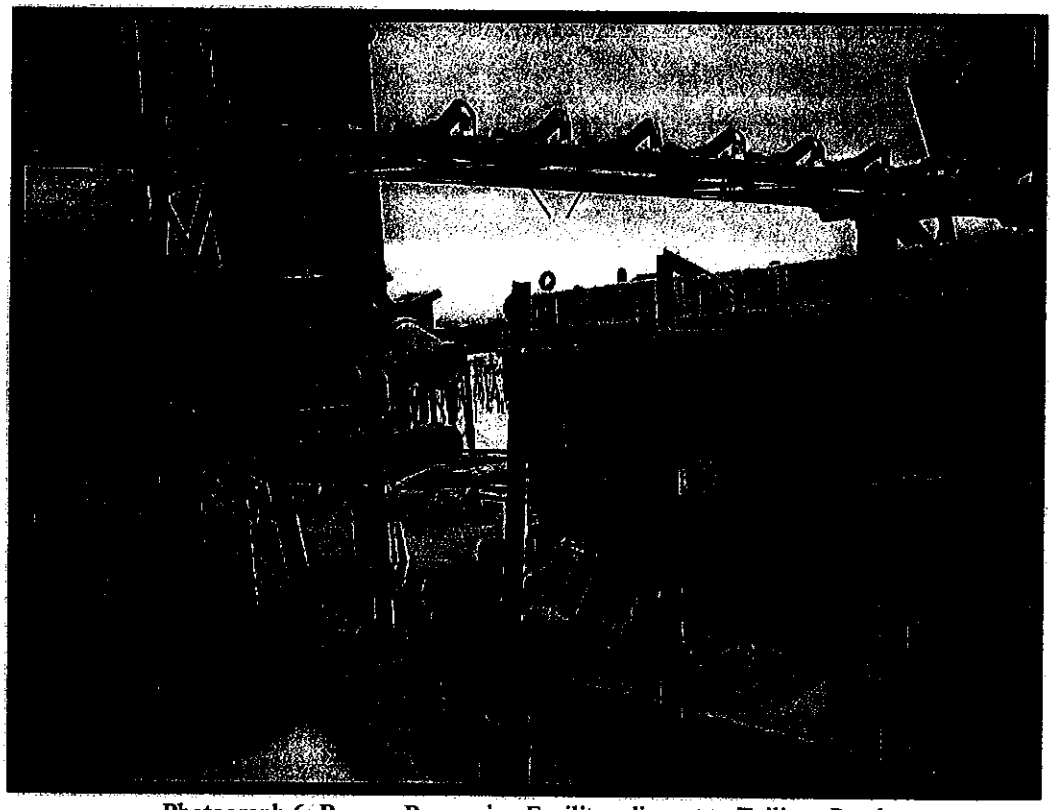


Photograph 3: Drums and Car Wrecks near Raymo Processing Facility

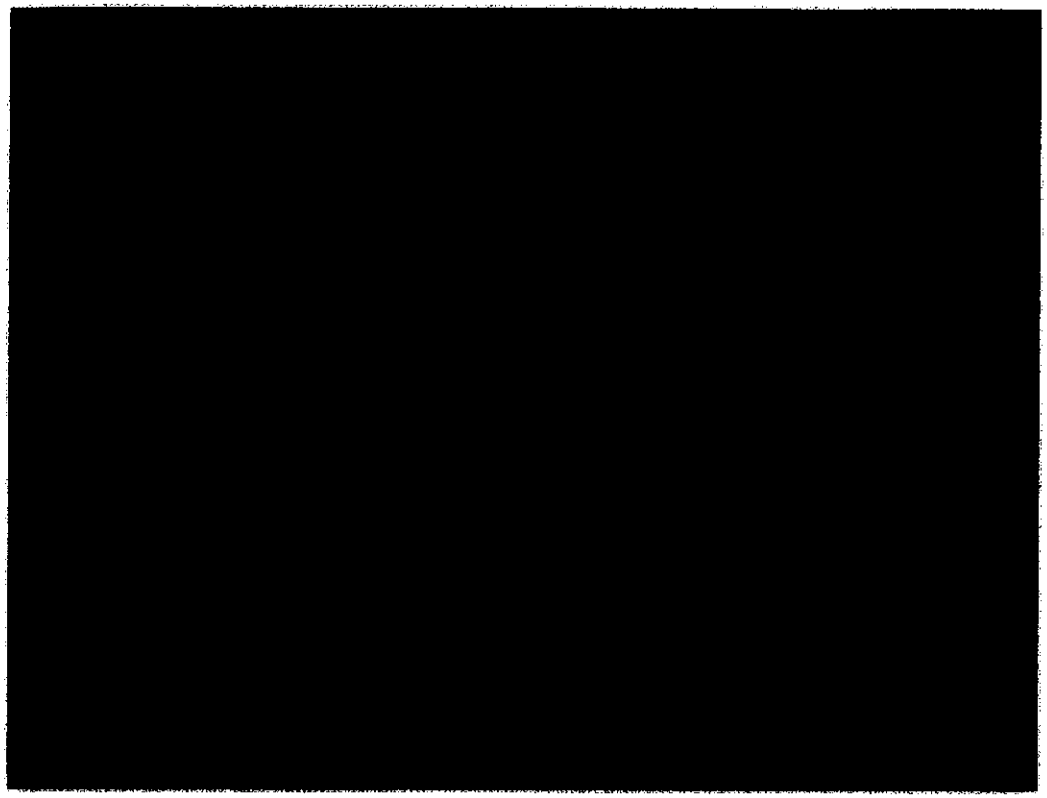
Photograph 4: Debris near Raymo Processing Facility



Photograph 5: Raymo Processing Facility adjacent to Tailings Pond

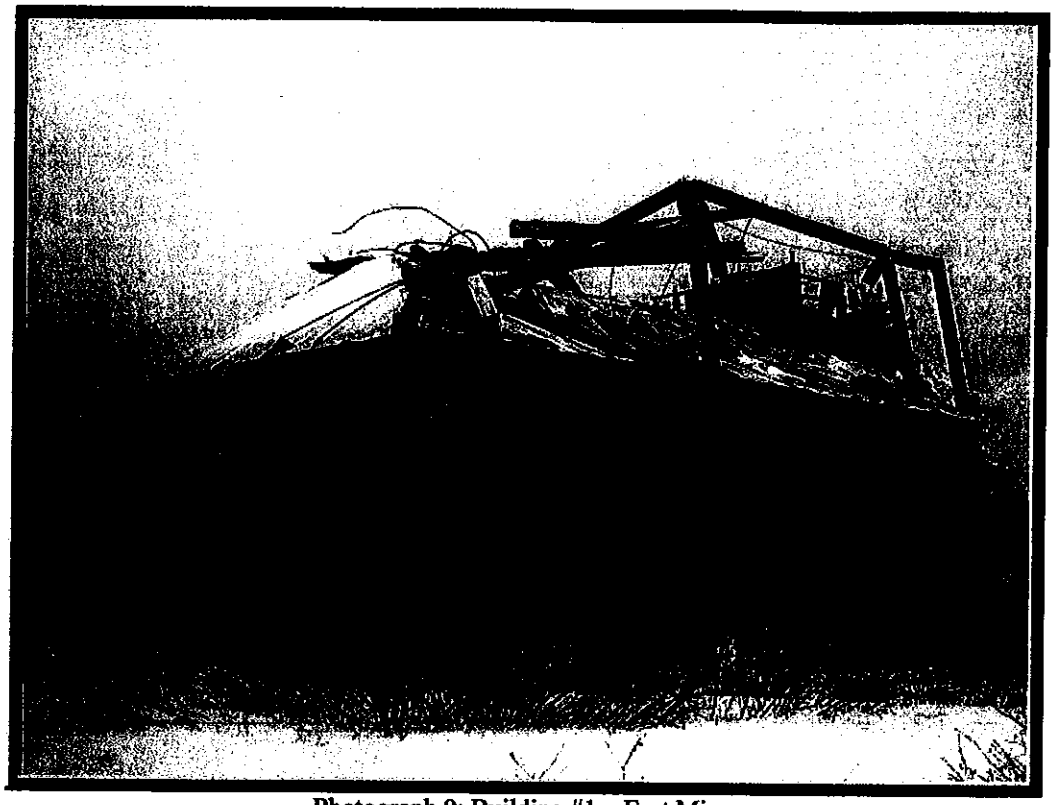


Photograph 6: Raymo Processing Facility adjacent to Tailings Pond



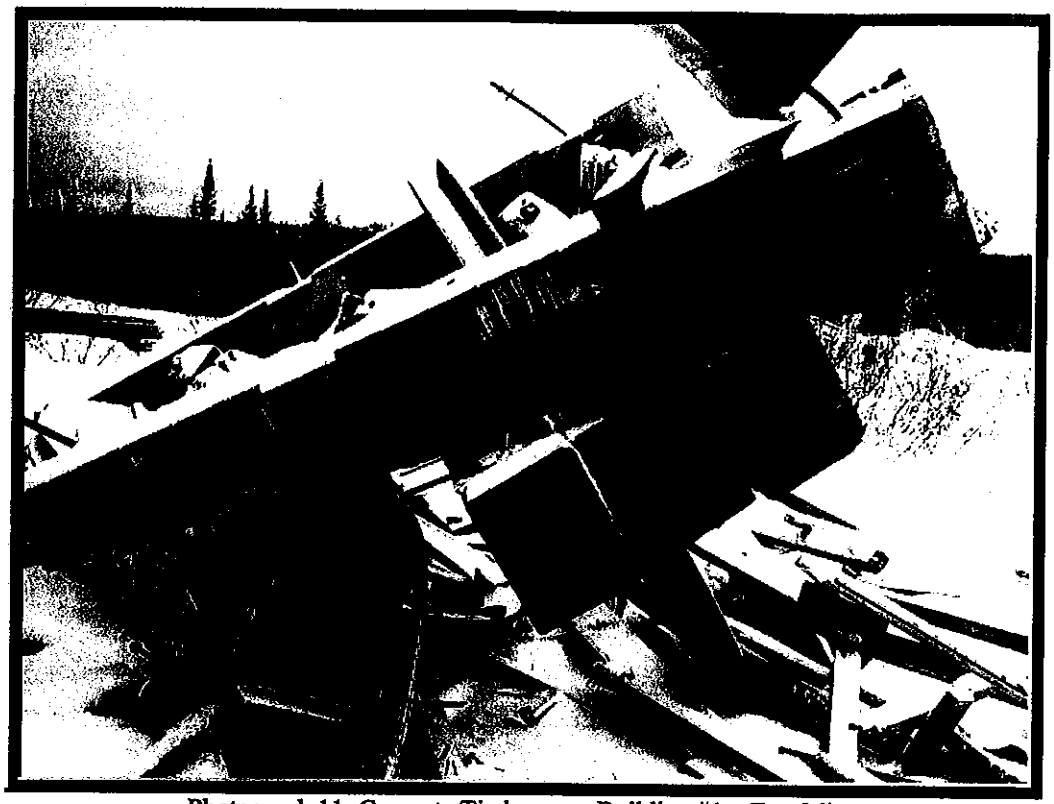
Photograph 7: View of the Tailings Pond towards the road

Photograph 8: View of the Tailings Pond toward Little Rambler Pond



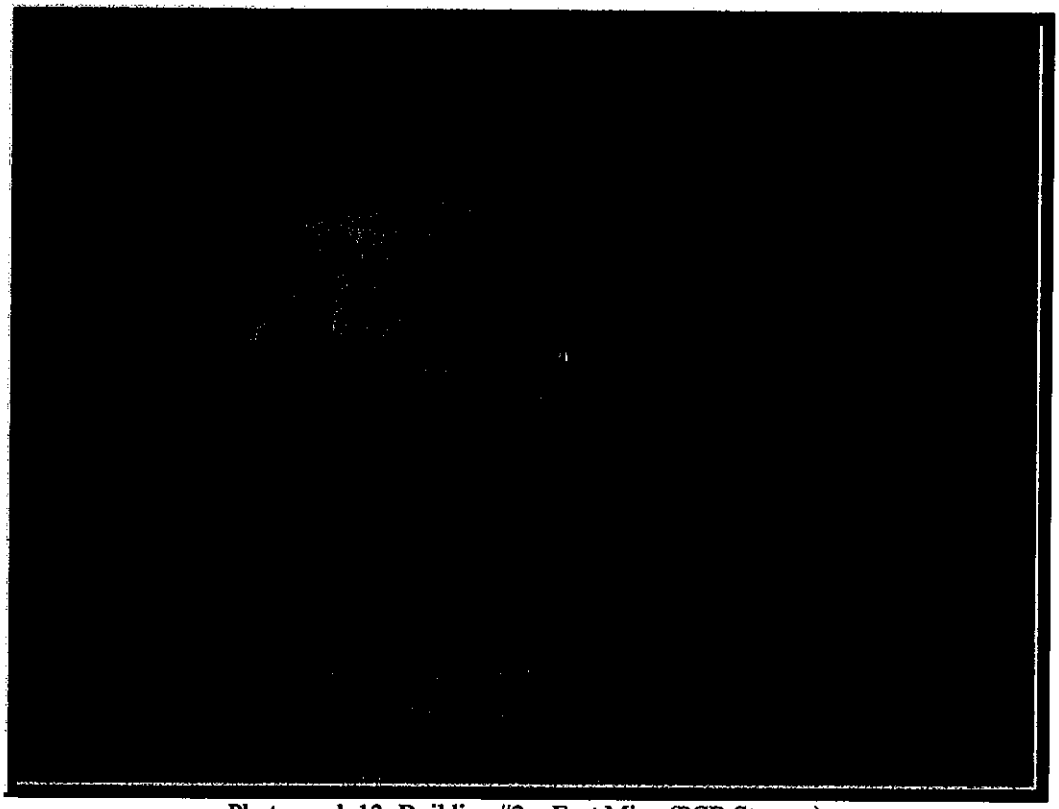
Photograph 9: Building #1 – East Mine

Photograph 10: Mined Ore left on screening equipment, Building #1 – East Mine

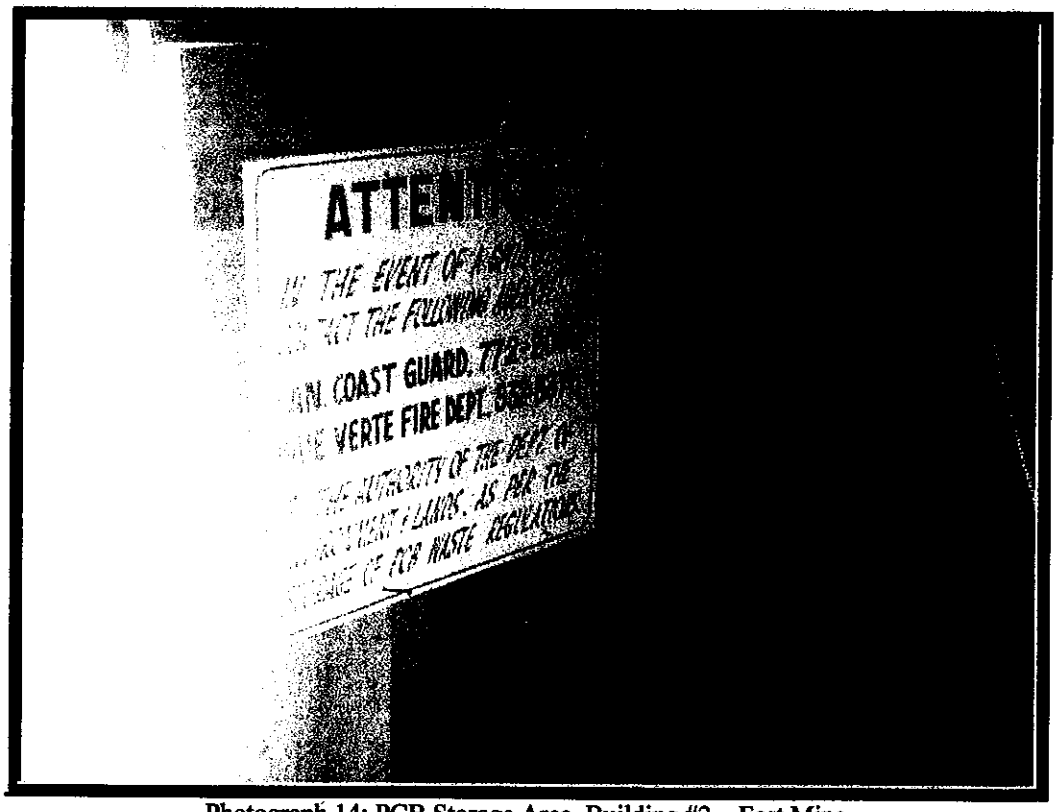


Photograph 11: Creosote Timber near Building #1 – East Mine

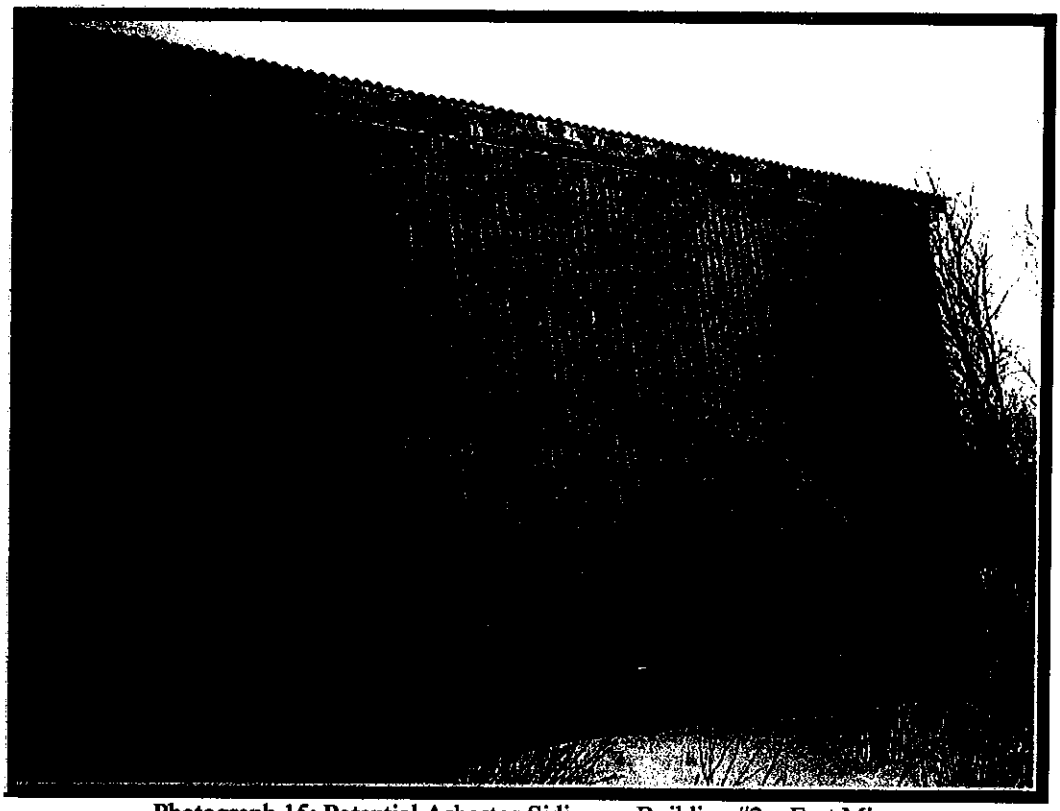
Photograph 12: Inside Building #1 – East Mine



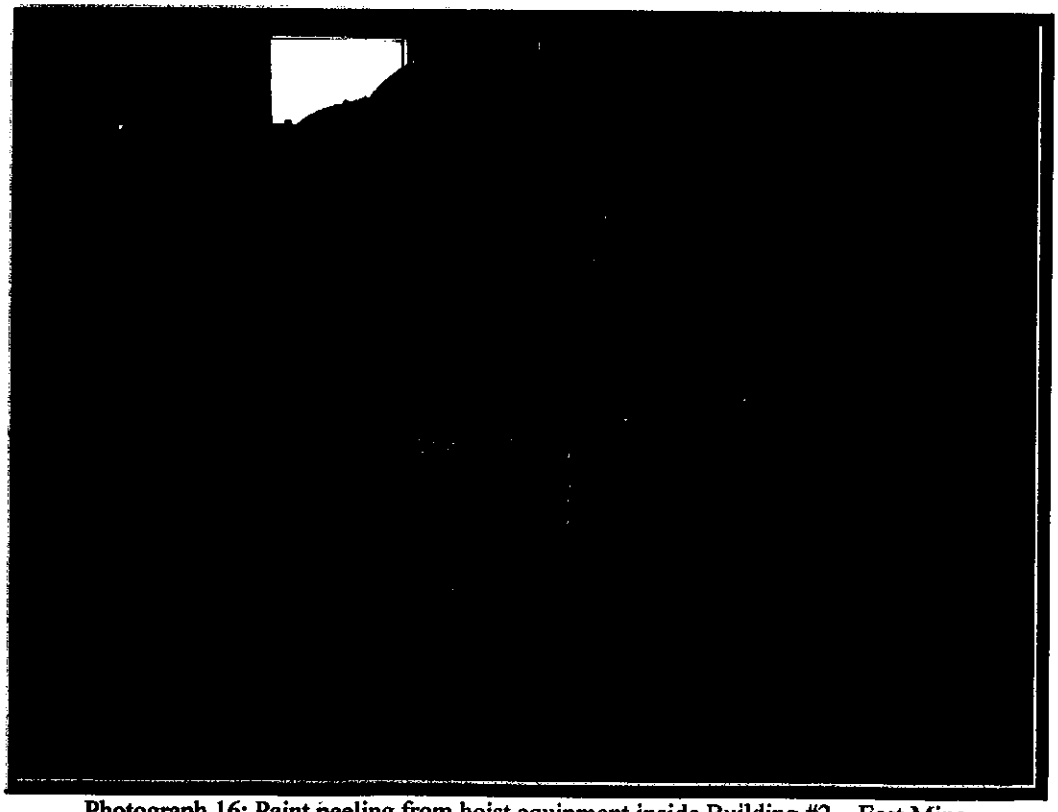
Photograph 13: Building #2 – East Mine (PCB Storage)



Photograph 14: PCB Storage Area, Building #2 – East Mine

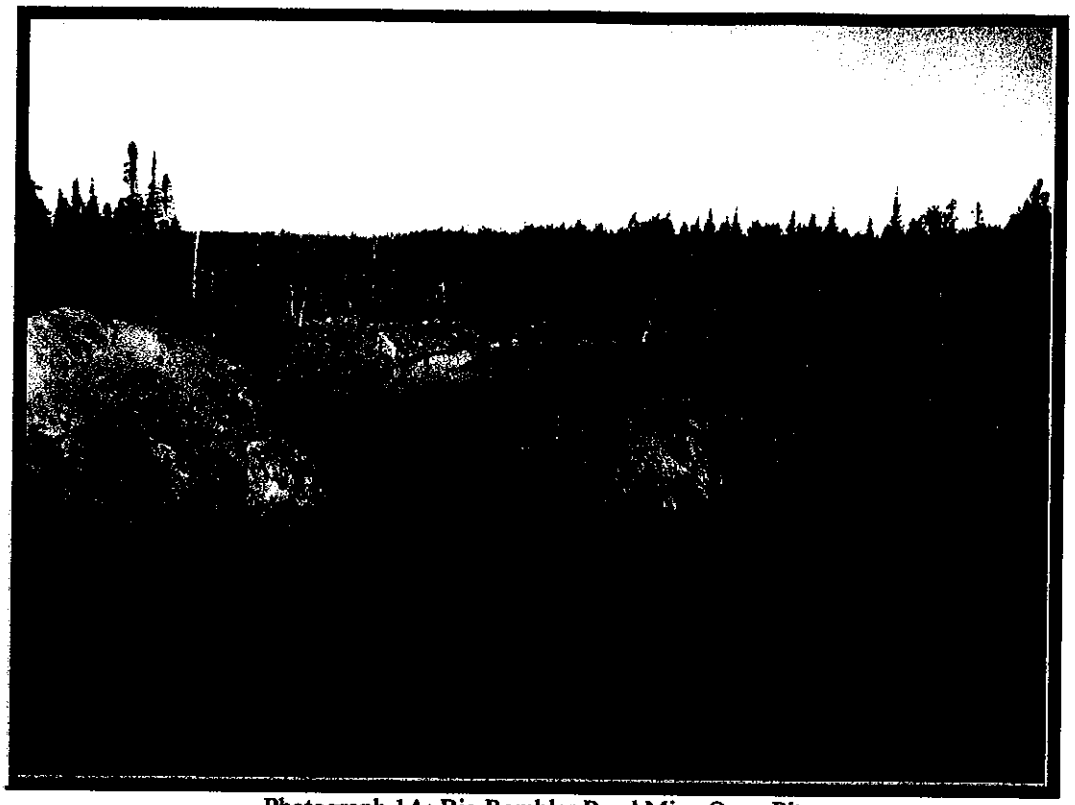


Photograph 15: Potential Asbestos Siding on Building #2 – East Mine



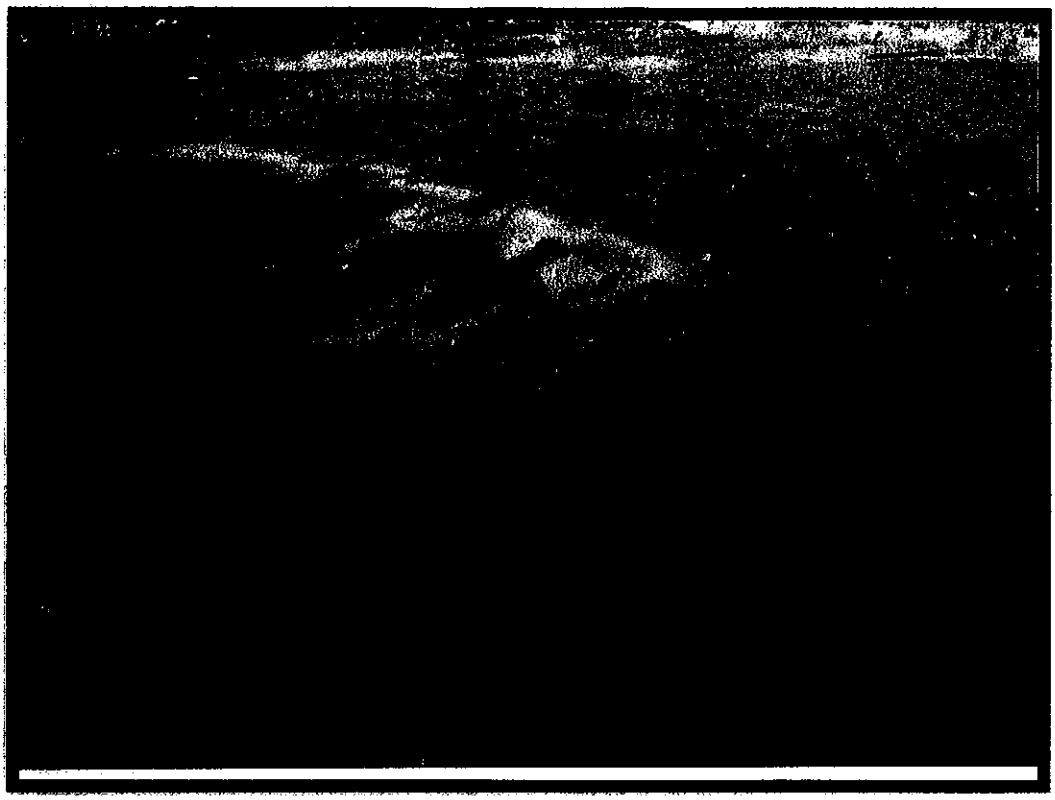
Photograph 16: Paint peeling from hoist equipment inside Building #2 – East Mine

Photograph 17: Big Rambler Pond Mine Open Pit



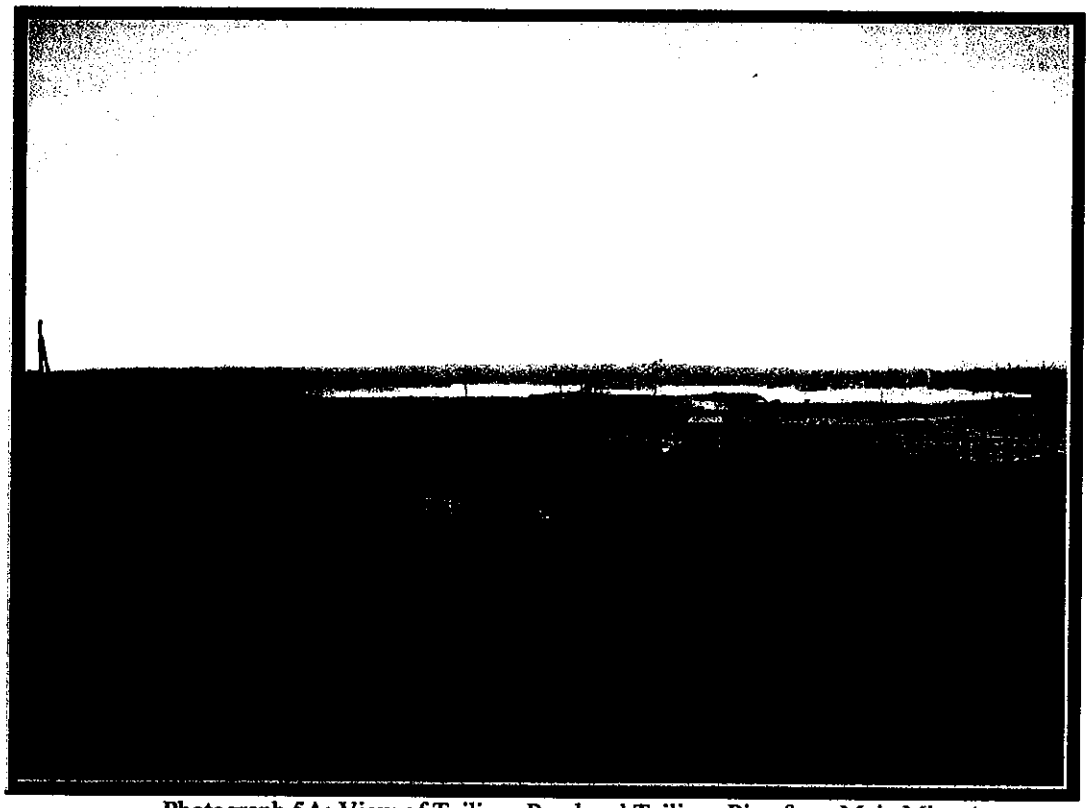
Photograph 1A: Big Rambler Pond Mine Open Pit

Photograph 2A: Big Rambler Pond Mine Portal Area

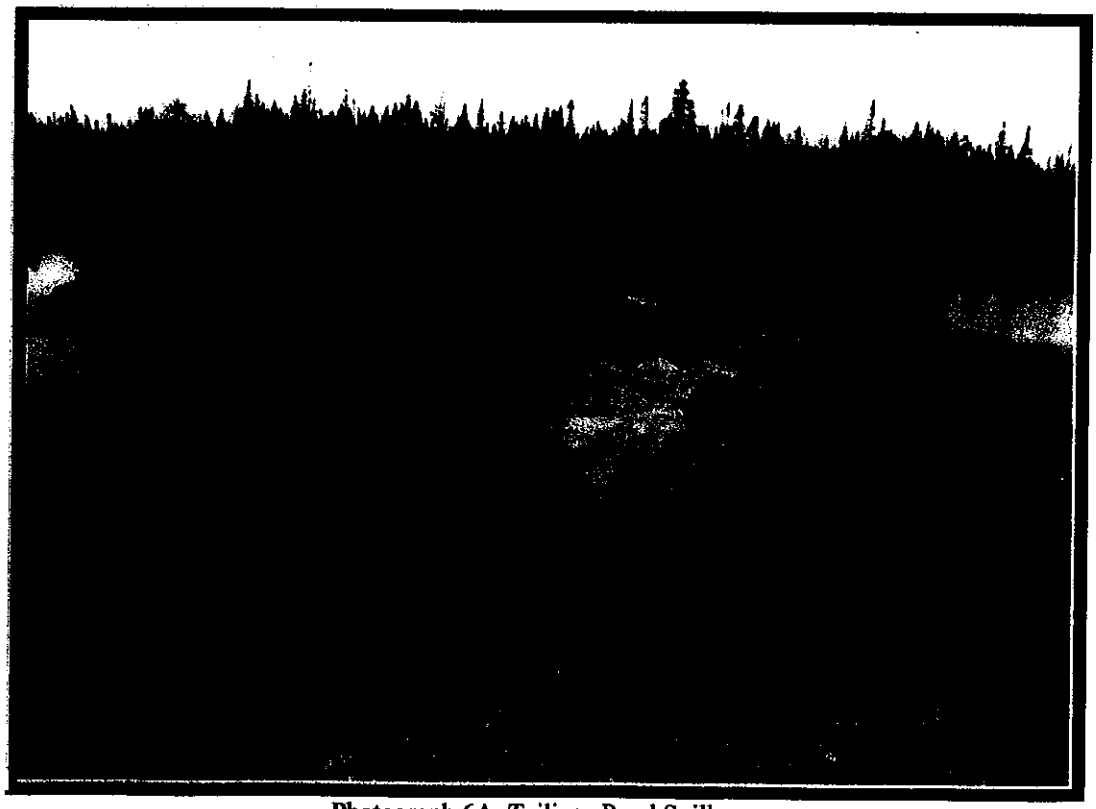


Photograph 3A: Tailings Pond Effluent

Photograph 4A: Tailings Pond Effluent



Photograph 5A: View of Tailings Pond and Tailings Pipe from Main Mine Area

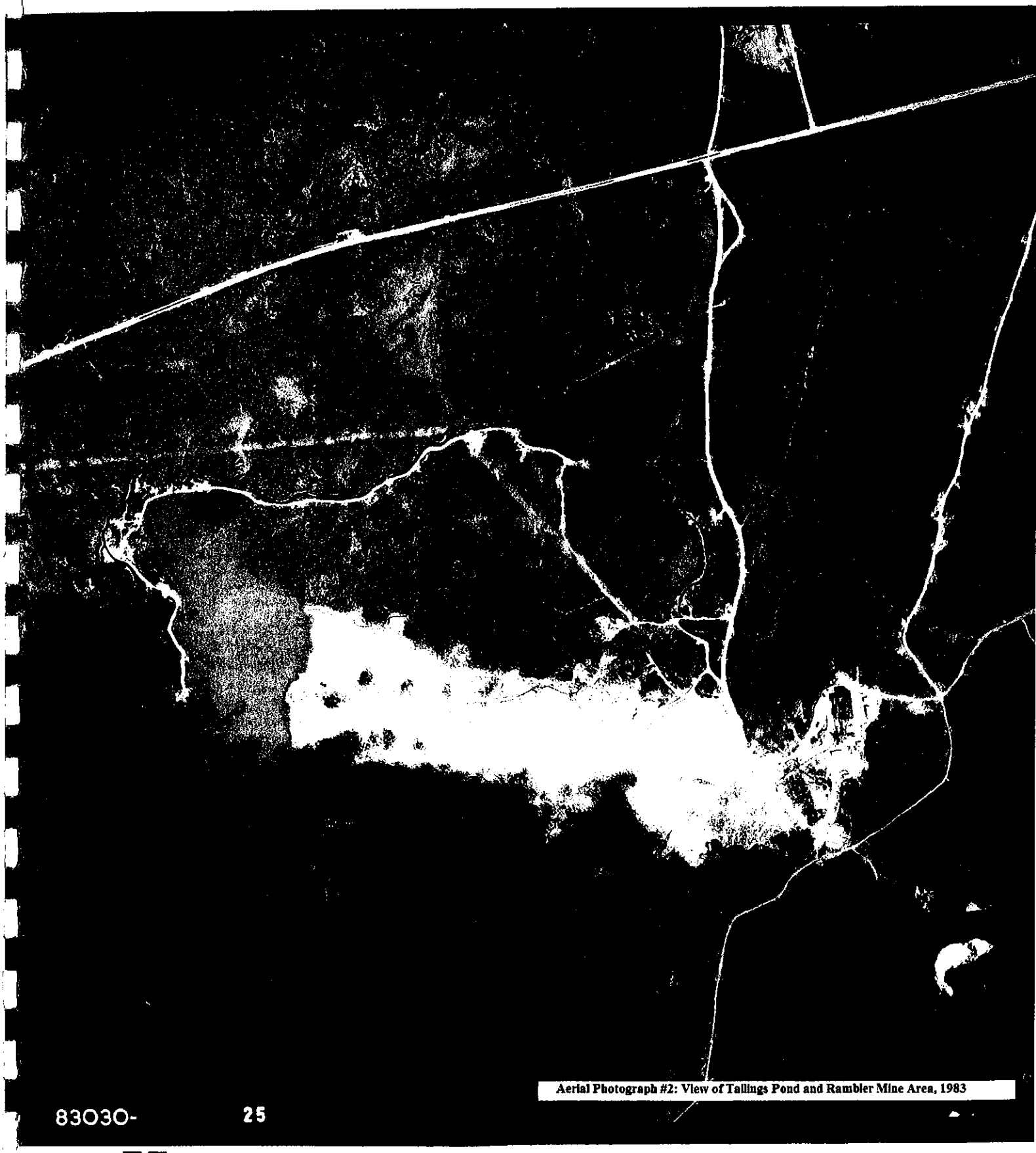


Photograph 6A: Tailings Pond Spillway

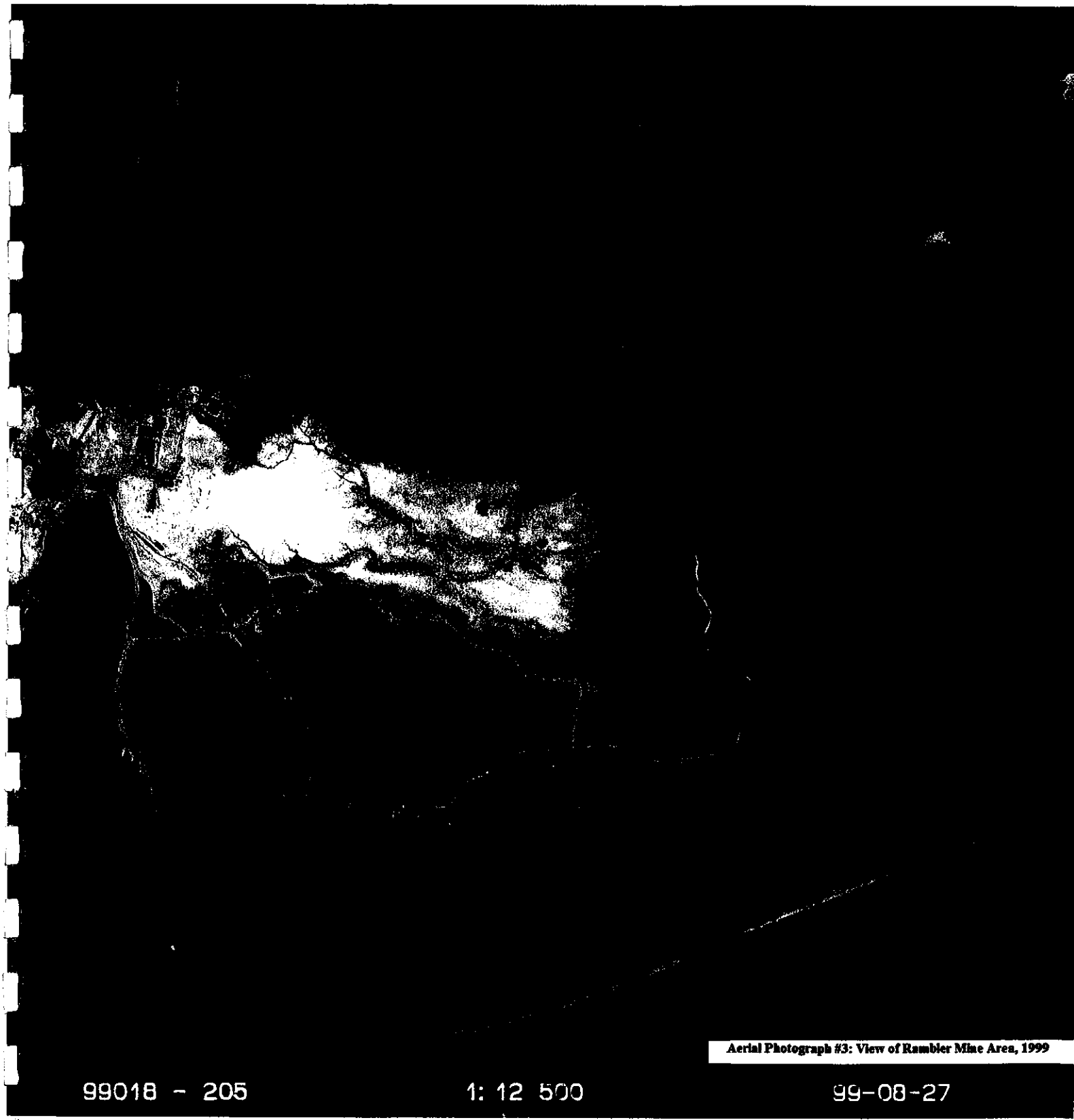
Photograph 9A: Open Pit and Cabin at Big Rambler Pond Site

Photograph 10A: Debris area at Big Rambler Pond Site

Appendix C
Aerial Photographs & Topographic Maps



Aerial Photograph #2: View of Tailings Pond and Rambler Mine Area, 1983



Aerial Photograph #3: View of Rambler Mine Area, 1999

Aerial Photograph #4: View of Tailings and East Mine Site, 1999

99018 - 203 1: 12 500 99-08-27

Appendix D
Regulatory Agency Review

Environment Canada Centre
6 Bruce Street .
Mount Pearl, NL
A1N 4T3
(709) 772-4005

January 27, 2005

Our File # 4170-1

Mr. Neil Hunt
Davis Engineering & Associates Limited
10 Thompson St.
P.O. Box 1060
Clarenville, NF A0E 1J0

Dear Mr. Hunt:

Re: Phase 1 Audit – Former Rambler Mine property

We have reviewed your request regarding the environmental status of the above noted property. Upon the review of our files for the property name and locations you have specified, we have found no information regarding spills, reported incidents, chemical use or fuel storage. We do, however, have a substantial amount of material on file regarding issues associated with our mandate under the Fisheries Act. I have attached a letter sent to The Dept. of Mines and Energy in 2001 which summarizes our position on this property in terms of compliance issues. I have also included a few examples of monitoring data we have which reflects the situation on the site in terms of effluent discharges.

Should you require further information or have any questions on the above, please feel free to call me.

Yours sincerely,

Kevin C. Power, P.Eng.
Head, Pollution Prevention and Reduction Section
Environmental Protection Branch
Newfoundland Office

Environment Canada Environment Canada

6 Bruce Street,
Mt. Pearl, Nfld.
A1N 4T3

File: 7824-37/C503-1

November 21, 2001.

Mr. Len Mandville, Mineral Development Geologist
Department of Mines & Energy
50 Elizabeth Avenue
P.O. Box 8700
St. John's, NF
A1B 4J6

Dear Mr. Mandville :

Re: **Rambler property, Baie Verte**

On September 20, 2001, you requested Environment Canada's input to a rehabilitation / closure plan which you have been asked to put together for the above noted property.

On June 07, 2001, I conducted an inspection of the Rambler properties in determining the compliance status with respect to the Fisheries Act. During this inspection I collected effluent samples from the tailings pond effluent for both chemical and biological analysis and I have attached these results for your information.

These results indicate that the effluent, due to the extremely low pH, is acutely lethal to rainbow trout and possibly in violation of Section 36 (3) of the Fisheries Act.

Environment Canada has additional test results from previous years. Should you wish copies of these results please feel free to call me at 772-4149.

Sincerely

Ronald J. Hunter
Fisheries Act Inspector
Environment Canada

cc: Charles MacLean
Alex Smith

Canada

Environment Canada | Environnement Canada

MEMORANDUM/NOTE DE SERVICE

To/ À	Ron Hunter Environmental Protection Branch Environment Canada Mount Pearl, NF	**Security-Class /Sécurité**
		Our File/Notre référence 76935
From/ De:	Troy Steeves Bioassay Technician Toxicology Laboratory Environmental Conservation Branch Environment Canada Atlantic Region	**Data File/Fichier de données**
		Date: 18 July 2001

SUBJECT: Results of Toxicity Test for Rambler Property, Tailings Pond Effluent.

On June 7, 2001, a water sample from Rambler Property, Tailings Pond Effluent was collected by Ron Hunter of Environment Canada. The sample number was 2001001777. The sample was received at EQL in Moncton on June 8, 2001 and the temperature upon arrival was 15.4°C.

On June 8, 2001 a 100 % pass/fail static bioassay was started on this sample using fingerling rainbow trout of average weight 0.58 grams. Testing was conducted according to the Environment Canada test method "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout EPS 1/RM/ 13 July 1990" and incorporating the amendments from May, 1996.

This sample was acutely lethal to rainbow trout. The sample was found to cause 100 % mortality to rainbow trout. No mortalities occurred in any of the control fish.

A copy of the test report is attached. Please contact me at (506)851-2891 or Ken Doe at (506)851-3486 if you wish to discuss these results further.

Troy Steeves
Attachment: 1
cc: D. Aggett
K. Doe

34264

FISH TOXICITY REPORT PASS T VERS FEBRUARY 28, 2001

ENVIRONMENT CANADA, ECB, ATLANTIC REGION, MONCTON, NB

MATERIAL TESTED: Rambler Property, Tailings Pond Effluent, Baie Verte, NFLD

Collected: 07 June 2001 **By:** Ron Hunter
Sample No.: 2001001777 **Station No.:** N/A
Type of Sample: Effluent **Sample Method:** Grab

TEST CONDITIONS

Method Used EPS 1/RM/13 1990; SOP-TOX 15 rev. 4 **100%** X **or LC50** _____ **Test**
Volume: 20 L **Solution Depth:** 24 cm **Type:** X static _____ **Other:** _____
Duration: 96 hr **Pre-aeration time:** 1.25 hr **Aeration rate:** 110 - 150 (mL/min)
Control water: Moncton Dechlorinated **pH ambient:** X **or adjusted:** _____
Test organism: *Oncorhynchus mykiss* (Rainbow Trout) **Source:** Rainbow Springs Trout Hatchery
Number/test tank 10 **From holding tank no.:** 1 **Date received:** 30 May 01
% mortality 7 days prior to test: 1/1500 = 0.07
Length x ± S.D. (range) cm 3.7 ± 0.5 (2.8 - 4.4) **n =** 10
Weight x ± S.D. (range) g 0.583 ± 0.22 (0.25-1.02) **n =** 10 **Loading density:** 0.14 g/L

TEST STARTED: 8 June 01 **TIME:** 1245 **TEST TERMINATED:** 12 June 01 **TIME:** 1245

RESULTS:

Conc. (%)	T (°C) Range	DO (mg/L) Range	pH Range	Conduc. (µS)	#Dead/ #Exposed	LT50 (hr)	REMARKS
100	14.6 - 15.1	10.0 - 10.0	3.16 - 3.18	843	10/10	2.75 - 23.1	
0	14.1 - 15.1	9.5 - 10.2	7.12 - 7.48	60	0/10	> 96	

Sample description before preparation of test solutions:
T= 15.4 °C, DO= 9.6 mg O_2/L, pH= 3.14, S= <1 ppt, Conductivity= 843 µS

 # control fish showing stressed behavior 0
% Mortality at 96 hours for 100% sample 100 **% Mortality at 96 hour for control** 0
96 hr LC50 result for reference toxicant: 5.48 **95% C.L.** 4.31 - 6.97 **Date:** 25 June 2001
Historical reference toxicant (pheno.) mean LC50: 10.2 **Warning Limits ± 2SD:** 7.55 - 13.8

Remarks/Comments Variance by P. Jackman: fish not acclimated for 2 weeks, discussed with client - OK. This sample was acutely lethal to rainbow trout. Reference toxicant was outside of control limits. Reference toxicant repeated on same batch of fish July 13, 2001 and was within control and warning limits.

Performed by: T. Steeves **Verified by:** [signature] **Date:** 30 July 2001

Sample Details Report

Sample Number: 2001001782 **Legal:** N **Priority:** Y **Sampling Date:** 7-Jun-2001 12:00 PM
Project Number: 2001-379 **Envirodat Station** NF00000000 **Sub-Station:**
Client Number: N/A **Collection Code:** 016 **Envirodat Project** AT0
Sample Owner: R.HUNTER **Sample Submitter:** R.HUNTER **Number of Containers:**
Received Date: 11-Jun-2001 **Expected Date:** 09-Jul-2001 **Accepted Date:** 18-Oct-20
Client Remarks: RAMBLER PROPERTY BAIE VERTE,NFLD (EFFLUENT) GRAB SAMPLE

Method	Value	Units	Method Description	Analysis Date PAC
S 1 TM/E-ICPMS/W		Lab Code: 02	Analyst: aubej Holding Date: 05-Sep-2001	Acceptance Date: 18-Oct-2001
A0238	3940	UG/L	AL-E/ICP PRE-UNF DA-PLASMA ICP-MS	12-Oct-2001
A0239	<0.1	UG/L	SB-E/ICP PRE-UNF DA-PLASMA ICP-MS	26-Jun-2001
A0240	5.5	UG/L	AS-E/ICP PRE-UNF DA-PLASMA ICP-MS	26-Jun-2001
A0241	7.5	UG/L	BA-E/ICP PRE-UNF DA-PLASMA ICP-MS	26-Jun-2001
A0242	<0.1	UG/L	BE-E/ICP PRE-UNF DA-PLASMA ICP-MS	26-Jun-2001
A0243	<0.1	UG/L	B-E/ICP PRE-UNF DA-PLASMA ICP-MS	26-Jun-2001
A0244	10.6	UG/L	CD-E/ICP PRE-UNF DA-PLASMA ICP-MS	26-Jun-2001
A0245	6.4	UG/L	CR-E/ICP PRE-UNF DA-PLASMA ICP-MS	26-Jun-2001
A0246	74.6	UG/L	CO-E/ICP PRE-UNF DA-PLASMA ICP-MS	26-Jun-2001
A0247	712.0	UG/L	CU-E/ICP PRE-UNF DA-PLASMA ICP-MS	12-Oct-2001
A0248	46.80	MG/L	FE-E/ICP PRE-UNF DA-PLASMA ICP-MS	12-Oct-2001
A0249	177.0	UG/L	PB-E/ICP PRE-UNF DA-PLASMA ICP-MS	26-Jun-2001
A0250	2010	UG/L	MN-E/ICP PRE-UNF DA-PLASMA ICP-MS	12-Oct-2001
A0251	<0.1	UG/L	MO-E/ICP PRE-UNF DA-PLASMA ICP-MS	26-Jun-2001
A0252	34.4	UG/L	NI-E/ICP PRE-UNF DA-PLASMA ICP-MS	26-Jun-2001
A0253	50.4	UG/L	SR-E/ICP PRE-UNF DA-PLASMA ICP-MS	26-Jun-2001
A0254	5.4	UG/L	TI-E/ICP PRE-UNF DA-PLASMA ICP-MS	26-Jun-2001
A0255	0.3	UG/L	V-E/ICP PRE-UNF DA-PLASMA ICP-MS	26-Jun-2001
A0256	3460	UG/L	ZN-E/ICP PRE-UNF DA-PLASMA ICP-MS	12-Oct-2001
A0261	<0.1	UG/L	AG-E/ICP PRE-UNF DA-PLASMA ICP-MS	26-Jun-2001
S 2 PP/TSS/WW		Lab Code: 02	Analyst: bernierm Holding Date: 09-Jun-2001	Acceptance Date: 18-Oct-2001
A0229	1.2	MG/L	TSS T-FLT FILTER_MONIFOLD GRAVIMET	14-Jun-2001
S 12 PH-COND/W		Lab Code: 02	Analyst: bernierm Holding Date: 05-Jul-2001	Acceptance Date: 18-Oct-2001
A0223	891.0	US/CM	SPCOND --- DIP-SPECIFIC_COND PC-TITRA	12-Jun-2001
A0224	3.2	PH UNITS	PH PH4710 ELECTRO PC-TITRA	12-Jun-2001

Neil Hunt

From: Jana Fenske [JanaFenske@gov.nl.ca]
Sent: Monday, January 31, 2005 11:59 AM
To: afn@thezone.net
Subject: Former Rambler Mines Property - IFW response

TO: Leslie Spracklin

Dear Mrs. Spracklin,

For an Environmental Site Assessment within the area of investigation, the Inland Fish & Wildlife Division would recommend that consideration be given to possible conflicts with wildlife such as moose, bear, furbearers, birds, fish etc. in the area.

Please be reminded that raptors such as eagle and osprey may occur within the area and appropriate buffers need to be maintained around active nest sites (200m outside the breeding season, 800m during breeding).

For information on rare plants, please check with the Atlantic Canada Conservation Data Centre (ACCDC). You may contact Mr. Meherzad Romer at (709)- 637- 2969 for further information.

For any proposed activities along water bodies or wetlands, adequate buffers along the waters have to be maintained (buffer widths can range from 15m up to 100m) depending on the type of activities and type of water body or wetland. The appropriate buffer width can be assessed more accurately once the type of activity and its location is known.

If you have any further questions, please call me at (709) 637-2062.

Jana

Jana Fenske
GIS - wildife biologist
Inland Fish & Wildlife Division
Dept. of Environment & Conservation
PO Box 2007, 117 Riverside Dr.
Corner Brook, NL, A2H 7S1

e-mail: janafenske@gov.nl.ca
phone: (709) 637-2062
fax: (709) 637-2004

Appendix E
Department of Natural Resources Review

Consolidated Rambler Mines 4705-37/C343

Date: June 10, 1987

Place: NDOE

Attendees: Les Hulett, NDOE
Ferd Morrissey, Nfld Mines & Energy
John Newhook, Environment Canada

1. There are about 2,000,000 tonnes of tailing at the Rambler site, which drain to England's Brook.

2. The Rambler site is now "exempt mineral land", which means that nobody can "stake" the property. The property reverted to the Crown on May 21, 1987.

3. There are significant problems (liabilities) at the Rambler site, including site rehabilitation and (possibly) high zinc concentrations in the effluent from the tailings pond.

4. The assets of Rambler Mines are now sitting on government property. Rambler is part of the Irving Group, and was cash-rich when they shut down, five years ago. They used the money to buy timber rights in Maine.

5. With regard to the Fisheries Act and MMLE Regulations, it was noted that Ron Hunter will be taking effluent samples at Rambler this week. It is anticipated that the results will indicate that Rambler is not in compliance with the federal MMLE Regulations - their zinc levels have traditionally been high. If this were to be the case, and Environment Canada approached Rambler Mines to require compliance with these Regulations, could Rambler claim that the tailings effluent is now the responsibility of Crown Lands? Ferd Morrissey to check.

6. It was decided that, if Rambler is found to be out of compliance with the MMLE Regulations, Environment Canada will approach the Company requesting mitigation. Their response to this issue could give an indication of what their attitude will be to the overall issue of site rehabilitation.

John Newhook

J. Newhook

JN/pb
cc: Attendees
R. Nancarrow

Consolidated Rambler Mines Limited
P.O. BOX 937
SAINT JOHN, N.B.
E2L 4E3

November 16, 1988

225-09

May 21, 1987

VIA REGISTERED MAIL

Mr. J. Osborne,
CEPA Inspector,
Manager, Compliance and Enforcement,
Environmental Protection/Nfld.,
P.O. Box 5037,
St. John's, Newfoundland
A1C 5V3

Dear Mr. Osborne: Re: The Canadian Environmental Protection Act (the "Act")

Your letter of November 1, 1988 was received by us on November 7, 1988.

As you may be aware, certain mining property (the "Mine Property") formerly owned by Consolidated Rambler Mines Limited ("Rambler") reverted to the Province of Newfoundland and Labrador in May, 1987. The PCB's storage facility (the "Storage Facility") is located on the Mine Property. The Province reclaimed the Mine Property by passing an order-in-council causing all of Rambler's mining and surface rights on the Mine Property to revert to the Crown. Subsequent to this, Rambler sold its remaining interest in any and all assets on the Mine Property to Inco Gold, a division of Inco Limited.

Since Rambler had no further interest in the mining or surface rights of the Mine Property, or chattels lying on or about the land, it did, by letter dated December 16, 1987 notify the Province that it was cancelling a surety bond which had been previously granted to the Province under the Waste Material (Disposal) Act. Subsequently, we understand that the Province sent Inco Gold a request for compliance with the Waste Material (Disposal) Act.

In June, 1988, the Province awarded title to the Mining Property to Petromet Ltd. and certain associated companies, who now have possession of the Mine Property and the Storage Facility.

Rambler is not now the owner or operator of the Storage Facility and is not the owner of the waste. It has not been since late 1987. The Mine Property, the Storage Facility and the waste

.../2

November 16, 1988

Mr. J. Osborne

is owned by others and your letter should be directed to them.

Rambler appreciates and acknowledges the importance of complying with the Canadian Environmental Protection Act and other related legislation. During the period it was responsible for the management of the Waste Storage Facility, Rambler complied with such legislation. Should you require any further information to assist with the enforcement of or compliance with the matters raised in your letter, do not hesitate to contact me.

Yours truly,
CONSOLIDATED RAMBLER MINES LIMITED

D.A. Macfarlane,
TREASURER

M:M.J.

Environmental Protection / Protection de l'Environnement

TOXICITY EVALUATION UNIT BIOASSAY REPORT FORM

REQUESTED BY _____ DATE REQUESTED _____

MATERIAL TESTED Company: Consolidated - Rambler

Effluent: Tailings Pond

Collected: October 2, 1986 By: Ron Hunter

TEST CONDITIONS

☒ Static ☐ Cont. flow

46 lit. Duration 96 hr. Type ☐ _____ Replacement Rate 1/A Aeration Rate 2 ml/l

Control Water Treated city supply Started October 3, 1986

Test Organism ☒ Salmo gairdneri ☐ _____ # Used 9 Source Rainbow trout

Mean length (cm) 6.10 n= 9 range 5.6 - 6.8

Mean weight (gm) 3.06 n= 9 range 2.06 - 4.21

RESULTS: LT50 = 17.0 hours

EFFLUENT	T(°C) init	T(°C) final	PH init	PH adj	PH final	D.O. (mg/l) init	D.O. (mg/l) final	% mort.	LT50 (hr)	REMARKS
100% Effl.	16	16	5.8	✓	6.0	10.5	8.8	100	17.0	Unadjusted pH =
Control	16	16	6.1		6.2	9.4	9.0	0	> 96	

ADDITIONAL COMMENTS Clear effluent became yellow and cloudy upon exposure to test conditions.

Performed By Colleen Leeder Approved By _____ Date _____

of Canada du Canada

MEMORANDUM NOTE DE SERVICE

Ron Hunter
Senior Engineering Technician
EP/Nfld.

Ed Porter
Aquatic Toxicologist
EP/Nfld.

SECURITY - CLASSIFICATION - DE SECURITE

OUR FILE/NOTRE REFERENCE
4033-4

YOUR FILE/VOTRE REFERENCE

DATE
Aug. 15, 1989

SUBJECT
96 h LT50 Compliance Bioassays for Rambler Mines.

Attached for your information are the results for the 96 h LT50 bioassays conducted on the TPE from Rambler Mines. The test commen on Aug. 2, 1989 at 1230 and was terminated on Aug. 6 , 989 at 1230. Test conditions were followed according to those outlined in Standard Procedure for Testing the Acute Lethality of Liquid Effluents (EPS Repo No. EPS1-WP-80-1).

The TPE had a pH value of 3.0, thus, a pH adjusted (5.9) bioa was also prepared. The TPE(no pH adjustment) had an LT50 less than 12 h with 100% mortality. The TPE (pH adjustment) had an LT50 less than 96 h with 50% mortality. Thus, the TPE was extremely toxic to fish but may be rendered less toxic by increasing the pH. No mortalities occurred in the control test chambers.

Edward Porter

cc: J. Newhook
B. Moores

Environmental Protection / Protection de l'Environnement

TOXICITY EVALUATION UNIT
BIOASSAY REPORT FORM

QUESTED BY Ron Hunter DATE REQUESTED 2/8/89

TERIAL TESTED Company: Rambler Mines

Effluent: TPE (no pH adjustment).

Collected: 1/8/89 By: Ron Hunter

ST CONDITIONS

☒ Static
☐ Cont. flow

20 lit. Duration 96 hr. Type ☐ _____ Replacement Rate NA Aeration Rate 200c

trol
ter Dechlorinated Tap Started 1230 2/8/89

st ☒ salmo gairdneri # Used 10 Source Rainbow Springs
ganism ☐ _____

sh length (cm) 5.14 n= 10 range 4.4-6.0

sh weight (gm) 1.90 n= 10 range 1.17-3.0

SULTS:

EFFLUENT	T(°C) init	T(°C) final	pH init	pH adj final	D.O. (mg/l) init	D.O. (mg/l) final	% mort.	LT50 (hr)	REMARKS
TPE,	16	16	3.0	5.5	10.0	6.8	100	< 12	

DITIONAL MENTS Effluent was acutely lethal to fish.
Loading density= 0.25 L/g/day.

formed By Ed Porter Approved By Ed Porter Date 15/8/89

Environmental Protection / Protection de l'Environnement

TOXICITY EVALUATION UNIT
BIOASSAY REPORT FORM

TESTED BY Ron Hunter DATE REQUESTED 2/8/89

ERIAL TESTED Company: Rambler Mines

Effluent: TPE (pH adiustment)

Collected: 1/8/89 By: Ron Hunter

T CONDITIONS

☒ Static ☐ Cont. flow

20 lit. Duration 96 hr. Type ☐ _____ Replacement Rate NA Aeration Rate 200cc

rol
er Dechlorinated Tap Started 1230 2/8/89

nism ☒ salmo gairdneri ☐ _____ # Used 10 Source Rainbow Springs

length (cm) 5.58 n= 10 range 5.0-6.5

weight (gm) 1.82 n= 10 range 1.24-3.12

TS:

UENT	T(°C) init	T(°C) final	PH init	PH adj	PH final	D.O. (mg/l) init	D.O. (mg/l) final	% mort.	LT50 (hr)	REMARKS
	16	16	3.0	5.9	6.4	9.9	10.2	50	<96	

IONAL Effluent was acutely lethal to fish.
NTS Loading density= 0.27 L/g/day.

med By Ed Porter Approved By Ed Porter Date 15/8/89

Environmental Protection | Protect. de l'Environnement

TOXICITY E[illegible] LUATION UNIT
BIOASSAY REPORT FORM

UESTED BY Ron Hunter DATE REQUESTED 2/8/89

RIAL TESTED Company: Control water #1

Effluent:

Collected: By:

CONDITIONS

☒ Static ☐ Cont. flow

20 lit. Duration 96 hr. Type ☐ Replacement Rate NA Aeration Rate 200c

rol
r Dechlorinated Tap Started 1230 2/8/89

anism ☒ salmo gairdneri ☐ # Used 10 Source Rainbow Springs

n length (cm) 5.20 n= 10 range 4.7-6.0

weight (gm) 1.63 n= 10 range 1.0-2.32

TS:

UENT	T(°C) init	T(°C) final	PH init	PH adj	PH final	D.O. (mg/l) init	D.O. (mg/l) final	% mort.	LT50 (hr)	REMARKS
ntrol	16	16	6.5		6.6	9.8	9.5	0	> 96	

IONAL Control water was not acutely lethal to fish.
ENTS Loading density= 0.31 L/g/day

ormed By Ed Porter Approved By Ed Porter Date 15/8/89

Canada Environmental Protection

Canada Protection de l'Environnement

TOXICITY EVALUATION UNIT
BIOASSAY REPORT FORM

REQUESTED BY Ron Hunter DATE REQUESTED 05/10/87

MATERIAL TESTED Company: Consolidated Rambler Mine ltd.

Effluent: Tailings Pond Effluent (C1255)

Collected: 29/09/87 By: Ron Hunter

TEST CONDITIONS

☒ Static
☐ Cont. flow

Vol 40 lit. Duration 96 hr. Type ☐ _____ Replacement Rate Not applicable Aeration Rate 200 cc

Control Water St John's City Water

☐ ambient PH ☒ adjusted *3.09 to 6.5 with NaOH

Started 11:00/05/10/87

Test Organism ☒ salmo gairdneri ☐ _____ # Used 10 Source Rainbow Springs, stock

Mean length (cm) 5.09 n = 10 range 4.4 - 5.8

Mean weight (gm) 1.47 n = 10 range 0.78 - 2.35

RESULTS: LT50 = 65.3 hours, effluent with adjusted pH is acutely lethal to salmo gairdneri when tested according to standard method.

Conc.	T(°C) init	T(°C) final	PH init	PH final	D.O.(mg/l) init	D.O.(mg/l) final	% mort.	LT50 (hr)	LC50	REMARKS
100%	16.5	15.0	6.5	6.5	10.2	10.25	60	65.3	-	
control	14.0	14.5	6.7	6.7	9.1	9.95	0	G96.	-	

ADDITIONAL COMMENTS Loading density is 0.092 g / L /day.

Performed By Suzanne Roussel Approved By Suzanne Roussel Date 09/10/87

Government of Canada / Gouvernement du Canada

MEMORANDUM NOTE DE SERVICE

TO / A
Ron Hunter
Senior Engineering Technician
EP-Nfld

FROM / DE
Richard Martin
Project Biologist
EP-Nfld

SECURITY - CLASSIFICATION - DE SÉCURITÉ

OUR FILE/NOTRE RÉFÉRENCE
4705-37/C343-1

YOUR FILE/VOTRE RÉFÉRENCE

DATE
July 6, 1987

SUBJECT / OBJET Results of Consolidated Rambler Mines Ltd Bioassay

Attached for your information is the raw data from the bioassay conducted on the Consolidated Rambler Mines Ltd. effluent. The following parameters were calculated:

Effluent	LT50
Tailings Pond Effluent	9.8 hours

Richard C. Martin

Richard Martin

cc: B. Moores

ENVIRONMENT CANADA MEMORANDUM

TO :

C. MacLean
Environmental Engineer
EP / Nfld.

FROM :

R. HUNTER
Sr. Engineering Technician
EP / Nfld.

Security-Classification
Our File # 4705-37/A198-1
Your File
Date November 24, 1992

SUBJECT : Consolidated Rambler (Abandoned Mine) 1992 Monitoring

I conducted inspection/monitoring visits to the old Rambler properties on June 25, and September 15, 1992. Effluent samples were collected on both occasions from the locations which are indicated on the attached Map. The analytical results of these samples can be seen in the attached Table.

During my first visit I realized that one of the tailings dykes had been breached. The purpose of this dyke was to both retain tailings and to divert uncontaminated water from the tailings area. The dyke had been breached as a result of some ambitious Beavers which had dammed the diversion and forced it to flow over this dyke to the tailings pond. In June the flow to the tailings pond was relatively small and N. Norman said he was going to have the dyke repaired.

The sample which was collected for Toxicity testing turned out to be non-toxic even with a pH of 4.7. This seemed strange and it was decided that another visit was warranted.

I revisited the mine on Sept. 15 to find the following:

1. The previously discovered dyke breach (#1) had become worse and all but a trickle of the diversion water was entering the tailings pond.

2. Mr. Norman told us that there was another breach (#2) of the dyke on the other side of the tailings pond and that it had been breached for a couple of years (since 1985).

...2

CONSOLIDATED RAMBLER PROPERTIES
BAIE VERTE PENINSULA

PARAMETER	UNITS	Tailings Pd. Eff. (TPE)			Diversion Ditch (DD)		Tailings Diversion (TD)		Downstream (DS)		
		Nov. 90	June 92	Sept. 92	Nov. 90	June 92	Nov. 90	June 92	Nov. 90	June 92	Sept. 92
pH	units	4.06	4.6	4.45	6.44	5.04	6.33	6.16	4.81	4.78	4.48
TOTAL ALKALINITY	mg/l	0.66	0.3		6.26	0.77	5.89	2.4	1.11	0.71	
CONDUCTIVITY	mmho/cm	-	59.7		-	95.2	-	27.6	-	73.3	
TURBIDITY	jtu	14	2.3	5.3	1.6	3.5	1.9	0.45	4.2	2.6	5
TOTAL HARDNESS CaC03	mg/l	19.1	13		24.2	24.3	24.5	7.67	18.4	17.6	
TOTAL SUSPENDED SOLIDS	mg/l	18	2.4	8.8	2	3.2	2.4	<1	10	4	4.8
TOTAL ZINC	mg/l	0.258	0.112	0.215	0.116	0.279	0.122	<0.02	0.138	0.164	0.214
TOTAL LEAD	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
TOTAL COPPER	mg/l	0.081	0.02	0.069	0.079	0.115	0.082	<0.02	0.058	0.048	0.074
TOXICITY (LT 50)	hours	?	>96	-	-	-	-	-	-	-	41

CaO + MgO ... plant

pH 5.5-9 — 5.-5.5 6

* ε Alkalinity / Conductivity
* ε Suspended Solids 36 — 25

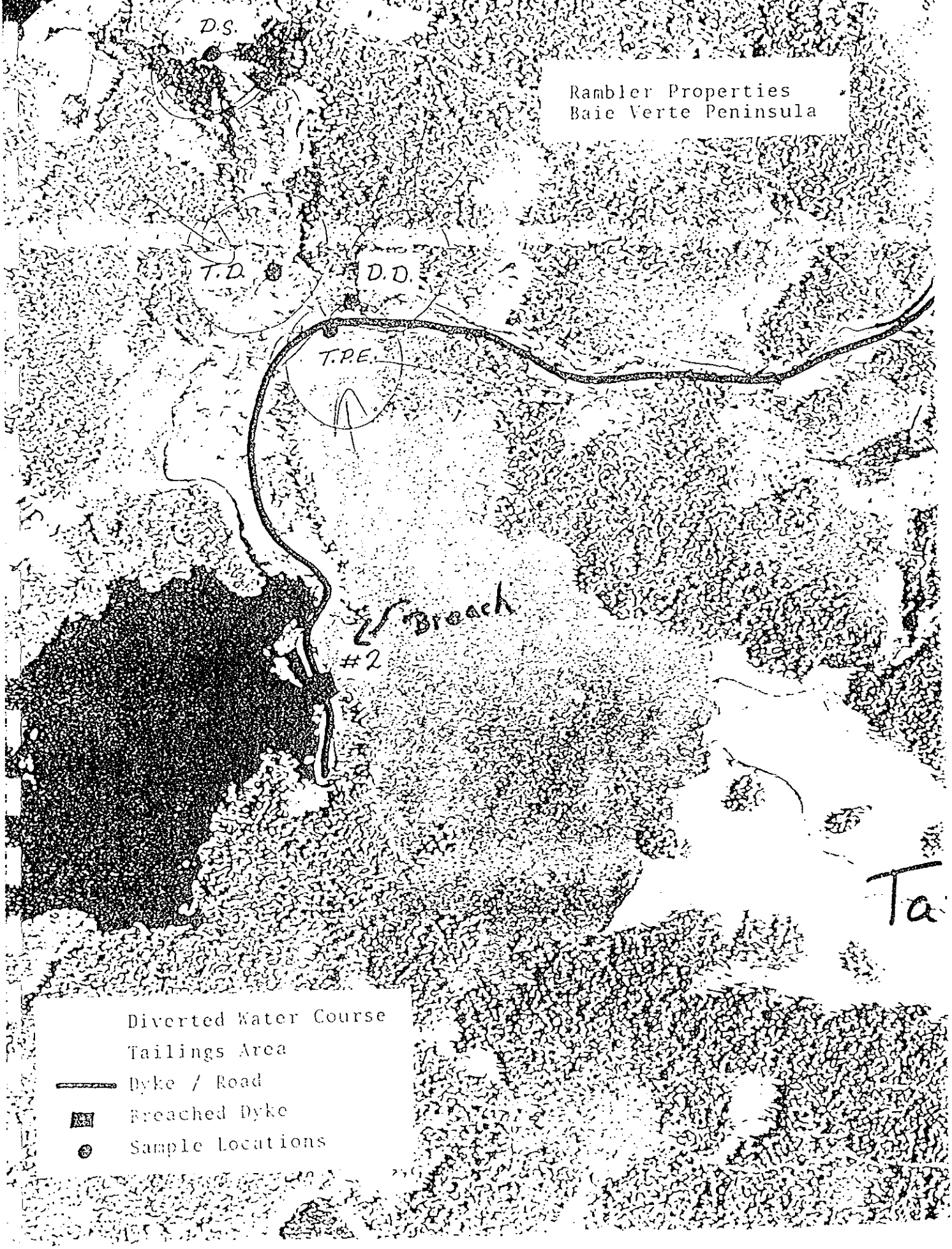
ε Zn 0.5 mg/l — 0.5

ε Pb 0.2 — 0.2

ε Cu 0.3 — 0.3

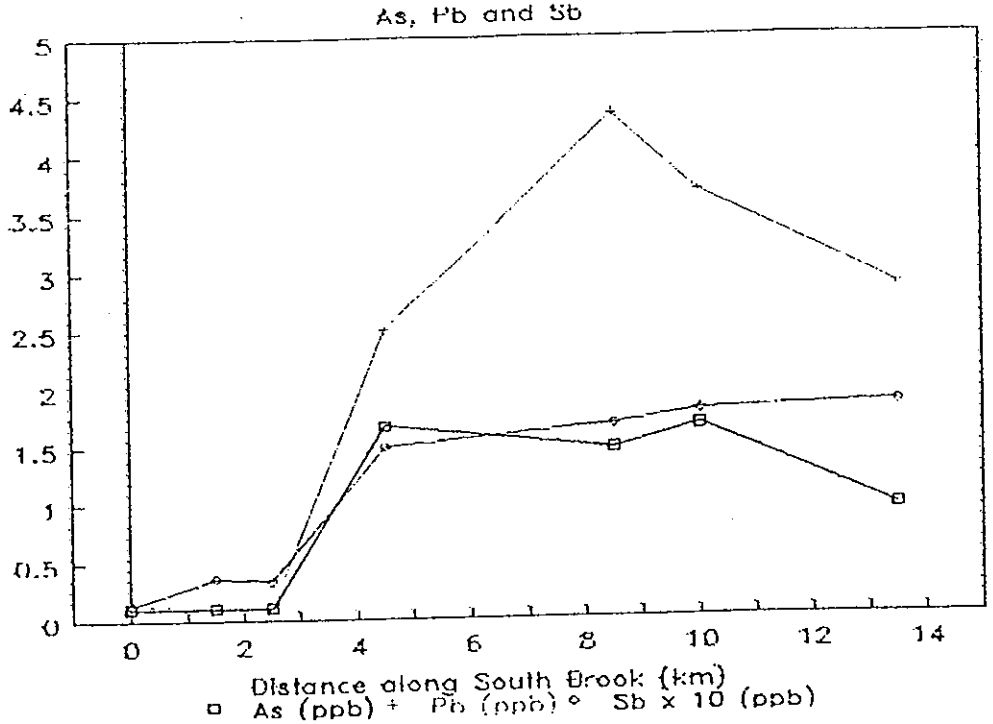
* Hardness

Not in Regs — metal mining liquid Effluent Regulations


Rambler Properties
Baie Verte Peninsula
D.S.
T.D.
D.D.
T.P.E.
Breach
#2
Diverted Water Course
Tailings Area
Dyke / Road
Breached Dyke
Sample Locations

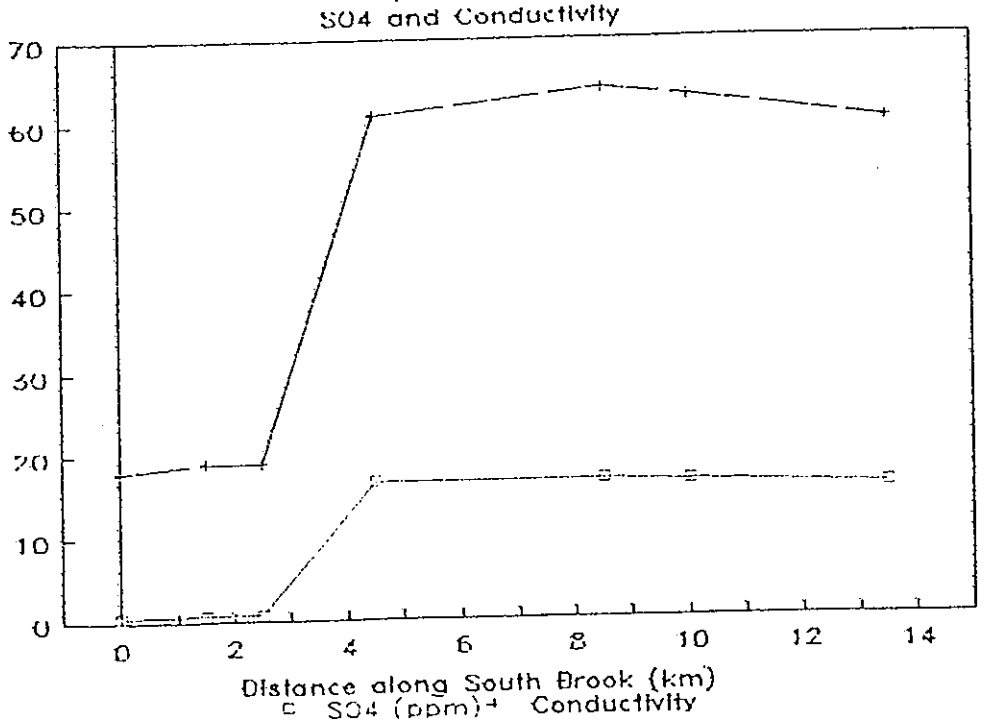
Water analyses in South Brook

As, Pb and Sb

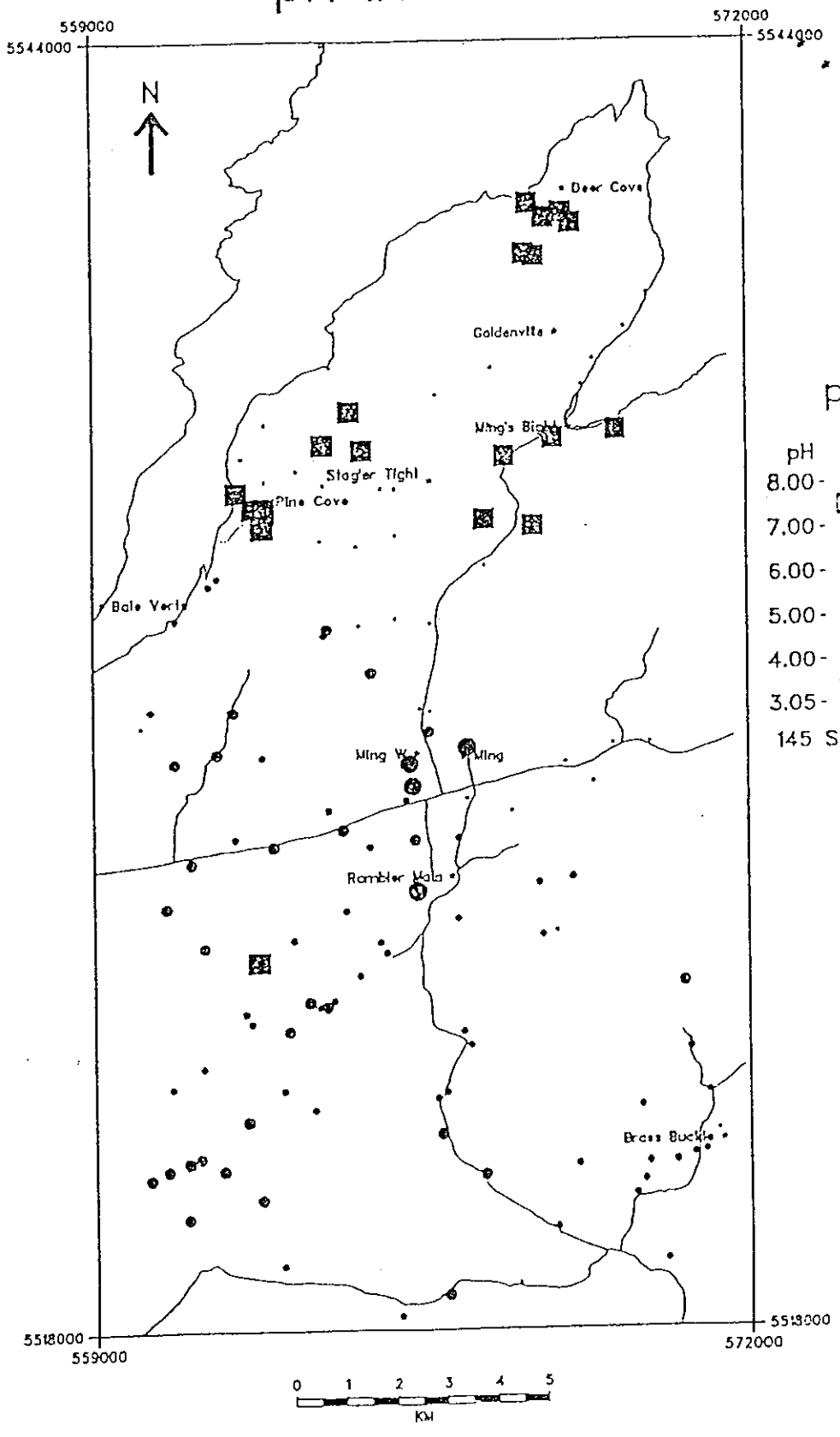


Water analyses in South Brook

SO4 and Conductivity



pH IN WATERS


559000
5544000
572000
5544000
N
Deer Cove
Goldenville
Ming's Bight
Stag'er Tight
Pine Cove
Bale Verte
Ming W
Ming
Rambler Mata
Brass Buckle
5518000
559000
572000
5518000
0 1 2 3 4 5
KM
pH
pH %TILE
8.00 - MAX
7.00 - 85
6.00 - 55
5.00 - 25
4.00 - 4
3.05 - MIN
145 SAMPLES

GOVERNMENT OF NEWFOUNDLAND AND LABRADOR

DEPARTMENT OF MINES AND ENERGY

P.O. Box 8700
St. John's, Newfoundland
A1B 4J6

MEMO TO: Paul L. Dean
Assistant Deputy Minister

FROM: Michael J. Collins
Geologist

SUBJECT: Notes on Preliminary Trial - Environment Canada Vs Consolidated Rambler Re Sale of PCB Liquids and Other Contaminated Material

DATE: June 19, 1990

The preliminary hearing was continued in Baie Verte on Thursday, June 7, 1990, began at approximately 10:15 a.m. and was presided over by Judge A. Olford of Provincial Court, Springdale. Legal counsel were present for Crown and defence and the Court continued a ban on the publication of evidence.

Environment Canada under the Environment Contaminants Act (now CEPA) charges Consolidated Rambler Mines Ltd. (CRML) with selling PCB liquids and PCB contaminated materials (drained electrical transformers and drummed soil and gravel).

Two Crown witnesses were questioned by Crown and defence counsel.

WITNESS: Allan E. Sheito - Geologist; Manager of Exploration, Atlantic Canada, Inco. Gold

Counselors review previous exhibits dealing with INCO. A.E.S. reviews and documents history of INCO's involvement with

Consolidated Rambler Mines Ltd. (CRML) property up to bill-of-sale. INCO's main interests were the mineral rights and plant and priginally were unaware of PCB on property.

A.E.S. became aware of PCB during tour of CRML property with N. Norman (caretaker for CRML and INCO). A.E.S. informed head office of PCB. INCO lawyer exempted PCB from bill-of-sale by reference to 'encumbered' assets.

INCO offered $600,000.00 for property; when CRML insisted on $1,000,000.00, A.E.S., having consulted A.T. McGibbon, (INCO geologist responsible for contracts and joint ventures) settled matter in 1/2 hour phone call with Arthur Irving.

Discussion of meaning of 'properties'. A.E.S. - all surface and mineral rights, all buildings and equipment except those exempted, restricted or otherwise encumbered. Two Mining Leases No. 21 and 24 and two Fee Simple Grants (exhibits A.S. No. 1 & 2) go to INCO from CRML.

A.E.S. reviews bill-of-sale with defense counsel - no reference to PCB in document. INCO inspected assets referred to in bill-of-sale but main interest was mill equipment, very little interest in building containing PCB.

After purchase of buildings etc. INCO agreed to monitor PCB storage until caretaker was transferred, whereupon keys to building were given to provincial Department of Environment and Lands.

A.E.S. admits that all items in storage building (mine dry and hoist building) were purchased by INCO but that INCO is very sensitive to environmental concerns and would not involve themselves with, nor did they intend to purchase, PCB.

Witness: Newton Norman, watchman (caretaker) for CRML and INCO; recently hired by Corona Corp., who purchased property from INCO.

Crown counsel reviews with N.N. the transfer of PCB from Gullbridge mines property to CRML storage site. Stored in building that was purchased by INCO from CRML.

Some mine timber stored in portion of building were subsequently sold and payment went to INCO.

N.N. told field geologist R. Bell about PCB and that, while caretaker for CRML, he monitored the building - he was told to continue inspections until ordered otherwise.

Defence counsel tried to establish ownership of PCB and inferred Gullbridge Mines Ltd. as owner.

Defense entered 'notice of litigation' against Newfoundland Government by CRML as exhibit (Defense Exhibit No. 1). Crown counsel does not object to document as evidence but says that content of document is not evidence and is irrelevant to arguments in this case and should have no weight.

Postponement to 10:00 a.m., September 19th at Springdale for final written and oral summation and argument.

P.O.Box 5037
St. John's, NF
A1C 5V3
(709) 772-4181

File # 4705-37/C343

April 1, 1993

Mr. Ferd Morrisey
Dept. of Mines & Energy
P.O.Box 8700
St. John's, NF
A1B 4J6

Dear Mr. Morrisey

Re: Bioassay Data - Consolidated Rambler
Abandoned Mine Site

As discussed please find enclosed some bioassay results for the Tailings Pond effluent for the above location. if you have any questions please contact me at your convenience.

Yours truly,

Charles R. MacLean, P. Eng.
Environmental Engineer
EP/Nfld.

cc: K. Power

EP (NFLD) - TOXICITY REPORT

Material Tested: Rambler

Sample Number: H499

Collected By : Ron Hunter Date collected: 19/09/92

TEST CONDITIONS

Vol 20 L Duration 96 Hr Type X Static ___ Flow Replacement Rate NA mL/min Aeration Rate 150 mL/min

Control Water Dechlor. Municipal pH X Ambient ___ Adjusted Date Started 21/09/92

Test Organism Rainbow Trout No./Tank 10 Source Rainbow Springs Hatchery Arrived 24/08/92 Tank # 2

Length with Std. Dev. (cm) 4.8 + 0.3 # 10

Mass with Std. Dev. (g) 0.90 + 0.19 # 10 Loading Density (g/L) 0.45

RESULTS

Conc.	Temp Range (C)	DO Range (mg/L)	pH Range	Cond. (uohms/cm)	# Mort/ # Expt.	LT_{50}	Remarks
100 %	14.5 - 16	10.0 -10.7	4.4 - 5.3	96.0	9 / 10	41 Hrs	
0 %	15 - 16	10.2 -10.5	6.5 - 6.8	94.2	0 / 10	> 96	

96-Hour LT_{50} 41 hours 95% Confidence Limits 33.1 - 50.8

Comments:

Performed By: Paula Jackman

EP, ATLANTIC RI - TOXICITY REPORT

MATERIAL TESTED: Rambler TPE

COLLECTED: June 24/92 BY: Ron Hunter

SAMPLE NO. H189 LOCATOR CODE:

TEST CONDITIONS:

Vol 20 L Duration 96 hr Type ✓ static ___ cont. flow Replacement rate — (mL/min) Aeration rate 150 mL (mL/min)

Control Water Dechlorinated Municipal pH ✓ ambient ___ adjusted Started June 29/92

Test Organism Rainbow Trout #/Tank 9 Source Rainbow Springs Hatchery 09/05/92

Length x ± S.D. (range) cm 4.91 ± 0.12 n = 9

Weight x ± S.D. (range) g 1.14 ± 0.10 n = 9 g/L 0.5

RESULTS:

Conc. (%)	T (C) Range	DO(mg/l) Range	pH Range	Cond. (umhos/cm)	# Mort/ # exp	LT50 (hr)	REMARKS
100	14.5 -16	10.1 -10.2	7.1-6.8	66.5	0/9	>96	
0	15-16	9.6-10.6	6.4-7.0	68.8	0/9	>96	

96-hour LC50 >96 95% Conf. Limits

Comments: No mortalities at 96 hours

Performed By: P.S Verified By: Date:

GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR

Department of Natural Resources

MEMO TO: Ferd Morrissey
Manager, Engineering

FROM: Paul LeGrow
Geologist

Leonard Mandville
Geologist

SUBJECT: Rambler Property - Mine Site and Tailings Pond Inspections.
(File 825:65)

DATE: June 28, 1995

On Friday June 23, 1995 several inspections were conducted on the Rambler property.

A tour of the Rambler mill was guided by Sam Blagdon of Ming Minerals who are presently reactivating the property. They plan to develop the Ming West copper and gold deposit.

Raymo Processing Limited representatives Kevin MacNeil and David Duncan identified the location of their proposed vat leaching project for gold recovery from the tailings pond.

The spillway for the tailings pond and a previously known breach in the dyke were inspected. Several water samples were taken near the breach and the spillway, and will be analyzed for pH and metal content.

Photographs and videotape were taken and are on file.

Paul LeGrow
Geologist

Leonard Mandville
Geologist

P.O. Box 8700, St. John's, Newfoundland, Canada, A1B 4J6

Date: 24-Jul-95
Geologist: LeGrow P.

Dept. of Natural Resources
Water Analysis Report (ICP)

Lab Number	Field Number	SO4 ppm	Fe ppb	Mn ppb	Si ppm	Mg ppm	Ca ppm	K ppm	Na ppm	Mo ppb	P ppb	Ni ppb	Co ppb	Zn ppb
		Long Term Average for Control Samples												
	AVG rr-3	10.6	59	205	1.6	1.30	6.56	1.5	76.10	0	4	1	0	41.6
	AVG 1643D	0.2	22	7	0.1	1.89	7.20	0.5	2.33	20	3	11	4	14.0
8580012	DC95-001	9.0	48	6	3.3	4.28	43.59	0.5	5.95	1	10	2	-1	3.5
8580013	DC95-002	9.1	52	7	3.1	4.16	42.47	0.6	5.96	1	11	3	-1	4.4
8580014	RM95-001	1.0	323	30	0.5	0.46	1.27	0.3	1.43	-1	19	2	1	8.9
8580015	RM95-002	39.7	1782	234	0.7	2.45	7.18	1.0	2.05	1	13	10	6	395.0
8580016	RM95-003	33.2	1770	375	1.2	1.94	7.80	0.9	3.48	3	30	28	16	400.1

Date: 24-Jul-95
Geologist: LeGrow P.

Dept. of Natural Resources
Water Analysis Report (ICP)

Lab Number	Field Number	Al ppb	Cr ppb	Ti ppb	Y ppb	Be ppb	Cu ppb	Ba ppb	Sr ppb	Li ppb	pH
		Long Term Average for Control Samples									
	AVG rr-3	16	1	-0	0.2	0.0	4	23	26.1	1	
	AVG 1643D	29	4	1	0.0	4.7	6	10	49.3	3	
8580012	DC95-001	53	3	1	0.5	0.1	19	6	62.3	2	8.21
8580013	DC95-002	49	1	1	0.3	-0.1	18	5	60.1	4	8.22
8580014	RM95-001	280	2	4	-0.5	-0.1	17	4	5.2	4	5.37
8580015	RM95-002	990	6	-1	0.8	-0.1	107	13	7.8	6	3.85
8580016	RM95-003	479	6	-1	1.5	0.7	225	7	8.1	6	4.98

L. J. ASSOCIATES LIMITED
BOX 2101, 22 ELIZABETH DR., PARADISE, NFLD. A1L 1E4
BUSINESS AND FAX. (709) 782-2002 RES. 782-1775

PROGRAM: ON THE GO (#04)	DATE: WEDNESDAY, MAY 3, 1995
NETWORK: CBC RADIO	TIME: 4:30 P.M.

* FOR INFORMATION AND INTERNAL USE ONLY. SUBJECT TO ERRORS.

IT'S BEEN YEARS SINCE RAMBLER MINES CLOSED BUT AN UNPLEASANT LEGACY LIVES ON, POLLUTION.

CINDY WALL: It's been years since Rambler Mines in Baie Verte closed but an unpleasant legacy lives on, pollution.

JEFF GILHOOLY: A new study by a scientist in the Provincial Geology Department shows there's so much copper in nearby streams it's killed the fish.

CINDY WALL: John McConnell just published the results of his study and he told Jeff how it worked.

JOHN MCCONNELL: Well we took, I think all totalled there were around sixty or eighty samples but we were taking them from brooks and streams and small rivers in the area and also we sampled some of the drainage ditches that were put in at the time of the development of the mine, so to divert the existing watershed around the tailings pond or the tailings area.

JEFF GILHOOLY: So did you, in the samples that you got did you discover that there were still some pollution problems left over from the previous mining activity?

JOHN MCCONNELL: Yes, clearly there are and in fact it's probably worse than it was some years ago.

JEFF GILHOOLY: Really?

..../2

JOHN MCCONNELL: Well, it was designed and the plan was to isolate the tailings. The tailings are the waste materials but they still contain alot of metals from the ore processing. The plan was when it was designed was to isolate this by a system of dykes and diversion ditches so they say the existing streams would bypass them, and what has happened is that, one of the things that has happened is that one of the dykes has broken in South Brook which is one of the large rivers or large, smaller rivers, large streams in the area. The major drainage in the area is now pouring into this waste area and then pours back into its old stream course and then on down for about, oh about ten kilometers before it finally empties into Baie Verte itself.

JEFF GILHOOLY: But there's nothing you can see is there? I mean if you look at the water my understanding is it looks crystal clear.

JOHN MCCONNELL: Actually some of them really are crystal clear. They're clearer than, not South Brook itself but some of the other contaminated or polluted streams, the most severely ones are extremely acidic and there's absolutely no organic material in that what so ever.

JEFF GILHOOLY: That's why they're crystal clear.

JOHN MCCONNELL: That's why they're crystal clear. They look beautiful as you come across them in the woods.

JEFF GILHOOLY: Okay, and the acid is caused by, how does that form then from the tailings? Can you explain that?

JOHN MCCONNELL: Well, basically it's a break down of the sulphides that's in their action of water and oxygen and sulphur and it creates acid and, of course, the generation of the acid from this

..../3

material then liberates these metals which are otherwise held in the minerals.

JEFF GILHOOLY: And because of the break down of the dyke that was there or which was intended to hold these tailings back, because of that pollution in those streams is actually worse now than when the mine was on the go.

JOHN MCCONNELL: That's right. I would say it is. We don't have data but almost certainly it was because at that time there was almost no release, at least from the tailings pond of this water which is now, as I say, very high in various metals and also very acidic.

JEFF GILHOOLY: And so it's at a point, and I think you said this, I'm just sort of going over it again, but it's at a point where it's totally lethal to fish.

JOHN MCCONNELL: Yes, to, Environment Canada has guidelines and above which it's defined as being lethal or toxic to aquatic life and in many cases it may be microorganisms on which the fish feed and to the fish themselves, and in the case of copper their guideline level is two parts per billion and we're finding much higher levels than that in the streams.

JEFF GILHOOLY: Okay. Can they clean it up some how?

JOHN MCCONNELL: Well, it certainly could be cleaned up. I don't know whose responsibility it is to do it but I mean clearly simply filling in the breech in the dyke would solve a good portion of the problem but there are other sources, fairly significant sources of metals coming into the stream, South Brook in particular, coming into it that would not be solved by merely stopping the leakage from the

..../4

tailings pond.

JEFF GILHOOLY: Because I understand that some of this land is now owned by the Government.

JOHN MCCONNELL: I believe so. I don't really know fully the details of the ownership or even the responsibility. Our role really was to document to the problem.

JEFF GILHOOLY: So what would it take if there was some sort of joint effort at this point to say look, we've got to stop this, this is ridiculous, you know, we've got to stop what's causing the pollution and we've got to clean it up. What would it take right now?

JOHN MCCONNELL: Well, what you'd have to do is stop these metals and the acidity of the water getting into the watersheds and, as I say, the one area would simply be a matter of filling that breech in the dyke and that would stop alot of the contaminated, polluted, acidic water getting in to South Brook. Now, the other problems are the smaller streams which are not leaking out of the tailings pond and at this point we haven't gone in to fully assess them to see actually what the sources are. We suspect they're probably waste rock that have been dumped up near where the ore was brought to the surface.

JEFF GILHOOLY: But still having the same effect.

JOHN MCCONNELL: But still having the same effect, yeah.

JEFF GILHOOLY: Okay. Mr. McConnell, thanks very much for coming in and explaining your study to us. We appreciate it.

JOHN MCCONNELL: Well, you're very welcome.

..../5

CINDY WATT: John McConnell works with the Geological Survey of the Provincial Government.

JEFF GILHOOLY: There may be a way to clean up some of this mess. A new company wants to mine another deposit of copper that's right next to the old Rambler Mine and as part of their proposal they say they can clean up what Rambler Mines left behind. We're going to hear all about that tomorrow.

* * * * * * * * * *

825: 68 4

GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR

DEPARTMENT OF ENVIRONMENT AND LABOUR
Environmental Assessment Division

5706

MEMO TO: John Eason, Manager
Environmental Impact Management Section

FROM: Milton Crewe
Environmental Surveillance Officer
Environmental Impact Management Section

DATE: May 24, 1996

RE: Rambler Mine Inspection

On May 23, 1996, I accompanied Mike Lacey of the Industrial Environmental Engineering Division on a site visit to the Rambler Mine near Baie Verte. The purpose of my visit was to ascertain whether certain activities described in the registration document where actually being undertaken. The registration document describes the development of an open pit mine and modifications to the existing mill processing system. The open pit mine was to be located approximately 150 m to 250 m south of the mill building. The gold circuit was to be installed within the mill building. The gold extraction process will utilize sodium cyanide.

Upon arrival at the site, we noticed a trailer unit just east of the mill building. It was open-ended so we could see the contents which were a number of stacked pallets of 205 litre steel drums marked "sodium cyanide". At least one of these drums had been damaged and had the top secured with plastic and electrical tape. A nearby worker mentioned there was sodium cyanide stored "all over the place", and we did notice a nearby service garage that had similar containers. As you know, the registration document states that the sodium cyanide to be used will be shipped in protected self-contained units referred to in the trade as a "Big Box".

We then entered the mill building. We briefly toured the existing processing system which produces a copper concentrate, using a flotation process. Work had also been undertaken on refurbishing the gold circuit, portions of which had been dismantled and removed after the shutdown in 1982. The wood stave agitator and thickener tanks had been repaired and filled with water, and appeared to have a number of small leaks. A cement block furnace room, to be used during the gold refining, had also been recently constructed. We were then met by Mr. Clarence Martin of Ming Minerals Incorporated. I explained the purpose of my site visit, and he acknowledged that the gold circuit had been partially refurbished, and that the sodium cyanide was indeed on site and was to be used in the gold extraction process. I questioned him about the open pit, and he explained that work had started on a decline ramp into the underground

P.O. Box 2006, Corner Brook, NF, Canada, A2H 6J8 Telephone (709) 637-2375, Facsimile (709) 637-2541

workings below the proposed open pit in order to collapse the area so it could be safely mined. I explained that these were all activities identified in the registration document which is still going through the Environmental Assessment Process. I informed him that under the Environmental Assessment Regulations, no construction or site preparation activity forming part of the undertaking is to take place until the undertaking has been discharged under the Act. He disagreed with this, contending that Ming Minerals held a mining lease which gave the company carte blanche to do as they pleased. At this point, our discussions became rather heated. I won't elaborate, except to say that our dialogue ceased with his contention that the open pit development should not have formed part of the registration document and must have been included as a "mistake".

Mike Lacey and I then proceeded outside to the area of the proposed open pit. A decline ramp had been partially excavated just south of the main office and heading into and under the proposed open pit area. A large pile of waste rock from this excavation was stored just north of the decline. We then looked at the open pit area from above. A number of drill holes were evident, as well as an open shaft, called No. 1 shaft on the location plan, drawing C-5-1. We also looked at the small stream which runs through the property, known as Rambler Brook Diversion. In the registration, it is proposed to re-divert this stream around the open pit area. No work had been done on this part of the undertaking. We completed our inspection and left the site.

If you require any further information, you may contact me at your convenience.

Milton Crewe

Environmental Surveillance Officer

cc: Mike Lacey

An Assessment of the Condition and Remediation Options for the Rambler Tailings: Baie Verte Newfoundland

July 14, 2000

Tom A. Al, Ph.D. P. Geo
Department of Geology
University of New Brunswick
P.O. Box 4400
Fredericton, NB
E3B 5A3

1. Background

At the request of Mr. Paul Dean, Assistant Deputy Minister of Mines & Energy, I visited the former Consolidated Rambler Mines site on June 16 and 18, 2000 to assess the condition of the tailings and consider the possibilities for remediation. I was accompanied on June the 18th by Department of Mines & Energy representatives Mr. Ferd Morrisey - Director of Mineral Development, Mr. Ned Vukomanovic - Mineral Development Engineer, and Mr. Len Mandville - Mineral Development Geologist.

2. Current Conditions

2.1 Hydrology

Knowledge of the hydrology at the site is critical to understanding the fluxes of contaminants from the tailings to the surrounding environment. For this reason, detailed hydrological measurements of the water balance for the tailings would be beneficial for planning future remediation activities. Most surface water in the area has been diverted around the tailings impoundment through England's Steady to South Brook, and from Big Rambler Pond to South Brook. Based on observations during the June site visit, surface water flowing through the tailings impoundment appears to be limited to direct run off from precipitation on the tailings, and a small stream that flows onto the tailings from the water supply pond behind the staff house (Photos 1b and 2). All surface water outflow from the tailings impoundment occurs at a weir that discharges to South Brook.

Groundwater discharging from the tailings is a likely source of contamination, and the principal discharge areas appear to be England's Steady where tailings are piled highest along the shore, and the tailings pond.

2.2 Sulphide Oxidation

Most of the tailings at Rambler have been exposed to atmospheric oxygen for more than 20 years. Diffusion of oxygen into the pore spaces of the unsaturated tailings near the surface has resulted in oxidation of pyrite and pyrrhotite and the acidification of the pore water. Although detailed measurements have not been made, based on experience at similar sites, it is likely that the tailings pore water has been acidified to depths of several metres, and there are high concentrations of dissolved Fe^{2+} and Al^{3+} in the pore water to greater depths. The Fe^{2+} and Al^{3+} represent latent acidity due to the reactions:

i) $$Fe^{2+} + 0.25O_2 + 2.5H_2O = Fe(OH)_{3(s)} + 2H^+$$

ii) $$Al^{3+} + 3\ H_2O = Al(OH)_{3(s)} + 3H^+$$

The Fe oxidation reaction causes the acidification of surface water bodies when the pore water discharges to surface water systems (such as England's Steady) and the Fe^{2+} contacts atmospheric oxygen. Aluminum acidity is released when low pH, Al^{3+} bearing mine drainage water mixes with natural water of neutral pH, commonly in the receiving water stream. The velocity of groundwater in a tailings impoundment commonly ranges from less than a metre to several metres per year. Therefore, even if sulphide oxidation

could be stopped immediately, it would take decades to centuries to remove the acidity currently in the pore water from the system.

2.3 Water Quality and Contaminant Fluxes

Several water samples were collected during the visit to the site in June (Table 1). The water samples were filtered with 0.45 µm membranes prior to analysis, consequently the results represent dissolved concentrations only. The sample results indicate the changes in water quality that occur through the surface water flow system, beginning with the background uncontaminated water (Sample 1, Photo 1a); followed by the stream entering the tailing impoundment behind the staff house (Sample 2, Photo 2); the water flowing from the tailings pond into South Brook over the weir (Sample 3); and finally the water in South Brook where it crosses the LaScie highway (Sample 4, Photo 3). Although Sample 2 was collected upstream from the tailings, the water quality in Sample 2 is similar to Sample 3 which was collected in the tailings pond. This is because a small dam upstream of sample location 2 is constructed of sulphide-rich waste rock, and seepage through the dam has been contaminated by sulphide oxidation (Photo 1b).

Table 1. Water Chemistry

	-1-	-2-	-3-	-4-
pH	6.19	3.46	3.11	4.79
Fe	0.150	2.030	79.600	2.280
Mn	0.067	2.930	2.880	0.183
Al	0.186	9.860	6.570	0.451
Cu	0.006	4.640	1.330	0.075
Pb	0.0007	0.1740	0.3170	0.0038
Zn	0.008	6.510	6.350	0.227
Cd	0.0002	0.0312	0.0273	0.0009
Co	0.001	0.131	0.130	0.006
Ni	0.002	0.063	0.056	0.004
SO_4	4.3	249	500	12.6

Concentrations in mg/L

-1- Natural background upstream of water supply to staff house (Photo 1a)

-2- Water supply pond across the road from the staff house (Photo 2)

-3- Water in tailings pond collected at the weir (point of discharge to South Brook)

-4- South Brook at the intersection with LaScie highway (Photo 3)

The drainage from the tailings pond (Sample 3) contains high concentrations of acidity and metals. At sample location 4, the concentrations are attenuated somewhat by dilution, precipitation of Fe and Al hydroxides and adsorption processes. It is likely that the tailings pond represents by far the largest flux of acidity and metals to South Brook. Through the discharge of tailings pore water and contaminated surface run off from the

tailings to England's Steady (Photos 4a,b), the stream diversion from England's steady to South Brook represents an additional source of acidity and metals.

3. Remediation:

The advanced state of oxidation in the Rambler tailings limits the practical options for remediation. The following is a brief discussion of the applicability of the remediation methods that are commonly considered for tailings.

3.1 Covers

Engineered covers are designed either to limit the diffusion of oxygen into the tailings to prevent sulphide oxidation, or to inhibit the infiltration of precipitation water, thereby preventing the transport of contaminants from the tailings with flowing groundwater. In the case of diffusion-limiting covers, it has become generally accepted that there is little benefit derived by installing these covers on tailings that have been exposed for more than 10 to 20 years. The reason for this is that sulphide oxidation over the 10 to 20 year period is sufficient to contaminate the pore water in the tailings to the extent that decades to centuries would be required to flush all the acidity from the pore water with the natural groundwater flow. Infiltration limiting covers are somewhat effective in reducing the flux of contaminated pore water from the tailings but commonly only by 50 to 60% with a carefully designed and constructed cover. The long-term integrity of these covers is uncertain because of weathering and erosion processes, particularly freeze-thaw effects. Covers of either type are very expensive and because of the advanced state of oxidation at Rambler they would not be a suitable remediation method.

Flooding represents a special type of oxygen diffusion barrier. It is effective in limiting sulphide oxidation because of the low solubility of oxygen in water (~8 mg/L). Unless it is planned at the start of a mining operation, flooding is seldom a viable remediation method because of the high cost of constructing and maintaining water-retaining perimeter dams.

Vegetative covers are effective in stabilizing the surface of tailings, preventing the air-borne transport of tailings that is common during the summer and also during cold windy conditions when the surface is prone to freeze-drying.

3.2 Relocation

A possible remediation scheme at Rambler would be to relocate the tailings to a location where the rate of sulphide oxidation would be greatly reduced and/or the flux of groundwater through the tailings would be reduced. Possible new locations include the underground workings at the Rambler site, and submergence in the waters of Big Rambler Pond. In either case, the cost alone would be prohibitive.

There are a number of problems associated with relocation to the underground workings. Not all of the tailings could be disposed of in the workings because of the volume increase that accompanies mining, and because it is unlikely that tailings would fill all open voids in the workings. In addition, detailed hydrogeological investigations of the mine surroundings would be required to ensure that acidic water contained in the tailings, and possibly in the underground workings, would not escape as a result of the

large increase in hydraulic gradient that would occur when the tailings are pumped into the workings.

The relocation of tailings to an existing surface water body such as Big Rambler Pond requires a willingness to trade an existing surface water body and the habitat within for the long-term chemical and physical stability of the tailings.

3.3 Effluent Treatment with Lime

At older mine sites where tailings and waste rock storage areas have not been designed to prevent sulphide oxidation, by far the most common method chosen by mining companies for controlling acidic effluent is neutralization with lime. The lime causes an increase in pH resulting in rapid oxidation of Fe^{2+}, and precipitation of $Fe^{(III)}$ and Al hydroxides (reactions (i) and (ii) above). In this way, both the proton acidity and latent acidity from Fe and Al are neutralized by the lime prior to discharging the effluent to the receiving stream.

There are several problems related to the operation of a lime treatment facility at an abandoned mine site.

1) The cost of installing a high-density sludge treatment plant commonly runs in excess of two to three million dollars. In addition, the operating costs are high (10's to 100's of thousands of dollars annually) and highly trained personnel are required.
2) A low-density sludge plant costs less to install and operate, but the volume of sludge generated by these plants is enormous and represents a significant disposal problem.
3) A commitment must be made to operate the plants for 100's of years, the minimum time frame for sulphide oxidation and release of acidity from the tailings pore water.

3.4 Sulphate Reduction

Sulphate reduction is a chemical process, mediated by micro-organisms, that reverses the acid-generating process of sulphide oxidation:

iii) $$SO_4^{2-} + 2\,CH_2O = H_2S + 2\,HCO_3^-$$

Sulphate reduction has been demonstrated to work for removing acidity from water contaminated by acidic drainage, generally resulting in water that has net acid consuming capacity due to the alkalinity (HCO_3) generated by the reduction reaction. Sulphate reduction as a method of water treatment is favoured over lime addition for several reasons:

1) The primary product of the reaction, H_2S, reacts with Fe^{2+} in the water to form FeS precipitates, thereby removing the Fe acidity from the water. The density of FeS is very high and there is no problem with sludge accumulation.
2) The increase in pH that accompanies the reaction causes the precipitation of Al hydroxides, thereby removing the Al acidity from the water.
3) The reaction is conducted by anaerobic bacteria, therefore it proceeds with very little intervention provided anaerobic conditions are maintained.

There are various ways to maintain anaerobic conditions suitable for sulphate reduction to occur. In groundwater systems sulphate reduction is promoted in porous reactive walls by adding a source of organic carbon (CH_2O in reaction (iii) above) which quickly reacts to consume dissolved oxygen and is also necessary for the sulphate reduction reaction to occur. Where contaminated surface water is involved, the water may be channeled through a subsurface chamber to limit the access to atmospheric oxygen, as is the case with anoxic limestone drains.

4. Conclusions

Taking into consideration the cost and other practical problems noted above, diffusion- and infiltration-limiting surface covers, relocation of the tailings, and treatment of the effluent with lime are probably not suitable remediation options for the Rambler tailings. A vegetative cover to physically stabilize the tailings surface is a necessary part of a long-term remediation strategy.

There is a lot of available space at the lower end of the tailings pond near the weir, and it may be possible to design a sulphate reduction treatment system in this area. Preliminary investigations would be required to determine the surface water discharge volumes in and around the tailings impoundment, the time variation in tailings water chemistry and the kinetics of sulphate reduction and pH neutralization in a field-based trial.

Sulphate reduction is only recently gaining acceptance as a viable treatment alternative and the type of treatment system that might be considered at the Rambler site would not be conventional. As such, this would be a research project initially to test the practicality of the system. The benefit is that a successful trial would be considerably less expensive than the alternatives, and the cost could be spread over a number of years because the capital costs would be relatively low. As a research project, the research, design and preliminary testing should be conducted by graduate students, providing the added benefit of low cost.

134.005

CC AS
1999/10/21

Suggestions for Rehabilitation of Rambler Mine, Baie Verte Peninsula

By
Errol vanHuyssteen, CANMET/MMSL, 555 Booth Street, Ottawa.

2 Sha @ $60/m^2$ ⇒ $15M

Introduction

The former Rambler operation is located 19 km by road from Baie Verte at co-ordinates 49°53'N and 56°05'W. The area under discussion includes the 3.8 million tonnes of tailings (~25 hectares), the mine shaft and head gear, former mill buildings, associated utilities, the tailings reprocessing plant and associated equipment, and a rubber lined disposal pond.

The recommendations provided below for the rehabilitation of the site assume that there will be no further mining and beneficiation on the site. The underground ore is exhausted, and the failure of the tailings Au - extraction circuit preclude leaving anything standing on the site for processing ore or tailings. Salvaging and selling off plant would generate revenue which can be used for rehabilitation purposes.

Excluded from this discussion are the Ming Mining operations just to the North of the area under consideration. In general these operation on the northern fringes of the tailings are well engineered, managed, and monitored.

Objectives

This document identifies areas requiring rehabilitation, and prescribes remediation options. A ranking of the importance of the various issues is also provided.

Rehabilitation Defined

Site rehabilitation involves the following aspects:-

- The stabilization of chemical wastes. In the case of Rambler this includes the acid generating wastes and contents of the rubber lined pond.
- Eliminating or providing protection against physical hazards. Physical hazards at Rambler include the pits on the surface of the tailings.
- Instituting a monitoring program. Monitoring points already exist around the property.
- Engineering the site so that it blends in with the surroundings. To achieve this at Rambler would require demolition of exiting structures and reprofiling of the land surface.
- Returning the site to appropriate land use

Rambler Site Areas Requiring Immediate Attention

The table below summarizes the main rehabilitation issues at the site.

	Problem	Cause	Corrective action required
1	Dangerous holes on surface of tailings *PRIORITY: 1	High grading of the gold rich portions of the tailings during reprocessing has resulted in a series of pits (>6ft deep) and heaps. The pits are flooded and steep sided and as such a hazard.	Filling the pits, compacting the fill, and leveling the tailings surface
2	Potential dam stability problems PRIORITY: 1	Erosion of retaining structures Blocking of flowpaths by for example beavers Washing away of protective rock cover adjacent to spillway and on retaining walls during periods of high volume, high velocity flow e.g. spring runoff	Inspection of retaining structures Reinforcement of weakened areas. Use of suitable protective rock cover to limit erosion.

3	Excessive runoff from tailings surface – results in erosion, suspended solids, and dissolved metals PRIORITY: 2	Rainfall runoff from the large catchment basin which includes the slopes to the south of the tailings flows across the tailings surface.	Building of a diversion ditch peripheral to the S boundary of the tailings to limit the amount of surface runoff flowing across the tailings and thereby the volume of contaminated water.
4	Dust formation on the tailings surface. PRIORITY: 3	Dessication of the surface layer of the tailings	Placement of gravel on the surface of the tailings.
5	Existence of redundant building and plant on property PRIORITY: 3	Cessation of operations	Dismantling of plant and equipment and removal from property
6	Existence of unused open mine shaft on site, and other ground openings PRIORITY 1	Cessation of operations	Capping of mine shaft & fencing off of ground openings.
7	Acid mine drainage generation (see note below & point 3 above).	Oxidation of sulphides in tailings	Corrective action will be costly and difficult to implement because:- • The large aerial extent will make the use of an engineered soil cover extremely expensive. • The flat terrain will result in the flooding of an extensive area if the use of a water cover were instituted

*Priority 1 > priority 2 > priority 3

Note: Regular surface water monitoring should be maintained at the already designated monitoring points.

A high priority has been given to dam stability issues because dam failure would result in a catastrophic scenario with the washing downstream of the suspended tailings together with dissolved metals and acid.

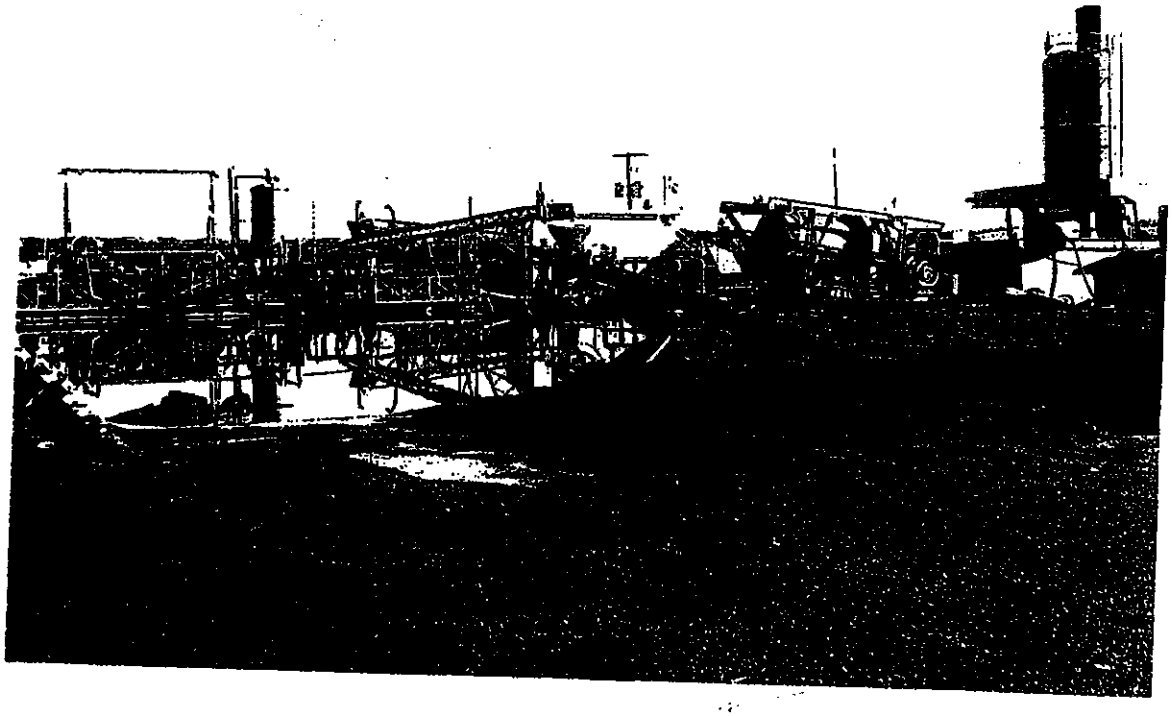
Comments on the Acid Mine Drainage generation on site.

The major extent of the emplaced tailings and their high sulphide content (20 – 50% pyrite according to the logs) render these tailings a major source of acid mine drainage. The terrain does not permit permanent flooding of this area to limit acid generation because the adjacent flat areas will also be flooded. Also, a site water balance would be required to ascertain whether a water cover of an adequate depth could be maintained year long. Placement of a ground cover to limit oxygen penetration to slow down sulphide oxidation and thereby acid generation over the tailings at a cost of ~$60/ square metre is also not practical. The best that can be achieved with limited funds is to manage and limit the amount of acid generation by limiting the amount of surface water flowing across the tailings. This can be achieved by constructing a diversion ditch around the S side of the tailings to limit the surface water flow onto the tailings. Due to the fine particle size of the tailings the actual subsurface flow within the tailings is extremely slow.

Appendix

Illustrations of various features on the Rambler site

Requiring consideration for rehabilitation



Photograph 2
Equipment associated with pelletizing and vat leaching of tailings.

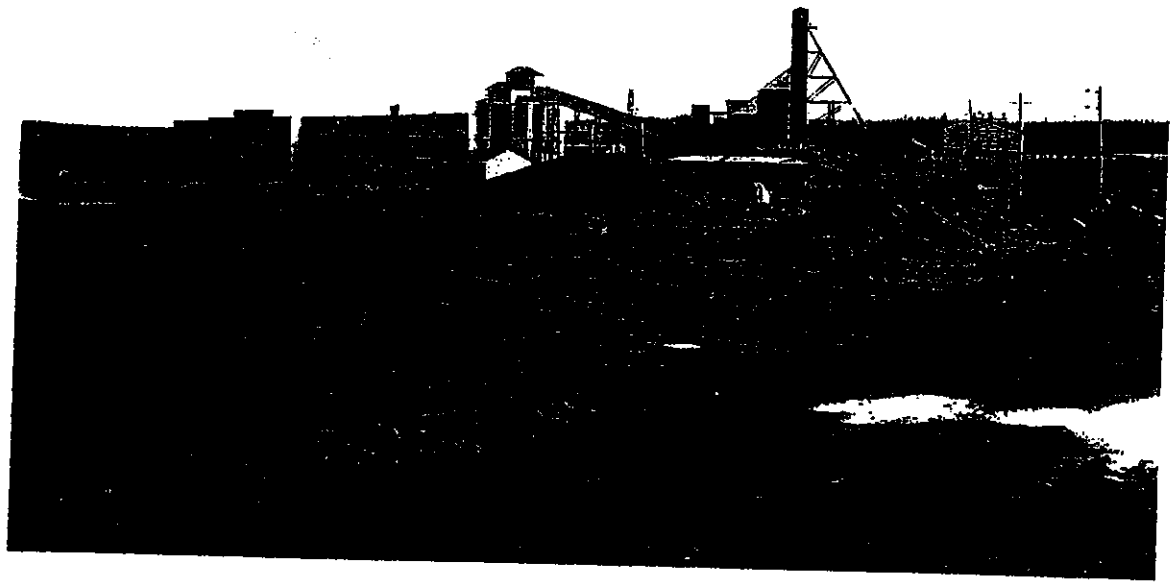
Problem
Equipment redundant since recovery of gold from tailings has been shown to be uneconomic.

Remediation required
Dismantling, salvaging, and sale of equipment to defray costs. Leveling, landscaping and revegetation of site.

Photograph 3
Rubber lined pond associated with reprocessing operation.

Problem
Pond contains acid generating materials. Rubber lining damaged

Remediation required
- Draining and neutralization of supernatant
- Folding inwards of edges of residual rubber pond ensuring that remaining contained solids
- Covering of pond with soil, relandscaping to fit in with surrounding



Photograph 4
View of abandoned mine headgear and connected processing plant.

Problem
Plant and headgear redundant. Ore worked out. Degeneration of plant, and associated buildings could result in a safety hazards and associated liabilities.

Corrective action required
Removal of buildings on site; dismantling of headgear; salvaging of materials; and, capping of mine shaft.

Photograph 5
Spillway

Action required
Inspection to ensure that heavy surface drainage from tailings during spring thaw does not erode areas adjacent to the buttresses. Placement of additional rock where indicated by inspection.

Photograph 6
Acid mine drainage generation

Corrective action required
Total resolution of this problem will require a multi-million dollar expenditure on the development of a suitable ground cover. An interim solution for the management of the situation can be achieved by construction of a diversion ditch to limit the flow of surface water across the tailings from the adjacent watershed surface.

Photograph 7:
Flow of water from adjacent water shed surface onto tailings. Note that the resulting stream channel erodes the channel to a lower level. This in turn lowers the water table in the tailings, and thereby the thickness of the oxidation zone.

Establishment of a rock lined diversion channel would prevent this type of erosion and accelerated acid generation.

GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR

Department of Mines and Energy
Mines Branch

MEMO TO: Ferd Morrissey
Director, Mineral Development Division

FROM: Paul LeGrow
Geologist

DATE: November 9, 1998 File # 825:65

SUBJECT: **Inspection of the Rambler Tailings Pond and the Baie Verte Mine Site.**

Monday - November 2, 1998:
Drove (via government vehicle) from St. John's to the Baie Verte area.

Tuesday - November 3, 1998:
Met Errol Van Huyssteen of Canmet at the Baie Vista Hotel in Baie Verte. Proceeded to the Rambler mine site and inspected the mill buildings, Raymo-Elektra site, tailings pond, Ming Minerals tailings area, and the dyke and spillway. There was some concern on his part as to the amount of precipitate in water outside a settling pond on the Raymo-Elektra site - this indicates an acidic environment. He also suggested that the numerous test pits on the surface of the tailings pond be refilled as a smoother tailings surface reduces the degree of acid generation. As a long-term solution to reduce acid generation he suggested to spread an aggregate cover-material over the exposed tailings and install drainage ditches around the perimeter of the tailings pond to keep water flow within the pond perimeter. Material has washed away from either end of the spillway and may require some work by next spring. Fresh water is still entering the tailings pond at the far breach in the dyke.

Northco Forest Products has installed a sign at the entrance to the Baie Verte mine site and has begun storing wood in the parking lot next to the mine dry.

The water level in the pits at the Baie Verte mine site appears to have risen slightly since the last inspection in July.

Wednesday - November 4, 1998:
Returned to St. John's (via government vehicle) arriving at 3:30 pm at the office.

Paul LeGrow
Geologist

P.O. Box 8700, St. John's, Newfoundland, Canada A1B 4J6

RAYMO PROCESSING

ENVIRONMENTAL CLEAN-UP

DECEMBER 1999

Prepared By:
Barry Hammer
Richmont Mines Inc.
January 2000

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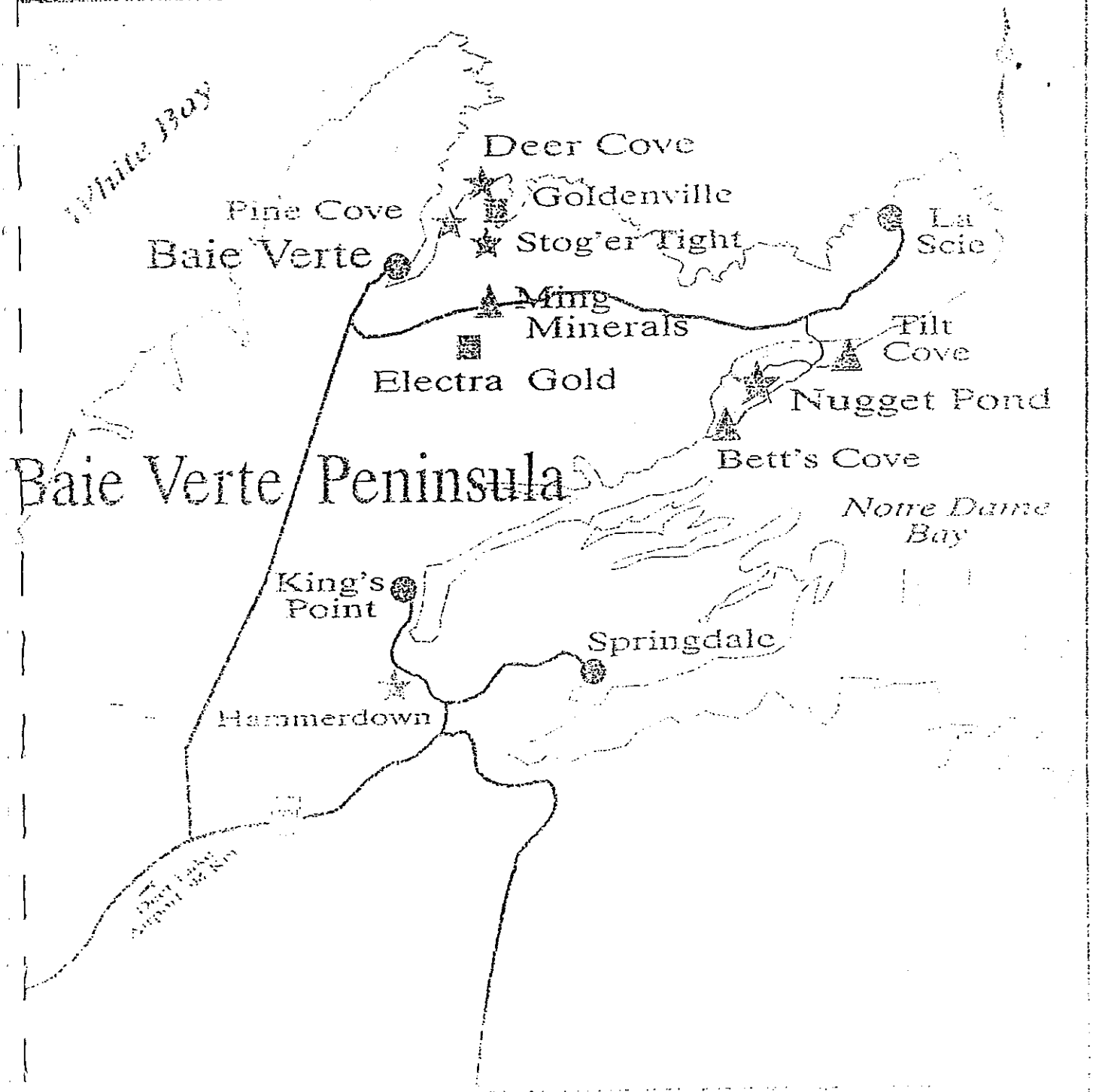


Gold Deposits

Past Gold Producers

Past Base Metal Producers

ELECTRA GOLD - RAYMO PROCESSING

LOCATION MAP

Baie Verte Peninsula

Gold and Base Metals Resou[illegible]

0 5 10 15 km.

1.0 BACKGROUND AND SUMMARY

Electra Gold - Raymo Processing site had previously tried unsuccessfully to recover gold from the old Rambler Copper/Gold tailings located at the Southwest end of the now Ming Minerals mine site.

The processing of tailings commenced in early 1995 and was terminated by mid 1996. Since the shutdown of the project, the site was left in such despair that measures were necessary to protect public safety.

The immediate environmental concerns were as follows:

a) deep test pits - without barriers for public protection and accelerated acid mine drainage
b) tailings piles beside test pits are a source of airborne containments
c) unused cyanide and other chemicals stored unattended
d) empty cyanide drums containing chemical residue not properly disposed
e) two process vats full of contaminated effluent
f) leach containment reagent pond full of contaminated effluent

In November, the Newfoundland and Labrador Department of Mines and Energy as well as the Newfoundland and Labrador Department of Environment and Labour contacted Richmont Mines Inc., to aid them in conducting reclamation activities at the former Raymo Processing site because of health, safety and environmental concerns.

Electra Gold was contacted and agreed to release $12,000 of the bond it secured with the Newfoundland and Labrador government to carry out reclamation activities to deal with the immediate health and safety issues only. Much more work is required to properly restore the site and hopefully this work will be done in the near future.

The following organizations were involved in this project:

Newfoundland and Labrador Department of Mines and Energy
Newfoundland and Labrador Department of Environment and Labour
Richmont Mines Inc.
Guy J. Bailey Ltd.

Please note, that neither Richmont Mines Inc., or Guy J. Bailey Ltd are to assume any responsibility for any health, safety and environmental situations present or in the future at the site or areas affected by this site.

Richmont Mines Inc., and Guy J. Bailey Ltd are only to assist the Newfoundland and Labrador Department of Mines and Energy and the Department of Newfoundland and Labrador Department of Environment and Labour in these reclamation activities.

The reclamation activities under the direction of the Newfoundland and Labrador Department of Environment and Labour and Newfoundland Department of Mines and Energy, was supervised by Richmont Mines inc., and work completed by a local contractor, Guy J. Bailey Ltd. of Baie Verte. This work commenced on December 06,1999 and concluded on December 16, 1999.

Throughout this report each environmental concern will be individualized and a brief work description given on each, accompanied by tables showing effluent treatment results and photographs depicting before and after reclamation activities had taken place.

2.0 WORKER SAFETY

2.1 SAFETY TRAINING OUTLINE

Before any work commenced at the Raymo Processing site, all Guy J. Bailey Ltd. employees involved in the reclamation activities, were given in-depth training on the proper handling procedures for cyanide and other chemicals.

The training included:

a) proper personnel protective equipment (all workers were issued the required equipment.)

b) proper transportation of dangerous goods. One employee possessed a dangerous goods certificate.

c) exposure identification and what to do

3.0 USED CYANIDE DRUM CLEAN-UP AND DISPOSAL

The first stage of the reclamation activity involved the clean-up and disposal of used cyanide drums containing amounts of chemical residue.

The number of drums stored, 200-300 meters behind the Raymo Processing site, totaled 350 steel drums, a mixture of 50 and 100 kg drums. (Photos - 1a and 1b). These steel cyanide drums contained varying amounts of chemical residue and most contained different concentrations of cyanide solutions caused by rain water dissolving cyanide residue within the drum.

Some of the drums were stored at this location for a period of 3 years and the metal in the drums was well deteriorated.

3.1 USED CYANIDE DRUM CLEAN-UP

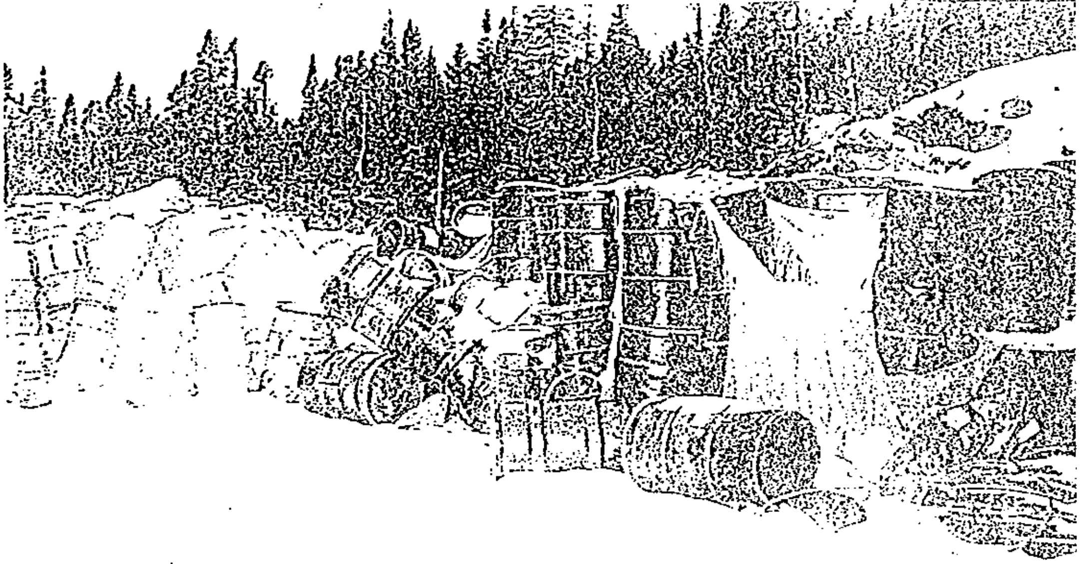
The clean-up of the used cyanide drums was the first project in the reclamation activities.

All 350 steel drums were transported from the storage area approximately 200-300 meters directly behind the processing area to the vats from clean out (see Location Map).

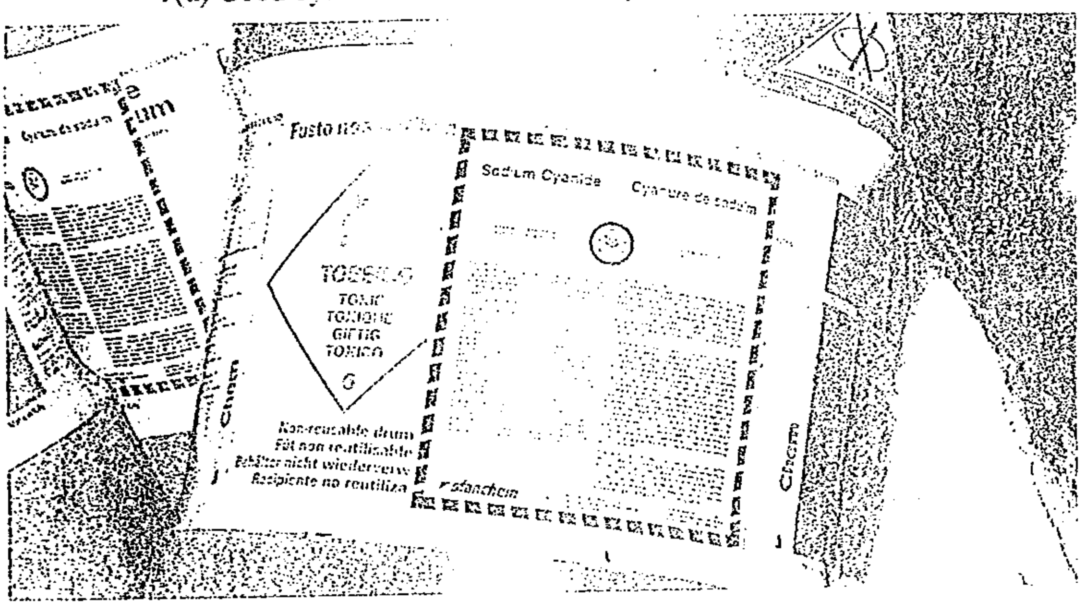
The inside of each steel cyanide drum was thoroughly washed using water from the Vat #1 and drained into Vat #2. Once each drum was cleaned, they were crushed by means of an excavator and loaded into Tandem axle trucks.

In a letter dated December 06, 1999 from the Newfoundland and Labrador Department of Environment and Labour (appendix 8.0, letter #3), permission was granted to dispose the cleaned drums at the Baie Verte Public Landfill and this procedure was fulfilled.

Once the area was cleaned (photo 1c.), the site and surrounding wooded area was inspected for hidden debris.



1(a) Used cyanide drums behind Raymo Processing



1(b) Typical cyanide drum stored behind Raymo Processing

1(c) [illegible] behind Raymo Proce[illegible]

4.0 TAILINGS TEST PIT RECLAMATION

Another major component in the reclamation plan was to deal with public safety and airborne contaminants and fill and level the areas where Raymo Processing had in excess of 3 meter test pits, within the old Ming Minerals (Rambler) tailings. (Photo 4a).

The original plan of these pits was to access the anomalous gold areas within the tailings deposited by the Rambler Mines operation.

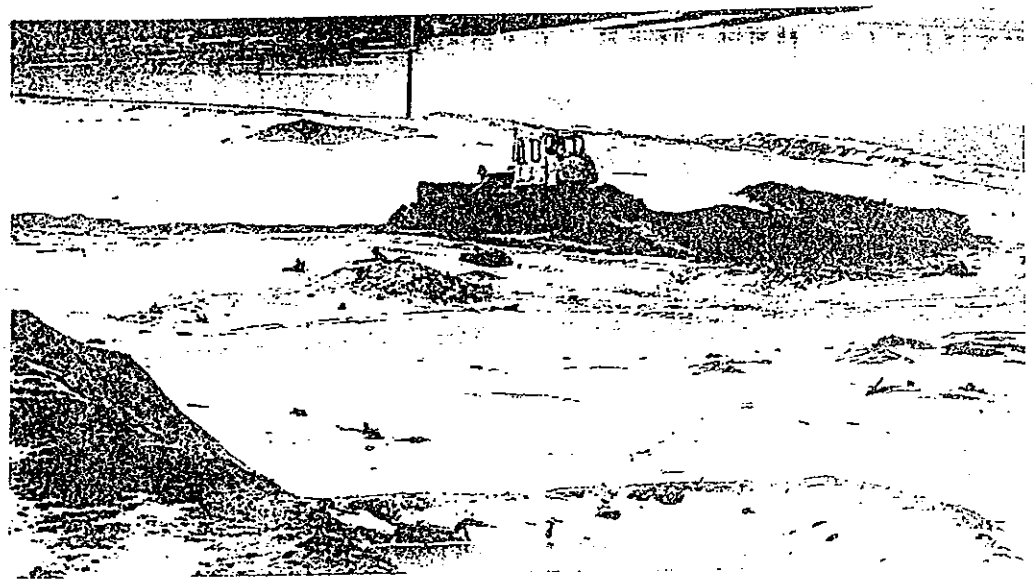
These open pits caused hazard to snowmobilers in the area. High winds are capable of blowing dry stacked tailings around to surrounding areas making conditions similar to a dust storm. (photo 4a).

4.1 TAILINGS TEST PIT CLEAN-UP

The reclamation of the tailings test pits took in access of 30 hours to complete involving a D6 dozer and operator. (photo 4b).

Each test pit was pushed in and leveled. In areas where the pits were too large, the banks were sloped back to minimize the dangers. (photo 4c).

4(a) Tailings Test Pit Area



4(b) Dozer leveling off tailings test pits

4(c) Area after tailings levelled off

5.0 LEACH VAT CONTAINMENT EFFLUENT TREATMENT

5.1 TREATING VAT EFFLUENT

The treatment of the contaminated effluent in the vats was conducted in two parts. Vat #1 effluent was treated first followed by Vat #2 effluent. (photo 5b.)

Permission was granted from the Provincial Department of Environment and Labour on treatment procedures before discharging (appendix 8.0 and letter 5).

The scenario for treating both vats was basically the same in that a diesel pump was set up in the vat and the discharging effluent was diluted 15:1 using water from the nearby dilution pond. (Photo 5a).

Before discharging effluent from each vat, a head sample was collected to determine the dilution factor to be used in having treated effluent from the vat meet environmental specifications. While effluent was being discharged from the vats, composite samples were collected every hour for analysis for the final effluent. All analysis were performed at Richmont's laboratory at Nugget Pond.

5.2 VAT EFFLUENT TREATMENT

LEACH VAT CONTAINMENT EFFLUENT TREATMENT
TABLE #1 -SAMPLE ANALYSIS

SAMPLE	pH	Cn Tot ppm	Cn Wad ppm	Cu ppm	Fe ppm	Zn ppm	NH_3 ppm	TDS ppm	TSS ppm
Dilution Pond	3.65	0.16	0.05	0.12	7.05	0.05	0.64	4	2
Vat #1 Solution	7.35	1.28	0.60	0.38	0.05	0.05,	14.0	8	2
Vat #1 Treated Effluent	4.57	0.15	0.09	0.20	2.03	0.05	2.50	4	2
Vat #2 Solution	8.05	2.80	0.84	0.85	0.05	0.05	15.0	20	12
Vat #2 Treated Effluent	5.30	1.40	0.62	0.42	1.12	0.05	3.0	6	2

Notes :All samples are composites. Solution contained in vats is a product of 3 years of natural degradation

5.3 BACKFILLING OF VATS

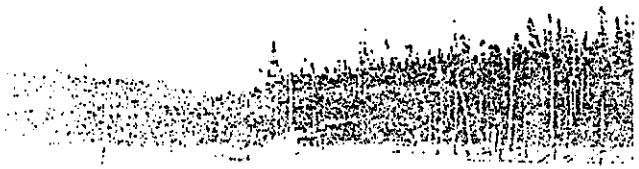
Once the contaminated effluent within the vats was treated, the 5 meter deep vats were filled to eliminate possible hazards.

Vat # 1 was filled with approximately 4000 tones of existing tailings, as funds were not available for other material. (Photo 5d).

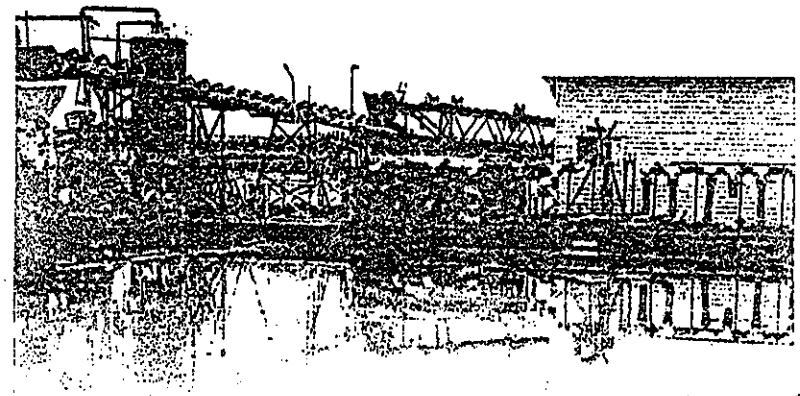
Vat #2 was backfilled using fresh material adjacent to the side of the containment. (Photo 5e).

When the job was completed, the public and environmental hazards were addressed. The only remaining work was to dismantle the existing equipment and completely backfill the entire area.

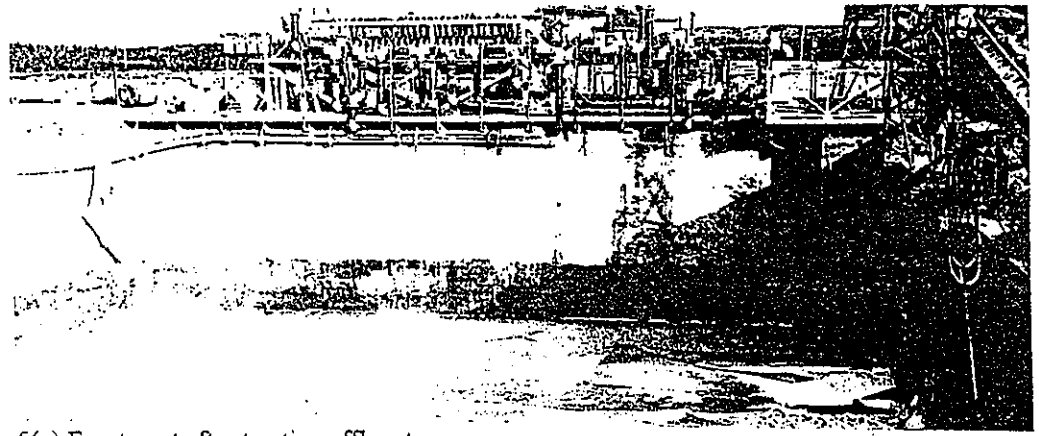
5.4 LEACH VAT (PHOTOS)



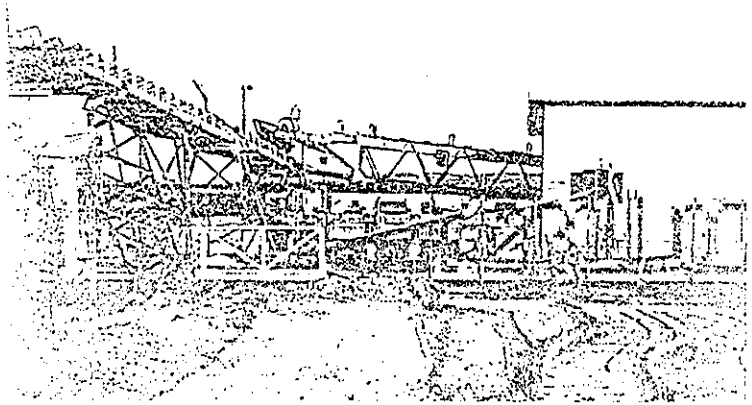
5(a) Dilution Pond



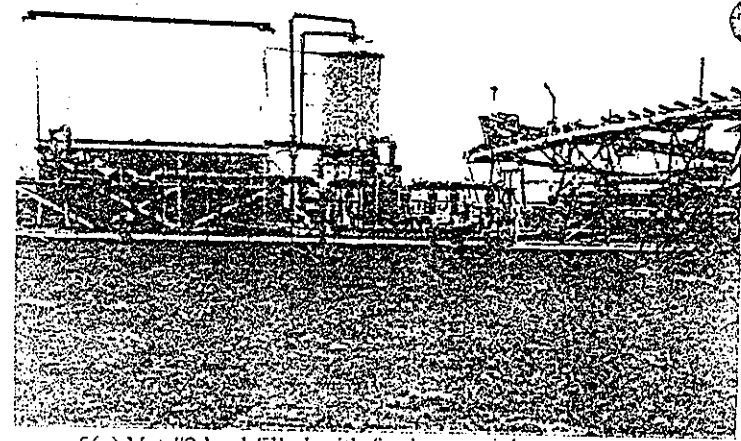
5(b) Vat full of contaminated effluent



5(c) Empty vat after treating effluent



5(d) Vat #1 backfilled with tailings



5(e) Vat #2 backfilled with fresh material

6.0 REAGENT CONTAINMENT POND EFFLUENT TREATMENT

6.1 TREATING REAGENT CONTAINMENT POND EFFLUENT

The reagent containment pond effluent treatment was carried out in much the same manner as the effluent contained within the vats. (Photo 6a).

Permission was granted from the Provincial Department of Environment and Labour to treat the solution contained in the reagent pond by dilution from a pond directly alongside. (Letter's 8.0 and #4).

Based on analysis performed on the reagent pond head sample at Richmont's laboratory, a dilution factor of 20:1 was calculated in order to maintain a quality of effluent acceptable to meet environmental specifications.

The treatment did not involve pumping, but by cutting a small trench through the reagent pond dam and by cutting a much larger trench through the dilution pond dam to obtain the desired dilution factor required. (Photo 6b).

While treating the reagent containment pond effluent, composite samples were collected every hour for analysis during discharging.

6.2 REAGENT POND EFFLUENT TREATMENT RESULTS

REAGENT POND EFFLUENT TREATMENT
TABLE #1
SAMPLE ANALYSIS

SAMPLE	pH	Cn Tot	Cn Wad	Cu ppm	Fe ppm	Zn ppm	NH_3 ppm	TDS ppm	TSS ppm
Dilution Pond	3.65	0.16	0.05	0.12	7.05	0.05	0.64	4	2
Reagent Pond Solution	3.14	1.10	0.80	4.00	90.0	0.05	8.3	20	18
Reagent Pond Treated Effluent	3.64	0.20	0.05	1.11	29.7	0.05	2.2	10	6

Notes: All samples are composites. Solution contained in Reagent Pond is a product of 3 years of natural degradation

6.3 BACKFILLING OF REAGENT POND

After treating all the solutions contained within the reagent containment pond, the magnitude of the potential hazard associated with the highly acidic nature of the material left was a great concern to public safety and the generation of more acid mine water. The reagent pond was filled immediately.

Upon receiving an additional $2000.00 from the Provincial Department of Mines and Energy to complete outstanding issues at the site, the money was allotted to Guy J. Bailey Ltd. to pay for dozer and operator time (approximately 30 hours) to push the heaped material located above the reagent pond down to completely cover in the pond.
The reagent pond dam and liner were pushed in and buried. The area was backfilled an leveled and a the remaining heaped pile sloped off.

REAGENT POND (PHOTOS)

6(a) Reagent Containment Pond

6(b) Trench in Reagent Pond Dam

6(c) Backfilling Reagent Containment Pond

7.0 USED CHEMICALS AT RAYMO SITE

7.1 CHEMICAL TRANSPORTATION

The final item addressed at Raymo Processing was the unused hazard chemicals stored at the site.

Between the Provincial Environment Department and Richmont Mines Inc., it was decided to store the unused chemicals at the Nugget Pond Mine site because the site is very secure and the personnel are trained in handling hazardous materials.

The chemicals were loaded and transported by Guy J. Bailey Ltd., 40 km along La Scie Highway to Richmont Mines - Nugget Pond Site. The chemicals were placed in a covered 5 ton truck bearing appropriate placards and driven by operators with dangerous goods training. The truck was piloted, front and rear, by two additional personnel until it reached its final destination.

The truck was off loaded by trained Richmont personnel and the material placed inside a properly designed chemical storage area. These chemicals will remain onsite until the Provincial Department of Environment and Labour decides the best disposal method.

7.2 CHEMICAL INVENTORY SHIPPED

The chemicals shipped from Raymo Processing and stored at Richmont Mines - Nugget Pond Mine site are as follows:

a)	Activated Carbon	-	525 kg (21 x 25 kg bags)
b)	Flotation Aerofloat 208 Promotor	-	22 kg (1 drum)
c)	Flotation Xanthate	-	155 kg (1 drum)
d)	Zinc Precipitate (used cyanide drums)	-	605 kg (11 x 55 kg drums)
e)	Zinc Dust	-	75 kg (3 x 25 kg pails)
f)	Sodium Cyanide	-	700 kg (7 x 100 kg drum)
	(Cyanogran)	-	50 kg (1 x 50 kg drum)

8.0 APPENDIX

GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR

Department of Environment and Labour
Pollution Prevention Division

File No. 735.311

November 02, 1999

LETTER #1

Mr. Steven McAlpine
General Manager
Richmont Mines
Nugget Pond Division
P.O. Box 580
Baie Verte, NF

Dear Mr. McAlpine :

Reclamation Activities, Rambler Site

In reference to our telephone conversation of yesterday, the following is a list of required reclamation activities for an area of the Rambler site:

1. Removal and disposal of unused chemicals and reagents (no chemicals should be destroyed on site).
2. Wash and dispose of empty reagent containers (water used should be collected in vats and treated) .
3. Wash mill equipment (water used should be collected in vats and treated).
4. Treat and discharge water in vat and reagent pond.
5. Fill vats with material (clean fill should be used, rather than tailings).
6. Test agglomerated tailings (analysis and sampling methods to be approved by the Department of Environment and Labour prior to testing).
7. Cut up and dispose of tailings and reagent pond liner (liner is not to be burnt. breaching of the liner in order that it no longer retains water may be acceptable).
8. Empty, purge, and remove all fuel storage facilities to satisfaction of GSC.
9. Fill excavations in tailings (tested agglomerated tailings are acceptable for this purpose).
10. Clean up bone yard.
11. Demolish to ground level all concrete walls, footings, foundations, and floor slabs.
12. Dismantle and remove building from site.
13. Cut off and cover buried pipe lines and electrical cables (clean fill should be used. rather than tailings).
14. Remove mill equipment from site.
15. Grade site as necessary.

16. Submit a plan of buried pipe lines and cables.

If you have any questions or comments, please call me at (709) 729-3545, or Mr. Alex Smith at (709) 637-2482.

Sincerely yours,

Sam El-Gohary, P. Eng.
Manager (A)
- Industrial Compliance

cc: A. Smith

RICHMONT

Richmont Mines
Nugget Pond Division

P.O. Box 580
Baie Verte, NF
A0K 1B0, CANADA
Tel: (709) 661-5162
Fax: (709) 661-5151
http://www.richmont-mines.com

Mr. Sam El-Gohary, P.Eng.
Manager (A)
Industrial Compliance Section
Pollution Prevention Division
Department of Environment and Labour
P.O. Box 8700
St. John's, NF A1B 4J6
Via Fax Only: 709 729 6969

LETTER #2

November 9, 1999

Dear ~~Sir~~ SAM:

Re: Health, Safety and Environmental Concerns
Electra/Raymo Site

I am writing as the result of our meeting of Friday, November 5, 1999 and as a result of our collective concern for the Health, Safety and Environmental Protection of the people of the province.

My opinion is that there are significant Health, Safety and Environmental concerns at the Electra/Raymo Site that require immediate attention. These concerns include:

- Chemicals including cyanide remaining at this abandoned site
- Empty chemical containers with chemical residue present
- Contaminated water being held in the leach vats
- Contaminated water being held in the reagent pond
- The many pits dug in the tailings pond provides increased contact area which allows for accelerated AMD
- The piles of tailings left beside the pits provide for more airborne contaminants

Richmont Mines Inc. is prepared to assist the Government of Newfoundland and Labrador to improve the situation by taking steps to deal with the above-mentioned items. At no cost to the province Richmont will properly store the unused chemicals at the Hugget Pond Mine until proper use or disposal can be arranged.

Also at no-cost Richmont will also provide supervision and operator training (Mill Superintendent; Barry Hummer), management services (Steven McAlpine) and lab analysis at Richmont's Lab.

Scott Bailey of Guy J. Bailey Ltd. has agreed to provide the equipment and people to deal with items listed in this letter for a guaranteed maximum cost of $10,000.00. If more clean up, work can be completed within the cost window of $10,000.00 it will be discussed with your staff and completed.

Both Richmont and Guy J. Bailey Ltd. will use their best efforts to carry out the work in a safe and efficient manner to reduce the serious Health, Safety and Environmental concerns listed in this letter. However, neither Richmont nor Guy J. Bailey Ltd. will be assuming any responsibility for the Health, Safety and Environmental situation present now or in the future on the site or in area affected by this site.

If you have any questions or comments about this letter, please direct them to Steven McAlpine at the mine office.

Yours truly,

J. Steven McAlpine
General Manager

Copy

Alex Smith DoE C. Brook
Ferd Morrissey DoM+E
Barry Hummer RIC

RICHMONT

Richmont Mines
Nugget Pond Division

P.O. Box 580
Baie Verte, NF
A0K 1B0, CANADA

Tel.: (709) 661-5162
Fax: (709) 661-5154
http://www.richmont-mines.com

December 7, 1999

LETTER #5

Alex Smith, P. Eng.
Environmental Engineer
Department of Environment & Labour
P.O. Box 2006, Corner Brook, Nf
A2H 6J8

Dear Alex,

I am writing to outline the effluent treatment plan for the Raymo Processing property.

With the limited funds available for reclamation activities ($10,000 total), we can use a nearby pond containing very low cyanide metals and ammonia, for dilution of both the vat water (refer to the table) and leach containment water. The dilution factor for both water will be in access of 15:1 ratio.

In order to properly treat this solution, an additional $5000 - $8000 is required.

I await your response and recommendation to deal with this matter.

Sincerely,

Barry Hummer
Mill Superintendent

GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR

Department of Environment & Labour
Pollution Prevention Division

File No. 734.061

December 7, 1999

Mr. Barry Hummer
Richmont Mines
Nugget Pond Division
PO Box 580
Baie Verte, NF A0K 1B0

LETTER #4

Dear Barry:

RE: Effluent from Raymo's Vats and Containment Pond

Further to our telephone conversation earlier today, I am writing to confirm that your plans for treating of effluent from the former Raymo property by dilution is acceptable to the Industrial Compliance Section and Pollution Prevention Division of this Department.

It is understood that chemical treatment of the effluents would cost between $5,000 and $8,000, money which is not currently available. The only other alternative would be to leave the contaminated effluent as is and tolerate the constant seepage of untreated effluent from the reagent (containment) pond. As such, use of dilution for treatment of the effluent is acceptable for only this particular instance of carrying out the reclamation activities at the former Raymo site.

Thank you again for your assistance in this matter. If you have any questions or comments, or if I can be of assistance, please call me at (709) 637-2482.

Sincerely

ALEX SMITH, P.Eng.
Environmental Engineer

cc: S. El-Gohary, Pollution Prevention Division

AOS{electra 2.d07}

LETTER #3

GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR

Department of Environment & Labour
Pollution Prevention Division

File No. 734.061

December 6, 1999

Mr. Barry Hummer
Richmont Mines
Nugget Pond Division
PO Box 580
Baie Verte, NF A0K 1B0

Dear Barry:

RE: Disposal of Raymo's Cyanide Drums

Further to our telephone conversation earlier today, I am writing to inform you of the requirements for disposal of the empty cyanide drums currently at the former Raymo site.

First the drums are to be thoroughly washed and the resulting effluent treated before discharging to the environment. There are two options for disposal of the washed drums:

1. The method preferred by the Department is to recycle or re-use them as garbage containers or by contacting a metal scrap & recovery dealer; or
2. Crush and dispose of them in a municipal landfill. The drums are not considered hazardous after cleaning.

I would request at this time to be informed of the sampling results of the reagent pond (lined drainage collection area) and of your plans for treatment of this water prior to proceeding with this portion of the work.

If you have any questions or comments, or if I can be of assistance, please call me at (709) 637-2482.

Sincerely

ALEX SMITH, P.Eng.
Environmental Engineer

cc: S. El-Gohary, Pollution Prevention Division

AOS(electra.d06)

Sam El-Gohary
Maddocks, Derrick; Morrissey, Ferd
e: Tue, Dec 21, 1999 4:01 PM
bject: Electra Mining Reclamation

On December 13, 1999, Alex Smith and I, visited the Raymo/Elektra site, and met with Richmont Mines officials and the contractor (carrying out the reclamation work), to review and discuss the progress of the reclamation activities. It was noted that most of the reclamation work was effectively implemented, and it is expected to be completed within a week. Richmont Mines will submit a report outlining the work which was conducted within the agreed upon budget authorized by the Department of Mines and Energy (Ferd Morrissey).

Two larger holes (source of the tailings processed by Raymo) were too large to fill in without major work. However, the edges of the holes were contoured to the waterline. The reagent pond was not filled in, but the liner was breached so that water will not collect in that pond. The conglomerated tailings still drain to this area and a sludge remains at the bottom of the reagent pond. The resulting effluent was red in colour. To fill in the pond would take an additional $2,000 (2 full days with dozer). Steve McAlpine told the Contractor to go ahead and do it. He indicated to us that he would have no trouble getting the $2,000 from the Department of Mines and Energy (Paul Dean).

825.45.01 4

RICHMONT

Richmont Mines
Nugget Pond Division

P.O. Box 580
Baie Verte, NF
A0K 1B0, CANADA
Tel.: (709) 661-5162
Fax: (709) 661-5154
http://www.richmont-mines.com

Fax / Télécopieur

Date : NOVEMBER 9, 1999

To / Destinataire : SAM EL-GOHARY 709 729 6969

From / Expéditeur(trice) : STEVEN McALPINE

Total of pages including this one / Nombre de pages incluant celle-ci : 3

Message:

- LETTER AS DISCUSSED FRIDAY
- I AM ALSO FAXING THE LETTER TO ALEX SMITH AND FERD MORRISSEY

ALEX SMITH 709-637-2541

FERD MORRISSEY 709-729 2871

If this document is illegible or incomplete, please call /
Si ce document est illisible ou incomplet, veuillez communiquer avec : (709) 661-5162

From:
To:

825:75:01

RICHMONT

Richmont Mines
Nugget Pond Division

P.O. Box 580
Baie Verte, NF
A0K 1B0, CANADA

Tel: (709) 661-5162
Fax: (709) 661-3154
http://www.richmont-mines.com

Mr. Sam El-Gohary, P.Eng.
Manager (A)
Industrial Compliance Section
Pollution Prevention Division
Department of Environment and Labour
P.O. Box 8700
St. John's, NF A1B 4J6
Via Fax Only: 709 729 6969

November 9, 1999

Dear ~~Sir~~ SAM:

Re: Health, Safety and Environmental Concerns
Electra/Raymo Site

I am writing as the result of our meeting of Friday, November 5, 1999 and as a result of our collective concern for the Health, Safety and Environmental Protection of the people of the province.

My opinion is that there are significant Health, Safety and Environmental concerns at the Electra/Raymo Site that require immediate attention. These concerns include:

- Chemicals including cyanide remaining at this abandoned site
- Empty chemical containers with chemical residue present
- Contaminated water being held in the leach vats
- Contaminated water being held in the reagent pond
- The many pits dug in the tailings pond provides increased contact area which allows for accelerated AMD
- The piles of tailings left beside the pits provide for more airborne contaminants

Richmont Mines Inc. is prepared to assist the Government of Newfoundland and Labrador to improve the situation by taking steps to deal with the above-mentioned items. At no cost to the province Richmont will properly store the unused chemicals at the Nugget Pond Mine until proper use or disposal can be arranged.

Also at no-cost Richmont will also provide supervision and operator training (Mill Superintendent, Barry Hummer), management services (Steven McAlpine) and lab analysis at Richmont's Lab.

Scott Bailey of Guy J. Bailey Ltd. has agreed to provide the equipment and people to deal with items listed in this letter for a guaranteed maximum cost of $10,000.00. If more clean up, work can be completed within the cost window of $10,000.00 it will be discussed with your staff and completed.

Both Richmont and Guy J. Bailey Ltd. will use their best efforts to carry out the work in a safe and efficient manner to reduce the serious Health, Safety and Environmental concerns listed in this letter. However, neither Richmont nor Guy J. Bailey Ltd. will be assuming any responsibility for the Health, Safety and Environmental situation present now or in the future on the site or in area affected by this site.

If you have any questions or comments about this letter, please direct them to Steven McAlpine at the mine office.

Yours truly,

J. Steven McAlpine
General Manager

Copy

Alex Smith DoE C. Brook
Ferd Morrissey DoM+E
Barry Hummer RIC

GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR

Department of Mines & Energy

November 19, 1999

Mr. Doug Stelling
Electra Gold Ltd.
404 - 595 Howe St.
Vancouver, BC V6C 2T5

Dear Mr. Stelling:

There are significant health, safety and environmental concerns at the Electra/Raymo processing facility at the former Consolidated Rambler Mines property that require immediate attention. The issues to be addressed include, but are not limited to:

- Removal of chemicals at the site,
- Treat and discharge contaminated water in leach vats,
- Treat and discharge contaminated water in reagent pond,
- Rinse empty containers, treat and discharge liquid, dispose of containers,
- Backfill pits in tailings,
- Dispose of tailings stockpile(s).

The Dept. of Environment and Labour has written this department requesting that action be taken to address the Electra/Raymo Processing facility.

As you are aware, an Environmental Trust Fund was established by Electra Mining, Raymo Division in 1996. The approximately $11,000 is held in trust by the Government of Newfoundland and Labrador. According to the agreement (see enclosed copy), monies cannot be released from the fund without the consent of the Minister of Mines and Energy. We are requesting that you write the Minister asking that the money in the fund be released to be used to do as much clean-up work as possible at the site.

File No.: 734.000.1

Site Inspection Report
Industrial Compliance Section

To: Sam El-Gohary From: Alex Smith

Inspection Site: Rambler Mine Site (Raymo, Rambler & Ming)

Date of Inspection: September 16, 2002 Duration of Inspection: 10:30 -12:30

Purpose of Inspection: Determine quality of drainage & if cyanide is present

Site Address	Site Contacts		
	Name	Position	Phone #
	Clarence Martin	Ming Minerals	532-8220

Other Persons Present

Name	Organization	Name	Organization	Name	Organization
Len Mandville	M&E				

Background / Compliance History

- The Consolidated Rambler Property is located approximately 19 km from Baie Verte

  Consists of five mines in the area:
  - Main mine operated from 1964 - 1967
  - East Mine operated from 1967 - 1969
  - Big Rambler Pond operated until 1969 (small deposit)
  - Ming Mine operated from 1971 - 1982
  - Ming West mine operated from ?
- Processing of the ore from these operations resulted in generation of 3.8 million tonnes of highly acid generating tailings covering approximately 25 hectares.

  The mines have buildings in various states of disrepair, shafts and adits which require capping and material used for road construction and site grading appears to be acid generating.

  Sampling indicates major impacts on nearby streams with low pH and high metals appearing in samples taken. South Brook is dead down stream from the site.

  The Rambler mill remains in "care and maintenance" under the ownership of Ming Minerals.

Opening Conference

- Clarence Martin stated that the high CN results from a sample at Ming's Monitoring Well #4 was caused by CN coming from the stacked process tailings from the former Raymo operation.

  Sampling will be done for CN

Items / Areas Inspected

- Raymo Tailings
- Rambler Tailings
- Ming Tailings
-

Observations

- Sample Point 1
  - puddle near intersection of Ming Road and Raymo Road
  - collects drainage from Raymo tailings area
  - pH 2.4
  - noted a black sediment
- Sample Point 2
  - water collected and contained at north east corner (opposite end from old reagent pond) of Raymo tailing collection liner
  - pH 2.2
  - reddish colour water
- Sample Point 3
  - drainage flow from culvert under Raymo road near tanks. Sampled about 500 m downstream
  - water clear
  - pH 2.9
- Sample Point 4
  - drainage flow upstream of culvert and Raymo tailings ..
  - water clear
  - pH 2.8
- Sample Point 5
  - puddle (no flow) upstream of Ming monitoring well #4
  - pH 2.5
- Sample Point 6
  - drainage leading to Ming pump sump
  - organic film on water
  - pH 5.7
- Sample Point 7
  - puddle collecting seepage from Ming tailings and what appears to be an old dump
  - topography makes this drainage unaffected by Raymo
  - pH 2.2
- Raymo Tanks
  - pH 3.9
- Sample Point 8
  - spillway discharge
- Sample Point 9
  - England Steady upstream of spillway
-

Activities / Actions Performed

Pictures were taken by Len Mandville. A list of pictures will be prepared once a copies have been obtained.

Samples taken and pH measured as noted above. See attached map.

Closing Conference

Clarence Martin requested that sampling cease for the winter, as has been done in the past. It was stated that any such decision would not be made until analysis results can be reviewed.

Follow-up Actions Required

To be determined after analysis results from samples have been reviewed.

Inspector _____ **Date** Sept. 19/02

PSC ANALYTICAL SERVICES

Prepared For:
Len Mandville

Date Generated
30-Sep-2002

Spreadsheet File Name
0214010H.XLS

Parameters	Method	EQL	Units	Client ID: RM-02-001	RM-02-002	RM-02-003	RM-02-004	RM-02-005	RM-02-006	RM-02-007	RM-02-008	RM-02-008 DUP
				Project ID:								
				PSC Analytical ID: 02-H055765	02-H055766	02-H055767	02-H055768	02-H055769	02-H055770	02-H055771	02-H055772	02-H055773
				Matrix: Water	Water	Water	Water	Water	Water	Water	Water	Water
				Duplicate of:								02-H055772
				Date Sampled:								
				Client Description:								
C-H-:0 Cyanides - Total	Dist-Color	0.002	mg/L	< 0.002	220	0.14	0.01	< 0.002	0.019	0.02	< 0.002	< 0.002

Ramber Mines pH results - Dept. Lab				Samples taken Sept. 16, 2002			Dept. of Mines and Energy Laboratory
Lab Number	Field Number	cond (uS)		pH	pH (field test)	Location Description	
8580027	RM-02-3	2320		2.94	2.9	Stream on south side of tailings below Raymo site	
8580028	RM-02-4	1132		2.94	2.8	Outflow from small pond upstream from Raymo site	
8580029	RM-02-8	1979		2.71	2.7	Spillway	
8580030	8580027	2380		2.96	2.9	Run-off near England's steady; between road and power line	
8580031	RM-02-9	139		4.54	n/a	North Diversion Ditch	
8580032	RM-02-10	107		4.41	n/a	Culvert in road below Rambler Mill site	
8580033	RM-02-11	107		5.06	n/a	Outflow from England's steady	
8580034	RM-02-12	121		7.85	n/a	Stog'er Tight - outflow from Fox Pond	
8580035	RM-02-13	316		8.15	n/a	Stoger Tight - outflow from open pit	
8580036	RM-02-14	83		7.46	n/a	Stoger tight - outflow from Camp Pond	
8580037	RM-02-15	101		4.39	n/a	Rambler - culvert where south Brook crosses LaScie Hwy	

Rambler Mines - Cyanide Sampling						Samples taken - Sept. 16, 2002		
Sample #	**Location Description**							
RM-02-001	Run-off near England's steady; between road and power line							
RM-02-002	Standing water at base of Raymo tailings pile							
RM-02-003	Stream on south side of tailings below Raymo site							
RM-02-004	Outflow from small pond upstream from Raymo site							
RM-02-005	small stream in tailings near north side							
RM-02-006	Run-off below Ming tailings - near Ming's well # ?							
RM-02-007	Run-off below Ming tailings - further upsteam from 006							
RM-02-008	Spillway							

28/Sept/02

Len,
Saw this fax for you when collecting H.B. daily report. Interesting.
FYI – we have our own CAEAL accredited lab @ Hope Brook – may save a few $ unless Alex wants to go elsewhere – Chris Finch?

GOVERNMENT OF
NEWFOUNDLAND AND LABR/

Department of Mines & Energy

MEMO TO: Allister Taylor, ADM Mines

FROM: Len Mandville, Mineral Dev. Geologist

SUBJECT: Rambler Cyanide Sampling

DATE: October 03, 2002

Al:

On Sept. 16, 2002 I met Alex Smith with the Pollution Prevention Division of the Dept. Of Environment at the Rambler Mine site to investigate a report of elevated levels of cyanide in the water. It was thought that the source of the cyanide was the tailings waste pile from the former Raymo facility.

Eight water samples were taken throughout the site; see attached map.

I bring the following to your attention:

- The cyanide permit limit is 1.0 mg/L.
- A sample of standing water inside a berm at the base of the tailings pile (RM-02-002) measured 220 mg/L of cyanide.
- The second highest result was from a small brook, down steam from the Raymo site; RM-02-003 - 0.14mg/L
- There was no cyanide detected in the water at the discharge point (RM-02-008).
- Samples 005, 006 and 007 were taken to measure any discharge or run-off from the Ming Minerals operation and all samples were well below the maximum level.

Len Mandville, Mineral Development Geologist; Box 8700, St. John's, NF A1B 4J8; (709)729-6439, fax (709)729-3493; lenmandville@mail.gov.nf.ca

It appears that the cyanide is coming from the Raymo tailings. I have forwarded these results to Alex Smith and will await his recommendations on how to proceed.

Regards,

Len Mandville
Mineral Development Geologist

cc. Ned Vukomanovic, Min. Dev. Engineer

Len Mandville, Mineral Development Geologist; Box 8700, St. John's, NF A1B 4J8; (709)729-6439, fax (709)729-3493; lenmandville@mail.gov.nf.ca

Tel: (902)420-0203
(800)565-7227
Fax: (902)420-8612

NF Dept. of Mines and Energy
P.O. Box 8700, 4th Floor
St. John's NF A1B 4J6
ATTENTION: MANDVILLE, LEN 0214010H

CC: CC FAX:

FAX NUMBER: 709-729-3493 DATE: 9/27/02	

Number of pages including cover page: 6(5)

Confirmations of Receipt or Analytical Reports follow.

Original Analytical Reports mailed to your attention.

If you have any questions,
please call Tamara McFarland at ext 264.

Inorganic Parameters page : 1

Client : NF Dept. of Mines and Energy
P.O. Box 8700, 4th Floor
St. John's
NF A1B 4J6
PSC Project Number : 0214010H
Client Project Number :

MANDVILLE, LEN

FAX # : 709-729-3493
Printed : 2002/09/27
Reported : 2002/09/27

Matrix			Water	Water	Water	Water
Philip ID			02-H055765	02-H055766	02-H055767	02-H055768
Client ID			RM-02-001	RM-02-002	RM-02-003	RM-02-004
Date Sampled (y/m/d)						
Date Received (y/m/d)			02/09/19	02/09/19	02/09/19	02/09/19
Analyte	**Units**	**EQL**				
Cyanides - Total	mg/L	0.002	nd	220	0.14	0.010

tal Cyanide value may include contribution from thiocyanate. Please consult
e Total Cyanide in Water Technical Data Sheet.

Legend
- EQL = Estimated Quantitation Limit is the minimum concentration that can be reliably reported. It is not a regulatory limit.
- ND = Not Detected, our instruments did not detect anything above standard EQL.
- ND ( ) = Not Detected at the elevated EQL specified, due to matrix interferences or sample pre-dilution.
- \- = Dash is reported when parameter not requested in sample.

Note : Soil results are expressed as air dry weight basis.
: Biota results are expressed on a wet weight basis unless otherwise stated.

page verified

Analytical Services
Bluewater Road
ord, NS Canada B4B 1G9
(902) 420-0203
l1 free (800) 565-7227
(902) 420-8612

Client : NF Dept. of Mines and Energy MANDVILLE, LEN
P.O. Box 8700, 4th Floor
St. John's
NF A1B 4J6
PSC Project Number : 0214010H
Client Project Number :

FAX # : 709-729-3493
Printed : 2002/09/27
Reported : 2002/09/27

Matrix		Water	Water	Water	Water
Philip ID		02-H055769	02-H055770	02-H055771	02-H055772
Client ID		RM-02-005	RM-02-006	RM-02-007	RM-02-008
Date Sampled (y/m/d)					
Date Received (y/m/d)		02/09/19	02/09/19	02/09/19	02/09/19
Analyte	Units EQL				
Cyanides - Total	mg/L 0.002	nd	0.019	0.020	nd

Total Cyanide value may include contribution from thiocyanate. Please consult
e Total Cyanide in Water Technical Data Sheet.

Legend EQL = Estimated Quantitation Limit is the minimum concentration that can be reliably reported. It is not a regulatory limit.
ND = Not Detected, our instruments did not detect anything above standard EQL.
ND ( ) = Not Detected at the elevated EQL specified, due to matrix interferences or sample pre-dilution.
- = Dash is reported when parameter not requested in sample.

lote : Soil results are expressed as air dry weight basis.
: Biota results are expressed on a wet weight basis unless otherwise stated.

page verified

C Analytical Services
0 Bluewater Road
ford, NS Canada B4B 1G9
(902) 420-0203
11 free (800) 565-7227
(902) 420-8612

Client : NF Dept. of Mines and Energy MANDVILLE, LEN
P.O. Box 8700, 4th Floor
St. John's
NF A1B 4J6
PSC Project Number : 0214010H
Client Project Number :

FAX # : 709-729-3493
Printed : 2002/09/27
Reported : 2002/09/27

Matrix	Water
Philip ID	02-H055773
Client ID	RM-02-008 DUP
Date Sampled (y/m/d)	
Date Received (y/m/d)	02/09/19

Analyte	Units	EQL	DUP
Cyanides - Total	mg/L	0.002	nd

Total Cyanide value may include contribution from thiocyanate. Please consult the Total Cyanide in Water Technical Data Sheet.

Legend
EQL = Estimated Quantitation Limit is the minimum concentration that can be reliably reported. It is not a regulatory limit.
ND = Not Detected, our instruments did not detect anything above standard EQL.
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Note : Soil results are expressed as air dry weight basis.
: Biota results are expressed on a wet weight basis unless otherwise stated.

page verified

JWEL PROJECT NO. NFS08959

FINAL REPORT
DECOMMISSIONING OF PCB STORAGE SITES
FORMER CONSOLIDATED RAMBLER MINE
BAIE VERTE, NL

NOVEMBER 2003

JWEL PROJECT NO. NFS08959

FINAL REPORT TO

NEWFOUNDLAND AND LABRADOR
DEPARTMENT OF ENVIRONMENT
P.O. BOX 8700
ST. JOHN'S, NL A1B 4J6

ON

DECOMMISSIONING OF PCB STORAGE SITES
FORMER CONSOLIDATED RAMBLER MINE
BAIE VERTE, NL

BY

JACQUES WHITFORD ENVIRONMENT LIMITED
607 TORBAY ROAD
ST. JOHN'S, NL A1A 4Y6
Tel: (709) 576-1458
Fax: (709) 576-2126

November 24, 2003

EXECUTIVE SUMMARY

Jacques Whitford Environment Limited (JWEL) has conducted a site investigation for the Newfoundland and Labrador Department of Environment (NLDE) at a former PCB storage site at the former Consolidated Rambler Mine in Baie Verte, Newfoundland and Labrador. The purpose of the investigation was to assess soil, sediment, surface water and floor surface conditions on the site with respect to potential PCB impacts that may be present as a result of past activities at the site.

The investigation included the manual excavation of five test pits, collection of PCB swab samples from the concrete floor at the facility and sampling and analysis of soil, sediment and surface water for PCBs.

The PCB concentrations detected in soil samples collected from one test pit at the site (i.e., TP1-RM) exceeded the applicable criteria of 33 mg/kg for TPH in soil on a commercial/industrial site. A low concentration of PCBs was detected in sediment/soil in a drainage ditch on site. The source of the PCB impacts is not known for certain, but is believed to be associated with the discharge from a floor drain from inside the PCB storage building.

PCB swab samples were collected from the concrete floor at various locations inside the PCB storage site building. PCBs were detected in six swab samples at concentrations ranging from 16 $\mu g/cm^2$ in swab sample RM SW6 to 61,800 $\mu g/cm^2$ in swab sample RM SW5. The detected levels of PCBs in swab samples taken from the concrete floor indicate that PCB containing materials have been released onto the floor at the facility during past activities. According to the Environment Canada protocol for sampling and testing at PCB storage sites in Ontario, concrete is considered a porous surface. Therefore, the PCB concentrations identified through PCB swab samples at the site can only be used as an indicator and are not comparable to CCME criterion values.

Based on the results of this investigation, JWEL makes the following recommendations:

1. Provide a copy of this report and the delineation report to the Government Service Centre (GSC) in Grand Falls-Windsor, Newfoundland and Labrador for their review and confirmation of the site sensitivity.

2. Based on the presence of PCBs in soil samples in excess of the CCME guidelines and the high costs associated with the treatment and disposal of PCB-contaminated materials, additional soil delineation should be carried out in these areas to better define the volume of PCB impacted material requiring treatment. Since, low level PCB impacts were confirmed on the sediment sample from the drainage ditch, additional delineation should be carried out to better define the extent of PCB impacts on the soil/sediment at the bottom of the drainage ditch. In addition, although no PCBs were detected in a water sample collected from the drainage ditch located down-gradient of the site,

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1.0 INTRODUCTION

Jacques Whitford Environment Limited (JWEL) was retained by the Newfoundland and Labrador Department of Environment (NLDE) to conduct a site investigation at a PCB storage facility at the former Consolidated Rambler Mine located in Baie Verte, Newfoundland and Labrador (see Drawing No. NFS08959-RM-EE-01 in Appendix 1). The purpose of the investigation was to determine the presence or absence of PCB impacts in soil, sediments, surface water and concrete floors associated with the site.

This report is organized in six sections. Section 1 presents background information about the site, explains the regulatory guidelines and their applicability and describes the scope of work. Section 2 summarises the methodology used for the site investigation and for laboratory analyses. Section 3 provides results of the investigations and laboratory analyses and a discussion of the results. Conclusions and recommendations from the assessment are provided in Sections 4 and 5, respectively. Section 6 discusses the limitations of the assessment and its findings. Supporting information is provided in the appendices at the end of this report.

This report was prepared specifically and solely for the above project. The report presents all of the factual findings and laboratory results of the site investigation, and presents our comments on the environmental status of the site.

1.1 Background

Based on information provided by NLDE, the East Mine Dry Building at the former Consolidated Rambler Mine was used to store a variety of PCB-contaminated items, including drained transformers and drums of PCB-contaminated solids and liquids. These materials were reportedly transported to the site from the abandoned Gullbridge Mine in late 1983. The PCB storage site was initially maintained by Consolidated Rambler and then by a second company that assumed control of the property until the late 1980s.

From 1988 to December 2000, the Newfoundland and Labrador Department of Environment and Department of Government Services and Lands retained the services of local individuals to perform regular inspections of the site. In February 2000, all PCB impacted materials were shipped off-site for appropriate disposal. Currently the site does not contain any PCB-contaminated materials.

1.2 Site Description

The subject property is located at the former Consolidated Rambler Mine along a gravel road approximately 1.5 km from Route 414 to La Scie, NL. The site is occupied by two vacant buildings

including a mine shaft enclosure and a PCB storage facility. Adjacent properties are all part of the former mine site and are undeveloped and predominantly tree covered.

Based on available information, the native surficial soils at the site, below placed fill materials, generally consist of glacial deposits, principally comprised of sand and gravel till overlying bedrock. The characteristic permeability of these soils is moderate. The site is generally level, with a slight slope down towards the north. A drainage ditch is located north of the PCB storage building and flows in a south to north direction from the facility. The drainage ditch is not connected to any freshwater stream or pond and water in the ditch eventually flows into the ground. Regional surface drainage (apparent groundwater flow direction) appears to be approximately to the north. Surface drainage at the site appears to follow the general slope of the property, which is generally downward towards the north. Groundwater on the site and in the general site area is not utilized as a source of drinking water.

1.3 Scope of Work

JWEL's scope of work for the site investigation consisted of the following:

- Excavate five test pits to investigate the potential for PCBs impacts in the soil at various locations in the vicinity of the former PCB storage site;
- Collect representative soil samples from each test pit;
- Collect a sediment sample from a drainage ditch down-gradient of the site;
- Collect a surface water sample from a drainage ditch down-gradient of the site;
- Collect representative PCB swab samples from selected locations within the former PCB storage site;
- Submit selected soil and sediment samples for laboratory analysis of PCBs based on the history of the area, visual inspections of each soil sample and the measured soil vapour concentrations;
- Submit swab samples for laboratory analysis of PCBs;
- Submit a surface water sample for laboratory analysis of PCBs; and,
- Prepare a report detailing all observations, conclusions and recommendations made at the site during the investigation.

1.4 Regulatory Framework

When remediating a contaminated site, two basic approaches are normally considered acceptable to the Newfoundland and Labrador Department of Environment (NLDE): a *criteria* or numerical based approach, where an affected area is cleaned up based on a set maximum allowable contaminant concentration in soil and water; and a comprehensive, *site-specific risk based approach* involving the characterization of potential risks, hazards and exposures of receptors to contaminants at a particular impacted site. In cases where a risk-based approach is proposed, the specific methodology to be used must be approved by NLDE.

For the purposes of this investigation, concentrations of PCBs detected in soil at the site were compared to the CCME criteria for soil on a Commercial or Industrial site (i.e., 33 mg/kg). Concentrations of PCBs in sediments from the on-site drainage ditch were compared to the CCME criteria for soil on a Commercial or Industrial site (i.e., 33 mg/kg), since the drainage ditch is not permanently flooded and is not connected to a freshwater stream or pond. Based on the Environment Canada protocol for sampling and testing at PCB storage sites in Ontario, concrete is considered a porous surface. Therefore, the PCB concentrations identified through PCB swab samples at the site can only be used as an indicator and are not comparable to available CCME criterion values. There are presently no provincial or federal criteria for PCB levels in groundwater, however any detected level is considered undesirable and should be subject to virtual elimination strategies.

2.0 METHODOLOGY

2.1 Site Investigation

A site investigation of a PCB storage site at the former Consolidated Rambler Mine in Baie Verte, NL was carried out on May 15, 2003. The site investigation included the manual excavation of five test pits (TP1-RM to TP5-RM), collection of soil samples, collection of one surface water sample (Surface RM) and one sediment sample (SED 1 RM) and collection of six swab samples (RM SW1 to RM SW6) from the concrete floor inside the PCB storage facility. Table 2-1 outlines the rationale for the location of the test pits at the site. The locations of the test pits were established in the field by NLDE and JWEL personnel prior to excavation and are shown on Drawing No. NFS08959-RM-EE-01 in Appendix 1.

Table 2-1 Test Pit Sample Locations

Test Pit Nos.	Location And Reason For Placement
TP1-RM through TP5-RM	Delineate potential PCB impacts in soil related to the storage of PCBs in this area.

2.1.1 Test Pits

All test pits (TP1-RM to TP5-RM) were excavated manually by a local contractor and supervised by JWEL personnel. The test pits were excavated to depths ranging from 0.2 m to 0.6 m below the ground surface. Subsurface conditions encountered in the test pits were logged by JWEL field personnel at the time of excavating. The details of subsurface conditions are presented in the Test Pit Records in Appendix 2.

Soils were sampled from the test pits by bulk sample methods. Soil samples were recovered from the test pits at frequent intervals over their respective depths. The number of soil samples collected from test pits varied with the test pit depth, generally with one sample near surface and one at maximum test pit depth. The soil samples were visually examined in the field for any evidence of PCB impacts. Duplicate soil samples were collected at each sample location, where possible. The samples were then placed in clean glass jars with aluminum foil under the lids. The samples were placed on ice in sample coolers and returned to the JWEL lab in St. John's, Newfoundland and Labrador for soil vapour testing. Headspace soil vapour concentrations were measured in the duplicate sample jars using a MiniRAE 2000 photo ionization detector (PID). These PID readings are presented on the Test Pit Records in Appendix 2.

Based on the measured soil vapour concentrations, field observations, and historical site activities, selected soil samples were submitted to PSC Analytical Services Inc. in Dartmouth, Nova Scotia for laboratory analysis of PCBs.

2.1.2 Sediment

On May 15, 2003, one sediment sample (SED 1 RM) was collected from a down-gradient drainage ditch located north of the PCB storage facility at the site. The sample was examined in the field visually for any evidence of PCB impacts. Duplicate soil samples were collected at the sample location, where possible. The samples were then placed in clean glass jars with aluminum foil under the lids. The samples were placed in sample coolers and returned the JWEL lab in St. John's, NL for soil vapour testing. Headspace soil vapour concentrations were measured in the duplicate sample jars using a MiniRAE 2000 photo ionization detector (PID). These PID readings are presented on Table 3-2 in Appendix 3. The sediment samples were submitted to PSC Analytical Services Inc. (PSC) in Dartmouth, Nova Scotia for laboratory analysis for PCBs.

2.1.3 SurfaceWater

On May 15, 2003, one surface water sample (Surface RM) was collected from a down-gradient drainage ditch located south of the PCB storage facility at the site. The sample was submitted to PSC Analytical Services Inc. for PCB analysis.

2.1.4 Swab Samples

A total of six PCB swab samples (RM SW1 to RM SW6) were collected from the surface of the concrete floor at various locations inside the PCB storage facility at the site. The samples were collected using prepared PCB swabs provided by PSC Analytical Services Inc. and swabbing over a 100 cm^2 area. Each of the samples collected was submitted to PSC Analytical Services Inc. for PCB analysis.

2.2 Laboratory Analyses

All of the laboratory analysis was conducted by PSC Analytical Services Inc. The laboratory analysis schedule completed for this assessment is presented in Table 2-2 below:

Table 2-2 Summary of Laboratory Work

Site: PCB Storage Site Consolidated Rambler Mine, Baie Verte	Number of PCB Analyses
Soil	6
Sediment	1
Surface Water	1
Swab	6
Total	14

3.0 RESULTS OF THE SUBSURFACE INVESTIGATION

3.1 Stratigraphy

The stratigraphic information recorded during the investigation is presented on the Test Pit Records in Appendix 2. The observed stratigraphy at the site generally consisted of surficial fill material ranging in thickness from approximately 0.2 m at test pits TP1-RM and TP4-RM to 0.6 m at test pits TP2-RM, TP3-RM and TP5-RM. The test pits were all terminated within the fill layer due to the nature of the fill material that made manual excavation quite difficult. The fill material ranged from loose brown sand and gravel to cobbles with occasional gravel and silt.

0.62 mg/kg, respectively. However, only the PCB concentration in soil sample TP1-BS1 at 130 mg/kg exceeded the applicable CCME criteria of 33 mg/kg for PCBs in soil on a commercial site.

3.5.2 Laboratory Analysis Results – PCBs in Sediment

On May 15, 2003, one sediment sample (SED 1 RM) was collected from a down-gradient drainage ditch located north of the PCB storage facility at the site. The sediment sample was submitted to PSC Analytical Services Inc. for PCB analysis. The results of the laboratory analysis for PCBs for this sample are presented in Table 3-2 in Appendix 3. The PCB concentration in sediment sample SED 1 RM was 0.3 mg/kg, which does not exceed the CCME criteria of 33 mg/kg for PCBs in soil on a commercial site. The PSC Analytical Services Inc. laboratory report indicated that the detected PCBs resembled Aroclor 1260.

3.5.3 Laboratory Analysis Results – PCBs in Surface Water

On May 15, 2003, one surface water sample (Surface RM) was collected from a down-gradient drainage ditch located north of the PCB storage facility at the site. The sample was submitted to PSC Analytical Services Inc. for PCB analysis. The results of the laboratory analysis for PCBs for this sample are presented in Table 3-3 in Appendix 3. The PCB concentration in water sample Surface RM was non-detectable, however the estimated quantitation limit (EQL) was elevated from 0.05 ug/L to 0.06 ug/L, due to the small sample volume. There is no applicable CCME guideline for PCBs in water, however it is recommended that any concentration should be subject to virtual elimination strategies.

3.5.4 Laboratory Analysis Results – PCB Swab Samples

A total of six PCB swab samples (RM SW1 to RM SW6) were collected from the surface of the concrete floor at various locations inside the PCB storage facility at the site. The results of laboratory analyses for PCBs for these samples are presented in Table 3-4 in Appendix 3. PCBs were detected in all samples at concentrations ranging from 16 µg/ 100 cm^2 in swab sample RM SW6 to 61,800 µg/ 100 cm^2 in swab sample RM SW5. The detected levels of PCBs in swab samples taken from the concrete floor indicates that PCB containing materials have been released onto the floor at the facility during past activities. The PSC Analytical Services Inc. laboratory report indicated that the detected PCBs resembled Aroclor 1254 and Aroclor 1260. According to the Environment Canada protocol for sampling and testing at PCB storage sites in Ontario, concrete is considered a porous surface. Therefore, the PCB concentrations identified through PCB swab samples at the site can only be used as an indicator and are not comparable to CCME criterion values.

4.0 DISCUSSION AND CONCLUSIONS

A site investigation was completed at the PCB storage facility at the former Consolidated Rambler Mine in Baie Verte, Newfoundland and Labrador, by JWEL at the request of the Newfoundland and Labrador Department of the Environment. The conclusions of this assessment are summarized below.

1. The observed stratigraphy at the site generally consisted of surficial fill material ranging in thickness from approximately 0.2 m at test pits TP1-RM and TP4-RM to 0.6 m at test pits TP2-RM, TP3-RM and TP5-RM. The test pits were all terminated within the fill layer due to the nature of the fill material that made manual excavation quite difficult. The fill material ranged from loose brown sand and gravel to cobbles with occasional gravel and silt.

2. Groundwater was not encountered in any of the test pits excavated at the site. Based on regional topography and site observations the groundwater flow direction is inferred to be to the north.

3. Based on the land usage of the subject and surrounding sites, it is likely that the GSC would consider the site a commercial/industrial site. This must be confirmed with the GSC.

4. Detectable concentrations of PCBs were identified in two soil sample collected from the test pits excavated at the site during the site investigation. Soil sample TP1-BS1-RM and soil sample TP2-BS2-RM had PCB concentrations of 130 mg/kg and 0.62 mg/kg, respectively, however only the concentration in soil sample TP1-BS1-RM (130 mg/kg) exceeded the applicable CCME criteria of 33 mg/kg for PCBs in soil on a commercial site.

5. Detectable concentrations of PCBs were identified in a sediment sample (SED 1 RM) collected from a drainage ditch at the site during the investigation. Sediment sample SED 1 RM had a PCB concentration of 0.3 mg/kg, which does not exceed the applicable CCME criteria of 33 mg/kg for PCBs in soil on a commercial site.

6. No detectable concentrations of PCBs were identified in one surface water sample (Surface RM) collected from a drainage ditch at the site during the investigation.

7. PCBs were detected in six swab samples (RM SW1, RM SW2, RM SW3, RM SW4, RM SW5 and RM SW6) collected from the surface of the concrete floor inside the PCB storage facility. PCB concentrations ranged from 16 µg/100 cm^2 in swab sample RM SW6 to 61,800 µg/100 cm^2 in swab sample RM SW5. The detected levels of PCBs in swab samples taken from the concrete floor indicates that PCB containing materials have been released onto the floor at the facility during past activities.

According to the Environment Canada protocol for sampling and testing at PCB storage sites in Ontario, concrete is considered a porous surface. Therefore, the PCB concentrations identified through PCB swab samples at the site can only be used as an indicator and are not comparable to CCME criterion values.

5.0 RECOMMENDATIONS

Based on the results of this investigation, JWEL makes the following recommendations:

1. Provide a copy of this report and the delineation report to the GSC in Grand Falls-Windsor, Newfoundland and Labrador for their review and confirmation of the site sensitivity.

2. Based on the presence of PCBs in soil samples in excess of the CCME guidelines and the high costs associated with the treatment and disposal of PCB-contaminated materials additional delineation should be carried out in these areas to better define the volume of PCB impacted material requiring treatment. Since, low level PCB impacts were confirmed on the sediment sample from the drainage ditch, additional delineation should be carried out to better define the extent of PCB impacts on the soil/sediment at the bottom of the drainage ditch. In addition, although no PCBs were detected in a water sample collected from the drainage ditch located down-gradient of the site, further water sampling should be carried out in this area as PCB concentrations have been identified in sediments in the same drainage structure.

3. Based on the presence of detectable concentrations of PCBs in swab samples collected from the concrete floor of the PCB storage facility additional sampling should be carried out at the site. Due to the porous nature of concrete, a series of concrete core samples should be collected from the existing floor at areas identified with PCB impacts at surface or by visual inspection, as well as the underlying soil beneath the concrete floor. Samples of the concrete core from various depths and the soil if required, should then be analysed to provide a depth profile of PCB impacts and estimate of concrete and/or soil volumes requiring disposal.

4. Develop a remedial action plan (RAP) for the site once the site sensitivity is confirmed and the recommended delineation work is completed.

6.0 CLOSURE

This report has been prepared for the sole benefit of the Newfoundland and Labrador Department of Environment. The report may not be used by any other person or entity without the express written consent of Jacques Whitford Environment Limited (JWEL) and the Newfoundland and Labrador Department of Environment.

Any use which a third party makes of this report, or any reliance on decisions made based on it, are the responsibility of such third parties. Jacques Whitford Environment Limited accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The information and conclusions contained in this report are based upon work undertaken by trained professional and technical staff in accordance with generally accepted engineering and scientific practices current at the time the work was performed. Conclusions presented in this report should not be construed as legal advice.

The conclusions presented in this report represent the best technical judgement of JWEL based on the data obtained from the work. The conclusions are based on the site conditions encountered by JWEL at the time the work was performed at the specific testing and/or sampling locations, and can only be extrapolated to an undefined limited area around these locations. The extent of the limited area depends on the soil and groundwater conditions, as well as the history of the site reflecting natural, construction and other activities. In addition, analysis has been carried out for a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited data available, Jacques Whitford Environment Limited cannot warrant against undiscovered environmental liabilities.

If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, we request that we be notified immediately to reassess the conclusions provided herein.

This report was prepared by Gary Kennell, B. Tech., CET, and reviewed by Keith Keating, P. Eng., and Jim Slade, P. Eng., P. Geo.

Respectfully submitted,

JACQUES WHITFORD ENVIRONMENT LIMITED

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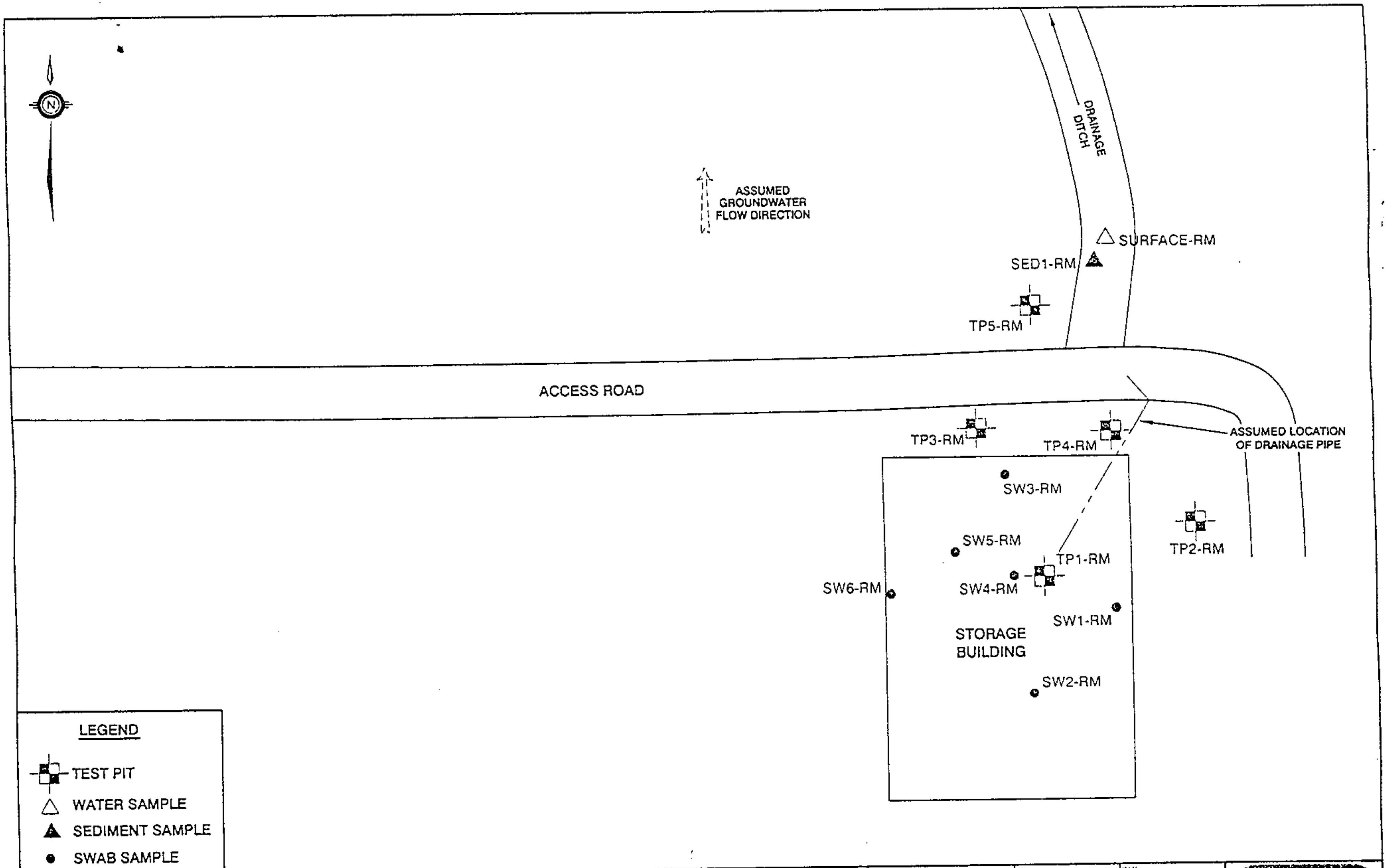
PROVINCE OF NEWFOUNDLAND
PERMIT HOLDER
This Permit Allows
JACQUES WHITFORD ENVIRONMENT LIMITED
To practice Professional Engineering
In Newfoundland and Labrador.
Permit No. as issued by APEGN 10837
which is valid for the year 2003

REGISTERED PROFESSIONAL ENGINEER
JAMES SLADE, P. GEO.
SIGNATURE
Nov. 24/03
DATE
NEWFOUNDLAND & LABRADOR



CLIENT: NEWFOUNDLAND AND LABRADOR DEPARTMENT OF ENVIRONMENT

PROJECT TITLE: PCB STORAGE SITE DECOMMISSIONING
CONSOLIDATED RAMBLER MINE, BAIE VERTE, NL

SCALE: N.T.S.	DATE: NOV 24, 2003		
DRAWN BY: P.D.	CHECKED BY:		
EDITED BY:	REV No: 0		
DWG No: 08955 ... EE-01			

APPENDIX 2

TERMS AND SYMBOLS
AND
TEST PIT RECORDS

SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Terminology Describing Common Soil Genesis

Rootmat	-	vegetation, roots and moss with organic matter and topsoil typically forming a matteess at the ground surface
Topsoil	-	mixture of soil and humus capable of supporting good vegetative growth
Peat	-	fibrous aggregate of visible and invisible fragments of decayed organic matter
Loam	-	silty sand or sand with silt mixed with organics matter
Till	-	unstratified glacial deposit which may range from clay to boulders
Fill	-	any materials below the surface identified as placed by humans (excluding buried services)

Terminology Describing Soil Structure

Homogeneous	-	same colour and appearance throughout
Stratified	-	composed of alternating successions of different soil types, e.g., silt and sand
Lensed	-	inclusion of small pockets of different soils
Laminated	-	alternating layers of varying material or colour with the layers less than 6 mm thick
Layer	-	thickness > 75 mm
Seam	-	thickness between 2 mm and 75 mm
Parting	-	thickness < 2 mm

Grain Size and Plasticity

Terminology describing soils on the basis of grain size and plasticity is based on the Unified Soil Classification System (USCS) (ASTM D-2487). The classification excludes particles larger than 76 mm (3 inches). This system provides a group symbol (e.g., SM) and group name (e.g., silty SAND) for identification. Note: terminology describing materials in the absence of laboratory analysis is based on the ASTM D-2488 visual method.

Terminology describing materials outside the USCS (e.g., particles larger than 76 mm, visible organic matter, construction debris) is based on the (visually estimated) proportion of these materials present:

Trace, or occasional	Less than approximately 10%
Some	approximately 10-20%
Frequent	Greater than approximately 20%

Standard Penetration Test 'N-Value'

The performance of the Standard Penetration Test provides an 'N-value'; the number of blows of a 140 pound (64 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (51 mm) O.D. split spoon sampler one foot (305 mm) into the soil. For split spoon samples where insufficient penetration is achieved and 'N' values cannot be determined, the number of blows is reported over sampler penetration in millimetres (e.g., 50/75).

Density of Cohesionless Soils

The standard terminology to describe cohesionless soils includes the compactness (formerly "relative density"), as determined by laboratory test or by the Standard Penetration Test 'N- value'.

Density	N-Value	Compactness %
Very Loose	< 4	< 15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	> 50	> 85

Consistency of Cohesive Soils

The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by *in situ* vane tests, penetrometer tests, unconfined compression tests, or occasionally by standard penetration tests.

Consistency	Undrained Shear Strength		N-Value
	ksf	kPa	
Very Soft	< 0.25	< 12.5	< 2
Soft	0.25-0.5	12.5-25	2-4
Firm	0.5-1.0	25-50	4-8
Stiff	1.0-2.0	50-100	8-15
Very Stiff	2.0-4.0	100-200	15-30
Hard	> 4.0	> 200	> 30

ROCK DESCRIPTION

Rock Quality Designation (RQD)

The classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be due to close shearing, jointing, faulting, or weathering in the rock mass and are not counted. RQD was originally intended to be applied to NW core; however, it can be used on different core sizes if most of the fractures caused by drilling stresses are easily distinguishable from *in situ* fractures.

RQD (%)	Rock Quality		
90-100	Excellent	-	intact, very sound
75-90	Good	-	moderately jointed, massive, sound
50-75	Fair	-	fractured, blocky and seamy
25-50	Poor	-	severely fractured, shattered and very seamy or blocky
0-25	Very poor	-	very severely fractured, crushed

Total Core Recovery (TCR)

Total core recovery is defined as the total cumulative length of all core recovered in the core barrel divided by the length drilled and is recorded as a percentage on a per run basis.

Weathering State

Term	Description
Slight	Weathering limited to the surface of major discontinuities. Typically iron stained.
Moderate	Weathering extends throughout rock mass. Rock is not friable.
High	Weathering extends throughout rock mass. Rock is friable (crumbles naturally or broken between fingers).

Terminology Describing Rock Mass

Spacing (mm)	Bedding, Laminations, Bands	Discontinuity
2000-6000	Very Thick	Very wide
600-2000	Thick	Wide
200-600	Medium	Moderately close
60-200	Thin	Close
20-60	Very Thin	Very close
< 20	Laminated	Extremely close
< 6	Thinly Laminated	

RECORD SYMBOLS AND ABBREVIATIONS

Sample Types

SS	Split spoon sample (obtained by performing the Standard Penetration Test)	WS	Wash sample	ST	Shelby tube or thin wall tube
		BS	Bulk sample	HQ, NQ, BQ, etc.	Rock core samples obtained using standard size diamond drilling bits.
		RC	Rock chip sample		

Laboratory Tests

S	Sieve analysis	H	Hydrometer analysis	A	Atterberg limits

Water Level Measurement

Indicates recorded water level in a borehole, test pit or standpipe.

Strata Plot

Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols:

Boulders, Cobbles, Gravel | Sand | Silt | Clay | Organics | Asphalt | Concrete | Fill | Igneous Bedrock | Meta-morphic Bedrock | Sedi-mentary Bedrock

Solid lines between strata indicate the boundary between different strata. Dashed lines between strata indicate the boundary between strata is inferred.

CLIENT NL Department of Environment
PROJECT Decommissioning of PCB Storage Site - Consolidated Rambler Mine
LOCATION Baie Verte Peninsula, NL
DATES (mm-dd-yy): DUG 5-15-03 WATER LEVEL N/A

TEST PIT No. TP 1-RM
PROJECT No. NFS08959
DATUM

ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES HYDROCARBON ODOUR	SAMPLES OTHER TESTS	PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm) TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
	Loose, brown SAND with silt (SP-SM); occasional gravel			BS	1	-		65.1	-	-	-	-	-
	End of Test Pit No groundwater seepage observed. Bedrock not encountered. NOTE: Test pit terminated at 0.2 m depth due to difficulty digging thought floor.												

...ENVIRONMENT LIMITED

TEST PIT RECORD

...ENT: NL Department of Environment
...ROJECT: Decommissioning of PCB Storage Site - Consolidated Rambler Mine
...OCATION: Baie Verte Peninsula, NL
...TES (mm-dd-yy): DUG 5-15-03 WATER LEVEL N/A

TEST PIT No. TP 2-RM
PROJECT No. NFS08959
DATUM

ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES HYDROCARBON ODOUR	SAMPLES OTHER TESTS	PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm) TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
	Loose, cobbles; occasional gravel and silt			BS	1	-		80.7	-	-	-	-	-
				BS	2	-		88.3	-	-	-	-	-
	End of Test Pit No groundwater seepage observed. Bedrock not encountered.												

ENVIRONMENT LIMITED — TEST PIT RECORD

CLIENT: NL Department of Environment
PROJECT: Decommissioning of PCB Storage Site - Consolidated Rambler Mine
LOCATION: Baie Verte Peninsula, NL
DATES (mm-dd-yy): DUG 5-15-03 WATER LEVEL N/A

TEST PIT No. TP 3-RM
PROJECT No. NFS08959
DATUM

ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	HYDROCARBON ODOUR	OTHER TESTS	PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm) TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
	Loose, cobbles; occasional gravel and silt			BS	1	-		86.3	-	-	-	-	-
				BS	2	-		82.5	-	-	-	-	-
	End of Test Pit No groundwater seepage observed. Bedrock not encountered.												

VIRONMENT LIMITED

TEST PIT RECORD

ENT NL Department of Environment

OJECT Decommissioning of PCB Storage Site - Consolidated Rambler Mine

OCATION Baie Verte Peninsula, NL

TEST PIT No. TP 4-RM

PROJECT No. NFS08959

DATUM

ES (mm-dd-yy): DUG 5-15-03 WATER LEVEL N/A

ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES HYDROCARBON ODOUR	SAMPLES OTHER TESTS	PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm) TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
	Loose, cobbles; occasional gravel			BS	1	-		82.6	-	-	-	-	-
	End of Test Pit												
	No groundwater seepage observed.												
	Bedrock not encountered.												

/IRONMENT LIMITED

TEST PIT RECORD

NT NL Department of Environment — TEST PIT No. TP 5-RM

OJECT Decommissioning of PCB Storage Site - Consolidated Rambler Mine — PROJECT No. NFS08959

CATION Baie Verte Peninsula, NL — DATUM

ES (mm-dd-yy): DUG 5-15-03 — WATER LEVEL N/A

ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES HYDROCARBON ODOUR	SAMPLES OTHER TESTS	PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm) TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
	Loose, brown SAND with gravel (SP)			BS	1	-		130	-	-	-	-	-
	Large cobbles			BS	2	-		96.7	-	-	-	-	-
	End of Test Pit No groundwater seepage observed. Refusal on probable bedrock at 0.6 m depth.												

APPENDIX 3

LABORATORY ANALYTICAL RESULTS SUMMARY TABLES

Table 3-1 Summary of Soil Chemistry Results – PCBs
PCB Storage Site, Former Consolidated Rambler Mine
Baie Verte, NL
JWEL Project No. NFS08959

Sample ID	EQL (mg/kg)	Sample Depth (m)	PID Reading (ppm)	PCBs (mg/kg)	Criteria (mg/kg)
TP1-BS1 RM	0.05	0.0 – 0.2	65.1	130	33[1]
TP2-BS2 RM	0.05	0.4 – 0.6	88.3	0.62	
TP3-BS1 RM	0.05	0.0 – 0.2	86.3	nd	
TP4-BS1 RM	0.05	0.0 – 0.2	82.6	nd	
TP5-BS1 RM	0.05	0.0 – 0.2	130	nd	
TP5-BS2 RM	0.05	0.4 – 0.6	96.7	nd	

Notes: 1 = CCME criteria for Commercial or Industrial site
EQL = estimated limit of quantitation of routine analysis
nd = not detected above standard EQL
shaded = value exceeds applicable criteria

Table 3-3 Summary of Water Chemistry Results – PCBs
PCB Storage Site, Former Consolidated Rambler Mine
Baie Verte, NL
JWEL Project No. NFS08959

Sample ID	EQL (mg/kg)	PCBs (mg/kg)	Criteria (mg/kg)
Surface RM	0.05	nd (0.06)	NC

Notes: NC = No CCME criteria for PCBs in water however any concentration is considered undesirable and should be subject to virtual elimination strategies.

EQL = estimated limit of quantitation of routine analysis

nd = not detected above standard EQL

nd ( ) = not detected above elevated EQLs shown in brackets

Table 3-4 Summary of Chemistry Results – PCB Swabs
PCB Storage Site, Former Consolidated Rambler Mine
Baie Verte, NL
JWEL Project No. NFS08959

Sample ID	EQL (ug)	PCBs (ug/100 cm^2)	Criteria (ug/100 cm^2)
RM SW1	5	630	NC
RM SW2	5	30	
RM SW3	5	970	
RM SW4	5	1180	
RM SW5	5	61800	
RM SW6	5	16	

Notes: EQL = estimated limit of quantitation of routine analysis
NC = no applicable criteria for swab samples on porous surfaces (i.e., concrete)

APPENDIX 4

PSC ANALYTICAL SERVICES INC. ANALYTICAL REPORTS

Organic Parameters page : 7

alytical Services
uewater Road
rd, NS Canada B4B 1G9
902) 420-0203
ree (800) 565-7227
902) 420-8612

Client : Jacques Whitford Environment Ltd.SLADE, JIM
607 Torbay Road
St. John's
NF A1A 4Y6
PSC Project Number : 0308239H
Client Project Number : NFS 8959

FAX # : 709-576-2126
Printed : 2003/05/30
Reported : 2003/05/30

trix			Soil	Soil	Soil	Soil
hilip ID			03-H028819	03-H028820	03-H028821	03-H028822
ient ID			SED 2 BVM	SED 2 BVM DUP	TP1-BS1 RM	TP2-BS2 RM
ate Sampled (y/m/d)			03/05/20	03/05/20	03/05/20	03/05/20
te Received (y/m/d)			03/05/23	03/05/23	03/05/23	03/05/23
halyte	Units	EQL		DUP		
in Soil Event #		-	HE43	HE43	HE43	HE43
lychlorinated Biphenyl	mg/kg	0.05	nd	nd	130	0.62
ecachlorobiphenyl Surr.	% Rec.	-	123.	100.	104.	96.
sture	%	-	23.	21.	9.	13.
-H028821 TP1-BS1 RM		Aroclor 1260.				
3-H028822 TP2-BS2 RM		Aroclor 1260.				

= Estimated Quantitation Limit is the minimum concentration that can be reliably reported. It is not a regulatory limit. For soils, zero %moisture is assumed. The moisture corrected EQL = EQL/(1-(%moisture/100))
= Analyte was not detected above the EQL. Raised EQL listed in Parenthesis.
= Dash is reported when parameter not requested in sample.
= PSC Quality Control Reference number for QC samples run with your sample.
= Surrogate Recovery Values are results of PSC quality control tests.
= Soil results are expressed on a dry weight basis.
= Biota results are expressed on a wet weight basis.

page verified

Organic Parameters page : 8

nalytical Services
iewater Road
d, NS Canada B4B 1G9
902) 420-0203
ree (800) 565-7227
2) 420-8612

Client : Jacques Whitford Environment Ltd.SLADE, JIM
607 Torbay Road
St. John's
NF A1A 4Y6
PSC Project Number : 0308239H
Client Project Number : NFS 8959

FAX # : 709-576-2126
Printed : 2003/05/30
Reported : 2003/05/30

rix			Soil	Soil	Soil	Soil
ilip ID			03-H028823	03-H028824	03-H028825	03-H028826
ient ID			TP3-BS1 RM	TP4-BS1 RM	TP5-BS1 RM	TP5-BS2 RM
de Sampled (y/m/d)			03/05/20	03/05/20	03/05/20	03/05/20
te Received (y/m/d)			03/05/23	03/05/23	03/05/23	03/05/23
lyte	Units	EQL				
in Soil Event #		-	HE43	HE43	HE43	HE43
ychlorinated Biphenyl	mg/kg	0.05	nd	nd	nd	nd
cachlorobiphenyl Surr.	% Rec.	-	99.	95.	98.	102.
isture	%	-	20.	23.	14.	14.

= Estimated Quantitation Limit is the minimum concentration that can be reliably reported. It is not a regulatory limit. For soils, zero %moisture is assumed. The moisture corrected EQL = EQL/(1-(%moisture/100))
= Analyte was not detected above the EQL. Raised EQL listed in Parenthesis.
= Dash is reported when parameter not requested in sample.
= PSC Quality Control Reference number for QC samples run with your sample.
= Surrogate Recovery Values are results of PSC quality control tests.
: Soil results are expressed on a dry weight basis.
Biota results are expressed on a wet weight basis.

page verified

Organic Parameters page : 9

nalytical Services
tewater Road
, NS Canada B4B 1G9
902) 420-0203
ree (800) 565-7227
2) 420-8612

Client : Jacques Whitford Environment Ltd.SLADE, JIM
607 Torbay Road
St. John's
NF A1A 4Y6

PSC Project Number : 0306239H
Client Project Number : NFS 8959

FAX # : 709-576-2126
Printed : 2003/05/30
Reported : 2003/05/30

rix		Soil	Soil
ilip ID		03-H028827	03-H028828
ient ID		SED1 RM	SED1 RM DUP
e Sampled (y/m/d)		03/05/20	03/05/20
te Received (y/m/d)		03/05/23	03/05/23
lyte	Units	EQL	DUP
in Soil Event #		-	HE43	HE43
chlorinated Biphenyl	mg/kg	0.05	0.3	0.3
achlorobiphenyl Surr.	% Rec.	-	97.	99.
isture	%	-	80.	81.

H028827 SED1 RM Aroclor 1260.
H028828 SED1 RM DUP Aroclor 1260.

= Estimated Quantitation Limit is the minimum concentration that can be reliably reported. It is not a regulatory limit. For soils, zero %moisture is assumed. The moisture corrected EQL = EQL/(1-(%moisture/100))
= Analyte was not detected above the EQL. Raised EQL listed in Parenthesis.
= Dash is reported when parameter not requested in sample.
= PSC Quality Control Reference number for QC samples run with your sample.
= Surrogate Recovery Values are results of PSC quality control tests.
: Soil results are expressed on a dry weight basis.
: Biota results are expressed on a wet weight basis.

page verified

Organic Parameters page : 4

ytical Services
ewater Road
, NS Canada B4B 1G9
) 420-0203
ee (800) 565-7227
2) 420-8612

Client : Jacques Whitford Environment Ltd.SLADE, JIM
607 Torbay Road
St. John's
NF A1A 4Y6
PSC Project Number : 0308239H
Client Project Number : NFS 8959

FAX # : 709-576-2126
Printed : 2003/05/30
Reported : 2003/05/30

rix		Swab	Swab	Water	Water
ip ID		03-H028807	03-H028808	03-H028809	03-H028810
nt ID		BVM SW7	BVM SW8	Surface Rm	Surface BV M
Sampled (y/m/d)		03/05/20	03/05/20	03/05/15	03/05/15
Received (y/m/d)		03/05/23	03/05/23	03/05/23	03/05/23
lyte	Units	EQL			
on Swabs Event #		-	HE40	HE40	-	-
in Water Event #		-	-	-	HE29	HE29
hlorinated Biphenyl	ug/L	0.05	-	-	nd(0.06)	nd(0.06)
hlorobiphenyl Surr.	% Rec.	-	-	-	86.	72.
ychlorinated Biphenyl	ug	5.	nd	7.	-	-
hlorobiphenyl Surr.	% Rec.	-	96.	92.	-	-

-H028808 BVM SW8 Aroclor 1242 , Aroclor 1254 & Aroclor 1260.
-H028809 Surface Rm Elevated PCB EQL due to sample volume after decanting.
PCB sample decanted due to sediment.
028810 Surface BVM Elevated PCB EQL due to sample volume after decanting.
PCB sample contained sediment.

Estimated Quantitation Limit is the minimum concentration that can be reliably reported. It is not a regulatory limit. For soils, zero %moisture is assumed.
The moisture corrected EQL = EQL/(1-(%moisture/100))
Analyte was not detected above the EQL. Raised EQL listed in Parenthesis.
Dash is reported when parameter not requested in sample.
PSC Quality Control Reference number for QC samples run with your sample.
Surrogate Recovery Values are results of PSC quality control tests.
Soil results are expressed on a dry weight basis.
Biota results are expressed on a wet weight basis.

page verified

Organic Parameters

nt : Jacques Whitford Environment Ltd.
607 Torbay Road
St. John's
NF A1A 4Y6

SLADE, JIM

PSC Project Number : 0308239H
Client Project Number : NFS 8959

FAX # : 709-576-2126
Printed : 2003/05/30
Reported : 2003/05/30

trix	Swab	Swab	Swab	Swab
Lip ID	03-H028795	03-H028796	03-H028797	03-H028798
ent ID	RM SW1	RM SW2	RM SW3	RM SW4
te Sampled (y/m/d)	03/05/20	03/05/20	03/05/20	03/05/20
Received (y/m/d)	03/05/23	03/05/23	03/05/23	03/05/23

alyte	Units	EQL				
on Swabs Event #		-	HE40	HE40	HE40	HE40
lychlorinated Biphenyl	ug	5.	630.	30.	970.	1180
chlorobiphenyl Surr.	% Rec.	-	92.	111.	92.	95.

H028795 RM SW1 Aroclor 1260.
-H028796 RM SW2 Aroclor 1254 & Aroclor 1260.
-H028797 RM SW3 Aroclor 1260.
H028798 RM SW4 Aroclor 1260.

Estimated Quantitation Limit is the minimum concentration that can be reliably reported. It is not a regulatory limit. For soils, zero %moisture is assumed.
The moisture corrected EQL = EQL/(1-(%moisture/100))
Analyte was not detected above the EQL. Raised EQL listed in Parenthesis.
= Dash is reported when parameter not requested in sample.
PSC Quality Control Reference number for QC samples run with your sample.
Surrogate Recovery Values are results of PSC quality control tests.
: Soil results are expressed on a dry weight basis.
Biota results are expressed on a wet weight basis.

page verified

Organic Parameters page : 2

alytical Services
ewater Road
, NS Canada B4B 1G9
02) 420-0203
e (800) 565-7227
) 420-8612

Client : Jacques Whitford Environment Ltd.SLADE, JIM
607 Torbay Road
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NF A1A 4Y6
PSC Project Number : 0308239K
Client Project Number : NFS 8959

FAX # : 709-576-2126
Printed : 2003/05/30
Reported : 2003/05/30

ix					
lip ID		Swab	Swab	Swab	Swab
ent ID		03-H028799 RM SW5	03-H028800 RM SW6	03-H028801 BVM SW1	03-H028802 BVM SW2
Sampled (y/m/d)					
e Received (y/m/d)		03/05/20 03/05/23	03/05/20 03/05/23	03/05/20 03/05/23	03/05/20 03/05/23
yte	Units	EQL			
on Swabs Event #	-		HE40	HE40	HE40	HE40
hlorinated Biphenyl	ug	5.	61800	16.	nd	21.
chlorobiphenyl Surr. % Rec.	-		173.	93.	96.	105.
-H028799 RM SW5		Aroclor 1260. PCB surrogate(s) not within acceptance limits due to matrix/co-extractive interference. Insufficient sample to repeat.				
-H028800 RM SW6		Aroclor 1254 & Aroclor 1260.				
-028802 BVM SW2		Aroclor 1242 & Aroclor 1254 & Aroclor 1260.				

Estimated Quantitation Limit is the minimum concentration that can be reliably eported. It is not a regulatory limit. For soils, zero %moisture is assumed.
he moisture corrected EQL = EQL/(1-(%moisture/100))
Analyte was not detected above the EQL. Raised EQL listed in Parenthesis.
Dash is reported when parameter not requested in sample.
SC Quality Control Reference number for QC samples run with your sample.
urrogate Recovery Values are results of PSC quality control tests.
Soil results are expressed on a dry weight basis.
ota results are expressed on a wet weight basis.

page verified

Organic Parameters page : 10

lytical Services
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PSC Project Number : 0308239H
Client Project Number : NFS 8959

FAX # : 709-576-2126
Printed : 2003/05/30
Reported : 2003/05/30

Certificate of Analysis

od Summaries :
nd OC Pesticides - Soil/Sediment: Acetone/hexane extr'n - Silica Gel
up. HP5890 cap. col. GC-ECD. Ref: EPA 8080, 8081
hlorinated Biphenyls - Swabs: Hexane extraction - Florisil cleanup (as req'd).
cap. col. GC-ECD. Ref: EPA 8080
and OC Pesticides - Water: Solvent extraction - Silica Gel cleanup.
C cap. col. GC-ECD. Ref: EPA Method 8082 (Modified)
re- based upon: Handbook of Analytical Methods for Environmental
s Gravimetric Metod Vol 1, page ME4, Ontario Ministry of the
onment. Rexdale Ont.1983. Drying temperature 105+- 5 Degrees C.

ork recorded herein has been done in accordance with normal professional standards
g accepted testing technologies, quality assurance and quality control procedures
t where otherwise agreed to by the client and testing company in writing. Liability
hy and all use of these test results shall be limited to the actual cost of the
inent analysis performed. There is no other warranty expressed or implied. Excess
e will be discarded upon expiry of hold time.

roval of Organic Parameters:

Organics Manager : James MacDonald

Project Manager : Jane Barteaux

Appendix F
DOE, Pollution Prevention Division Information Review

735.400/
734.001

GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR

Department of Environment

Industrial Environmental Engineering Division

File No. _____

February 14, 1995

Memo To: Sam El-Gohary
From: Michael Lacey

Subject: **Pine Cove Resources - Site Visit of February 09, 1995**

During this visit discussions were held with Kevin MacNeill and Roland Chamberlain. The following issues were discussed:

Pine Cove

NovaGold Resources Inc. is still actively seeking investors to help finance the construction and operation of a gold mine on the Pine Cove gold deposit. Imperial Minerals, the latest potential investor, has backed out (Apparently, samples of the deposit taken by Imperial did not prove to be favourable). However, Diamond Field, the Vancouver group in Voisey Bay, have recently shown an interest in the Pine Cove deposit. Kevin MacNeill is hoping to hear something from them in the next couple of weeks.

Rambler Tailings

Raymo Processing Limited (a company formed by Kevin MacNeill, Roland Chamberlain, and David Duncan) has acquired the Rambler tailings from NovaGold Resources. Raymo is proposing to process approximately 1.1 million tonnes of the Rambler tailings using the Indoor Vat Leach Process to extract gold, i.e. the process developed by NovaGold Resources Inc. and described in the registration document for the Pine Cove Gold Mine. A 500 tonne/day operation utilizing two vats is being considered. The tailings will be extracted from mainly the eastern portion to a depth of approximately 15 feet, processed to extract the gold, and then deposited on an impermeable liner. Runoff will be collected and treated with lime as necessary. Approximately 30 Kg of cement per tonne of tailings will be needed to bind the material for vat leaching. It is anticipated that this cement will act to neutralize any acid from these high sulphide tailings. Raymol also proposes to set aside between $0.50 to $0.75 per tonne of tailings processed for an environmental fund. This fund will ensure that any money required for reclamation/future monitoring will be available. According to Kevin MacNeill, Raymo Processing Limited will be registering their proposal within the next 30 days.

Regards,

M. L.

P.O. Box 2006, Corner Brook, Newfoundland, Canada, A2H 6J8. Telephone (709) 637-2482. Facsimile (709) 637-2426

734.001/
005

Briefing Note

Rambler Mine

September 14, 1994

BACKGROUND

The Rambler property operated from 1964 to April 1982 and produced 4.7 million tonnes of copper-gold ore. Unmined reserves and new discoveries total over 3.5 million tonnes, mostly lower grade.

The mine was a copper mine and did not particularly recover gold. As a result, there are approximately 4 million tonnes of tailings containing potentially economically recoverable gold. Approximately 15% of the tailings area was revegetated.

The tailings are acid generating and the discharge of the tailings area has a low pH and elevated metals.

The property has reverted to the province and Consolidated Rambler Mines accepts no responsibility for the property. Both this Department and the Department of Mines and Energy have pursued the former owners in relationship to liabilities, without success.

In 1993 the Department of Mines and Energy reinforced the spillway on the tailings dam to prevent erosion and eventual collapse of the dam.

A $3.8 million exploration program in 1988-1990 failed to prove up enough reserves for a mine.

In 1993 Nova Gold carried out a cleanup of the mill building in exchange for the gold values remaining. 150 tonnes were processed to produce 400 to 500 ounces.

PRESENT SITUATION

Nova Gold holds leases to some of the tailings area. They are presently mechanically treating (no chemicals except lime) 25,500 tonnes of a total of 1,500,000 tonnes. This is a relatively high grade area. They expect to make a profit on this (obviously) but also hope to use the knowledge gained to make a decision on possibly treating the remainder of the tailings. The processed tailings will be returned to where they were removed and the area capped to prevent acid generation. They are doing considerable monitoring which will provide us with useful information in the event that they propose to process all the tailings.

DEPARTMENT POSITION/ACTION

The Department will need to very carefully evaluate any proposal to reprocess the tailings. Disturbing the tailings now could lead to an even worse acid generating problem.

In addition to this property, there are a number of other properties that have acid generating problems. When resources are sufficient, it would be appropriate to invest greater time in developing expertise in acid generation prevention and mitigation.

Contact: Derrick Maddocks/Sam El-Gohary
Industrial Environmental Engineering Division

GOVERNMENT OF NEWFOUNDLAND AND LABRADOR
DEPARTMENT OF ENVIRONMENT AND LANDS

CERTIFICATE OF APPROVAL

File No. 734.001

Pursuant to *The Department of Environment & Lands Act*, Section(s) 24

Date: September 7, 1994 Approval No. AA94-094789

Proponent: Pine Cove Resources Inc.
P.O. Box 418
Baie Verte, NF
A0K 1B0

Attention: Mr. Kevin MacNeil
Manager

Re: Recovery of Rambler's Tailings Gold.

Approval is hereby given for: Testing facilities for the recovery of Rambler's Tailings Gold.

This approval does not release the proponent from the obligation to obtain appropriate approvals from other concerned provincial, federal and municipal agencies.

This approval is subject to the terms and conditions indicated in the attached Appendix(es).

It should be noted that prior approval of any significant change in the design or installation of the proposed works must be obtained from the Department of Environment & Lands.

Failure to comply with the terms and conditions will render this approval null and void, place the proponent and their agent(s) in violation of *The Department of Environment and Lands Act* and make the proponent responsible for taking any remedial measures as may be prescribed by this Department.

for MINISTER

Government of Newfoundland and Labrador
Department of Environment and Lands
Appendix A

Approval No. AA94-094789

---

1. All necessary measures shall be taken to prevent damage to water courses, air, vegetation , land and wildlife and to prevent pollution of bodies of water.

2 Any liquid effluent which may discharge into the environment shall comply with the Environmental Control (Water and Sewage) Regulations, 1980.

3. The disposal of waste material shall comply with the Waste Material (Disposal) Act, 1973.

4. On site fuel storage tanks shall require an approval from this Department as per The Storage and Handling of Gasoline and Associated Products Regulations, 1982, as Amended.

5. Should any dust and/or effluent pollution problems arise within the area, the company shall immediately notify this Department at the telephone number 637-2482 or fax number 637-2541. Any mitigation required will be subject to the approval of this Department.

6. The test work shall be carried out as shown in the information submitted on May 30, 1994. Should the company wish to deviate from this plan, prior approval is required from this Department.

7. The following facilities shall be constructed before the start up of the test work:

   a) A Berm (around the perimeter of the site) to keep the surface runoff out,

   b) A Lime Treatment Tank (in the circuit) to maintain the pH level between 9.5 and 10.0,

   c) A small centrifugal concentrating circuit to recover gold, and

   d) An excavated area (3 meters deep) with associated 2 decant Ponds to act as a tailings impoundment facility.

8. The following shall be carried out by the company during the operation:

   a) To collect water quality samples (from 6 locations) and to analyze them on a weekly basis. The analyses shall be performed by a laboratory approved by this Department,

cc. Mr. Paul Dean
Assistant Deputy Minister
Department of Mines and Energy
P.O. Box 8700
St. JOHN'S, Nf
AiB 4J6

cc. Mr. Brian Power
District Director
Environmental Protection
Environment Canada
P.O. Box 5037
St. John's, NF
A1C 5V3

cc. Mr. John Nwoke
Department of Environment & Lands
Sir Richard Squires Building
Corner Brook, NF
A2H 6J8

File No.: 734.000.1

Site Inspection Report
Industrial Compliance Section

To: Sam El-Gohary **From:** Alex Smith

Inspection Site: Rambler Mine Site (Raymo, Rambler & Ming)

Date of Inspection: July 9, 2003 **Duration of Inspection:** 10:30 -12:00

Purpose of Inspection: Determine quality of drainage & if cyanide is present

Site Address	Site Contacts		
	Name	Position	Phone #

Other Persons Present					
Name	Organization	Name	Organization	Name	Organization
Angela Blanchard	NDOE				
Dave Janes	NDOE (student)				

Background / Compliance History

- The Consolidated Rambler Property is located approximately 19 km from Baie Verte
- Consists of five mines in the area:
  - Main mine operated from 1964 - 1967
  - East Mine operated from 1967 - 1969
  - Big Rambler Pond operated until 1969 (small deposit)
  - Ming Mine operated from 1971 - 1982
  - Ming West mine operated from ?
- Processing of the ore from these operations resulted in generation of 3.8 million tonnes of highly acid generating tailings covering approximately 25 hectares.
- The mines have buildings in various states of disrepair, shafts and adits which require capping and material used for road construction and site grading appears to be acid generating.
- Sampling indicates major impacts on nearby streams with low pH and high metals appearing in samples taken. South Brook is dead down stream from the site.
- The Rambler mill remains in "care and maintenance" under the ownership of Ming Minerals.
- Sampling in September 2002 indicated high cyanide. It is thought that interference by cyanates caused a false high reading.

Opening Conference

-

Items / Areas Inspected

- Raymo Tailings

•	Rambler Tailings
•	Ming Tailings
•	

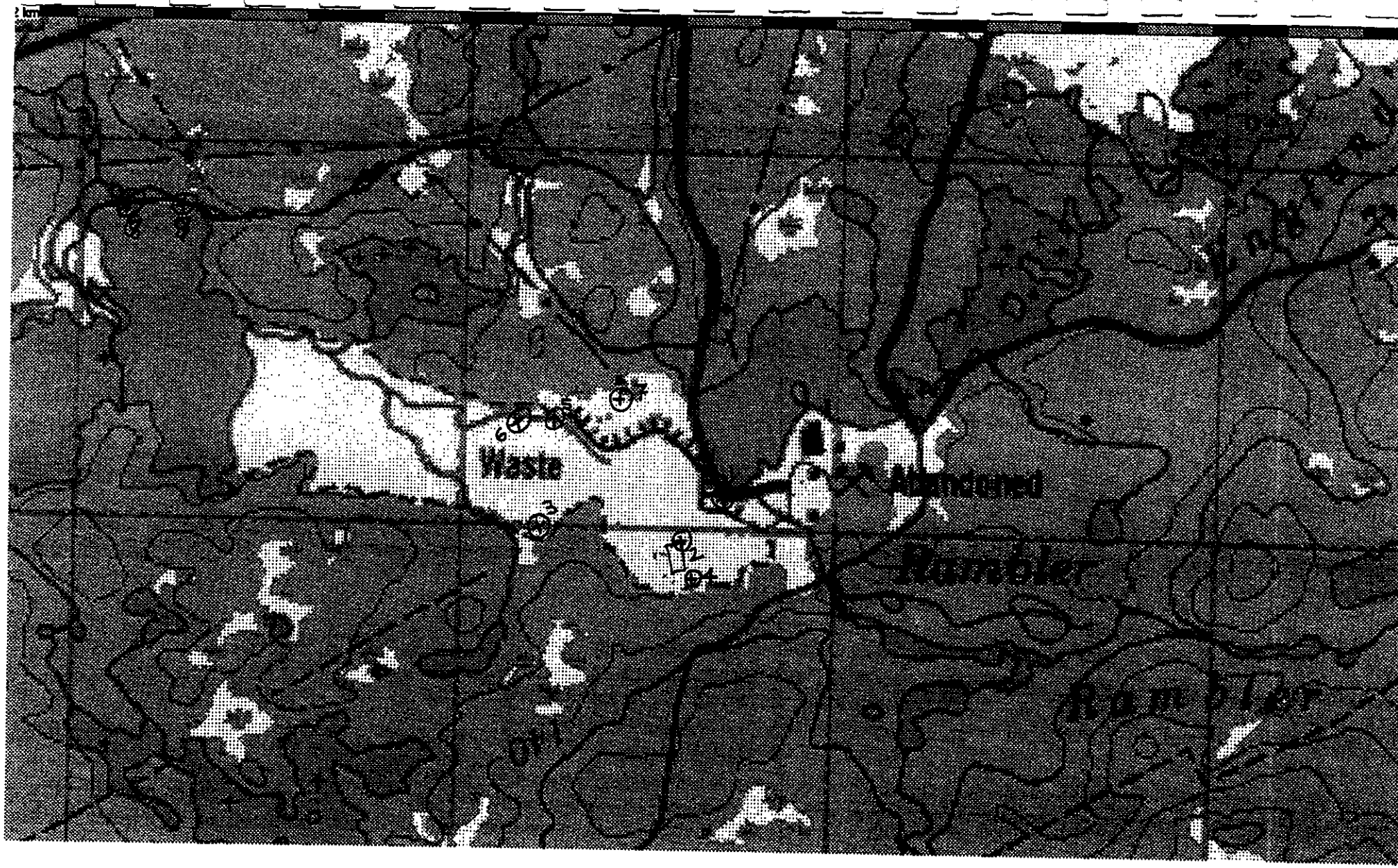
Observations	
•	Sample Point 1 • water collected and contained at north east corner (opposite end from old reagent pond) of Raymo tailing collection liner • pH 2.4 • reddish colour water
•	Sample Point 2 • puddle near intersection of Ming Road and Raymo Road • collects drainage from Raymo tailings area • pH 2.5
•	Sample Point 3 • puddle (no flow) upstream of Ming monitoring well #4 • pH 2.7
•	Ming Tailings • pH 2.6

Monitoring Actions Performed
• Pictures were taken. A list of pictures is attached.
• Samples taken and pH measured as noted above.

Meeting Conference
•

Follow-up Actions Required
• To be determined after analysis results from samples have been reviewed.

Inspector _____ **Date** July 21, 2003



Scalebar unit = 0.2 km Scale is 1:13,945 1 cm = 0.14 km
ile Verte 12-H-16, 09/18/2002, 10:32:53 AM, Touratech-QV-Navigator

Filename	Size	Modified	Description
Dcp_1160.jpg	486 KB	07/09/2003 10:52 AM	Rambler - Sample site 1, raymo tailings
Dcp_1161.jpg	485 KB	07/09/2003 10:52 AM	Rambler - Sample site 1, raymo tailings
Dcp_1162.jpg	437 KB	07/09/2003 10:53 AM	Rambler - Sample site 1, raymo tailings
Dcp_1163.jpg	334 KB	07/09/2003 11:18 AM	Rambler - Sample site 2, drainage at turnoff to raymo
Dcp_1164.jpg	531 KB	07/09/2003 11:40 AM	Rambler - Sample site 3, Ming tailings sump
Dcp_1165.jpg	480 KB	07/09/2003 11:41 AM	Rambler - Sample site 3, Ming tailings sump
Dcp_1166.jpg	685 KB	07/09/2003 11:42 AM	Rambler - Sample site 3, Ming tailings sump
Dcp_1167.jpg	529 KB	07/09/2003 11:44 AM	Rambler - inflow to Ming tailings
Dcp_1168.jpg	474 KB	07/09/2003 11:45 AM	Rambler - inflow to Ming tailings
Dcp_1169.jpg	729 KB	07/09/2003 12:05 PM	Ming - washout adjacent England Steady
Dcp_1170.jpg	767 KB	07/09/2003 12:06 PM	Ming - washout adjacent England Steady

File No.: 734.000.1

Site Inspection Report
Industrial Compliance Section

To: Sam El-Gohary **From:** Alex Smith

Inspection Site: Rambler Mine Site (Raymo, Rambler & Ming)
Date of Inspection: September 16, 2002 **Duration of Inspection:** 10:30 -12:30
Purpose of Inspection: Determine quality of drainage & if cyanide is present

Site Address	Site Contacts		
	Name	Position	Phone #
	Clarence Martin	Ming Minerals	532-8220

Other Persons Present					
Name	Organization	Name	Organization	Name	Organization
Len Mandville	M&E				

Background / Compliance History

- The Consolidated Rambler Property is located approximately 19 km from Baie Verte
- Consists of five mines in the area:
  - Main mine operated from 1964 - 1967
  - East Mine operated from 1967 - 1969
  - Big Rambler Pond operated until 1969 (small deposit)
  - Ming Mine operated from 1971 - 1982
  - Ming West mine operated from ?
- Processing of the ore from these operations resulted in generation of 3.8 million tonnes of highly acid generating tailings covering approximately 25 hectares.
- The mines have buildings in various states of disrepair, shafts and adits which require capping and material used for road construction and site grading appears to be acid generating.
- Sampling indicates major impacts on nearby streams with low pH and high metals appearing in samples taken. South Brook is dead down stream from the site.
- The Rambler mill remains in "care and maintenance" under the ownership of Ming Minerals.

Opening Conference

- Clarence Martin stated that the high CN results from a sample at Ming's Monitoring Well #4 was caused by CN coming from the stacked process tailings from the former Raymo operation.
- Sampling will be done for CN

Activities / Actions Performed
• Pictures were taken by Len Mandville. A list of pictures will be prepared once a copies have been obtained. • Samples taken and pH measured as noted above. See attached map.

Closing Conference
• Clarence Martin requested that sampling cease for the winter, as has been done in the past. It was stated that any such decision would not be made until analysis results can be reviewed.

Follow-up Actions Required
• To be determined after analysis results from samples have been reviewed.

Inspector _____ **Date** Sept. 13/02

File No.: 734.000.1

Site Inspection Report
Industrial Compliance Section

To: Sam El-Gohary **From:** Alex Smith

Inspection Site: Consolidated Rambler Mines including Main Mine, East Mine, Ming, and Ming West Mines

Date of Inspection: Nov. 21 & 22, 2001 **Duration of Inspection:** 3:30-4:30; 8:30-11:30

Purpose of Inspection: Familiarization Inspection as preparation for involvement with reclamation committee

Site Address	Site Contacts		
Department of Mines & Energy	Name	Position	Phone #
PO Box 8700	Ned Vukomanovic	Min Dev. Engineer	729-6442
St. John's NF A1B 4J6	Len Mandville	Min. Dev. Geologist	729-6439

Other Persons Present					
Name	Organization	Name	Organization	Name	Organization
Deneen Spracklin	NDOE				

Background / Compliance History

Working on a concise site history. Will include in next report.

Opening Conference

- Environment staff inspected the site without representatives of M & E.

Items / Areas Inspected

- General Overview
- Ming West
- Ming Mine
- Main Mine
- East Mine
-

Observations

- General Overview
  - Acid generating material is used throughout all sites for road construction and site grading.
- Ming West
  - Settling ponds remain. Sludge evident in bottom of first pond.
  - Area of vegetation kill downstream of ponds and pit (collapse?)
  - Portal blocked by only a few boards nailed in place about 50 feet from portal. Does not prevent access.

- **Ming Mine**
  - Near Vent Raises
    - pit (collapse?) sloped down with AGM
    - plywood cap of eastern vent raise has hole about .5 x 1 feet
  - Near headframe
    - Settling pond in place
    - industrial waste such as metals and tires around site
    - film in water indicating possible presents of petroleum
- **Main Mine and Mill**
  - Dam (with pump house) behind buildings still retaining water.
  - Pit (collapse?) has water running though it, despite previous efforts to divert water around.
  - Noted area which appeared to facilitate the dumping of materials by truck. Located on road to East Mine, approximately 50 metres from existing gate, on the mill side.
  - Drums and industrial scrap type waste through out vicinity of mill.
- **East Mine**
  - Headframe has collapsed and poses safety risk in current condition.
  - Tank present behind former PCB storage building
  - Has building been tested for PCB's since PCB's have been moved?
-
-

Activities / Actions Performed

- Pictures were taken. See attached list. Pictures will be kept on my computer, digital copies are available upon request.

Closing Conference

-

Follow-up Actions Required

- Do further research into background of site including activities, effluent and background water quality.
- Work with M & E to develop a site rehabilitation plan and see site reclamation through to completion.

Inspector _____

Date Nov. 27, 2001

Filename	Size	Modified	Image Properties	Description
Dcp_0409.jpg	742 KB	11/21/2001 4:14 PM	2160x1440x24b jpeg	Ming West - Portal barrier
Dcp_0410.jpg	464 KB	11/21/2001 4:33 PM	2160x1440x24b jpeg	Ming West - pit/crown pillar failure
Dcp_0411.jpg	368 KB	11/21/2001 4:34 PM	2160x1440x24b jpeg	Ming West - pit/crown pillar failure
Dcp_0412.jpg	532 KB	11/21/2001 4:34 PM	2160x1440x24b jpeg	Ming West - dead area d/s settling pond
Dcp_0413.jpg	343 KB	11/21/2001 4:34 PM	2160x1440x24b jpeg	Ming West - 2nd settling pond
Dcp_0414.jpg	322 KB	11/21/2001 4:35 PM	2160x1440x24b jpeg	Ming West - mine portal
Dcp_0415.jpg	414 KB	11/21/2001 4:36 PM	2160x1440x24b jpeg	Ming West - 1st settling pond, sludge at bottom
Dcp_0416.jpg	669 KB	11/22/2001 10:10 AM	2160x1440x24b jpeg	Ming Mine - Open pit, graded material AGM
Dcp_0417.jpg	677 KB	11/22/2001 10:11 AM	2160x1440x24b jpeg	Ming Mine - Open pit, graded material AGM
Dcp_0418.jpg	489 KB	11/22/2001 10:12 AM	2160x1440x24b jpeg	Ming Mine - near pit, AGM
Dcp_0419.jpg	476 KB	11/22/2001 10:15 AM	2160x1440x24b jpeg	Ming Mine - Vent raise, hole in plywood cap
Dcp_0420.jpg	643 KB	11/22/2001 10:40 AM	2160x1440x24b jpeg	Ming Mine - settling pd near headframe
Dcp_0421.jpg	479 KB	11/22/2001 10:42 AM	2160x1440x24b jpeg	Ming Mine - headframe
Dcp_0422.jpg	490 KB	11/22/2001 11:14 AM	2160x1440x24b jpeg	Ming East - collapsed headframe
Dcp_0423.jpg	545 KB	11/22/2001 11:23 AM	2160x1440x24b jpeg	Ming East - tank behind old PCB storage
Dcp_0424.jpg	777 KB	11/22/2001 11:34 AM	2160x1440x24b jpeg	Ming Main Mine - dam w/ pumphouse u/s of pit
Dcp_0425.jpg	745 KB	11/22/2001 11:35 AM	2160x1440x24b jpeg	Ming Main Mine - dam w/ pumphouse u/s of pit
Dcp_0426.jpg	512 KB	11/22/2001 11:56 AM	2160x1440x24b jpeg	Ming Main Mine - Rambler tailings left
Dcp_0427.jpg	532 KB	11/22/2001 11:56 AM	2160x1440x24b jpeg	Ming Main Mine - Rambler tailings right
Dcp_0428.jpg	472 KB	11/22/2001 11:57 AM	2160x1440x24b jpeg	Ming Main Mine - mill, note barrels
Dcp_0429.jpg	618 KB	11/22/2001 12:01 PM	2160x1440x24b jpeg	Ming Main Mine - pit
Dcp_0430.jpg	560 KB	11/22/2001 12:02 PM	2160x1440x24b jpeg	Ming Main Mine - pit
Dcp_0431.jpg	867 KB	11/22/2001 12:10 PM	2160x1440x24b jpeg	Ming Main Mine - apparent truck dumping area? behind mill

SE T For your files.

Briefing Note

S. Vg.

March 22, 1994

MING MINERALS - FORMER RAMBLER MINES, BAIE VERTE, NF

Background

- On February 24, 1994 an anonymous complaint was received from a Baie Verte resident about the handling of PCB equipment on the former Rambler Mines Property. It was reported the property no longer had a full time caretaker and one building which housed a PCB transformer had been sold and removed leaving the transformer exposed to the elements.

- Wayne Pierce of Environment Canada, and Graham Thomas of the Department of Environment & Lands inspected the property on February 28, 1994. Transformer, Environment Canada Serial # AR20132 containing 441 gallons of PCB oil was exposed to the elements and had been leaking from a valve at the top of the transformer. The mill building which houses more PCB transformers was fully accessible and in extremely deteriorated condition.

- Attempts to contact the owner, Sam Blagden of Ming Minerals, were unsuccessful on February 28, 1994.

- A meeting was finally arranged on March 4, 1994 between Sam Blagden of Ming Minerals, Wayne Pierce of Environment Canada, and Graham Thomas of the Department of Environment & Lands. Concerns regarding the poor storage of the PCB equipment at Ming Minerals were discussed. Mr. Blagden voluntarily took full responsibility for all the PCB equipment and assured both Departments measures would be put in place to secure the mill building, construct a temporary building over the exposed transformer AR20132, to do monthly inspections of all the PCB equipment on their property, to do a cleanup of the spilled PCB oil, and to develop a long term plan to store and dispose of their PCB material.

- The Department of Environment and Lands has taken charge of inspections on PCB material stored on a section of the former Rambler Mines Property. This storage site is separate from buildings controlled by Ming Minerals.

Status

- A temporary building has been constructed over PCB transformer AR20132 to protect it from the elements.

GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR

Department of Environment & Lands
Environmental Investigations Division

File no: 832.002.4

March 23, 1994

Registered

Sam Blagden
Ming Minerals
P.O. Box 174
Baie Verte, NF
A0K 1B0

COPY

Dear Mr. Blagden:

RE: PCB STORAGE AT FORMER RAMBLER MINES, BAIE VERTE, NF.

Further to our meeting of March 4, 1994, I understand from talking to Wayne Pierce of Environment Canada the mill building has been secured, a temporary building has been erected over transformer AR20132, and Mr. Newton Norman will be doing monthly inspections on all PCB material owned by Ming Minerals.

To provide you with some guidance in this matter I have enclosed a copy of the Waste Material Disposal Act and amendments, and the Storage of PCB Wastes Regulations. These regulations must be adhered to in order to properly store PCB material in this province. As discussed in the March 4, 1994 meeting with you, Wayne Pierce of Environment Canada, and I, these temporary measures you have taken are satisfactory until weather conditions permit a longer term solution to this problem. The solution we agreed to is an approved storage facility to house the PCBs at the former Rambler Mines which your company, Ming Minerals, now own. The storage facility must meet all the requirements of the Regulations enclosed. I have received confirmation Newton Norman is now conducting monthly inspections as required. These inspections must be recorded in permanent log books at the sites of the PCB material. I have enclosed sample inspection sheets to demonstrate the various things requiring inspection under the Regulations.

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P.O. Box 2006, Corner Brook, NF, Canada, A2H 6J8 Telephone (709) 637-2449, Facsimile (709) 637-2541

- Mill building has been secured and transformer locations addressed with respect to preventing snow and rain from getting at the transformer through vents and openings in the roof.

- Monthly inspections of all the PCB equipment have begun and logs have been established for recording them.

- Arrangements are being made to clean up the spilled PCB material.

- Department has written Ming Minerals explaining requirements for long term storage.

- The Department of Environment and Lands is continuing it's monthly inspection of the PCB storage area under it's control on the former Rambler Property.

Departmental Action/Position

- Department is working closely with representatives of Ming Minerals and Environment Canada to ensure all concerns in this matter are addressed.

- Sam Blagden of Ming Minerals has been very co-operative and very willing to take responsibility for the matter.

- The Department feels a properly designed and approved storage site will be constructed when weather conditions permit. Ming Minerals have been fully briefed in writing on the approval procedure.

- The Department will be conducting regular spot checks of the property to ensure Ming Minerals comply with the PCB Storage Regulations and the Waste Material Disposal Act.

- The Department intends to fully participate in the Atlantic Canada PCB Destruction Program. The PCB material stored on the Rambler property will be destroyed under that Program. Funding has not been allocated in the 93/94 budget but in view of the fact the Department hasn't spent all of the Federal money allocated in the past few years, compounded with delays in the Destruction Project, a request to Treasury Board for a reallocation of funds is possible later in the fiscal year should the incinerator be operational prior to 1995.

Contact: Graham Thomas
Environmental Investigations Division

If you have any questions I may be contacted at 637-2448.

Yours truly,

COPY

GRAHAM D. THOMAS
Environmental Specialist

GDT:pjc

Enclosures

cc: Mr. Wayne Pierce
Environmental Protection/NF
Environment Canada
P.O. Box 1017
Corner Brook, NF
A2H 6J3

cc: Mr. Carl Strong, Director
Environmental Investigations Division
Department of Environment and Lands
P.O. Box 8700
St. John's, NF
A1B 4J6

GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR

Department of Environment and Labour
Pollution Prevention Division

Memo to: Sam El-Gohary
Memo from: Stephen Dyke
Date: Oct 2, 2000

File No. 734.005

Re: Inspections - Rambler/Raymo/Electra

Sept. 27, 2000 - Wed. 3:00 pm - Rambler/Raymo/Electra 734.005

AB and SD toured Rambler/Raymo/Electra site. AB took a series of photos of entire site. Nothing appears to have changed from last visit.

About 400m on the right hand side in on the site access road, there is a marsh area that had a large patch of "red" grass along a stream that flows into the road ditch. The grass furtherest away from the stream is green. This area is downstream from the tailings pond which is known to be leaking. The "red" grass could be the result of acid drainage. AB photographed this area.

P.O. Box 8700, St. John's, Newfoundland, Canada, A1B 4J6, Telephone (709) 729-2555, Facsimile (709) 729-1930

GOVERNMENT OF NEWFOUNDLAND AND LABRADOR

DEPARTMENT OF PROVINCIAL AFFAIRS AND ENVIRONMENT

ST. JOHN'S

June 3, 1975

MEMO TO: C. J. Downey,
A.D.M. (Environment).

FROM: B. F. Power,
Environmental Engineer.

RE: Visit to Consolidated Rambler Mines, Baie Verte on May 29.

PURPOSE:

Annual visit to maintain contact with Rambler and to discuss pertinent environmental issues.

IN ATTENDANCE:

John Granger, Don Bruce, Joe Sullivan, Graham Cochrane, Peter Dyan - Rambler.

D. G. Jeans, B. F. Power - DPAE.

I. G. Sherbin, C. Whalen - EPS.

DISCUSSION:

1. Mercury levels in effluent. EPS analyses of Rambler effluent has shown mercury levels between 0.001 - 0.076 ppm. Newfoundland standards are 0.005 ppm. Rambler do not use any mercury in their process and feel that any mercury in the effluent would be of natural occurrence. Rambler have not done any Hg analyses of their own yet. They have purchased an atomic absorption unit but need a procedure for Hg analyses. EPS will supply this method and their chemist, John Roberts, to review Rambler's lab procedures.

..../2

PHASE I ENVIRONMENTAL SITE ASSESSMENT

FORMER RAMBLER MINE PROPERTY

BAIE VERTE, NL

Submitted To:

Department of Natural Resources
P.O. Box 8700
St. John's, NL
A1B 4J6

Submitted By:

Rutter Engineering
Formerly: Davis Engineering & Associates Limited
70 Brookfield Rd.
St. John's, Newfoundland
A1C 5K4

Project #:4-1038

March 2005

2. Rambler's effluent testing. They have 13 stations throughout the mine area. They will send a map of station locations to us and start reporting their results.

3. Lagoon for the Ming Mine shaft. A lagoon to treat the Ming Mine drainage will be constructed this summer. This lagoon will be the second location to treat this drainage. Primary treatment can be done in the mine shaft by the use of a conical sump in which lime can be injected for pH control.

4. Revegetation of the tailings area. Vegetation growth from the experimental plots of 1974 was poor. Plots will be attempted again this summer.

Work is presently being done on the revegetation of high sulfate soils by Noranda. Rambler is following these studies and feels that any favorable results could be used by them.

5. Messrs. Jeans, Sherbin and Whalen were given a tour of the effluent dam area. Mr. Power toured the mill, the Ming Mine area, the effluent sampling sites and the 1974 revegetation plot.

Brian F. Power.

BFP:NJH
c.c.: I. G. Sherbin,
EPS.

D. G. Jeans,
Director.

GOVERNMENT OF NEWFOUNDLAND AND LABRADOR
DEPARTMENT OF CONSUMER AFFAIRS AND ENVIRONMENT

ST. JOHN'S

1978 12 18

MEMO TO: Cyril J. Downey
A.D.M. (Environment)

THROUGH: David G. Jeans
Director of Environment

FROM: Brian F. Power
Environmental Engineer

RE: Meeting with Rambler Mines in Baie Verte on December 7, 1978.

ATTENDANTS:

J. Grainger	Rambler
P. Dyan	Rambler
B. Collins	Rambler
B. Power	DCAE
J. Clarke	EPS

DISCUSSION:

(1) Vegetation of tailings. Since our last meeting (December 1977) Mr. Grainger reported to have done the following:

i) inspected the ASARCO vegetation and became familiar with ASARCO's work

ii) as recommended by ASARCO, prepared 6 test plots.

Mr. Grainger said that the plots were unsuccessful and had been discarded. He agreed to prepare and submit a report describing the test work.

We emphasized the need for stabilizing the tailings to prevent acid leaching and wind erosion. Rambler has done very little, despite our requests over the past three years, regarding vegetation. With closedown of the mine within two years (Grainger's estimate), Rambler Mines must quickly establish a program.

...../2

We suggested consulting an expert on agriculture and Rambler agreed to do so. Mr. Fred Rayment of Federal Agriculture and the INCO agronomists in Sudbury were named. EPS also agreed to search for pertinent literature.

In view of the slowness in Rambler's vegetation activities, I suggest a Ministerial letter requesting action. Such a letter is drafted and attached.

(2) Effluent levels. The Ming and Boundary Mines effluents continue to be high in heavy metals. However, the flows are very low and not likely to cause damage to the bog into which they drain.

The tailings pond decant experienced its seasonal drop in pH this summer. Despite the liming of the tailings in the mill, the pH dropped from 6 to 3-4 at the decant. Mr. Grainger stated the the daily lime load was doubled and the pH did not improve. They feel that the pH drops with the warmer summer waters and increased bacterial activity.

The October and November pH's are 4-5 and are expected to climb back to normal during the winter.

A tour of the mill revealed a more sophisticated liming method with slurry tanks and pumping stations.

(3) Abandonment. Mr. Grainger estimated 18 to 24 months of reserves left. With such a short life, abandonment activities were discussed. Mr. Collins has reviewed the abandonment activities ongoing with ASARCO and is familiar with the types of requirements made by both Environment and Mines & Energy. He is presently gathering information to plan shutdown. Of concern to environment is the stabilization of the tailings, the filling of waste dumps and elimination or control of acid mine drainage.

We stated that our activities would be in conjunction with Mines & Energy regarding shutdown.

Brian F. Power

BFP/mcf

GOVERNMENT OF NEWFOUNDLAND AND LABRADOR
DEPARTMENT OF CONSUMER AFFAIRS AND ENVIRONMENT

Rambler Mines

ST. JOHN'S

1979 11 26

MEMO TO: Cyril J. Downey
A.D.M. (Environment)

THROUGH: David G. Jeans
Director of Environment

FROM: Brian F. Power
Environmental Engineer

RE: Meeting of November 22 with Rambler Mines in Baie Verte.

ATTENDANTS:

John Grainger	Mine Manager, Rambler
Roy Norman	Geologist, Rambler
David Jeans	DCAE
Brian Power	DCAE
Joe Kozak	EPS, Halifax

DISCUSSION:

(1) The tailing vegetation plots of 1979 gave encouraging results.

(2) Program for 1980 is not yet finalized. Possibly 5 of approximately 25 acres of tailings will be vegetated in 1980. Rambler is awaiting recommendations from Agriculture Canada.

(3) The mine life is not definitively known. There may be 12 months left in the Ming deposit. Low grade ore is one of the footwalls of Ming is presently being evaluated.

(4) Mr. Grainger will forward vegetation program for 1980 when available.

(5) We asked for commitment from Rambler Mines that the vegetation work will be completed even if the mine shuts down. Mr. Grainger will approach Board of Directors for commitment.

Brian F. Power

BFP/mcf

"LET'S KEEP IT CLEAN"

File

GOVERNMENT OF NEWFOUNDLAND AND LABRADOR
DEPARTMENT OF ENVIRONMENT

1982 06 24

ST. JOHN'S

In Reply Please Quote
File Ref. No.

MEMO TO: David G. Jeans, Assistant Deputy Minister

FROM: Brian Power, Director, I.E.E.D.

RE: Meeting and inspection of Rambler Mines

I met with John Grainger on June 17 to discuss shutdown and the rehabilitation work outlined in our letter of December 9, 1981.

Rambler has removed its underground equipment and will allow the Ming mine to flood. Mr. Grainger stated that it would take 18 months to flood to the 1985 level and 1 month to pump it out. Reopening after a prolonged shutdown will have environmental implications in that Ming mine drainage has always been high in heavy metals.

Rambler is mothballing all equipment onsite. They anticipate a 2-5 year shutdown with the price of copper being the controlling factor. Electricity will be turned off with provision to supply a few buildings onsite. After the end of June only security forces will be employed. Exploration by a 5 man crew will continue all summer.

Mr. Grainger said that there would be no difficulty to bring in workers for any environmentally related work during the shutdown.

With respect to our requirements:

1. Tailings vegetation

The 9 acres worked last year has growth beginning and looks green from a distance. Up close clumps of grass and three types of weeds cover approximately 20 percent of the area. This should thicken as the very beginning of growth could just be seen on about another 30-50%.

../2

Cons. Rambler management is waiting for Mr. Grainger's recommendation before embarking on further vegetation. The recommendation will be based on the 9 acres regrowth. He has approached the same contractor from last year and he is available to start at any time.

The contractor is presently looking for sources of topsoil in the general area. Mr. Grainger felt fairly certain that vegetation work would be performed and promised to keep us informed.

2. Garbage sites

The main dump site has been buried over and graded. The site restoration is satisfactory.

An old dump on the tailings will be cleaned up this fall. The plan is to burn off the wood in the pile then bury the rest. A scrap metal dump near the east pit and another dump in the Ming Mine area will be buried before the end of June.

Six tractor trailer loads of scrap metal have been removed from the site.

3. Concentrate loading at Tilt Cove has been delayed because of wharf repairs to be done by Federal Public Works. Shipping is scheduled to start mid August with at least 3 ships to remove some 16,000 tonnes of concentrate.

4. The dams on England's Brook have not been lowered yet but will be done according to our instructions.

5. The diversion ditch isolating Rambler Pond (tailings pond) from surface runoff was inspected and looks to be a permanent waterway. I do not foresee any problems with slumping of banks in the near future. Photographs were taken.

I am reasonably satisfied with the rehabilitation efforts to date.

Brian Power
Director
Industrial Environmental
Engineering Division

BP/mw

GOVERNMENT OF NEWFOUNDLAND AND LABRADOR
DEPARTMENT OF ENVIRONMENT

ST. JOHN'S

In Reply Please Quote
File Ref. No.

1983 10 20

MEMO TO: David G. Jeans, P. Eng.
Assistant Deputy Minister

THROUGH: Les Hulett, Ph.D.
Director

FROM: John J. Dutton

RE: Visit to Consolidated Rambler Mine at Baie Verte on October 13, 1983.

ATTENDANTS:

John J. Dutton - NDOE
Bill Moores - EPS
John Grainger - C.R.M.

As a result of our meeting with Mr. Grainger and a subsequent site inspection, we were able to determine the following information regarding vegetation, effluent sampling, etc.

1. Vegetation

Mr. Grainger indicated that the birds foot trefoil was doing very well but the other grasses were not. He also stated that he had received no further indication from head office regarding future vegetation. He pointed out the company's concern with the possibility of back flooding onto presently vegetated areas should the mine reopen and certain areas on the tailings pile become active again. We also determined that the person at head office to be contacted regarding this matter is a Mr. Mcfarlane, president of C.R.M. who is located in St. John, NB. From our inspection of the tailings, we found the vegetation to generally be in poor condition and a great deal of dust was blowing about. I find it difficult to believe that the vegetation can survive for very long under these conditions.

. . . ./2

2. Sampling & Reporting

Mr. Grainger indicated he would submit the results of effluent sampling for this past year and will continue to do so with future results. He did make some sort of comment about not knowing where or to whom he should send the results.

Mr. Grainger will be writing to the Department requesting a relaxation of some of our requirements (i.e. to be released from having the samples checked for mercury, iron and possibly suspended solids). I indicated he was perfectly free to make such a request but it would be up to the Minister to accept or deny his request.

He also asked that I check our files to see if there was ever a letter specifically stating that certain parameters must be tested for in the effluent samples. If there is, he would like a copy for his files. If there isn't, he will be requesting such a letter be issued to him.

3. Production

There are no plans at the present for any renewed production. There has been a crew doing exploratory work in the area this summer but nothing "exciting" has shown up.

4. Miscellaneous

We inspected the various P.C.B. storage areas on site and found several of the transformers had very very small leaks (or weeps) which Bill Moores made note of. Mr. Grainger had indicated earlier that he was still waiting for the proper P.C.B. storage drums to come in so they could begin removing the material from the Gullbridge Mind site and bring it to Baie Verte for storage.

John J. Dutton

John J. Dutton
Environmental Engineer

JJD:imd

Appendix G
Assessor Qualifications

NEIL HUNT, P.ENG., M.A.Sc. Project Appointment: **Project Manager**

Years Experience: 11

Education: Bachelor of Engineering (Civil), Memorial University of Newfoundland, 1996
Masters of Applied Science (Environmental Engineering), MUN, 1997.

RECENT REPRESENTATIVE WORK EXPERIENCE

2005 **Project Manager** for **Groundwater Monitoring Program** at Transport Canada property located at the Goose Bay Airport in Labrador. Program involved assessing soil and groundwater contamination on airport property, delineating contamination plumes and recommending passive and remedial action plans.

Project Manager for wharf site remediation at Transport Canada property located in Baie Verte, Newfoundland. Program involved assessing extent of contamination, recommending options for impacted sediment, soil and groundwater and supervising the subsequent site remediation.

2004 **Project Manager** for detailed environmental assessment work at the Miawpukek First Nations reserve expansion area in Conne River, Newfoundland. This program involved soil and groundwater testing, identification of contaminant sources, evaluation of risk and recommendations for remedial action.

Project Manager for feasibility analysis of sedimentation concerns related to the Voisey's Bay mining operations in Labrador. Tasks included identifying contaminants of environmental concern and recommending sedimentation control devices, complete with cost estimates, in accordance with Provincial waste management regulations.

Project Manager for **Temporary Landfill Closure** conducted in the community of Natuashish, Labrador. Tasks included designing permanent closure details of a temporary landfill site used during construction of the new community. Items addressed during close-out included accessibility, animal/rodent control, drainage, grading/cover and security.

Project Manager for intrusive investigation work at the Miawpukek First Nations landfill site in Conne River, Newfoundland. This program involved assessing contaminant plumes and pathways, evaluating risk to off-site sources and liability estimates.

Project Manager for Phase II/III ESA program conducted at an abandoned dump site located at the Gander International Airport property, Newfoundland. Project involved assessing levels of contamination, determining liabilities and recommending remedial action plans.

Project Manager for delineation and subsequent remediation of petroleum hydrocarbon impacted soil and groundwater at six (6) distinct sites located at the Gander International Airport property, Newfoundland. Project involved reviewing risk assessments prepared for each site, assessing the horizontal and vertical extent of contamination and supervising subsequent site remediation.

Project Manager for waste audits conducted at various locations at the Gander International Airport. Tasks included managing soil and groundwater delineation programs involving a wide range of contaminants, including petroleum hydrocarbons, heavy metals, volatile organics and PCBs.

2003 **Project Manager** for one year **Groundwater Monitoring Program** at the Fire Training Area and Former Disposal Site at the St. John's International Airport. This program involved assessing options for remediating contaminated groundwater and developing future sampling programs.

Project Manager for **Phase I through VI ESA** of five hydrocarbon contaminated sites in Natuashish, Labrador. This program involved hydrocarbon contaminated soil, surface water and groundwater at a construction camp site, residential properties and a bulk fuel storage area. The project involved determining the extent of contamination, recommending a remedial action plan and supervising clean-up activities.

Project Manager for **the Peer Review of an Ecological and Human Health Risk Assessment** for the community of Davis Inlet, Labrador. The project involved assessing the toxicology information used in the assessment, the equations and assumptions used to estimate exposure, the process(es) used to select chemicals, pathways, and receptors, the results of the risk assessment and the validity of conclusions.

Project Manager for **Environmental Baseline Study** conducted at a biopile soil treatment facility in Goose Bay, Labrador. Also responsible for the design of the treatment/receiving pad and site layout.

Project Manager for **Environmental Risk Assessment** conducted at a Coast Guard helicopter re-fuelling station in Wesleyville, Newfoundland.

Project Manager for **Environmental Assessment and Delineation** conducted at a Transport Canada property in Otter Creek, Labrador, downgradient of a former landfill site and asphalt plant. Tasks included managing the installation of monitoring wells and the delineation of sediment, groundwater and soil contaminant plumes.

2002 **Project Manager** for **Phase I through III Environmental Assessment** of 42 Department of Fisheries and Oceans properties located throughout NL. The project was contracted through PWGSC and involved an historic review, soil and groundwater testing and a review of remedial options for various small craft harbour sites, fuel storage depots, VHF stations, warehouse sites and bait depots.

Project Manager for **Groundwater Monitoring** at the former U.S. Military Base in Argentia, Newfoundland, including adjacent properties.

Project Manager for **Phase I through VI Environmental Assessment** of a decommissioned industrial site previously used to manufacture masonry products and for batching concrete, located in St. John's.

Project Manager for **Phase I through IV Environmental Assessment** of Works Services and Transportation sites located in St. John's, Clarenville, Grand Falls, Harbour Breton and Norris Point.

Project Manager for **Phase I Environmental Assessment and Hazardous Building Material Assessment** of 20 Department of National Defence properties located in Gander, NL.

Project Manager for **Environmental Baseline Study** conducted at a biopile treatment facility in Sunnyside.

2001 **Project Manager** for **Phase I Environmental Assessment** of 57 Department of Fisheries and Oceans properties located throughout NL. The project was contracted through PWGSC and included wharf facilities, oil depots, Loran C stations, and storage/warehouse sites.

Project Manager for **Groundwater Monitoring Programs** conducted at the St. John's, Gander and St. Anthony Airports.

Project Manager for **Phase III through VI Environmental Assessments** at two Nav Canada sites and a Transport Canada wharf facility in Labrador, involving hydrocarbon contaminated soil, sediment and water.

SHANNON MITCHELL
Role: Field Technician
Years Experience: 8
Education: Environmental Engineering Technologist, 1997 Central Newfoundland Regional College
Forestry Resources Technician, 1994 Westviking College

RECENT REPRESENTATIVE WORK EXPERIENCE

2004 **Environmental Technologist and Field Supervisor** for **Groundwater Monitoring Programs** conducted at the Goose Bay, St. John's and Gander International Airports. Tasks included the reporting of field observations, the collection of groundwater samples and data compilation.

Environmental Technologist and Field Supervisor for **Phase V through VI ESA** of five hydrocarbon contaminated sites in Natuashish, Labrador. Tasks included ensuring compliance with the established remedial action plan, directing contractors during excavation and collection of soil and groundwater samples for closure analysis.

Environmental Technologist and Field Supervisor for **Environmental Baseline Study** conducted at a biopile soil treatment facility in Goose Bay, Labrador.

Environmental Technologist and Field Supervisor for **Phase I/II Environmental Site Assessments** conducted at six facilities in St. John's, including Triware and Conpro buildings. Tasks included assessment of site conditions, on-site soil and groundwater sampling, compilation and presentation of data into stand alone reports.

2003 **Environmental Technologist and Field Supervisor** for **Phase I through III Environmental Assessment** of 22 Department of Fisheries and Oceans small craft harbour properties located throughout NL. Tasks included installation and sampling of monitoring wells, intrusive surface and subsurface soil sampling, collection of potential hazardous building materials and data compilation.

Environmental Technologist and Field Supervisor for **Phase I through III Environmental Assessment** of 15 oil storage depots and storage warehouses properties located throughout NL on behalf of PWGSC. Tasks included field assessment and testing, intrusive surface and subsurface soil and groundwater, collection of potential hazardous building materials and data compilation.

Environmental Technologist and Field Supervisor for **Phase I through VI Environmental Assessment** of a decommissioned industrial site previously used to manufacture masonry products and for batching concrete, located in St. John's. Responsible for soil and groundwater sampling, data analysis and reporting.

Environmental Technologist and Field Supervisor for **Phase I through IV Environmental Assessment** of Works Services and Transportation sites located in St. John's, Clarenville, Grand Falls, Harbour Breton and Norris Point. Tasks included historical review, monitor well installation and sampling, surface sampling, subsurface soil sampling of test pits and hazardous building material collection.

Environmental Technologist and Field Supervisor for **Quantitative Risk Assessment** conducted at the Wesleyville Helo fuel dump in Newfoundland. Tasks included soil and groundwater sampling.

LESLEY SPRACKLIN, B.Eng.
Role: Field Technician
Years Experience: 1
Education: Civil Engineer, 2004
Memorial University of Newfoundland - St. John's, NL

RECENT REPRESENTATIVE WORK EXPERIENCE

2004 **Engineer** for **Monitor Well Installation and Groundwater Monitoring** at the Works Services and Transportation Depot in St. John's, NL. Tasks included data assessment, delineation of contaminant plumes and reporting.

Engineer for **Groundwater Monitoring** at the Transport Canada Northside property in Goose Bay, Labrador. Tasks included data assessment (including identifying parameter exceedances), trend analysis and reporting.

Engineer for **Environmental Remediation** conducted at a former industrial site in Holyrood, NL. Tasks included collecting samples for analysis, delineating extent of contamination and preparing a closure report for Regulatory review.

Engineer for **Phase I/II/III ESA** conducted at the former Remand Centre in St. John's, NL. Tasks included data interpretation, contaminant identification, compilation of data and report preparation. Contaminants of concern included petroleum hydrocarbons, PAHs and metals.

Field technician for **Landfill Assessments** conducted at over 100 sites across Newfoundland and Labrador. Tasks included collection of data, risk classification and reporting, including recommendations for remediation.

Engineer for research on water quality station profiles to estimate the impact of land use and water use on watersheds in Newfoundland.

Engineer responsible for sampling and testing ambient water quality stations throughout Newfoundland for significant parameters and delineated watershed boundaries using computer programs and maps.

Engineer responsible for sampling and testing drinking water sources in Newfoundland for Trihalomethanes (THM's) and Haloacetic Acids (HAA's). Completed water quality data compilation, processing and analysis.

Engineer responsible for assisting in the preparation and updating of Emergency Preparedness/Response Plans for Federal Government buildings throughout Canada