- FINAL REPORT-

PHASE I ENVIRONMENTAL SITE ASSESSMENT
FORMER BAIE VERTE MINE
BAIE VERTE
NEWFOUNDLAND AND LABRADOR

Submitted to:

Department of Natural Resources
Mineral Development Division
P.O. Box 8700
St. John's, NL
A1B 4J6

Submitted by:

AMEC Earth & Environmental
P.O. Box 13216
133 Crosbie Road
St. John's, NL
A1B 4A5

March 31, 2005

TF4126504

EXECUTIVE SUMMARY

At the request of the Department of Natural Resources, Mineral Development Division (DNRMD), a Phase I Environmental Site Assessment (ESA) was conducted at the Former Baie Verte Asbestos Mine located along Highway 410, Baie Verte, Newfoundland and Labrador (NL). This assessment was required to provide the DNRMD with an evaluation of known and potential environmental concerns at the Site and requirements for additional environmental assessment and decommissioning of the Site. Written authorization to proceed with this assessment was given by Mr. Charles Bown of the DNRMD on December 15, 2004.

The main objective of this Phase I ESA was to identify potential environmental liabilities at the Site that may have resulted from existing and previous land uses or Site development activities on and adjacent to the subject property, and to identify any present conditions or practices that may represent materially significant environmental risks or liabilities.

The Phase I ESA followed the "Phase I ESA", Canadian Standards Association (CSA) standard CSA Z768-01, 2001 guidelines which set standards for the review of information pertaining to the Site, completion of detailed checklists during an inspection of the property, conducting interviews with people knowledgeable about the Site and preparation of the final report that documents the study results.

Large-scale mining operations were conducted at the Site from 1962 until its closure in 1994. The production of asbestos fibre at the Site was initially achieved using a dry-milling process and subsequently accomplished using a wet-milling process. Over 49 million tonnes of ore were processed through the dry mill between 1963 and 1991 to produce 1.6 million tonnes of asbestos fibre. The operation produced approximately 190 million tonnes of waste rock and 47 million tonnes of tailings. The wet mill operated intermittently over a five-year period between 1990 and 1994 at a peak performance of some 30,000 tonnes of fibre per year.

The Site has been out of operation since 1994. The DNRMD is currently responsible for the management of the Site and its infrastructure including the mill buildings, dock and warehouse. In 1998, the Province of Newfoundland and Labrador entered into a 20-year lease agreement with Northco Forest Products Limited (Northco) that allowed it to establish a sawmill in the Erection and Repair (E & R) building on the Site. Northco has since built an office building at the Site and have expanded its sawmill operations as part of this leasing agreement. At the request of the DNRMD, the area of the Site currently being leased to Northco was excluded from this assessment.

This Phase I ESA has revealed the following areas of potential environmental concern regarding the subject property:

- Asbestos Containing Materials (ACMs);
- Fuel Handling and Storage;
- Spills and Leaks;
- Chemical Use, Handling and Storage;
- Lead, Mercury and PCB Containing Paints;
- PCB Containing Electrical Equipment (PCB);
- PCB Storage Site;
- Mercury Containing Equipment;
- Radioactive Materials;
- Waste Disposal Sites;
- Septic Discharge Fields;
- Air Quality;
- Freshwater Resources; and
- Marine Sediment.

Based on the findings of the Phase I ESA, a Phase II ESA is recommended to confirm the presence or absence of environmental contamination at the Site. Recommended further actions for the Site include the following:

- Paint Sampling Program;
- Asbestos Sampling Program;
- Soil Sampling Program;
- Surface Water Sampling Program;
- Sediment Sampling Program;
- Air Sampling program; and
- Inspection of Potential PCB Containing Equipment.

It is also recommended that all Site infrastructure, including Site buildings, foundations, the dock and conveyors be decommissioned to ground level, dumped into the north pit and buried with waste rock.

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

At the request of the Department of Natural Resources, Mineral Development Division (DNRMD), a Phase I Environmental Site Assessment (ESA) was conducted at the Former Baie Verte Asbestos Mine, the Site, located along Highway 410, Baie Verte, Newfoundland and Labrador (NL). This assessment was required to provide the DNRMD with an evaluation of known and potential environmental concerns at the Site and requirements for additional environmental assessment and decommissioning of the Site. Written authorization to proceed with this assessment was given by Mr. Charles Bown of the DNRMD on December 15, 2004.

The former Baie Verte Asbestos Mine is located on the Baie Verte Peninsula, approximately 8 km north of the Town of Baie Verte, NL (see Figure 1, Appendix A). The Site is located along the Fleur de Lys Highway (Route 410), a paved secondary highway, which joins to the Trans Canada Highway (TCH) some 70 km to the south. Detailed Site location plans are provided in Figures 2, 3 and 4, Appendix A. The most recent aerial photograph (1999) of the area is provided in Figure 5, Appendix A.

Large-scale mining operations were conducted at the Site from 1962 until its closure in 1994. The production of asbestos fibre at the Site was initially achieved using a dry-milling process and subsequently accomplished using a wet-milling process. Over 49 million tonnes of ore were processed through the dry mill between 1963 and 1991 to produce 1.6 million tonnes of asbestos fibre. The operation produced approximately 190 million tonnes of waste rock and 47 million tonnes of tailings. The wet mill operated intermittently over a five-year period between 1990 and 1994 at a peak performance of some 30,000 tonnes of fibre per year.

The DNRMD is currently responsible for the management of the Site and its infrastructure including the mill buildings, dock and warehouse. In 1998, the Province of Newfoundland and Labrador entered into a 20-year lease agreement with Northco Forest Products Limited (Northco) that allowed it to establish a sawmill in the Erection and Repair (E & R) building on the Site. Northco has since built an office building at the Site and have expanded its sawmill operations as part of this leasing agreement. Upon the request of the DNRMD, the area of the Site currently being leased to Northco was excluded from this assessment (see Figure 3, Appendix A).

This report describes the methods used to investigate actual and/or potential environmental concerns affecting the subject property at the time of the assessment. This report is intended to reduce the level of uncertainty with respect to the property's environmental condition. While this report provides an overview of potential environmental concerns, both past and present, it is limited by the availability of information obtained at the time of the assessment. The Site was

snow covered at the time of the assessment, making it difficult to visually inspect the exterior property. For this reason, it is possible that other activities that may have adversely affected the environmental status of the property were not identified during this assessment.

1.1 OBJECTIVES

The purpose of this ESA was to identify potential environmental liabilities at the Site that may have resulted from existing and previous land uses or Site development activities on and adjacent to the subject property, and to identify any present conditions or practices that may represent materially significant environmental risks or liabilities.

The objectives of the Phase I ESA include the following:

- Undertake on-Site field screening to provide information on the Site conditions and potential sources of contamination;
- Evaluate all abandoned buildings and facilities, including the dock, open pits and tailings piles, to identify all areas of potential environmental concern;
- Dip and sample any existing storage tank systems;
- Provide a comprehensive inventory of equipment not contained within the mill buildings and all abandoned facilities on Site;
- Provide detailed recommendations on any further work required to ascertain the environmental condition of the Site, including development of a program for intrusive sub-surface investigations; and
- Provide a discussion on the available generic (CCME and Provincial) cleanup criteria.

2.0 SITE DESCRIPTION

The former Baie Verte Asbestos Mine is located on the Baie Verte Peninsula, approximately 8 km north of the Town of Baie Verte, NL (see Figure 1, Appendix A). The Site is located along the Fleur de Lys Highway (Route 410), a paved secondary highway, which joins to the Trans Canada Highway (TCH) some 70 km to the south. Detailed Site location plans are provided in Figures 2, 3 and 4, Appendix A.

Large-scale mining operations were conducted at the Site from 1962 until closure in 1994. The production of asbestos fibre at the Site was carried out through a series of physical processes. First, the ore was blasted from the mining pits and removed using electric shovels. A mixture consisting of ammonia nitrate and fuel oil (ANFO) was used as the blasting agent. Waste rock was stockpiled on-Site and the ore was conveyed to the primary crusher where it was crushed using a gyratory crusher.

From the primary crusher, the ore was then conveyed to the secondary crusher. At the secondary crusher, the ore passed through large vertical dryers that measured seven storeys in height and was recrushed using two cone crushers. From the cone crushers, material passed over large vibrating screens that separated the fine materials from the oversized materials. The fines were then either conveyed to the dry mill for processing or to the dry rock storage facility for storage. The oversized materials were reheated using two large Bunker C-fired horizontal dryers and conveyed to the cone crushers to be recrushed by the cone crushers.

From the secondary crusher and the dry rock storage facility, the ore was conveyed to the dry mill for processing. At the dry mill, the asbestos fibres were separated for the rock/waste materials using a vacuum powered system. The asbestos fibres recovered by the vacuums were bagged and delivered to the dock warehouse for storage until shipped to market. The mill rejects (tailings) were conveyed to the mill tailings stockpile. Product was shipped to market via marine vessels.

In November 1988, construction began on a wet mill facility at the Site. Wet milling of the tailings began at the Site in May 1990. During the wet milling process, mill rejects from the tailings stockpile were conveyed to the facility where is it was first mixed with water. Water for the wet milling process was obtained from the north pit and steam bath pond. The water-borne slurry then passed though a series of circuits consisting of screens, cyclones and other mechanical equipment. Fibre from the circuits was then screened to remove grit and dust. After the fibre was processed, it was dewatered using filter presses. From the presses, the product was sent to a propane-fired dryer where approximately 99% of the water was removed. The dry product was then pressure packaged into bags and delivered to the dock warehouse for storage

until it was trucked to market. All water used in the wet milling process was returned to the north pit with a sediment load of approximately 2800 tonnes per day.

The key features of the Site are described in more detail in the following sections.

2.1 MINING PITS

Two mining pits were observed at the subject property at the time of the Site inspection: north pit and west pit. The two pits are located side-by-side and are separated by a body of waste rock designated as the "saddle area" (see Figure 2, Appendix A). The saddle has a thickness of approximately 45 m and consists of compacted mine rejects over the underlying bedrock.

Advocate Mines Limited operated both pits, until the cessation of mining in 1981. When the mine was taken over by Baie Verte Mines in 1983, mining was carried out primarily in the north pit until the mid to late 1980's. Mining shifted to the west pit from 1987 to 1990. At that time, the north pit became a waste disposal Site for waste rock, dry tailings and wet milling reject materials.

At the time of the Site inspection, both pits were partially filled with water. Also, evidence of slope instability (i.e. slump faults and fractures) was observed along the northern edge of the west pit (see Photos 1 and 2, Appendix B).

2.2 WASTE ROCK STOCKPILES

There are three large stockpiles of waste rock present at the Site (see Figures 2 and 5, Appendix A) containing approximately 190 million tonnes of material. The largest of the three waste rock stockpiles is located northeast of the north pit. The smallest is located between the west pit and steam bath pond. The other stockpile is located northwest of the north pit and is bounded to the west by the Fleur de Lys Highway. These stockpiles consist of waste rock (i.e. overburden) that was removed from the pits while mining the ore for use in the production of asbestos (see Photo 3, Appendix B). It was reported that waste was disposed of in these areas.

2.3 MILL TAILINGS STOCKPILE

The mill tailings stockpile, located southeast of the wet mill and just to the south of Upper Duck Island Cove Brook, is estimated to contain over 40 million tonnes of tailings and contain approximately 2.2% asbestos fibre (see Figures 2 and 5, Appendix A). This material was deposited at the Site between the early 1960's and the late 1980's.

At the time of the Site inspection, a large slump was observed on the eastern slope of the tailings stockpile (see Photo 4, Appendix B). It appears that this slump was a result of surface run-off and/or the presence of a stream flowing underneath the tailings stockpile.

2.4 SITE BUILDINGS

Most of the buildings associated with the former Baie Verte Asbestos Mine still exists at the Site (see Figure 3 and Photo 5, Appendix B). The existing buildings are currently in poor condition and considered to be in a state of disrepair. The following sections describe the buildings observed at the Site at the time of the Site inspection.

2.4.1 Car Wash Station

The car wash station facility is located along the access road, near the entrance to the Site (see Figure 5, Appendix A). The facility was not in use at the time of the Site inspection. It was formerly used to decontaminate vehicles of asbestos fibres while exiting the facility. The pumphouse building remains at the location of the car wash station (see Photo 6, Appendix B). The structure measures approximately 3 m x 3 m and is constructed of a wooden frame with metal siding and an asphalt-shingled roof. No other aboveground structures related to the operation of the car wash facility were observed at the time of the Site inspection.

2.4.2 Primary Crusher

The primary crusher is located to the north of the dry rock storage building (see Figure 3, Appendix A and Photo 7, Appendix B). It was formerly used in the primary crushing of crude asbestos ore, the first stage of processing asbestos fibre at the Site. According the Site representatives, the gyratory crusher has been removed from the building. Some processing equipment still remains inside the structure.

The building measures approximately 15 m x 35 m. It is six storeys high and extends another five or six storeys underground. For safety reasons, field personnel did not access the below grade areas at the time of the Site inspection. The structure is constructed of a metal frame with corrugated asbestos sheeting walls on a poured concrete foundation. The interior walls consist of asbestos sheeting, concrete cinder blocks and wood. The roof is constructed of galvanized metal.

2.4.3 Secondary Crusher

The secondary crusher is located southeast of the primary crusher (see Figure 3, Appendix A and Photo 8, Appendix B). It was formerly used to dry and further crush the ore after it was processed at the primary crusher. The processing equipment remains inside the building.

The building measures approximately 60 m x 70 m and at it highest point, is approximately ten storeys high. The structure is constructed of a metal frame with corrugated metal and asbestos sheeting walls on a poured concrete foundation. The interior walls consist of metal and asbestos sheeting, concrete cinder blocks and wood. The roof is constructed of galvanized metal.

2.4.4 Power Centre

The power centre is attached to the northwest corner of the secondary crusher (see Figure 3, Appendix A and Photo 9, Appendix B). The building measures approximately 10 m x 20 m and is approximately two storeys high. The structure is constructed of a metal frame with corrugated asbestos sheeting walls on a poured concrete foundation. The interior walls consist of asbestos sheeting, concrete cinder blocks and wood. The roof is constructed of galvanized metal. No floor drains were observed throughout the building. A network of utility towers is located directly south and adjacent to the facility.

2.4.5 Dry Rock Storage Facility

The dry rock storage facility is located west of the secondary crusher and power centre (see Figure 3, Appendix A and Photo 10, Appendix B). It was formerly used as a storage facility for ore crushed at the secondary crusher. The mill used ore stored at the facility during times when the crushers were shutdown for maintenance or repairs. The facility consists of two separate buildings, the furnace/blower building and the dry rock storage building.

The furnace/blower building is located at the west side of the facility. It measures approximately 10 m x 15 m and is approximately five storeys high. The building houses an oil-fired furnace and a blower, used to further dry the ore being stored in the adjacent dry rock storage building and prevent it from freezing during the winter months. The furnace is connected to an underground storage tank (UST), located approximately 8 m north of the structure. The structure is constructed of a metal frame with corrugated metal sheeting walls on a poured concrete foundation. The interior walls consist of metal sheeting and concrete cinder blocks. The roof is constructed of galvanized metal.

The dry rock storage building measures approximately 15 m x 40 m and is approximately five storeys high. The structure is constructed of a metal frame with corrugated asbestos and metal

sheeting walls. Due to the poor structural condition of the building and the large volume of crushed ore stored within the facility, field personnel were not able to enter the building at the time of the Site inspection.

2.4.6 Dry Mill

The dry mill is located directly east of the secondary crusher (see Figure 3, Appendix A and Photo 11, Appendix B). It was formerly used to remove the asbestos fibres from the ore after it was processed at the secondary crusher. The fibres were separated from the ore using a series of vibrating screen and vacuums. Fibre was packaged into polyethylene bags and transported to the storage warehouse at the dock. The processing equipment remains inside the building.

The building measures approximately 50 m x 60 m and is approximately twelve storeys high. The structure is constructed of a metal frame with corrugated asbestos sheeting walls on a poured concrete foundation. An elevator was observed at the northwest corner of the facility and a pressure test laboratory was observed on the first floor (north). The interior walls consist of asbestos sheeting, concrete cinder blocks and wood. The roof is constructed of galvanized metal. Some flooding was observed on the main floor of the building, in the vicinity of the washrooms (west wall). A moderate hydrocarbon odour was observed in this area.

2.4.7 Wet Mill

The wet mill is attached to the east side of the dry mill (see Figure 3, Appendix A and Photo 12, Appendix B). Wet milling began at the Site in the early 1990s. During the wet milling process, asbestos fibre was recovered from the mill tailings stockpile as a water-borne slurry. After the fibre was processed, it was dewatered using a cake press, dried and packaged for shipment to market. The processing equipment remains inside the building.

The building measures approximately 30 m x 70 m and at it highest point, is approximately five storeys high. The structure is constructed of a metal frame with corrugated metal sheeting walls on a poured concrete foundation. The interior walls consist of metal sheeting and concrete cinder blocks. The roof is constructed of aluminum metal. At the time of the Site inspection, the main floor of the building was flooded and frozen.

2.4.8 Tailings Buildings

Several buildings are located along the mill tailings stockpile area of the Site (see Figures 4 and 5, Appendix A and Photo 13, Appendix B). Most of these buildings are located along the network of conveyors at the tailings stockpile and serve as transfer stations for the conveyor belts. It was reported that the largest building was used for equipment storage, change rooms,

lunchroom, washrooms and etc. The buildings varied in size and consisted primary of metal and wooden framing and siding walls on a poured concrete and earth foundations. The interior walls consist of metal sheeting and wood. Due to snow conditions at the Site, it was unsafe for field personnel to inspect all the buildings at the tailings stockpile.

2.5 FORMER STAFF HOUSING FACILITY

The former staff housing facility or "guest house" was located approximately 0.75 km west of the dock Site (see Figure 5, Appendix A). No buildings currently exists at that location. Based on interviews with former employees of the mine, the facility consisted of a single structure that was primarily used by management personnel to hold board meetings and to house guests visiting the mine from the mainland (i.e. Quebec). It was reported that the building was heated by electricity and that no fuel was stored at this location.

2.6 DOCK AND WAREHOUSE

The dock is located along the shoreline of Duck Island Cove, approximately 2.3 km east of the mill Site (see Figures 4 and 5, Appendix A). The dock is currently in a state of disrepair and no longer in use (see Photo 14, Appendix B). Historically, the dock provided two berths for marine vessels, one 70 m in length and the other at 150 m in length. The dock itself is constructed of sheet metal piling (20 m deep) and is rock filled. The top of the apron is located approximately 4 m above the low-water level and is topped with concrete, which served as the loading platform.

The warehouse is located approximately 10 m from the edge of the dock (see Photo 15, Appendix B). The structure measures 96 m x 98 m and has a height clearance of approximately 7 m. It had a storage capacity of 26,000 tonnes of asbestos product. The warehouse was used to store finished asbestos product before delivery to market. The building is currently vacant with some asbestos product still remaining inside.

Another small building and two large propane ASTs were observed at the northwest corner of the dock (see Photo 16, Appendix B). It was reported that this building was formerly used as a lunchroom facility and that the propane tanks were used to heat Bunker C fuel, previously stored in a large AST at the Site (see Figure 4, Appendix A). The AST has been removed from the Site.

The dock and warehouse were used extensively during the dry mill operation, but not during wet milling activities at the Site. Finished asbestos product was transported off-Site during dry milling operations by marine vessels and by truck during the wet milling. Reportedly, the warehouse was historically used by Ming Minerals for the storage and handling of copper

concentrate. In 2002, Avalon Coal, Salt and Oil Limited used the dock facility to offload road salt. The salt was loaded directly into trucks and not stockpiled on-Site.

2.7 FRESHWATER RESOURCES

Freshwater resources present at the Site include Steam Bath Pond, Upper Duck Island Cove Brook and Lower Duck Island Cove Brook (see Figures 2 and 5, Appendix A).

2.7.1 Steam Bath Pond

Steam Bath Pond is located near the entrance to the Site, at the southwest corner of the property. It is bordered to the south and east by the Site access road, to the north by waste rock and to the west by Fleur de Lys Highway. Water from the pond was previously used at the carwash station facility and the wet mill.

2.7.2 Lower Duck Island Cove Brook

Lower Duck Island Cove Brook extends from Steam Bath Pond, through the Site, to the waters of Duck Island Cove.

2.7.3 Upper Duck Island Cove Brook

Upper Duck Island Cove Brook travels just north of the waste rock piles and discharges its waters into Duck Island Cove.

2.8 MARINE ENVIRONMENT

Duck Island Cove is located along the eastern boundary of the Site. During operation of the mine Site, vessel activity was frequent within the harbour, both for the export asbestos product and delivery of Bunker C fuel to the Site.

3.0 SITE ASSESSMENT PROCESS

3.1 SCOPE OF WORK

The Phase I ESA consisted of:

- Researching past land use activities at the Site to evaluate possible historical sources of contamination. The search included reviewing previous reports, aerial photographs and interviewing persons knowledgeable about the Site. Items of concern addressed included:

    - Abandoned underground and aboveground storage tanks (USTs & ASTs);
    - Abandoned buildings and foundations of previously demolished buildings;
    - Abandoned conveyor systems;
    - Electrical equipment;
    - Former PCB storage area;
    - Abandoned waste disposal Sites;
    - Freshwater ditches and streams;
    - Abandoned surface and underground piping and drainage culverts;
    - Abandoned septic and sub-surface disposal fields;
    - Fuel handling and storage practices;
    - History of fuel spills on Site;
    - Storage and use of various chemicals on Site;
    - Storage of asbestos containing materials (ACMs);
    - Tailings waste piles;
    - Waste rock piles;
    - Open pit conditions; and
    - Wharf conditions.

- Contacting various government departments (i.e. Environmental Canada and the Newfoundland and Labrador Government Services Centre) with respect to environmental concerns associated with the Site or surrounding properties that may impact the Site;
- Identifying potential impacts of the surrounding environment on the property such as:

    - Nearby chemical or fuel storage and land use/zoning; and
    - Any adjacent environmental concerns (i.e. contaminated Sites).

- Providing detailed recommendations for further environmental assessment requirements to ascertain the environmental condition of the Site, including the development of a program for intrusive subsurface investigations; and

- Developing decommissioning requirements for the Site and associated cost estimates.

This report describes the methods used to investigate actual and/or potential environmental concerns affecting the Site at the time of the assessment. This report is intended to reduce the level of uncertainty with respect to the property's environmental condition. While this report provides an overview of potential environmental concerns, both past and present, it is limited by the availability of information obtained at the time of the assessment. The Site was snow covered at the time of the assessment, making it difficult to visually inspect the exterior property. It is possible other that activities that may have affected the environmental status of the property have not be identified in this assessment. A statement of the report limitations is provided in Appendix G.

3.2 METHODOLOGY

Work was conducted in accordance with the CSA Z768-01[1] Phase I Environmental Site Assessment and CMHC Site Assessment Procedure[2] requirements. Briefly, these procedures set standards for review of information pertaining to the Site (Document Review); conducting interviews with people knowledgeable about the Site (Interviews); completing a detailed checklist or protocol during an inspection of the property (Site Inspection); and preparing a final report that documents the study results. The following sections describe our investigative methods in greater detail.

3.2.1 Document Review

Documents relating to the development history and environmental conditions of the Site were reviewed during this assessment. Any environmental issues identified were subject to further investigation during the Site inspection and/or interviews. The documents reviewed consisted of the following:

- Aerial photographs obtained from the Air Photo & Map Library, Department of Government Services & Lands, as follows:

  - A12787-208 (1950) Black & White, Scale 1:40,000;
  - A18884-12 (1965) Black & White, Scale 1:15,840;
  - A18884-13 (1965) Black & White, Scale 1:15,840;
  - A18901-247 (1965) Black & White, Scale 1:15,840;
  - A18901-248 (1965) Black & White, Scale 1:15,840;

[1] Canadian Standards Association (CSA), 2001. Phase I Environmental Site Assessment (CSA Z768-01), Toronto, Canada
[2] Canada Mortgage and Housing Corporation (CMHC), 1993. Environmental Site Assessments, A Summary for Approved Lenders.

- 24119-53 (1975) Black & White, Scale 1:30,000;
- 83007-111 (1983) Colour, Scale 1:12,500;
- 83007-113 (1983) Colour, Scale 1:12,500;
- 83007-154 (1983) Colour, Scale 1:12,500;
- 83007-156 (1983) Colour, Scale 1: 2,500;
- 99017-15 (1999) Colour, Scale 1:12500;
- 99017-17 (1999) Colour, Scale 1:12500;
- 99017-179 (1999) Colour, Scale 1:12500; and
- 99017-181 (1999) Colour, Scale 1:12500.

- Reports reviewed at the Natural Resources Building, located at 50 Elizabeth Avenue, St. John's, NL included the following:

  - Jacques Whitford Environmental Limited, November 2003. Decommissioning of PCB Storage Sites, Former Baie Verte Asbestos Mine, Baie Verte, NL;
  - Titan Process Equipment Limited, 2001. Baie Verte Mines Equipment Evaluation.
  - NL Department of Natural Resources, 2001. Baie Verte Mines, West Pit Slump Monitoring Data, Fleur de Lys Highway (Route 410);
  - NL Department of Natural Resources, 1999. Supplementary Lease Agreement – Northco Property;
  - Sean Casey, 1999. Workplace Health and Safety Inspections: Asbestos Bulk Sample Assessment Report – Executive Summary;
  - NL Department of Natural Resources, 1998. Inspection of Baie Verte Mine Site and Preparation for Shipment of Radioactive Density Gauge. File # 825:45;
  - NL Department of Natural Resources, 1997. Baie Verte Asbestos Mine Open Pit Flooding/Decant Ditch. File # 825:45;
  - Government of Newfoundland and Labrador, 1996. Baie Verte Asbestos Property, Call for Proposals;
  - NL Department of Natural Resources, 1996. Baie Verte Mines Building Closure and Security Photographs. File number 835:45;
  - Kilborn et Associes Ltee, 1996. Feasibility Study of Wet Milling - Baie Verte;
  - Teranov Mining Corporation, 1996. Baie Verte Asbestos Mine, Index of Documents to be transferred to Trustee;
  - Ralph V. Stewart, 1994. Baie Verte Asbestos Mine: Expected Fibre Grade Distribution – Underground Ore Reserves and Implication to Mining when the Ore Pits are used as Dumping Sites; and
  - ADI Nolan Davis, 1993. Baie Verte Asbestos Mine, Environmental Preview Report.

- Government Services Centre Documents (obtained from DNRMD) included the following:

  - December 1, 2004: PCB Equipment, Baie Verte Mines: Paul L. Dean;
  - July 24, 2002: Off loading of 2600 mt of Road Salt at the former Baie Verte Mines Dock: Allister W. Taylor;
  - September 5, 1996: Outstanding Environmental Issues at Baie Verte: Sam El-Gohary;

- January 31, 1995: Re. PCB Capacitor Storage, Baie Verte Mines: Graham D. Thomas;
- February 1, 1995: Re. Inservice of PCB Transformer AR20877: Graham D. Thomas;
- March 24, 1995: Certificate of Approval – Operation of PCB Storage Site in Power Centre at the Former Baie Verte Mines Inc. Property: Carl W. Strong;
- October 10, 1995: Re. Cleanup of former Baie Verte Mines Property: Graham D. Thomas; and
- November 2, 1994: Re. PCB Equipment, Baie Verte Mines: Graham D. Thomas.

3.2.2 Interviews

In an effort to obtain further information regarding the development, occupancy history and environmental conditions of the Site, interviews were conducted with the following people:

- Mr. Bill Butler – Former Mine Surveyor, Bishop Falls, Newfoundland and Labrador;
- Mr. Percy Budgell – Former Mill Superintendent, Baie Verte, Newfoundland and Labrador;
- Mr. John Shea – Former Mill Superintendent, Baie Verte, Newfoundland and Labrador;
- Mr. Phonse McPherson – Former Pit Superintendent, Baie Verte, Newfoundland and Labrador; and
- Mr. Craig Bugden, P.Eng. – Newfoundland and Labrador Department of Environment and Conservation – Pollution Prevention Division.

Interview forms are provided in Appendix C.

3.2.3 Site Inspection

Field personnel visited the Site on December 16 and 17, 2004 to conduct a walk-through inspection of the Site, evaluate potential on-Site issues and determine whether any surrounding land uses may have and/or are currently impacting the environmental condition of the Site. During the Site inspection, field personnel interviewed and were accompanied by Alex Smith, P.Eng. and Ned Vukomanovic P. Eng., DNRMD ("Site representatives"). Groundcover conditions at the time of the Site inspection were snow covered. Select photographs taken during the Site inspection are included in Appendix B. Site inspection forms are provided in Appendix D.

This study was limited to a desktop review and Site inspection. No sampling or chemical analyses of samples for materials/substances of potential environmental concern was performed as part of this Phase I ESA. However, the UST located adjacent to the dry rock storage facility was sampled and tested for polychlorinated biphenyl (PCB), metals, flashpoint and halenoganation analyses.

4.0 PHASE I ESA FINDINGS

4.1 CURRENT LAND USE

The Site has been out of operation since 1994. The DNRMD is currently responsible for the management of the Site and its infrastructure including the mill buildings, dock and warehouse.

In 1998, the Province of Newfoundland and Labrador entered into a 20-year lease agreement with Northco Forest Products Limited (Northco) that allowed it to establish a sawmill in the former Erection and Repair (E & R) building. Northco's lease includes the former E&R building, former Mine Dry building and adjacent areas (see Figure 3, Appendix A). Northco has since built an office building at the Site and has expanded its sawmill operations as part of this leasing agreement. Upon the request of the DNRMD, the area of the Site currently being leased to Northco was excluded from this assessment.

4.2 HISTORICAL LAND USE

The production of asbestos fibre at the Site was initially achieved using a dry-milling process and subsequently accomplished using a wet-milling process. Over 49 million tonnes of ore were processed through the dry mill between 1963 and 1991 to produce 1.6 million tonnes of asbestos fibre. The operation produced approximately 190 million tonnes of waste rock and 47 million tonnes of tailings. The wet mill operated intermittently over a five-year period between 1990 and 1994 at a peak performance of some 30,000 tonnes of fibre per year. The following sections provide a summary of history of mining at the Site.

4.2.1 Advocate Mines Limited

In August 1955, prospectors George McNaughton and Norman Peters discovered the asbestos deposit at the property. In December of that year, Advocate Mines Limited assumed control of the property. After a detailed examination of the Site was completed in 1959, a small test plant was constructed and a bulk sample of 5,000 tonnes of ore was processed. In September 1960, the decision was made to bring the property into production. On June 30, 1963, the first ore was processed through the mill. In 1981, Advocate Mines Limited ceased mining because of reported financial difficulties and lack of markets. After provincial and federal government intervention and assistance, the property was assigned to Transpacific Asbestos Incorporated.

4.2.2 Baie Verte Mines Incorporated

After taking control of the property, Baie Verte Mines Incorporated was formed as a subsidiary of Transpacific Asbestos Incorporated and the mine was reopened in September 1982. In August 1987, Transpacific Asbestos Incorporated sold Baie Verte Mines Incorporated to Mineral

Commodities Limited of Australia. In January 1989, Cliff Resources, a Toronto-based company, bought Baie Verte Incorporated. Subsequently, on February 4, 1991, the mine was closed due to frequent equipment failure and a lack of financial flexibility.

4.2.3 Baie Verte Mines Reprocessing Incorporated

In November 1988, construction began on the wet-milling facility with the assistance of the Atlantic Canada Opportunities Agency (ACOA). Baie Verte Mines Reprocessing Incorporated, with Cliff Resources as the parent company, started up the wet-mill process in May 1990. In August 1990, Baie Verte Mines Reprocessing Incorporated defaulted on a bank loan and the operation was placed into receivership in July 1990. The plant ran uneconomically from July 1990 to December 1990, operated by the receiver who subsequently put the assets up for sale.

4.2.4 Terranov Mining Corporation

Terranov Mining Corporation, a subsidiary of Princeton Mining Corporation, was created for the purpose of purchasing the wet-milling process. It acquired the assets of Baie Verte Mines Reprocessing Incorporated in July 1991 and commenced production in August 1991. The company operated until December 1991 when it was closed for the winter months due to the freezing of the tailings. The plant operated for approximately eight months in 1992 and seven months in 1993. During October 1992, a limited number of modifications in the plant led to a significant improvement in the quality of the fibre recovered. Black Hills Minerals Limited purchased 50% of Terranov Mining Corporation in December 1993, with Cliff Resources Corporation acquiring the remaining 50% interest in May 1994. In November 1994, the plant closed for the winter months but failed to re-open in 1995 due to financial difficulties and has remained closed since.

4.2.5 Mineral Rights

On November 1, 1996, six months after the termination of the Surface Lease, the Site became the property of the Crown, pursuant to Section 36(2) of the Mineral Act and the responsibility for the management of the Site and assets was assigned to the NL Department of Mines and Energy.

In 1998, the Department invited proposals for the mineral or industrial development of all or part of the property. In May 1998, mineral rights were awarded to Canadian Magnesium Corporation (CMC) to investigate the possibility of recovering magnesium from the tailings. CMC did not seek renewal of its extended mineral licence after its analysis indicated that it was not cost effective to recover magnesium from the tailings at Baie Verte. The mineral rights, for a portion of the area, was then obtained by British Canadian Mines Limited under License 9821M, but

has since expired. Currently, Mr. George Walsh has retained the rights to the minerals under License 10466M, scheduled to expire on February 11, 2006.

4.3 ADJACENT LAND USE

Current land uses of neighbouring properties were observed from publicly accessible locations to assess potential environmental impacts to the Site that may arise from off-Site operations.

Properties surrounding the Site are summarized as follows:

North of the Site
Adjacent to the north perimeter of the Site is undeveloped land consisting primarily of wilderness and forested areas (see Figure 5, Appendix A).

East of the Site
Adjacent to the east perimeter of the Site is the waters of Duck Island Cove (see Figure 5, Appendix A).

South of the Site
Adjacent to the south perimeter of the Site is undeveloped land consisting primarily of a wilderness and forested areas (see Figure 5, Appendix A).

West of the Site
Adjacent to the west perimeter of the Site is undeveloped land and the Fleur de Lys Highway (Route 410) (see Figure 5, Appendix A).

Summary

Based on observations of these surrounding properties, no potential environmental concerns were identified at the time of the Site inspection associated with surrounding land use activities.

4.4 AIR EMISSIONS

No active sources of air emissions were observed at the Site at the time of the Site inspection. Previous air emission sources would have included exhaust from the boilers inside the power centre, vertical and horizontal dryers inside the secondary crusher, furnace inside the dry rock storage, and vacuum vents at various locations throughout the Site buildings.

On this basis, no issues of concern regarding air emissions have been identified at the Site at this time.

4.5 ASBESTOS CONTAINING MATERIALS (ACMS)

Asbestos containing materials (ACMs) are fibrous hydrated silicates, and can be found in building materials as either “friable” or “non-friable” asbestos products. Friable asbestos refers to materials, which can be readily crumbled using hand pressure, separating asbestos fibres from the binding materials with which they are associated. Non-friable material refers to asbestos, which is associated with a binding agent (such as tar or cement), preventing ready release of airborne fibres. Friable asbestos is commonly found in boiler and pipe insulation. Non-friable or bound asbestos is typically found in roofing tars, floor and ceiling tiles, and precast asbestos cement products commonly referred to as “transite”. ACMs were discontinued from use in Canada in the late 1970s/early 1980s, although non-friable asbestos is still found in many more recent buildings.

Large-scale mining operations were conducted at the Site from 1962 until its closure in 1994. Over 49 million tonnes of ore were processed through the dry mill between 1963 and 1991 to produce 1.6 million tonnes of asbestos fibre. The operation produced approximately 190 million tonnes of waste rock and 47 million tonnes of tailings. The wet mill operated intermittently over a five-year period between 1990 and 1994 at a peak performance of some 30,000 tonnes of asbestos fibre per year.

Due to historical land use activities at the Site, it was anticipated that ACMs would be present at the Site. The following sections provide details on the potential sources of ACMs observed at the Site at the time of the Site inspection.

4.5.1 Building Materials

The following building materials were observed on the Site buildings:

- car wash station: aluminum siding;
- primary crusher: asbestos siding;
- dry rock storage: asbestos and aluminum siding;
- secondary crusher: asbestos and aluminum siding;
- power centre: asbestos and aluminum siding;
- dry mill: asbestos siding;
- wet mill: aluminum siding;
- tailings buildings: aluminum and wooden siding; and
- dock warehouse: asbestos and aluminum siding.

Based on these observations, the potential exists for ACMs to be present within the building materials of the primary crusher, secondary crusher, power centre, dry rock storage, dry mill and dock warehouse. Asbestos sheeting was also observed in the concrete foundation framework of the dock warehouse facility. Most of these buildings are in a state of disrepair and appear to be heavily laden with asbestos containing debris and residue.

4.5.2 Processing Equipment and Storage Space

The majority of the processing equipment at the Site (i.e. conveyors, screens, machinery, and etc.) is heavily laden with asbestos containing debris and residue. It appears that the processing equipment was not emptied of its contents prior to the closure of the mine.

The dry rock storage facility appeared to be full of crushed ore and asbestos fibre at the time of the Site inspection (see Photo 17, Appendix B). The building is in poor condition and currently a source of airborne asbestos fibre.

A large stockpile of asbestos product was observed on the southside of the dock warehouse (see Photo 18, Appendix B). The stockpile was not covered and contained approximately 200 m^3 of asbestos product. A small stockpile of what appeared to be a mixture of copper concentrate, asbestos, mud and salt was observed inside the warehouse facility (see Photo 19, Appendix B).

4.5.3 Finished Product

At the time of the Site inspection, bags of finished asbestos product were observed being stored inside the dock warehouse and dry mill (see Photos 20 and 21, Appendix B). The product was packaged on wooden pallets and appeared ready to be transported to market.

4.5.4 Mill Tailings Stockpile

The mill tailings stockpile, located southeast of the wet mill and just to the south of Upper Duck Island Cove Brook, is estimated to contain 40 million tonnes of tailings and contain approximately 2.2% asbestos fibre.

At the time of the Site inspection, a large slump was observed on the eastern slope of the mill tailings stockpile (see Figure 5, Appendix A and Photo 4, Appendix B). It appears that the slump was a result of surface run-off and/or the presence of a stream flowing underneath the tailings stockpile. Tailings from the stockpile are eroding into the waters of Lower Duck Island Cove Brook and has created a “beach” of tailings at the mouth of the brook where it discharges its waters into Duck Island Cove (see Photo 22, Appendix B). It is likely that the brook is contaminated with asbestos containing tailings throughout its length.

4.5.5 Grounds, Roadways and Associated Banks

The exterior property was snow covered at the time of the Site inspection. For this reason, field personnel were unable to visually inspect ground surfaces.

A bulk asbestos sampling program was carried out at the Site in July 1999. The sampling program was carried out by Mr. Sean Casey, a certified hygienist and Mr Bill Finn, safety officer with the Department of Environment and Labour. At the time of the sampling program, it was reported that the roadways and associated banks appeared to be heavily laden with asbestos contaminated materials and debris. Results of the study revealed high concentrations of asbestos within the roadside gravel, parking lot area, backfill materials, stockpiled materials, old conveyor debris and etc.

Consideration should be given to the presence of actual and potential ACMs at the Site.

4.6 UNDERGROUND STORAGE TANKS (USTS)

At the time of the Site inspection, one UST was observed at the Site, approximately 8 m north of the dry rock storage facility (see Photo 23, Appendix B). The tank was used to store heating fuel used to power the furnace of the dry rock storage facility.

Based on the discussions with former employees of the mine, it was reported that several USTs were historically present at the Site (see Figure 3, Appendix A):

- A UST was located adjacent to the southside of the dry mill, near the garage doors. It was used to store gasoline to refuel the forklifts. In later years, forklifts at the Site were powered using propane. It has not been determined whether or not the UST was removed from the Site;
- There was a refuelling fuel station located at the intersection of the pit access road and the road leading to the primary crusher. It was reported that three or more USTs were present at this location. The USTs were used to store diesel fuel used to refuel the haul trucks, front-end loaders and tractors at the mine. It has not been determined whether or not the USTs were removed from the Site; and
- There were reports of another refuelling station located along the pit road, approximately 10 – 15 m north of the Northco machine shop (former E & R building). It was reported that several USTs were present at this location. It has not been determined whether or not the USTs were removed from the Site.

The number and locations of USTs currently and historically present at the Site is not known at this time.

At the time of the Site inspection, field personnel dipped and sampled the UST located adjacent to the dry rock storage facility. Approximately 0.6 m of liquid mixture of product and water was detected inside the tank. A disposal PVC bottom loading bailer was used to collect a 1 L sample from the product present inside the tank. The sample was stored in a laboratory supplied amber glass bottle and submitted to an accredited laboratory for PCB, metals, flashpoint and halenoganation analyses. The analytical results are provided in Appendix F. Based on the analytical results; in accordance with the Newfoundland and Labrador Used Oil Control Regulations; the product within the UST is considered to be a "Class 1" used oil. The volume of fuel present inside the tank is not known at this time.

Consideration should be given to the potential presence of surface and subsurface impacts as a result of current and former USTs at the Site. USTs at the Site should be decommissioned in accordance with the most recent Storage and Handling of Gasoline and Associated Products Regulations.

4.7 ABOVEGROUND STORAGE TANKS (ASTS)

At the time of the Site inspection, the following ASTs were observed at the Site (see Figures 2 and 3, Appendix A):

- Two 910 L (200-gallon) ASTs were observed at the exterior southeast corner of the power centre (see Photo 24, Appendix B). The ASTs were likely used to store diesel fuel used to fire the two boilers located inside the facility (see Photo 25, Appendix B). Due to snow conditions at the Site, field personnel were unable to assess the tanks to determine their contents;
- A 910 L (200-gallon) AST was observed inside the power centre (see Photo 26, Appendix B). It appears that this tank was either used to store fuel used to fire the boilers or run a back-up generator at the facility. The tank was empty at the time of the Site inspection;
- A propane AST (~ 2 m in diameter x 10 m in length) was observed approximately 75 m south of the dry mill, near the entrance of the access road leading to the tailings stockpile (see Photo 27, Appendix B). The propane tank was likely used to power the propane-fired dryer of the wet mill facility;
- Two propane ASTs (~ 1 m in diameter x 5 m in length) were observed at the dock Site (see Photo 28, Appendix B). It was reported that the propane stored in these tanks were used to heat the Bunker C fuel previously stored in a large AST at the dock; and
- Several small propane canisters were observed inside the dry mill facility (see Photo 29, Appendix B). These tanks were reportedly used to power forklifts at the facility.

A review of aerial photographs taken of the Site from 1950 to 1999 revealed the presence of the two large ASTs at the Site:

- A large AST was observed at the dock Site, approximately 40 m west of the warehouse facility (see Figure 4, Appendix A and Photo 30, Appendix B). The AST was used to store Bunker C used to power the boilers at the power centre facility. It was reported that Bunker C was delivered to the Site by marine vessels and pumped to the AST through an aboveground pipeline. It was reported that the AST was removed from the Site in the early to mid 1990's (exact date unknown).
- A smaller AST was observed approximately 20 m southwest of the power centre (see Figure 3, Appendix A and Photo 31, Appendix B). The AST was used to store Bunker C for use in the boilers of the power centre facility. Bunker C was delivered to this AST from the larger AST located at the dock Site using two on-Site tanker trucks. It was reported the AST was removed from the Site in the early to mid 1990's (exact date unknown).

It was reported that for several years, haul trucks at the Site were refuelled everyday at noon by tanker trucks at the pit office parking lot area. Throughout the life of the mine, the pit office was located at two different locations (see Figure 5, Appendix A):

- Originally, the pit office was located on the left-hand-side of the pit access road, near the access road leading to the primary crusher; and
- When mining shifted to the west pit, the pit office was relocated to the area between the two pits (i.e. saddle area).

Consideration should be given to the potential presence of surface and subsurface impacts as a result of ASTs and tankers at the Site. ASTs at the Site should be decommissioned in accordance with the most recent Storage and Handling of Gasoline and Associated Products Regulations.

4.8 SPILLS AND LEAKS

Results of the Environment Canada Regulatory search identified three incidents of fuel spills at the Site (see Appendix E):

- On January 18, 1978 it was reported that an unknown amount of diesel fuel was spilled into the harbour due to a leak from the discharge line of a 45,500 L (10,000-gallon) storage tank. No information was provided in the report on the purpose and location of the storage tank;
- On May 30, 1978 it was reported that an unknown amount of fuel was spilled into the harbour due to a broken casing in a pump connected to a 45,500 L (10,000-gallon) storage

tank. No information was provided in the report on the purpose, location, and product of the storage tank; and

- On February 12, 1987 it was reported that Bunker C fuel was spilled on the loading bay and dock due to a valve left open on a 2,275 L (500-gallon) storage tank. No fuel was observed getting into the harbour and a cleanup was completed. No information was provided in the report on the purpose and location of the storage tank.

Results of the GSC regulatory search have not been received at this time. Results of the search will be provided to the DNRMD once they become available.

Interviews with former employees of the mine did not reveal any major historical fuel spills at the Site. However, it was reported that occurrences of diesel fuel spills were frequent at the Site. Diesel fuel was frequently spilled from fuel tanks of damaged equipment and during refuelling of haul trucks, loaders, tractors, drills and etc. The number and locations of fuel spills at the Site is not known at this time.

Consideration should be given to spill events reported and the potential presence of surface and subsurface impacts as a result of spills and leaks at the Site.

4.9 SURFACE STAINING

The exterior property was snow covered at the time of the Site inspection. For this reason, field personnel were unable to visually inspect ground surfaces for evidence of surface staining.

4.10 CHEMICAL USE, HANDLING, AND STORAGE

Asbestos was produced at the Site through a series of physical processes. According to interviews with former employees of the mine and mill, very few chemicals were stored at the Site.

Several hundred 200 L (45-gallon) drums, of unknown product, were observed inside the mill buildings at the time of the Site inspection (see Photos 32, 33 and 34, Appendix B). It is likely that these drums were used to store hydraulic fluid used by various types of machinery at the mine Site. Labels were not visible on the drums. These drums should be inspected, removed and disposed in accordance with the applicable regulations.

At the time of the Site inspection, a minor amount of chemical storage was observed inside the test laboratory of the dry mill facility (see Photo 35, Appendix B). Chemicals included varsol (paint thinner), silcosil, F-Alumina Activated 8-14 Mesh (aluminum oxide) and glycerine. Due to

the limited quantity (<20 L) and toxicity of these chemicals, consideration regarding the use, handling and storage of these chemicals at the Site is not required at this time.

4.11 HAZARDOUS WASTE

No information regarding the generation, storage and handling of hazardous waste has been identified during this assessment. On this basis, no issues of concern regarding hazardous waste have been identified at the Site at this time.

4.12 SOLID WASTE AND WASTE DISPOSAL SITES

Based on discussions with former employees of the mine, all solid waste generated at the Site was disposed on-Site. It was reported that waste generated at the facility was limited to metal debris, plastics, wood and typical domestic waste. The waste was usually collected by an on-Site garbage truck, dumped into a pit and covered with waste rock. It was reported that the location of the waste disposal sites varied over time. The number and locations of former waste disposal sites at the Site is not known at this time.

Based on discussions with Site representatives, it was reported that area near the former storage shed, located on the left-hand-side of the access road leading to the tailings stockpile, contains a lot of buried metal debris (see Figure 3, Appendix A and Photo 39, Appendix B). Site representatives also indicated that there are other areas of buried debris and waste located throughout the Site, however, precise locations could not be determined.

The exterior property was snow covered at the time of the Site inspection. For this reason, field personnel were unable to visually inspect the exterior property for evidence of waste disposal Sites. However, field personnel did observe an area located approximately 100 m west of the primary crusher that contained a large amount of decommissioned equipment and metal debris (see Figure 3, Appendix A and Photos 36 and 37, Appendix D). Also, another storage area containing a large amount of conveyor equipment was observed approximately 15 m south of the dry mill (see Figure 3, Appendix A and Photo 38, Appendix B).

Consideration should be given to the presence of solid waste disposal Sites at the Site.

4.13 SITE INFILLING AND LAND RECLAMATION

Several areas of Site infilling have been identified at the subject property:

- There are three large stockpiles of waste rock present at the Site (see Figures 2 and 5, Appendix A). These stockpiles consist of waste rock (i.e. overburden) that was removed from the pits while mining the ore for use in the production of asbestos (see Photo 3, Appendix B); and
- There is a large stockpile of mill tailings (i.e. mill-rejects) located southeast of the wet mill that is estimated to contain over 40 million tonnes of tailings. This material was deposited at the Site between the early 1960's and the late 1980's.

Due to the presence of asbestos fibres within the waste rock and tailings at the Site, consideration should be given to Site infilling and land reclamation at the Site.

4.14 METHANE

Methane is a colourless and odourless gas commonly formed by the decomposition of organic material. Methane is a large component of natural gas associated with active and closed waste disposal Sites. Natural sources of methane include marshes, swamps, bogs, fens or coal and/or peat deposits. Potential risks associated with methane include explosion hazards where methane enters closed spaces and concentrations exceed the lower explosive limit.

Based on the fact that all waste materials generated at the facility were landfilled at various locations throughout the Site, the potential exists for subsurface pockets of methane gas to exists at the Site.

4.15 LIQUID WASTE

Based on discussions with former employees of the mine, it was reported that liquid waste generated at the Site was limited to waste oil from Site vehicles and equipment (i.e. haul trucks, loaders, tractors, and etc.). It was reported that all waste oil generated at the Site was mixed with Bunker C fuel and burned in the boilers located inside the power centre facility.

On this basis, no issues of concern regarding liquid waste have been identified at the Site at this time.

4.16 SEWAGE AND WASTEWATER TREATMENT

Based on discussions with former employees of the mine, it was reported that the washroom facilities at the Site were connected to septic systems. The number and location of abandoned septic discharge fields at the Site is not known at this time. It is common for various types of contaminants to be present in septic discharge fields, especially in those associated with older industrial facilities.

Consideration should be given to the potential presence of contamination at abandoned septic discharge fields at the Site.

4.17 LEAD BASED PRODUCTS (LBPS)

Lead compounds have been used in paint since the early 1800's. In the 1960's, public health and environmental researchers developed concerns about the long-term health effects of lead exposure. In 1976, the lead content in interior paint was limited to 0.5% by weight under the federal Hazardous Products Act. Lead is also associated with plumbing solder and older pipe materials, as well as products such as radiation protective shielding. The 1990 National Building Code limits the concentration of lead in plumbing solder to 0.2% in new construction for potable water systems.

Although not a significant concern when maintained in good condition, the presence of lead based materials poses a risk of building occupant or worker exposure to elevated levels of lead as a result of disturbance or deterioration of these surfaces. Although there are no provincial regulations specifically dealing with the disturbance of lead materials, in the past this issue has been enforced under the general provisions of provincial occupational health and safety legislation.

The exterior walls and interior walls of most Site buildings contained painted surfaces. Based on the reported date of construction of the Site buildings (i.e. 1960s), with the exception of the Wet Mill (late 1980's to early 1990's), lead based paints may potentially be present at the Site since its use was not discontinued until the late 1970's. Observations made at the time of the Site inspection indicated that the majority of the painted surfaces are in poor physical condition (i.e. peeling and flaking paint) (see Photo 40, Appendix B).

The presence of lead based paints can only be verified through sampling and analyses of suspect paint samples. If present at the Site, lead based paints may be addressed through the implementation of an appropriate management or abatement plans to protect the health of persons working at the Site, as required under applicable regulations. Where lead based paints are in poor condition (i.e. peeling or flaking) and potential human health concerns exists, lead

based paints may be addressed through encapsulation or removal. Appropriate management plans are also required where maintenance, alteration, renovation, or demolition activities undertaken at a Site may disturb these materials.

Consideration should be given to the potential presence of lead based paints at the Site.

4.18 MERCURY

Minor amounts of mercury are commonly found in a variety of building materials including mercury vapour lamps, thermostats and other electrical control switches. Exposure to mercury in the workplace can be managed through various methods, including encapsulation and removal.

The potential exists for mercury to be present within the processing equipment at the Site (i.e. electrical control switches, gauges, and etc.). Also, the potential exists for the painted surfaces of the buildings to contain traces of mercury. The presence of mercury containing paints can only be verified through sampling and analyses of suspect paint samples.

Consideration should be given to the potential presence of mercury containing equipment and paint at the Site.

4.19 POLYCHLORINATED BIPHENYLS (PCBS)

Insulating fluids and cooling oils in electrical equipment (i.e. transformers, fluorescent light ballasts, capacitors, etc.) often contained PCBs until around 1980. The insulating fluid in fluorescent light ballasts is used to compensate for variations in the voltage of the electrical supply. Although the use of PCBs in electrical equipment is not prohibited, the disposal and storage of PCBs and PCB containing equipment is regulated at both the provincial and federal level.

A total of five pole-mounted transformers were observed at the Site at the time of the Site inspection:

- A single transformer was observed approximately 10 m west of the dry rock storage facility, on the right-hand-side of access road leading to the mining pits (see Photo 41, Appendix B). The transformer appeared to be damaged (blown) at the time of the Site inspection;
- Two transformers were observed approximately 15 m north of the Northco machine shop (former E&R building), on the left-hand-side of the access road leading the mining pits (see Photo 42, Appendix B);

- A single transformer was observed approximately 10 m east of the largest building present at the mill tailings stockpile Site (see Photo 43, Appendix B); and
- A single transformer was observed approximately 50 m south of the warehouse facility at the dock Site (see Photo 44, Appendix B).

According to the Site representatives, the insulating fluids of all transformers at the Site were previously sampled and analyzed PCBs. In consultation with Mr. Craig Bugden, P.Eng. of the Newfoundland and Labrador Department of Environment and Conservation (NLDOEC), it was reported that only three of the five existing transformers at the Site were sampled and analyzed for PCB content. The NLDOEC has no record of any samples collected from the transformers located adjacent to the dry rock storage facility and at the tailings stockpile. Analytical results for the three transformers sampled revealed concentrations of PCBs below the applicable criterion of 33 ppm:

- Two transformers located adjacent to the Northco machine shop: 1.85 and 1.80 ppm Aroclor 1260 respectively; and
- Transformer located near the warehouse facility: <0.7 ppm PCB.

The number and locations of former transformers present at the Site is not known at this time, however, evidence of former pole mounted transformers was observed at various locations throughout the Site (i.e. south of power centre, south of dry mill, north of west pit, conveyor stations along tailings stockpile, various electric poles, and etc.). More information regarding the removal and disposal of transformers at the Site is provided in Section 4.20.

Fluorescent light fixtures were observed inside the primary crusher, secondary crusher, power centre, dry mill, tailings buildings and dock warehouse. Also, high intensity lights were observed on the exterior of the tailings buildings and dock warehouse. Based on the reported date of construction of the Site buildings (i.e. 1960s), the light ballasts and high intensity lights at the Site may contain PCBs since the use of PCBs in light ballasts was not discontinued until the early 1980s.

Also, the potential exists for the painted surfaces of the Site buildings to contain traces of PCBs. The presence of PCB containing paints can only be verified through sampling and analyses of suspect paint samples.

Consideration should be given to the potential presence of PCB containing equipment and paint at the Site.

4.20 PCB STORAGE SITES

On March 24, 1995, the Newfoundland and Labrador Department of Environment (NLDE) granted approval for the operation and maintenance of a PCB storage facility to be located in the power centre building of the former Baie Verte Asbestos Mine Site. The power centre is located at the southwest corner of the secondary crusher building.

From 1995 to 1999, the power centre was used to store a variety of PCB contaminated items associated with the operation of the Site. Items stored at the power centre included three capacitor banks containing a total of fifty-nine sealed capacitors. The dimensions of the capacitor banks were approximately 0.6 m x 0.6 m x 1.20 m in height and weighed in the order of 350 kg each. Each bank was placed in a separate steel tray that measured 1.20 m x 1.20 m x 0.3 m high.

From 1999 to late 2000, several transformers located throughout the Site were drained of fluid and prepared for off-Site disposal. Some of these drained transformers and some smaller transformers were temporality stored inside the power centre on individual steel trays. Since late 2001, all items stored inside the power centre have been shipped off-Site for proper treatment and disposal.

In 2003, Jacques Whitford Environmental Limited (JWEL) was retained by the NLDE to conduct a Site investigation at the PCB storage Site. The investigation included the manual excavation of five test pits, collection of PCB swab samples from the concrete floor and sampling of soil, sediment and surface water for PCB analyses.

PCB concentrations were detected in one soil sample collected downgrade of the power centre at levels (0.13 mg/kg) below the applicable criteria (33 mg/kg). The source was not identified at the time of the investigation, but was believed to be associated with the operation of the PCB storage Site.

PCB swab samples were collected from the concrete floor at various locations inside the power centre. PCBs were detected in five of the eight swabs collected. Concentrations ranged from 5 to 21 µg/100 cm^2. JWEL reported that according to the Environment Canada protocol for sampling and testing PCB storage Sites in Ontario, concrete is considered to be a porous surface and therefore the results of the PCB swap samples can only be used as an indicator and not compared to CCME criterion values.

No detectable concentrations of PCBs were identified in sediment and surface water samples collected at the Site.

Based on the results of the investigation, JWEL recommended the following further actions be carried out at the Site:

- Provide a copy of the report to the GSC in Grand Falls-Winsor for their review;
- Based on the results of the PCB swab samples, additional testing should be carried out at the Site. Due to the porosity of concrete, a series of concrete core samples should be collected from the existing floor and underlying soils;
- Collect swab samples from the steel drip pans to determine proper requirements for cleaning and disposal; and
- Develop a remedial action plan for the Site.

No reports of any additional work or closure obtained by the DNRMD since the JWEL Site investigation was produced at the time of this assessment. However, several drip pans were observed inside the power centre at the time of the Site investigation (see Photo 45, Appendix A). The drip pans were filled with sawdust; likely from the adjacent Northco saw mill operations.

4.21 RADIOACTIVE MATERIALS

The Canadian Nuclear Safety Commission (CNSC), formerly the Atomic Energy Control Board, under the Nuclear Safety and Control Act, is responsible for the management and licensing of radioactive materials, to ensure that the use of nuclear energy does not pose undue risk to health, safety, security and the environment. The CNSC achieves regulatory control of nuclear facilities and nuclear materials through a comprehensive licensing system that is administered through the cooperation of federal and provincial government departments such as health, environment, transport and labour.

At the time of the Site inspection, field personnel observed a Texas Nuclear (Model 5201) Density Gauge on the first floor of the wet mill building (see Photo 46, Appendix B). This radioactive device is known to contain Cesium-137. The gauge was historically used at the Site to measure the density of the tailings discharged from the wet mill.

The DNRMD reported that the “source housing” portion of the density gauge was removed from the wet mill in June 1998. The unit was temporary stored at a “Core Storage Building” until it was shipped to Noremtech Inc. (a disposal company in Ottawa) on July 10, 1998. The unit was package for shipment by Mr. Peter St. Michael of the Atomic Energy Control Board.

Field personnel did not observe any other potential radioactive devices at the Site during the Site inspection, however, other radioactive devices may be present at the Site.

4.22 OZONE DEPLETING SUBSTANCES (ODS)

Ozone depleting substances (ODSs) include any substances containing chlorofluorocarbon (CFC), hydrochlorofluorocarbon (HCFC), halon or any other material capable of destroying ozone in the atmosphere. ODSs have been used in rigid polyurethane foam and insulation, laminates, aerosols, air conditioners, fire extinguishers, cleaning solvents and the sterilization of medical equipment. Federal regulations introduced in 1995 required the elimination of production and import of CFCs by January 1, 1996 (subject to certain essential uses) and a freeze on the production and import of HCFC-22 by January 1, 1996. These regulations also require the complete elimination of HCFC-22 by the year 2020.

No potential sources of ODSs were observed at the Site and none were reported during discussions with former employees of the mine.

4.23 UREA FORMALDEHYDE FOAM INSULATION

Urea-formaldehyde foam insulation (UFFI) is a thermal insulation material that is pumped into interstitial spaces between the walls of building where it hardens to form a solid layer of insulation. The sale and installation of UFFI was banned for health-related reasons because of the formation of formaldehyde gas, which is released from the UFFI to the building interior.

Visual indicators suggesting the potential presence of UFFI were not observed at the Site. Insulation observed inside Site buildings at the time of the Site inspection consisted of fibreglass based insulations. No issues of concern regarding UFFI at the Site have been identified through this assessment.

4.24 PESTICIDES AND HERBICIDES

Based on interviews conducted with former employees of the mine, it was reported that neither pesticides nor herbicides are used or stored at the Site. Field personnel did not observe any pesticides or herbicides stored at the Site during the Site inspection.

No issues of concern regarding pesticides or herbicides at the Site have been identified through this assessment.

4.25 SUMPS AND DRAINS

Field personnel did not observe any floor drains and/or sumps within the Site buildings at the time of the Site visit. No issues of concern regarding sumps and drains at the Site have been identified through this assessment.

4.26 PIPELINES

Several aboveground pipelines were observed at the Site at the time of the Site inspection:

- A network of aboveground pipelines was observed running from the power centre to the area of the mine currently being leased by Northco (see Photo 47, Appendix B). According to discussions with former employees of the mine, these pipelines were used to carry steam from the boilers inside the power centre to heat the former E&R building and the mine office building; and
- Several aboveground water lines (plastic and metal) were observed throughout the Site.

Based on discussions with former employees of the mine, former fuel lines at Site included the following:

- Pipeline associated with the Bunker C AST at the dock Site. The pipeline was used to delivered fuel from marine vessels to the AST. The pipeline is no longer present at the Site;
- Pipeline associated with the Bunker C AST at the power centre. The pipeline was used to deliver fuel to the boilers inside the power centre. Due to snow conditions at the Site, field personnel were unable to determine whether or not the pipeline was removed from the Site; and
- Short pipelines and hoses associated with the refuelling pedestals historically were present at the various refuelling locations throughout the Site. No refuelling pedestals were observed at the Site at the time of the Site inspection.

Consideration should be given to the potential presence of surface and subsurface impacts as a result of former fuel pipelines present at the Site.

4.27 STRESSED VEGETATION

Field personnel were unable to visually inspect Site vegetation for signs of stress since the Site was snow covered at the time of the Site inspection.

4.28 MICROBIAL CONTAMINATION AND MOULD

Field personnel inspected the interior areas of the Site buildings for visual or olfactory evidence of obvious microbial contamination or mold. Evidence of microbial contamination or mold was not observed at the Site; however, no building cavity inspections were performed by field personnel during the Site visit. No evidence of microbial contamination or mold was identified within the Site buildings.

No issues of concern regarding microbial contamination and mould at the Site have been identified through this assessment.

4.29 INDOOR AIR QUALITY

Field personnel inspected the interior areas of the Site buildings for air quality issues. Overall, the potential air quality issues identified at the Site include the following:

- The majority of the Site buildings present at the Site are heavily laden with asbestos containing debris. There is a high potential for airborne asbestos fibres within these structures;
- The potential presence of lead, mercury and PCB containing paints can poses a risk of exposure to elevated levels of lead, mercury and PCBs in the air via airborne dust and particles. The majority of the painted surfaces within the Site building are in poor condition (i.e. flaking and peeling) (see Photo 40, Appendix B); and
- A moderate hydrocarbon odour was observed in the washroom facility located on the main floor of the dry mill. The area underneath the floorboards of the washroom was flooded at the time of the Site inspection (see Photo 48, Appendix B). This may be a result of previous fuel spills at the Site.

Consideration should be given to air quality at the Site due to the potential presence of airborne asbestos fibres, lead, mercury and PCB containing paints and hydrocarbon odours at the Site.

4.30 FRESHWATER RESOURCES

Freshwater resources observed at the Site include Steam Bath Pond, Upper Duck Island Cove Brook and Lower Duck Island Cove Brook (see Figures 2 and 5, Appendix A). It is likely that the surface water and sediments of these Lower Duck Island Cove Brook have been impacted with asbestos containing materials.

Consideration should be given to the potential presence of contaminated surface water and freshwater sediments at this Site.

4.31 MARINE ENVIRONMENT

Duck Island Cove is located along the eastern boundary of the Site (see Figures 2 and 5, Appendix A). The mine dock and warehouse facilities are located along the shoreline of Duck Island Cove, approximately 2.3 km east of the mill buildings. Historically, the dock provided two berths for marine vessels; one measured 70 m in length and the other measured 150 m. During

operation of the mine Site, vessel activity was frequent in the harbour, both exporting asbestos product and importing Bunker C fuel to and from the Site.

It is typical to find certain amounts of debris and other contaminants, such as hydrocarbons (diesel, gasoline, etc.), heavy metals, PCBs and polycyclic aromatic hydrocarbons (PAHs) in sediments around vessel berthage Sites. These impacts are a result of various activities associated with berthage Sites, but not limited to indiscriminate dumping, accidental spills during refuelling and general usage waste. Potential environmental impacts are suspected.

Environment Canada reported two fuel spills at the Site that resulted in fuel being spilled into the waters of Duck Island Cove. On January 18, 1978 it was reported that an unknown amount of diesel fuel was spilled into the harbour due to a leak from the discharge line of a 45,500 L (10,000-gallon) storage tank. On May 30, 1978 it was reported that an unknown amount of fuel was spilled into the harbour due to a broken casing in a pump connected to a 45,500 L (10,000-gallon) storage tank. The purpose and locations of these tanks were not provided in the report.

Tailings from the mill tailings stockpile are continuously being eroded into the waters of Lower Duck Island Cove Brook. During occurrences of high water flow, these tailing sediments are being deposited at the mouth of the brook where its water enters Duck Island Cove. At the time of the Site inspection, a large amount of tailings and sediment was observed at the mouth of the brook, appearing to have created a “beach of tailings” at the Site (see Photo 22, Appendix B). It is likely that the harbour sediments are contaminated with asbestos containing materials.

Consideration should be given to the potential presence of contaminated marine sediments at this Site.

Table 1. Summary of Findings

Issues of Concern	No Evidence Found of Actual or Potential Contamination, No use of Hazardous Materials, or Item not identified.	Evidence found of Actual (A) or Potential (P) Contamination (C), Use (U), or Storage (S) of Hazardous Materials.	Observations
Previous or Current Land Use		AC/PC	Past land use activities at the Site (i.e. asbestos production, fuel storage, fuel spills, PCB equipment storage, and etc.) may have lead to Site contamination.
Adjacent Land Use	X		No concerns identified through this assessment.
Air Emissions	X		No concerns identified through this assessment.
Asbestos Containing Materials		AC	Over 49 million tonnes of ore were processed through the dry mill between 1963 and 1991 to produce 1.6 million tonnes of asbestos fibre. ACMs are widespread throughout the Site (i.e. building materials, product storage, stockpiled materials, processing equipment and etc.).
Underground Fuel Storage Tanks		AU/PC	One UST was observed at the Site. It was reported that there were several USTs historically present at various locations throughout the Site. Potential subsurface impacts due to the presence of former and current UST(s) at the Site.
Above Ground Fuel Storage Tanks		AU/PC	Six ASTs (three fuel oil and three propane) were observed at the Site. Also, two large Bunker C ASTs were historically present at the Site. Potential surface and subsurface impacts due to the presence of former and current AST(s) and tankers at the Site.
Spills and Leaks		PC	Environment Canada reported three fuels spills at the Site near the dock and warehouse. Also, it was reported that diesel spills, from Site equipment, were frequent at the Site. Potential surface, subsurface and harbour sediment impacts due to the storage and handling of petroleum products at the Site.
Surface Staining		PC	Field personnel were unable to visually inspect ground surfaces for signs of staining since the Site was snow covered at the time of the assessment.
Chemical Use and Storage		AU/PC	Several hundred 200 L (45-gallon) drums, of unknown product, were observed inside the mill buildings. These drums should be inspected, removed and disposed in accordance with the applicable regulations.
Hazardous Waste	X		No concerns identified through this assessment.
Solid Waste and Disposal		PC	All solid waste was disposed/landfilled at the Site. Areas of buried waste and metal debris are scattered throughout the Site. Number and locations are not known at this time.
Site In-filling		PC	Three large stockpiles of waste rock and one large stockpile of mill tailings were observed at the Site. The waste rock and tailings contain asbestos fibre.
Methane		PC	All solid waste was disposed/landfilled at the Site. Potential source of methane gas.
Liquid Waste	X		No concerns identified through this assessment.
Sewage and Wastewater Treatment		PC	Washrooms at the facility were connected to septic discharge fields. Number and locations of abandoned septic fields are not known at this time.
Lead Based Products		PU	Due to the reported date of construction of the Site buildings (i.e. 1960's), lead based paints may be present at the Site.
Mercury	X	PU	Potentially present in the processing equipment (i.e. gauges) and paint at the Site.
PCBs		PC	Fluorescent light fixtures and high intensity lights were observed throughout the Site buildings. Five transformers were observed at the Site and several others were historically present at the Site. The potential also exists for traces of PCBs to be present in paint at the Site.
PCB Storage Sites		PC	PCB containing equipment was previously stored inside the power centre.
Radioactive Materials		PS	A Texas Nuclear (Model 5201) Density Gauge on the first floor of the wet mill building. It was reported that the radioactive source was removed from the unit. Other radioactive sources may exists at the Site.
Ozone Depleting Substances	X		No concerns identified through this assessment.
Insulation of Concern (UFFI)	X		No concerns identified through this assessment.
Pesticides and Herbicides	X		No concerns identified through this assessment.
Sumps and Drains	X		No concerns identified through this assessment.
Pipelines		PC	Several pipelines associated with the fuel handling and storage was historically present at the Site. Potential surface and subsurface due to the former presence of pipelines at the Site.
Damaged Vegetation	X		No concerns identified through this assessment.
Microbial Contamination	X		No concerns identified through this assessment.
Indoor Air Quality		AC	The potential exists for airborne asbestos fibres to be present inside the Site buildings. A moderate hydrocarbon odour was observed inside the dry mill.
Freshwater Resources		PC	Surface water and sediments of Lower Duck Island Cove Brook potentially impacted with asbestos containing materials.
Marine Environment		PC	Potential for marine sediment contamination due to historical vessel activity and fuel spills at the Site.

5.0 REGULATORY REVIEW

As part of this assessment, a request was made to Environment Canada and the local Government Service Centre (GSC) on January 13, 2005 to perform a file review and identify any historic or current issues of environmental concern. Environment Canada and the GSC are responsible for all such information and records in the province of Newfoundland and Labrador.

5.1 ENVIRONMENT CANADA

A response was received from Environment Canada on February 10, 2005 stating that they identified three incidents of spills at the Site:

- On January 18, 1978 it was reported that an unknown amount of diesel fuel was spilled into the harbour due to a leak from the discharge line of a 45,500 L (10,000-gallon) storage tank.

- On May 30, 1978 it was reported that an unknown amount of fuel was spilled into the harbour due to a broken casing in a pump connected to a 45,500 L (10,000-gallon) storage tank.

- On February 12, 1987 it was reported that Bunker C was spilled on the loading bay and dock due to a valve left open on a 2,275 L storage tank. None was observed getting into the harbour and a cleanup was completed.

Environment Canada also reported that they have a substantial amount of material on file regarding issues associated with air emissions from the mine Site and several assessments conducted on alternate uses for the Site. These issues are outside of the scope of work for this Phase I ESA report.

A copy of the Environment Canada regulatory response is provided in Appendix E.

5.2 GOVERNMENT SERVICES CENTRE

Results of the GSC regulatory search have not been received at this time. Results of the search will be provided to the DNRMD once they become available.

The regulatory review was limited to the above and matters pertaining to the environment.

6.0 CONCLUSIONS

Conclusions regarding the current environmental conditions at the former Baie Verte Asbestos Mine property located in Baie Verte, NL are based solely on the results of the information reviewed, Site inspection and interviews conducted as part of this Phase I ESA as described in this report.

Based on the Phase I ESA and reported herein, we conclude that there is a **High** potential for significant environmental liabilities to be associated with the subject Site. The following potential environmental concerns associated with the current and historical use of the Site and/or its environmental condition were identified:

- **Potential ACMs**
  Potential ACMs observed at the Site include building materials (i.e. asbestos sheeting), finished asbestos product, partially processed asbestos containing materials within processing equipment, stockpiled materials, and etc. Due to nature and poor condition of these materials, they have been considered to be a potential source of airborne asbestos fibres at the Site. In the absence of evidence to the contrary, it is likely that airborne asbestos fibres preside throughout the Site. As such, Site access should be controlled and use of the Site should be limited to minimize the potential for asbestos exposure.

- **Fuel Handling and Storage**
  Bunker C fuel was delivered to the Site by marine vessels and other types of fuel (i.e. diesel, gasoline, heating oil and propane) were delivered to the Site by tanker trucks. Several ASTs and one UST was observed at the Site at the time of the Site inspection. Additional ASTs and USTs were reported to have been historically present at the Site. Consideration should be given to the potential for surface and subsurface contamination as a result of previous fuel handling and storage practices at the Site, especially at the former locations of equipment refuelling stations and pit office parking lots.

  All ASTs and USTs at the Site should be decommissioned in accordance with the most recent Storage and Handling of Gasoline and Associated Products Regulations.

- **Spills and Leaks**
  Results of the regulatory search revealed three incidents of fuel spills at the Site, all at the dock Site. Discussions with former employees of the mine revealed that occurrences of diesel fuel spills were frequent at the Site. Diesel fuel was spilled from fuel tanks of damaged equipment and during the refuelling the haul trucks, loaders, tractors, drills and etc. The number and locations of fuel spills at the Site is not known at this time.

A moderate hydrocarbon odour was observed in the washroom facility of the dry mill. This may potentially be a result of former fuel spills at the Site. Consideration should be given to the potential presence of surface, subsurface and marine sediment impacts as a result of historical fuel spills and leaks at the Site.

- **Chemical Use, Handling and Storage**

  Several hundred 200 L (45-gallon) drums, of unknown product, were observed inside the mill buildings at the time of the Site inspection. It is likely that these drums were used to store hydraulic fluid used by various types of machinery at the mine Site. Labels were not visible on the drums.

  All drums present at the Site should be inspected, removed and disposed in accordance with the applicable regulations.

- **Potential Lead, Mercury and PCB Containing Paints**

  The exterior walls and interior walls of most Site buildings contained painted surfaces. Based on the reported date of construction of the Site buildings (i.e. 1960's), with the exception of the wet mill (constructed in the late 1980's and early 1990's), lead, mercury and PCB containing paints may potentially be present at the Site. The presence of lead, mercury and PCB containing paints can only be verified through sampling and analyses of suspect paint samples.

- **Potential PCB Containing Electrical Equipment**

  Insulating fluids and cooling oils in electrical equipment (i.e. transformers, fluorescent light ballasts, capacitors, etc.) often contained PCBs until around 1980. A total of five transformers were observed at the Site at the time of the Site inspection. Three of the five transformers were previously sampled and analyzed to PCBs. Results provided by the NLDOEC revealed that the concentrations of PCB in the three transfers sampled were below the applicable criterion of 33 ppm. Several locations at which transformers may have historically existed at the Site were also observed (i.e. south of power centre and dry mill, tailings conveyor system, north of west pit, and etc.).

  Fluorescent light fixtures were observed inside the primary crusher, secondary crusher, power centre, dry mill, tailings buildings and dock warehouse. Also, high intensity lights were observed on the exterior of the tailings buildings and dock warehouse. Based on the reported date of construction of the Site buildings (i.e. 1960's), the light ballasts and high intensity lights at the Site may contain PCBs since the use of PCBs in light ballasts was not discontinued until the early 1980's.

Consideration should be given to further assessment and proper disposal of potential PCB containing electrical equipment at the Site. Consideration should also be given to the potential presence of surface and subsurface impacts that may have resulted from any historical spills of PCB fluid at the Site.

- **PCB Storage Facility**
  From 1995 to 1999, the power centre was used to store a variety of PCB contaminated items associated with the operation of the Site. From 1999 to late 2000, several transformers located throughout the Site were drained of fluid and prepared for off-Site disposal. Several of these transformers were temporality stored inside the power centre on individual steel trays. Consideration should be given to the potential presence of surface and subsurface impacts as a result of historical PCB containing equipment inside the power centre.

- **Potential Mercury Containing Equipment**
  Minor amounts of mercury are commonly found in a variety of building materials including mercury vapour lamps, thermostats and other electrical control switches. The potential exists for mercury to be present within the processing equipment at the Site (i.e. electrical control switches, gauges, and etc.). Consideration should be given to the potential presence of mercury containing equipment at the Site.

- **Radioactive Materials**
  At the time of the Site inspection, field personnel observed a Texas Nuclear (Model 5201) Density Gauge on the first floor of the wet mill building. This radioactive device is known to contain Cesium-137. In 1998, the “source housing” portion of the density gauge was removed the wet mill and transported to a license disposal company. No other potential radioactive devices were observed at the Site during the Site inspection, however, other radioactive devices may be present at the Site.

- **Waste Disposal Sites**
  Based on discussions with former employees of the mine, all solid waste generated at the Site was landfilled at the Site. It was reported that waste generated at the facility was limited to metal debris, plastics, wood and typical domestic waste. The waste was collected by a garbage truck, dumped into a pit and covered with waste rock. It was reported that the location of the waste disposal sites varied over time.

- **Septic Discharge Fields**
  Based on discussions with former employees of the mine, it was reported that the washroom facilities at the Site were connected to septic systems. The number and location of abandoned septic discharge fields at the Site is not known at this time.

- **Air Quality**

  Field personnel inspected the interior areas of the Site buildings for air quality issues. There is a high potential for airborne asbestos fibres within the Site buildings. There is also a potential for elevated levels of lead, mercury and PCBs in the air due to the potential presence of lead, mercury and PCB containing paints at the Site. The majority of the painted surfaces within the Site buildings are in poor condition and considered to be a potential source of airborne dust and particles.

  Consideration should be given to conduct an air quality assessment at the Site to assess the quality of air, both inside the Site buildings and the exterior property.

- **Freshwater Resources**

  Freshwater resources observed at the Site include Steam Bath Pond, Upper Duck Island Cove Brook and Lower Duck Island Cove Brook. It is likely that the waters and sediments of Lower Duck Island Brook have been impacted with asbestos containing materials.

- **Marine Sediment**

  It is typical to find certain amounts of debris and other contaminants, such as hydrocarbons (diesel, gasoline, etc.) in sediments around vessel berthage Sites. These impacts are a result of various activities associated with berthage Sites, but not limited to indiscriminate dumping, accidental spills during refuelling and general usage waste. Potential environmental impacts are suspected.

  Tailings from the mill tailings stockpile are continuously being eroded into the waters of Lower Duck Island Cove Brook. A large amount of tailings and sediment was observed at the mouth of the brook, where it enters the water of Duck Island Cove. It is likely that the harbour sediments are contaminated with asbestos containing materials.

  Consideration should be given to the potential presence of contaminated marine sediments at this Site.

7.0 RECOMMENDATIONS

7.1 FURTHER ASSESSMENT REQUIREMENTS

Based on the findings of the Phase I ESA, it is recommended that a Phase II ESA be carried out at the Site to confirm the presence or absence of environmental contamination at the property. Details of the recommended further actions for the Site are provided below.

7.1.1 Paint Sampling Program

Conduct a paint sampling program at the Site to confirm the presence or absence of lead, mercury and PCB containing paints at the property. Recommended sampling locations include the painted exterior and interior surfaces of all Site buildings, with the exception of the wet mill building that was constructed at the Site in the late 1980's and early 1990's.

7.1.2 Asbestos Sampling Program

Conduct an asbestos sampling program at the Site to confirm the presence or absence of asbestos containing materials (ACMs) at the property. Recommended sampling locations include the following:

- suspect materials present on the interior and exterior of the Site buildings;
- crushed ore stored within the dry rock storage facility;
- materials present within the processing equipment;
- stockpile of material located at rear of warehouse at the dock;
- asbestos product stored inside warehouse and dry mill;
- random sampling of surficial soils (grounds, roadways, embankments, etc.); and
- random sampling of sediments from Lower Duck Island Cove Brook and Duck Island Cove.

7.1.3 Soil Sampling Program

Conduct a soil sampling program at the Site to determine the presence/absence of petroleum hydrocarbon (BTEX/TPH), PCB and asbestos impacted soils at the property. Recommended sampling locations and analytical requirements are provided in Table 2.

Table 2: Proposed Soil Sampling Program Requirements.

Location	Analytical Requirements
Former Bunker C AST and Pipeline at Dock Site	BTEX/TPH
Former Bunk C AST at Power Centre	
Downgrade of the two 910 L ASTs at the Power Centre	
Downgrade of the UST at the Dry Rock Storage	
Former Locations of Refuelling Stations	
Former Pit Office Locations	
Former Location of UST at Dry Mill (South)	
Adjacent to the Washroom Facility of the Dry Mill (West Wall)	
Downgradient of Power Centre	PCBs
Underneath Several Utility Poles (Former Transformer Locations)	
Random Locations	Asbestos

7.1.4 Surface Water Sampling Program

Conduct a surface water sampling program at the Site to confirm the presence or absence of petroleum hydrocarbon, metal and PCB impacted surface water at the Site. Sampling locations shall include various locations throughout Lower Duck Island Cove Brook and the drainage ditch running from the north pit into Lower Duck Island Cove Brook.

7.1.5 Sediment Sampling Program

Conduct a sediment sampling program at the Site to confirm the presence or absence of petroleum hydrocarbon, metal, PCB and asbestos impacted sediments at the Site. Recommended sediment sample locations include three sediment samples from Lower Duck Island Cove Brook (freshwater environment) and three from Duck Island Cove (marine environment).

7.1.6 Air Sampling Program

Conduct an air sampling program at the Site to determine the concentrations of airborne asbestos fibres at the Site. Recommended air sampling locations included the interior of all Site buildings and several locations throughout the exterior property.

7.1.7 Inspection of Potential PCB Containing Equipment

Inspect serial numbers on selected light ballast associated with the florescent lights and pole mount transformers observed at the Site to determine whether or not they contain PCBs.

7.1.8 Cost Estimate for Phase II ESA

The estimated cost to undertake the above-mentioned Phase II ESA sampling program is in the range of **$50,000** to **$65,000**. Based on the results of the Phase II ESA, additional assessment activities maybe required.

7.2 DISCUSSION OF ASSESSMENT CRITERIA

The federal and provincial governments have various Acts and Regulations in place to regulate and control the release of contaminants to the environment. The primary legislation relevant to the investigation of contaminants and contaminated Sites include the following:

- Canadian Environmental Protection Act;
- Fisheries Act; and
- Newfoundland Environment Protection Act.

Each of these Acts and associated Regulations have a direct bearing on the classification of contaminants and the measures to be taken when a contaminant is released to the environment in an unacceptable quantity.

The various governments in Canada (federal and provincial), the Canadian Standards Association (CSA) and the Canadian Council of Ministers of the Environment (CCME) have prepared and/or adopted numerous guidelines, policies, and procedures related to protection of the environment and the investigation of potentially contaminated Sites. Several of these documents are listed below:

- CSA Z768-01 Phase I Environmental Site Assessments, CSA (revised 2001);
- CSA Z769-00 Phase II Environmental Site Assessment, CSA (2000);
- National Guidelines for Decommissioning Industrial Sites, CCME (1991);
- Subsurface Assessment Handbook for Contaminated Sites, CCME (1994);

- Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites Volumes I and II, CCME (1993);
- National Classification System for Contaminated Sites, CCME (1992);
- Technical Assistance Bulletins (TAB) 1-29, Environment Canada (1989-1995);
- Atlantic RBCA (Risk Based Corrective Action) Reference Documentation for Petroleum Impacted Sites, Version 2.0, Atlantic Partnership in RBCA Implementation (PIRI - October 2003);
- Newfoundland Provincial Policy Directive (PPD97-01) for Class B Site (updated 1999);
- Guidance Manual for Developing Site-Specific Soil Quality Remediation Objectives for Contaminated Sites in Canada (1996);
- Environment Canada, Guidelines for Effluent Quality and Wastewater Treatment at Federal Establishments (1976);
- Canadian Environmental Quality Guidelines, CCME (revised 2004);
- Newfoundland and Labrador Asbestos Abatement Regulations, 1998 (Nfld. Reg. 111/98);
- Newfoundland and Labrador Transportation of Dangerous Goods (TDG) Act, 1992 (updated 2002); and
- Federal Hazardous Products Act (HPA), 1985 (updated 2003).

7.3 DECOMMISSIONING

It is recommended that all Site infrastructure, including Site buildings, foundations, the dock and conveyors be decommissioned to ground level, dumped into the north pit and buried with waste rock.

7.3.1 Cost Estimate for Decommissioning

The estimated cost to undertake the above-mentioned decommissioning program is estimated at **$4,400,000**. This cost estimate does not include any revegetation of waste rock and tailings at the Site.

8.0 CLOSURE

The American Society of Testing and Materials Standard of Practise notes that no environmental Site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental conditions in connection with a property. Performance of a standardized environmental Site assessment protocol is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions in connection with the property, given reasonable limits of time and cost.

This report has been prepared for the exclusive use of the Newfoundland and Labrador Department of Natural Resources, Mineral Development Division (DNRMD). The environmental assessment was conducted using standard assessment practices and in accordance with verbal and written requests by the DNRMD. No further warranty, expressed or implied, is made. The limitations of this report are provided in Appendix G.

Appendix available upon request.
Call Ed Moriarity at 729-5777