ENVIRONMENTAL SITE ASSESSMENT

ABITIBI-CONSOLIDATED INC. – STEPHENVILLE SITE
STEPHENVILLE, NEWFOUNDLAND

Prepared For:
WeirFoulds, LLP

Sec 30

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1.0 INTRODUCTION

This report presents the results of a data review and limited supplemental Environmental Site Assessment (ESA) completed for the Abitibi-Consolidated Inc. (Abitibi) property located in Stephenville, Newfoundland (Stephenville Site). Conestoga-Rovers & Associates (CRA) has prepared this report on behalf of WeirFoulds LLP (WeirFoulds). Investigations conducted to document environmental conditions at the Stephenville Site included the review and interpretation of Phase I and Phase II/III ESA data provided by others as well as a site walk-over and limited supplemental collection and analysis of sediment, sludge, and surface water samples by CRA.

The Scope of Work (SOW) for the data review and supplemental ESA was developed based on the "Phase I Environmental Site Assessment" Report (August 2006), prepared by Fracflow Consultants Inc. (Fracflow), and laboratory reports, sampling location logs and Site Plans that AMEC Earth & Environmental (AMEC) provided to CRA for review between September 11 and 29, 2009. The information that AMEC provided was developed as part of Phase II/III ESA investigations completed at the Site between approximately November 2006 and January 2009. This report provides an overview of the Stephenville Site history, operations, and the Potential Areas of Concern (PAOC). The findings from the Fracflow Phase I ESA and the AMEC Phase II/III ESA data have been summarized in Sections 2.2 and 6.0 of this report.

The CRA supplemental sampling program and site walk-over conducted on October 5 and 6, 2009 is detailed in Section 4.0.

The remainder of this report is organized as follows:

- Section 2.0 – Stephenville Site Background and History
- Section 3.0 – Environmental Setting
- Section 4.0 – Field Activities
- Section 5.0 – Applicable Regulatory Criteria and Guidance
- Section 6.0 – Analytical Results
- Section 7.0 – Summary of PAOCs
- Section 8.0 - References

2.0 STEPHENVILLE SITE BACKGROUND AND HISTORY

2.1 STEPHENVILLE SITE OVERVIEW

2.1.1 STEPHENVILLE SITE LOCATION AND DESCRIPTION

The Stephenville Site is approximately 186 hectares in area and is located within the Port Harmon industrial park area, approximately three kilometres southeast of the main commercial and residential areas of Stephenville (Town). The Port Harmon industrial park is located within the Town limits, on the north shore of St. George's Bay, Newfoundland, in the Gulf of St. Lawrence. The Stephenville Site is located in an area that is zoned Industrial General by the Town. A Stephenville Site location plan is presented on Figure 2.1 and a property map is presented on Figure 2.2. Site plans are presented on Figures 2.3A through 2.3C.

The Abitibi pulp and paper mill at the Stephenville Site was closed in December 2005. The mill produced newsprint using the thermo-mechanical pulping (TMP) process. The mill consisted of a main mill building including offices, steam plant area, TMP mill, wood room, machine shop, finishing room, and other support facilities. As part of the mill operation, there were also wood and chip pad storage areas, a paper storage building, various regulated and unregulated disposal areas, three aboveground Bunker C storage tanks and various underground and aboveground storage tanks (USTs and ASTs, respectively) used for the storage of other petroleum products and dyes. The mill also contained a central wastewater effluent treatment system consisting of two ash lagoons, a clarifier, effluent treatment building, two settling ponds, two aeration stabilization basins (ASBs), and three sludge disposal landfills.

Between approximately 2006 and 2008, Abitibi completed a decommissioning and demolition program that included the demolition of the majority of the main mill building, wood room building, effluent building, AST/UST removal, and the removal of other infrastructure. The only portions of the main mill building observed during CRA's 2009 site visit included the office building, machine shop and finishing room, and the vehicle repair building. The only other buildings remaining at the Stephenville Site include the paper storage building and the gate house. Details of structures remaining at the Stephenville Site are discussed in subsequent sections.

A brief chronology that describes the growth and development of the Stephenville Site is presented below.

- 1941-1966: Industrial development in the Stephenville area was initiated in 1941 with the construction and operation of the Harmon Field Air Base by the United States Air Force (USAF). The current Stephenville Site location and the surrounding area served as a fuel storage and distribution system for the USAF base and included approximately 21 large (generally greater than one million litre capacity) aboveground integrated tanks that contained different aviation and ground fuels. Tank names were subsequently designated USAF Tanks 1 through 21.
- 1966: The USAF moved out of the Stephenville area with the base infrastructure abandoned in place or redeveloped by the local community, including most of the ASTs in the vicinity of the Stephenville Site.
- 1970-1973: Construction of Labrador Linerboard Ltd. (Labrador) mill that included the paper mill building effluent treatment system (including ash ponds, settling ponds, and ASBs), paper storage shed, maintenance building, and the Mine Pond waste disposal site to the east of Route 490.
- 1973-1977: Labrador operated the unbleached kraft linerboard mill.
- 1977-1979: Labrador linerboard mill closed.
- 1979-2005: Abitibi-Price Inc. purchased the mill in 1979 and converted it for pulp and paper production, which it remained until its closure in 2005.

The previous ESAs completed by AMEC and Fracflow included the main mill building, the process effluent infrastructure (including the ash ponds, transfer building, settling ponds, ASBs, and sludge landfills), paper storage building, wood pad, chip pad, USAF Tanks 4, 5, and 8, Mine Pond Landfill, Tank 20 Landfill, and the Active Landfill.

In approximately 1997, Abitibi purchased a former Department of Transportation (DOT) building, also known as the repair building, located north of the paper storage building. This building is included in the Stephenville Site. Other former USAF tanks identified on site plans were not owned by Abitibi and, therefore, are not included in previous ESA investigations or in this report.

Surrounding properties in the area include the Port Harmon Authority (PHA) wharf and boat dock immediately east of the paper storage and former DOT buildings, the Canadian Coast Guard (CCG) base of operation immediately to the north of the former DOT building, Shur-Gain Feeds mill located on the north side of the CCG building, and Newfoundland Housing Corporation Limited (NLHC), which reportedly owns some of

the former USAF installations and properties to the north and east of the mill property. The area east of the main mill building, ASBs, and sludge landfills is primarily vacant forested areas.

An overview description of the processing activities of the mill is provided in Section 2.1.2. Each PAOC is described in Section 2.2.2.

2.1.2 SITE OPERATIONS

The major historical operations at the Stephenville Site included petroleum storage by the USAF, production of linerboard by Labrador, and subsequent conversion to a TMP system for the production of newsprint by Abitibi. Logs for the mill operation were originally boomed in Port Harmon throughout the 1970s and later trucked to the Stephenville Site for processing.

The TMP production included the moving of logs from the wood storage pile to the woodroom building where the wood was debarked. The bark was subsequently dried and used for hog fuel in the plant boiler. The debarked wood was then passed through a chipper before being blown to the chip pile. Runoff water generated in the debarking process was collected by floor drains which were then pumped into the clarifier for treatment. Wood chips were then cleaned and sent to the paper mill building for hydraulic and chemical processing. Completed paper rolls were sent to the paper storage building via an overhead trolley conveyer from the finishing room of the paper mill.

The boiler located in the south end of the former mill provided the steam required for the pulp and paper production processes. The boiler was fuelled by a combination of Bunker C and hog fuel (i.e., dried bark). Just prior to the mill closure in 2005, Abitibi proposed a pilot project for the burning of tires in the boiler; however, according to the Newfoundland Department of Environment and Conservation (DOEC), Abitibi never proceeded with the tire burning project. The Bunker C fuel for the boiler was provided by aboveground and underground day tanks located on the exterior of the mill building. The day tanks were filled from the Bunker C ASTs that are described further below. Burning of hog fuel produced ash in the boiler that was removed on a daily basis and stored outside of the building or transported to the on-Site landfills for disposal. Trapped ash in the stack was flushed into the steam plant sewer system and directed to the ash ponds for settling.

A portion of the fuel storage and distribution infrastructure left in place by the USAF was used by the mill to supply Bunker C fuel to the power boiler system. In particular, the marine terminal; former USAF Tanks 4, 5, and 8; and the associated piping were used as part of the mill operation. The Fracflow Phase I ESA indicated that Abitibi originally leased and later purchased Tanks 4, 5, and 8 from NLHC. The storage capacities of the tanks are 120,000 barrels (19 million litres), 80,000 barrels (12.7 million litres), and 80,000 barrels (12.7 million litres), respectively. The tanks are located northwest of the Stephenville Site and were constructed on unlined bermed pads. Originally, Abitibi used all three tanks. Abitibi reportedly removed Tank 4 from service in 1996. Abitibi used Tanks 5 and 8 until the closure of the mill in 2005. The Bunker C fuel piping and distribution system consists of two main networks that include the fill line and distribution networks. The original USAF 250-mm underground pipe network was used for tank filling. The fill pipes run from the south end of the marine terminal east to the pump house, and then north to the three Bunker C tanks. It is not known if the fill lines are still present or if they were removed as part of mill decommissioning work completed after the mill closure in 2005. The distribution lines were reportedly primarily aboveground surface except at road crossings. Aboveground distribution lines associated with the Bunker C fueling system were not observed at the time of CRA's 2009 site visit.

Abitibi's mill operation had four main process effluent systems that included the collection of wastewater from various area of the mill. The four sewer systems included the North Sewer, Central Sewer, South Sewer, and Steam Plant Sewer.

- The *North Sewer* collected fluids from the dry end of the paper machine including floor drains in that area.
- The *Central Sewer* collected water from the wet end of the paper machine including discharge and drainage trenches in the paper machine room. Caustic soda was added to this water to maintain pH levels.
- The *South Sewer* collected process water from the TMP process. The wastewater from each of these three systems was directed to the clarifier and through the effluent building to final treatment at the settling basins and ASBs.
- The *Steam Plant Sewer* collected discharge from the steam plant and directed it to the ash ponds, after which it flowed through the effluent building to the settling basins and ASBs.

Throughout the operation of the mill, accumulated sludge in the settling ponds and ASBs as well as ash in the ash ponds were excavated or dredged and disposed of in

on-Site landfills identified as Landfills A, B, and C. These three landfills are located directly adjacent to the ASBs and settling ponds.

In addition to the mill operations identified above, the following facilities and/or operations were also conducted at the Site:

Facility/Operations	*Description*
Office/Training Centre	Located at the north end of the main mill building
Machine shop	Located within the mill building and supported the mill production operations
Paper Machine Area	Located in the north end of the mill building and is where the paper making process occurred.
Dye Storage	Three dye tanks were located adjacent to the central sewer outlet of the main mill building and the dye was used in the paper production process
Chip and Wood Pad	The chip pad and wood pad are two large circular paved areas that were used for storage of wood chips and wood prior to processing
Chemical Storage/ Vehicle Maintenance Garage	The mobile equipment maintenance garage was originally used for chemical storage and preparation of chemicals associated with the unbleached kraft processes and was located in the central portion of the main mill building.
Vacuum Blowers	The vacuum blower room was located east of the TMP area and housed the steam powered vacuum blowers required to produce the process air for the mill.
Kraft Slushing Area	Located in the southern end of the pulp mill, the kraft slushing area was used originally in the unbleached-kraft slushing process but was later predominantly used for equipment storage and some chemical storage.
Transformer Yard	The main transformer yard, or substation, was located on the east side of the paper mill, behind the TMP process area
Paper Storage Building	The paper storage building is a large open warehouse adjacent to the wharf on Port Harmon
Former DOT Building	The DOT building, also known as the repair building, was located north of the paper storage building which was originally occupied by the DOT and used as a garage.
Salt Cake Storage A-Frame	The salt cake storage A-frame is located to the east of the paper storage building and was originally used for storage of the salt cake and later for the storage of surplus materials

2.2 INVESTIGATIVE HISTORY

2.2.1 FACILITY HISTORY

As noted in previous sections, the Stephenville Site was originally developed by the USAF for the storage and distribution of various petroleum products for the Harmon

Air Force Base. When the base closed in approximately 1966, Labrador constructed a linerboard mill on the property and used three of the former USAF ASTs (Tanks 4, 5, and 8) for storing Bunker C fuel. In 1979, Abitibi-Price Inc. purchased the mill from Labrador. Abitibi-Price Inc. later became Abitibi-Consolidated Company of Canada and Abitibi-Bowater Inc. Abitibi Price Inc., Abitibi-Consolidated Company of Canada, and Abitibi-Bowater Inc. will be collectively referred to as Abitibi for the remainder of this report.

The remainder of this Section presents a compliance summary and the results of the previous investigation completed at the Stephenville Site.

2.2.2 COMPLIANCE/REGULATORY SUMMARY

Numerous Certificates of Approval to Operate (Cs of A) were received from the Province during the operation of the mill. These Cs of A as well as other relevant environmental permits were summarized in the Phase I ESA completed by Fracflow in 2006.

In July 2006, Abitibi submitted an Environmental Assessment Registration document to the DOEC Environmental Assessment Division, for the permanent closure of the Stephenville Site (report dated July 28, 2006). The purpose of the report was to satisfy the requirement to register the permanent decommissioning of the Stephenville Site as per the Provincial Environmental Protection Act (2002) and Environmental Assessment Regulations. In the 2006 assessment report, Abitibi provided the framework for decommissioning the Stephenville Site which included:

1. *Conduct pre-decommissioning activities to secure ACCC* [Abitibi] *properties, and ensure there is no environmental degradation.*
2. *Finalize the Phase I Environmental Site Assessment (ESA) report including the identification of actual and potential site contamination.*
3. *Conduct a Phase II ESA to confirm the presence of contamination and characterize the substances of concern.*
4. *Evaluate soil contamination criteria and risk based corrective action (RBCA) options to manage contamination of the Site. Once evaluation has been completed, a Remedial Action Plan (RAP) will be developed. The RAP will be submitted to the Department of Environment and Conservation (DOEC) for approval prior to implementation. The RAP will describe the following:*
    - *The rationale* [sic] *for the selection of remedial criteria*

- *The remedial criteria*
- *The methodology of the remedial action to achieve the remedial criteria and/or the method of risk assessment*

5. *Conduct the necessary remedial actions to address substances of concern and site contamination as stated in the RAP.*
6. *Demolish various infrastructures that do not have alternative uses within a reasonable length of time. After demolition, the site will be re-vegetated to industrial standards.*

Based on the information provided for the preparation of this report, the Phase I ESA report has been finalized and a Phase II/III ESA program has been completed but a report on the findings of the Phase II/III ESA program was not provided to the DOEC. In addition, a RAP was not developed or submitted to the DOEC for review and approval. Based on CRA's October 2009 site walk-over, the majority of the infrastructure related to the former mill operation has been demolished; however, the Stephenville Site has not been revegetated.

2.2.3 PREVIOUS INVESTIGATIONS

Fracflow conducted a Phase I ESA of the Stephenville Site from April 18 to 20, 2006. As a result of the Phase I ESA, 19 PAOCs were identified along with the potential hazardous building materials associated with the Stephenville Site.

Based on the "*Phase I Environmental Site Assessment*" final report dated August 2006, (Fracflow Phase I ESA Report), Fracflow and AMEC completed a Phase II/III ESA program between approximately November 2006 and January 2009. The Phase II/III ESA investigation focused on the 19 PAOCs identified in the Phase I ESA and also two additional PAOCs that the consultants identified during the course of completing that work. The following section summarizes the PAOCs identified by Fracflow and AMEC and also provides an overview of existing conditions of the Stephenville Site based on CRA's site walkover completed on October 5 and 6, 2009. Photographs taken during CRA's 2009 site walkover are presented in Appendix A. Abitibi representatives [redacted] were present during the site walkover; however, Abitibi representatives were instructed not to provide CRA with any details regarding Facility activities, processes, and history.

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Prior to completing the site walkover, CRA reviewed the Phase I Report and Phase II/III ESA data as well as other DOEC records available for the Stephenville Site (files provided to CRA via email correspondence from WeirFoulds on August 14, 2009 see

Appendix B). CRA also reviewed Abitibi's response (email dated September 29, 2009) to a CRA request for missing documents and information (CRA letter dated September 18, 2009).

2.2.3.1 IDENTIFIED POTENTIAL AREAS OF CONCERN

The PAOCs identified in the Fracflow Phase I ESA report as well as the subsequent Phase II/III ESA are presented below. Excerpts from the Phase I ESA Report that describe the reasoning for identifying each area as a PAOC are also presented below (in italics). The PAOC locations identified by Fracflow and AMEC are shown on Figures 2.3A through 2.3C. Visual observations collected by CRA during the October 2009 Site walkover are also provided for each PAOC.

PAOC 1 - Steam Plant Day Tank

The steam plant day tank was located on the east side of the steam plant, which was located at the southeast end of the mill building. Bunker C from the tank farm area was directed to this tank for use in the steam plant on a daily basis. The aboveground tank had a capacity of approximately 56,825 L. The Phase I ESA indicates that there was an UST in approximately the same location.

Phase I ESA: *Spillage of Bunker C around the day tank has resulted in visible hydrocarbon stains and free product on the ground surface.*

2009 CRA Observations: The steam plant day tank has been removed and the steam plant portion of the mill building had been demolished. Hydrocarbon staining was not confirmed because the ground in the area was predominately covered with concrete and brick demolition rubble.

PAOC 2 - Paper Mill Building

The Phase I ESA noted that, as part of the mill operation, numerous hydraulic lift equipment and chemical storage containers had leaked with staining observed on the surrounding building materials. The Phase I ESA therefore recommended that soil and groundwater samples should be collected from below the floor slab and in the vicinity of sewer lines to determine if any of the oils and chemicals that have been spilled in the building have leaked from the collection trenches, through cracks and joints in the concrete, or from the sewer lines.

Phase I ESA: *Some specific Areas of Concern in the building include:*

1) *Recaust Room - Bunker C and light fuel oil leaked from filling lines in the recaust room and free product is present on the exposed earthern floor.*
2) *Basement area below the paper machine - there is a heavy oil build-up in the areas adjacent to the oiling stations.*
3) *Lubricating oil storage tanks - Each storage tank is surrounded by a dyke and there is a floor sump inside each dyked area. Oil stains are present on the concrete surfaces surrounding most of those tanks.*
4) *Parts Washing Area - The parts washing area adjacent to the heavy equipment garage, in the main mill building, is an Area of Concern based on the nature of the operations.*

2009 CRA Observations: The main mill building and associated infrastructure had been decommissioned and demolished, except for the Office and Machine Shop located at the northeastern end of the building and the Vehicle Repair Shop (also identified in the prior reports as the Chemical Treatment Area). Hydrocarbon staining was not confirmed because the ground in the area was predominately covered with concrete and brick demolition rubble.

PAOC 3 - Stream Bed near the Main Security Gate

Bunker C releases from the distribution lines occurred in the vicinity of a stream located approximately 100 metres northeast of the main security gate.

Phase I ESA: *Weathered free product Bunker C was observed in the stream bed on the north side of Abitibi Road, downstream of the Bunker C filling line.*

2009 CRA Observations: The area adjacent to the stream bed, between the mill access road and the stream bed, was observed to have been recently disturbed. The disturbance is assumed to be related to the recent Phase II/III ESA completed in the area by AMEC. CRA did not observe visible free product in this area in 2009. However, CRA did observe potential hydrocarbon staining on vegetation and soil along the stream bed shoreline.

PAOC 4 - Fire Training Area

The fire training area for the mill was located approximately 150 metres east of the southern end of the paper mill building. The training area consisted of a metal pan

surrounded by sand. The pan would have been used for mixing fuel and wood, which was then set alight to practice basic fire-fighting techniques.

Phase I ESA: *The ground surface at the fire training area is heavily stained with petroleum hydrocarbons.*

2009 CRA Observations: CRA did not observe hydrocarbon staining in the fire training area in 2009.

PAOC 5 - Tank Farm

The paper mill used three former USAF tanks for the storage and distribution of Bunker C fuel. Abitibi originally leased and later purchased Tanks 4, 5, and 8 from NLHC. The storage capacity of one tank is 19 million litres and the other two tanks have a storage capacity of 12.7 million litres. The three tanks were constructed on unlined bermed pads at the location shown on Figure 2.3A.

Phase I ESA: *Weathered Bunker C is visible on the ground surface inside the berms and soil contamination has been confirmed during previous borehole investigations at Tank 4 (Area 5a), Tank 5 (Area 5b) and Tank 6[1] (Area 5c).*

2009 CRA Observations: CRA observed hydrocarbon staining on the ground surface in the vicinity each of the three Bunker C tanks (Tanks 4, 5, and 8) in 2009. The hydrocarbon staining was generally confined to the areas where the fill and distribution lines connected to the tanks. The largest area of surface staining was in the vicinity of Tank 4.

PAOC 6 - Settling Ponds and Aeration Stabilization Basins (ASBs)

There are two settling ponds located at the end of the effluent pipeline. The settling ponds were used to reduce suspended solid loads in the effluent prior to discharge into the ASBs. The ponds are located approximately 1.5 kilometres southwest of the former mill building and are approximately 75 m long and 40 m wide (See Figure 2.3B). The reported retention time for effluent in those ponds was two days (Portt and Associates, 2000).

[1] Assumed the Phase I ESA reference to Tank 6 is a typographical error and should be identified as Tank 8

Located directly southwest of the two settling ponds are the ASBs which were the final stage in the industrial effluent treatment process. This was an aerobic microbiological digestion process facilitated by the operation of multiple aeration units in each ASB. Each ASB is approximately 400 m long by 75 m wide. The ASBs are reportedly six m deep, from the base to the top of the berm, and were covered with a hypalon liner (D.D. Dick Consulting Engineers, 1972). The reported retention time for effluent in the north ASB was nine days (Portt and Associates, 2000).

Phase I ESA: *Sludge quality in the settling ponds and ASBs needs to be evaluated, as well as its potential impact on the surrounding soil and groundwater. Sludge samples need to be collected and chemically characterized to determine if the material can remain in place or if remedial action is warranted. The four existing monitoring wells should be located, developed if possible, and sampled to determine groundwater flow direction and to evaluate potential impacts to groundwater quality.*

2009 CRA observations: CRA observed a semi-solid mat of organics, silt, sand, and clay material on the south ASB and both the north and south settling ponds in 2009. The mats were covered with vegetation consisting of woody shrubs, low growth shrubs, grasses, and alders. Beneath the mats is reportedly a layer of free water overtop of another layer of sludge.

During the Stephenville Site visit, CRA excavated test pits on the perimeter of the south ASB and two settling ponds using a shovel to determine the thickness of the floating mat. CRA excavated the test pits to a depth of approximately one metre in the south ASB and north settling pond. CRA was not able to penetrate the mat to observe underlying free water. However, CRA did encounter the underlying free water in the south settling pond at an approximate depth of 0.6 metres. Based on CRA's 2009 observations, and information provided to CRA by former Abitibi employees, the floating mat thickness is not uniform and presents a significant health and safety concern if people or animals were to walk on the mats.

A DOEC email dated September 17, 2009 indicated the north ASB was drained and dredged in 2007 as part of decommissioning activities. CRA confirmed that the north ASB appeared to have been drained with approximately one metre of water observed in the base of the ASB. Accumulated sludge was not present.

Province of Newfoundland and Labrador Government Services Centres (GSC) correspondence also indicated Camp Dresser & McKee (CDM) completed a feasibility study to evaluate the closure of the two settling ponds and two ASBs on behalf of Abitibi (report entitled: Abitibi Consolidated Company of Canada, Stephenville Pulp

and Paper Mill, Feasibility Study, December 5, 2008). The defined purpose of the study was to:

- Identify potentially applicable remedial action objectives and related regulatory requirements
- List potentially applicable remedial methods
- Screen out inappropriate or impractical methods
- Evaluate and compare the most appropriate methods
- Select and describe the preferred alternative

As part of the feasibility study, quantities of sludge and water present in the ASBs and settling ponds were evaluated. These were listed in the DOEC correspondence. However, the chemical and physical characteristics of the water and sludge in the ASBs/ponds were not evaluated as part of the feasibility study. The CDM report was not available for CRA's review.

PAOC 7 -Sludge Disposal Sites

There are three ash and sludge landfills located on the Stephenville Site which have been identified as Landfills A, B, and C. The unlined landfills were constructed for the disposal of sludge and ash produced as part of the effluent treatment system.

- Landfill A is located directly northeast of the settling ponds on a peninsula that separates the Inner Pond from Port Harmon. The Phase I ESA indicates the design footprint was 12.5 hectares, the planned depth of fill was 2.4 m, and the total expected capacity was 305,370 m^3.
- Landfill B is located to the south of the south ASB. The Phase I ESA indicates the design footprint was 7.8 hectares, the planned depth of fill was 4.3 m, and the total expected capacity was 334,540 m^3.
- Landfill C is located directly southwest of the ASBs. The proposed landfill was designed to be 0.5 hectares in area with a 1.1 metre depth of fill and total expected capacity of 5,380 m^3.

Phase I ESA: *Sludge quality, as well as the potential chemical impact on the surrounding soil and groundwater, may need to be evaluated at sludge disposal sites A, B, and C.*

2009 CRA Observations: The three landfills covered a total area of approximately 15 hectares. Landfill A is covered with grasses, shrubs, cattail, alders, and wetland and

other hydrophytic types of vegetation. The northern end of Landfill B is also covered with wetland type vegetation but the southern end of the landfill has extensive areas with free water. Duck Pond, an approximately one hectare open water pond, has formed on top of Landfill B. The Abitibi representatives indicated that the southern end of Landfill B is semi-solid with numerous areas of sludge floating on free water similar to the settling ponds and south ASB. Landfill C is also covered with vegetation but appears to be a more consolidated material. Stockpiles of concrete debris and crushed stone were located directly west of Landfill C and on the shores of Port Harmon channel.

PAOC 8 - Ash Ponds

There were two ash ponds located west of the south chip pad that collected process water from the steam plant. The Phase I ESA indicated the ponds were also used to collect blow-down water, water used to flush ash, and periodic slugs of caustic liquids and acids used to de-scale the boiler and for water treatment. The ash ponds acted as a primary settling basin for ash and sand suspended in the plant's industrial sewage.

The ponds were approximately 35 m wide by 135 m long and approximately 3.5 m deep. The base was formed with a concrete slab completed with a 0.6 m concrete curb around the edge. The side slopes of the berms were angled at an approximate 45 degree grade, and were constructed of a compacted sand bed overlain by a hypalon liner (D.D. Dick Consulting Engineers, 1972).

Phase I ESA: *Each ash pond was constructed with a concrete base that is expected to be intact and in good condition. The membrane liner[s] on the sidewalls have probably been damaged. Potential contaminants have entered the ash ponds through the process effluent stream. In addition, the ponds may have been affected by interaction with contaminated groundwaters from USAF/NLHC operations as well as possibly from Abitibi-Price Inc./ACCC-Stephenville (Abitibi). ACCC- Stephenville (Abitibi) staff have reported a sheen entering the east pond.*

2009 CRA Observations: The west ash pond was filled in and covered with coarse-grained sand and gravel. The east ash pond was observed to be intact and potentially recently dredged or re-graded. Standing water was present the entire length of the east ash pond. The water level in the pond was approximately 2 to 3 metres below the top of the berm. The berm appeared to be constructed of sand and gravel and was vegetated with grasses and small shrubs. The pond is located within the secured area of the Stephenville Site.

PAOC 9 - Fuel Storage Areas (ASTs and USTs, excluding PAOC 1 and 5)

During the construction and operation of the mill, several USTs and ASTs were installed in the main mill building area. The tanks included a Bunker C day storage tank, diesel fuel tanks, waste oil tanks, hydraulic oil tanks, and a glycol storage tank. The Phase I ESA indicated that Abitibi removed most of the USTs and replaced those tanks with ASTs. However, reports on the tank removal program or confirmatory soil samples from the resulting excavations were not available for CRA's review.

Phase I ESA: *A total of eight former USTs and twelve existing ASTs have been identified on ACCC-Stephenville property. Soil and groundwater samples should be collected and analysed to evaluate any potential chemical impacts. The chemical results, along with a contour map of the water table showing groundwater flow directions and hydraulic gradients, are necessary to identify impacts from mill operations and separate those impacts from any associated with the former USAF operations. A magnetometer/GPR survey will be required to locate the UST that was associated with the operations of the boiler in the former USAF pump house at the main mill site. This may also be required to identify other USTs where the exact location is unclear.*

2009 CRA Observations: CRA did not identify USTs or associated infrastructure such as ventilation pipes or distribution pipes during the 2009 Site visit. Only one steel AST, equipped with secondary containment, was observed outside of the Bunker C tank farm area (PAOC 5). The remaining AST was located in the parking lot area of the office building. The historical or current use of this AST is not known.

PAOC 10 - Septic Disposal Fields

Approximately seven domestic sewage disposal fields were associated with the mill Site.

Phase I ESA: *Monitoring wells should be installed at each of the seven septic field locations that were identified. Soil and groundwater samples should be collected from boreholes, monitoring wells and/or test pits for the appropriate chemical parameters.*

2009 CRA Observations: CRA did not observe any evidence of septic disposal fields, such as seepage areas. An email from Abitibi to DOEC dated September 29, 2009 indicated several of the septic systems were not decommissioned as part of the Stephenville Site demolition activities as the systems are still servicing buildings that will remain active in the future.

PAOC 11 - Push-off Area

The push-off area is located approximately 200 metres northeast of the former mill building. The push-off area was an unregulated disposal area of materials from the mill operations. The Phase I ESA notes the adjacent stream and associated gully served as a convenient disposal location with a considerable amount of dumped material observed around the creek bed, from the fence at the eastern edge of the property to an area southeast of the former steam plant. Some of the visible material included cable reels, asphalt, angle iron, numerous 205-litre steel drums (badly corroded), tar paper, clay tiles, aluminum pipe, flanges, PVC, sheet metal, shingles, scrap wood, tech cable, rebar and masonry. Iron staining was observed in the stream bed and a heavy iron floc was present in some of the standing bodies of water.

Phase I ESA: *The full extent of the debris field will need to be delineated. Because of the large number of visible drums, there is a concern that buried drums with unknown liquids may also exist. The presence of any buried drums needs to be established and the risk of puncturing or rupturing those drums needs to be minimized during any intrusive investigations. A geophysical survey of this area should be initially conducted, possibly using a combination of magnetic, GPR and EM methods.*

2009 CRA Observations: The push-off area extended to a small stream located to the eastern edge of the push-off area. Metal and wood debris from the push-off area were discarded or dumped directly into the brook. Drums were not visible.

PAOC 12 - Mine Pond Landfill

The Mine Pond Landfill is located north of Mine Pond and was used as a bark storage landfill as well as for the disposal of sludges and solid or semi-solid wastes generated at the mill. This landfill was reportedly closed in 1976.

Observations from the Phase I ESA noted that numerous 205-litre steel drums were identified in this area along with various other debris. Possible leachate, iron staining, and strong odours were noted. The Phase I ESA also identified anecdotal reports of buried drums potentially containing varsol, waste oil, and other chemicals from the mill operation as well as the burial in the landfill of radium-contaminated hospital waste and explosives from the former USAF operations.

Phase I ESA: *New monitoring wells should be installed at the Mine Pond landfill site. Nested well installations are needed to determine vertical as well as horizontal hydraulic gradients and potential impacts to groundwater in the bedrock. Soil and groundwater sampling for a suite of*

organic, inorganic, and microbiological contaminants should be performed. A magnetometer/GPR survey will be required to locate the UST that was associated with operation of the boiler room in the munitions building. The adjacent streams should also be sampled during baseflow conditions to determine potential impacts.

2009 CRA Observations: The landfill was thickly vegetated with alders, apple trees, raspberry bushes, grasses, etc. Although specific areas of groundwater leaching from the landfill were not observed, cattails and standing surface water surrounded the landfill at the toe of its slope. Three rusted and apparently empty metal drums were also present at the toe of the slope on the north side of the landfill.

PAOC 13 - Tank 20 Landfill

This landfill is located east of Highway 490, adjacent to former USAF Tank 20. The landfill was reportedly originally used as a bark and ash dump site and has been inactive since 1983. The Phase I ESA report identified numerous 205-litre steel drums, ammunition, and various other debris exposed at the landfill. Possible leachate, iron staining, and strong odours were also noted.

Phase I ESA: *New monitoring wells should be installed at the Tank 20 landfill site. Nested well installations are needed to determine vertical as well as horizontal hydraulic gradients and potential impacts to groundwater in the bedrock. Soil and groundwater sampling for a suite of organic and inorganic contaminants should be performed (note: this was apparently a site where a quantity of black liquor was disposed of from the linerboard operations).*

2009 CRA Observations: CRA observed that the landfill has a uneven ground surface and is thickly vegetated with alders. Groundwater/landfill leachate seeps were identified on the north side of the landfill. The leachate was observed to be draining into a nearby stream that flows from east to west at the north end of the landfill. In addition, CRA identified a wetland and standing surface water body on the south side of the landfill. CRA also observed empty metal drums and other debris on the south side of the landfill.

PAOC 14 - Active Landfill Site

This landfill is located directly east of Highway 490, at the intersection of the main access road to the mill building. This landfill was permitted and constructed in approximately 1984. The landfill was reportedly used for disposal of sludge and bark material as well as general mill debris and refuse. The landfill was not constructed with

a bottom liner. The southern end of the landfill area has reportedly been developed as gravel pit for road building.

Phase I ESA: *It appears that the lowest risk of environmental contamination from the landfills, located to the east of Route 490, is associated with the 'Active' landfill. However, leachate seeps were observed on the south side of the 'Active' landfill. Therefore, groundwater monitoring wells should be installed* (and) *sampled to evaluate potential soil and groundwater impacts. The adjacent stream should also be sampled during baseflow conditions to determine potential impacts.*

2009 CRA Observations: The landfill is not covered and appears to consist of mixed bark and other organics with sand and silt. Minor amounts of general mill refuse and other debris such as tar paper, gaskets, rubber matting, rubber hose, and pieces of cable were also observed on the surface of the landfill. The gravel/borrow pit located directly south of the landfill (formerly operated by Abitibi), was flooded with groundwater and/or surface water. Surface water from a stream present within the landfill was flowing down the truck access ramp and into the former borrow pit.

PAOC 15 - Electrical Substations and Transformers

The main electrical transformer yard was located on the east side of the paper mill, behind the TMP process area. The yard reportedly received 70 megawatts (MW) of 220 kilowatt (kV) electricity from Newfoundland and Labrador Hydro for use at the Stephenville Site.

The Phase I ESA indicated that many of the transformers had visible oil leaks at the time of inspection. The Phase I ESA also indicated that one transformer leaked shortly prior to the mill shutdown and impacted soil was removed by Westinghouse. In 2005, it was reported that 749 gallons of transformer oil, containing 219 parts per million (ppm) polychlorinated biphenyls (PCBs), were removed from transformer T1C by Stark for destruction. Abitibi reportedly obtained waste manifests and certificates of approval for the transfer of the PCB-containing material.

Several other transformers were located in other areas of the property and are identified on corresponding Site plans.

Phase I ESA: *Several electrical transformers were observed to be leaking fluid in the main substation, located behind the paper mill building, and from the transformer adjacent to the woodroom. In the past, many of the transformers contained PCB-contaminated mineral oils. Soil samples from around these transformers should be collected from shallow hand borings or test*

pits and analysed for PCBs. If PCB contamination in soil is encountered, groundwater sampling may be required to assess potential impacts to groundwater depending on the depth of contamination in soil relative to the depth of the water table.

2009 CRA Observations: The transformer were removed from the property and the adjacent mill building demolished prior to CRA's Stephenville Site visit. Staining was not confirmed by CRA because the ground in this area was predominately covered with concrete and brick demolition rubble.

PAOC 16 - Dry Ash Storage Area

Ash generated during the burning of hog fuel in the mill boiler was temporarily stored adjacent to the steam plant day tank (PAOC 1) prior to disposal at the landfills.

Phase I ESA: *Dry ash from the Power Boiler was temporarily stockpiled behind the paper mill building until it was transferred to the landfill sites. The soil in these areas will need to be sampled for the appropriate chemical parameters.*

2009 CRA Observations: The former dry ash storage area was predominately covered with concrete and brick demolition rubble during CRA's 2009 Stephenville Site visit.

PAOC 17 - Old Bark Pile

Phase I ESA: *There is an old bark pile located between the chip pad and the paper mill building. The quality of the bark materials in that pile and the underlying soil should be evaluated by sampling and chemical characterization.*

2009 CRA Observations: The old bark pile was in the same location as described in the Phase I ESA. The bark pile is a mounded area covering an area of approximately 9,000 square metres with the mound extending approximately four metres above ground level at its peak.

PAOC 18 - Wood and Chip Pads

The chip pad and wood pad were two large circular paved areas located southwest of the mill building that were used for storage of wood chips and wood prior to processing.

Phase I ESA: *The soil and groundwater immediately surrounding the wood and chip pads should be evaluated for possible chemical impacts from the storage of wood bark and chips on those pads.*

2009 CRA Observations: CRA observed the remnants of the wood and chip pads. Abitibi had been stockpiling debris, including grubbed material (soil with intermixed vegetation and organics) on the pads in this area of the Site. CRA also observed remnants of the transfer house located between the wood and chip pad as well as the former wood room, located directly southwest of the pads.

A DOEC email dated September 17, 2009 indicated that petroleum impacts (concentrations greater than guidelines) were previously identified in this area. In addition, groundwater was impacted with TPH at concentrations that were indicative of free phase petroleum product.

PAOC 19 – Salt Cake Storage A-Frame

The salt cake storage A-frame is located to the east of the paper storage building and was originally used for storage of the salt cake and later for the storage of surplus materials.

Phase I ESA: *The soil and groundwater immediately surrounding the A-Frame building should be evaluated for possible chemical impacts from the storage of salt cake and surplus equipment and supplies.*

2009 CRA Observations: The salt cake storage A-frame building had been decommissioned and demolished.

2.2.3.2 ADDITIONAL ESA PAOCs

Based on CRA's review of Abitibi's Phase II/III ESA reports, interviews with former employees and review of DOEC documents, CRA identified two additional PAOCs. These PAOCs are described below.

PAOC 20 – Jack Ladder

A jack ladder was formerly located directly west of the wood and chip pads, on the shores of the Inner Pond area. The jack ladder was used to collect logs from the Inner Pond and move them by conveyer to the top floor of the wood room for debarking. This area of the Stephenville Site was not identified as a PAOC in the Phase I ESA but the Phase II/III data provided by AMEC included data for samples of soil, groundwater, sediment, and surface water collected from the area.

7.0 SUMMARY OF PAOC IMPACTS

The following table presents a summary of the impacted media by PAOC. The impacts were determined based on the soil, groundwater, surface water, and sediment sample results presented in section 6.0.

PAOC		*Summary of Parameter Impacts*			
PAOC	*Name of PAOC*	*Soil*	*Groundwater*	*Surface Water*	*Sediment*
PAOC 1	Steam Plant Day Tank	-	Metals	NA	NA
PAOC 2	Paper Mill Building	-	Metals	NA	NA
PAOC 3	Stream Bed near the Main Security Gate	TPH/PAH	PAHs	Metals, PAHs, pH	PAHs
PAOC 4	Fire Training Area	-	-	NA	NA
PAOC 5	Tank Farm	TPH	Metals	NA	NA
PAOC 6	Settling Ponds and ASBs	-	Metals, TPH	Metals, SVOCs, PAHs, pH	NA
PAOC 7	Sludge Disposal Sites	Unknown	Metals	Metals, pH	Unknown
PAOC 8	Ash Ponds	Unknown	Metals, TPH	NA	NA
PAOC 9	Fuel Storage Areas (outside PAOC 5 and PAOC 1)	TPH	TPH	NA	NA
PAOC 10	Septic Disposal Fields	-	-	NA	NA
PAOC 11	Push-off Area	TPH	PAH, PCB	Metals	Metals
PAOC 12	Mine Pond Landfill	VOCs, Unknown	Metals, BTEX/TPH, PAHs, SVOCs	Metals, VOCs, SVOCs, pH	NA
PAOC 13	Tank 20 Landfill	Metals	Metals, PAHs, TPH	Metals, pH	-
PAOC 14	Active Landfill Site	Unknown	Metals	Metals	NA
PAOC 15	Electrical Substation and Transformers	TPH, Metals	-	NA	NA
PAOC 16	Dry Ash Storage Area	-	NA	NA	NA
PAOC 17	Old Bark Pile	-	-	NA	NA
PAOC 18	Wood and Chip Pads	TPH	TPH	NA	NA
PAOC 19	Salt Cake Storage A-Frame	-	-	NA	NA