



# ENVIRONMENTAL IMPACT ASSESSMENT

## CLOSURE OF THE DALHOUSIE THERMAL GENERATING STATION DALHOUSIE, NB

**Prepared For:**  
**NB Power Generation Corporation**

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**Prepared by:**  
**Conestoga-Rovers**  
**& Associates**

466 Hodgson Road  
Fredericton, New Brunswick  
Canada E3C 2G5

Office: (506) 458-1248  
Fax: (506) 462-7646

web: <http://www.CRAworld.com>

## 1.0 INTRODUCTION

### 1.1 PROPONENT INFORMATION

The Proponent is the NB Power Generation Corporation, hereafter referred to as “NB Power”.

**Proponent Chief Executive Officer: Mr. Gaëtan Thomas, President and CEO**

**Proponent Contact Information:** **Mr. Anthony Bielecki, P.Eng.**  
NB Power Generation Corporation  
515 King Street, Fredericton, NB E3B 4X1  
Tel: (506) 458-6701  
ABielecki@nbpower.com

**Consultant Contact Information:** **Mr. Troy Small, M.Sc., CE**  
Conestoga-Rovers & Associates  
466 Hodgson Road  
Fredericton, NB E3C 2G5  
Tel: (506) 458-1248  
Fax: (506) 462-7646  
tsmall@croworld.com

### 1.2 PROPERTY OWNERSHIP

Conestoga-Rovers & Associates (CRA) was retained by NB Power to prepare an Environmental Impact Assessment (EIA) registration document for decommissioning of the Dalhousie Thermal Generating Station (DTGS) located on located at 101 Thermal Lane, Dalhousie, New Brunswick. The DTGS consists of four main areas:

- The power generation plant site located at 101 Thermal Lane referred to as the “Plant Site”
- The fuel pipeline and associated infrastructure that extends from the West Wharf through the Town of Dalhousie culminating at the Plant Site referred to as the “Fuel Pipeline and West Wharf”
- The NB Power lands located near Eel River referred to as the “Blair Malcolm Solid Waste Disposal Site (BMSWD Site)”
- The former coal unloading station adjacent to the BMSWD Site referred to as the “Rail Siding”

These facilities will collectively be referred to as the “Facilities” or “Site” throughout this report. A Site location map and overall site location plan overlaid on an aerial photograph showing the location of these Facilities is provided on Figures 1.1 and 1.2, respectively. Additional descriptions of each area of the four areas are also provided below.

There is also a transmission line extending from the switch yard at the Plant Site to the Eel River High Voltage Direct Current (HVDC) station in Eel River and referred to the “Transmission Line”. This is a 35 metre (m) wide right-of-way (ROW) easement that extends approximately 7 kilometre (km) in total length from the Plant Site to the Eel River HVDC station. The Transmission Line is for distribution of electricity from the Plant Site to the HVDC. The switch yard is fenced area approximately 100 metres (m) by 60 m in area and located along the north property boundary of the Plant Site and is referred to as the “Switch Yard”. Both the Switch Yard and the Transmission Line infrastructure are not planned for demolition as part of the DTGS Facility Closure.

### **1.2.1 PLANT SITE**

The main area of the Plant Site includes 27 individual property parcels and a water lot property (PID Nos. 50341296, 50103696, 50103555, 50189687, 50102839, 50341239, 50102821, 50182443, 50054840, 50241603, 50220920, 50054485, 50055631, 50054477, 50220912, 50053636, 50220938, 50220946, 50055201, 50055649, 50182526, 50055276, 50216324, 50055060, 50054873, 50206838, and 50206846). The Plant Site is approximately 57 hectares (ha) in area and the water lot property (PID No. 50341288) is approximately 36 ha in area. There are also four undeveloped properties owned by NB Power south of the main Plant Site that covers an area of 18 ha (PID Nos. 50053743, 50182468, 50182450 and 50053651). These properties are segregated from the main Plant Site by private commercial/residential properties and were previously used to transport coal into the Plant Site through the Truck Haul Road (Pothier Street extension). All 31 properties associated with the Plant Site are owned by NB Power. The Plant Site property boundary outline is shown on Figure 1.3. An overview of the main Plant Site infrastructure from an aerial photograph is presented as Figure 1.4. Historical aerial photographs of the DTGS Facility and surrounding area are included in Appendix A.

### **1.2.2 FUEL PIPELINE AND WEST WHARF**

Fuel for the Plant Site (Orimulsion® or Bunker C) is received at the West Wharf in the Town of Dalhousie and conveyed via a 0.3 m diameter pipeline to the Plant Site. The Fuel Pipeline is approximately 3.9 km in total length and extends through private residential land, private commercial properties, and municipal properties. A large section of the pipeline was constructed in the same linear corridor as the municipal water supply pipelines from Eel River and Charlo River. This ROW corridor is owned by Regional Development Corporation (RDC) and includes PID Nos. 50382878, 50382860 and 50382852). This ROW corridor ends at the municipal fire station properties located at the corner of William and Renfrew Streets (PID Nos. 50101955, 50171933 and 50171925). The Fuel Pipeline is primarily above ground with buried portions on the municipal fire station properties and beneath Renfrew Street. On the west side of Renfrew Street, the fuel pipeline re-emerges above grade and parallels William Street on the American Iron & Metals LP/GP Inc. (AIM) properties which are part of the former Bowater mill property (PID Nos. 50173707, 50173681, 50173657, 50173715, and 50173616). At the intersection of William Street and the West Wharf entrance, the Fuel Pipeline extends north-south on AIM properties to the NB Power owned pumphouse and PIG station located on the Port of Dalhousie West Wharf property (PID No. 50352038). The Fuel Pipeline ROW property boundary as well as additional third party property boundaries containing the Fuel Pipeline and West Wharf infrastructure is shown on Figure 1.5. An overview of the Fuel Pipeline and West Wharf infrastructure from an aerial photograph is presented as Figure 1.6

Decommissioning work associated with the Fuel Pipeline will be within existing RDC ROW as well as Port of Dalhousie West Wharf leased property and likely will not require written consent from third party property owners under the easement and lease agreements. However, accessing specific sections of the pipeline ROW as well as areas of the pipeline on AIM or municipal lands will likely require written access agreements.

### **1.2.3 BLAIR MALCOLM SOLID WASTE DISPOSAL SITE**

The BMSWD Site is owned and operated by NB Power for the disposal of solid non-hazardous industrial waste generated from Facility operations. The BMSWD Site is located approximately 6.5 km southwest of the Plant Site and includes nine individual property parcels for a total area of 112 ha. (PID Nos. 50134428, 50229590, 50211663, 50170901, 50190347, 50171677, 50171669, 50136035, and 50171651). All nine properties associated with the BMSWD Site are owned by NB Power.

The BMSWD Site property boundary, including the Rail Siding (discussed below) is shown on Figure 1.7. An overview of the BMSWD Site and Rail Siding infrastructure from an aerial photograph is presented as Figure 1.8

#### **1.2.4 RAIL SIDING**

The Rail Siding is located on part of the BMSWD Site lands and partially on lands owned by Canadian National Railway (CN), and is operated by NB Power under a lease agreement with CN. The NB Power owned land associated with the Rail Siding includes portions of PID Nos. 50134428, 50171677, 50171669, 50136035, and 50171651 as well as leased property PID No. 50190347. The CN ROW associated with the Rail Siding is identified as PID No. 50058262. Prior to refurbishment of the DTGS in 1994, coal was delivered by rail to the Rail Siding where it was unloaded and temporarily stored prior to being transported by truck to the Plant Site. Decommissioning work associated with the Rail Siding will generally be within NB Power owned land but may encroach on the CN ROW property and therefore will likely require written consent and agreement with CN. The Rail Siding property boundaries and associated infrastructure are included with the figures associated with the property boundaries and infrastructure of the BMSWD Site (Figures 1.7 and 1.8, respectively).

## 2.0 THE UNDERTAKING

### 2.1 NAME OF THE UNDERTAKING

The name of the undertaking is **Closure of the Dalhousie Thermal Generating Station (DTGS)**. The DTGS was originally commissioned in 1969 and refurbished in 1994. The facility currently generates up to 320 megawatts of electricity (MWe) from the combustion of liquid Orimulsion® or Bunker C (heavy fuel oil) as its primary fuel in two boilers. Prior to refurbishment in 1994, Unit #1 boiler burned heavy fuel oil and Unit #2 burned coal originating from Minto, New Brunswick. The 1994 refurbishment also included the addition of a Flue Gas Desulphurization (FGD) system (“scrubber”).

Approval to Operate the Plant Site facility filed under the Clean Air Act (Approval #I-7185) expires on November 30, 2015. The Plan Site Approvals to Operate the industrial wastewater system, filed under the Clean Water Act (Approval I-5878), and the domestic wastewater system, filed under Clean Environment Act (Approval S-1457) expire on March 31 and May 31, 2013, respectively. All three Approvals to Operate identified above are bound to PID Nos. 50102839, 50054840, 50241603, 50103555, and 50102821. In addition, the Approval to Operate the BMSWD under the Clean Water Act and the Clean Air Act (Approval # I-7782) is valid until October 31, 2016 and is bound to PID No. 50134428. The New Brunswick Department of Environment and Local Government (NBDELG) has classified the BMSWD Site as a Class 1B Facility, pursuant to the Fees for Industrial Approvals Regulation 93-201 filed under the Clean Water Act and as a Class 4 Facility, pursuant to the Air Quality Regulation 97-133 filed under the Clean Air Act. This Approval to Operate contains conditions on type and origin of waste being disposed, construction and maintenance, wastewater management, discharge limits, testing, and monitoring and reporting requirements.

As a condition of the existing Approvals to Operate (Approval #I-7185 and #I-5878 ), NB Power is required to notify the Minister of Environment and provide an updated Site plan, and an engineered proposal for the Site rehabilitation and closure. This document is therefore intended to meet the requirements of NB Environmental Impact Assessment Regulation (Clean Environment Act) as well as the conditions under the Approvals to Operate (Clean Air Act and Clean Water Act). The Undertaking will therefore be referred to as “Facility Closure” for the remainder of this report and includes facility decommissioning and site rehabilitation.

## **2.2 PROJECT OVERVIEW**

The Facility Closure project will involve decommissioning, demolition and/or capping of existing infrastructure associated with current and former operation of the DTGS Facilities. The proposed Facility Closure plan is scheduled to occur in multiple distinct phases over a four year period followed by a Site clean-up and monitoring period. Decommissioning of the DTGS will be initiated as soon as the EIA Determination is received as the DTGS ceased operation in September 2012 and is not currently producing electricity. An overview of the four areas associated with the DTGS Facility Closure project requiring decommissioning is provided below. A description of the individual Facility Closure tasks and project schedule is provided in Section 2.7.

### **Plant Site**

Infrastructure associated with the Plant Site requiring decommissioning includes the existing plant building and offices, #1 and #2 boilers and turbines (collectively termed Units #1 and #2), redundant Unit #2 stack, Flue Gas Desulphurization (FGD) building and stack, fly ash plant, five aboveground bulk storage tanks (ASTs) for Orimulsion® and/or Bunker C fuel, six ASTs for storage of diesel fuel, one recirculation tank, one underground storage tank for waste oil, multiple chemical storage tanks, a transformer bank and other individual transformers, former polychlorinated biphenyl (PCB) storage building, cooling water (CW) intake structures, CW outlet structures, industrial waste water treatment plant (WWTP) and associated lagoons, and domestic (sanitary) treatment plant. As previously noted, the existing 138 kV electrical Switch Yard located at the northern property boundary will remain on the property along with the Transmission Lines into and out of the Switch Yard. Buildings or other infrastructure excluding the 138 kV Switch Yard and transmission lines will not be present on the Plant Site following the decommissioning work. The end land use of the Plant Site properties following the decommissioning work is the potential sale of the properties for commercial/industrial redevelopment with title transferred to the purchaser. The purpose for leaving the Switch Yard and Transmission Lines in-place is for contingent supply of high voltage electricity that may be required as part of potential commercial/industrial redevelopment options. The location of Plant Site buildings and infrastructure to be decommissioned is shown on Figure 2.1. Detailed plans of the Plant Site including buried services are included in Drawings B-1 to B-5 of Appendix B. An Existing Storm Water Infrastructure Plan and a conceptual Site grading and drainage plan are included in Drawings B-6 and B-7 of Appendix B, respectively.

### **Fuel Pipeline and West Wharf**

As previously described, fuel for the Plant Site (Orimulsion® or Bunker C) is received at the West Wharf in the Town of Dalhousie and conveyed via pipeline to the Plant Site. The majority of the pipeline is above grade and passes under two roadways (including the municipal hospital parking area) and through two hills which contain tunnelled sections. The above-ground sections of the Fuel Pipeline will be decommissioned and physically removed from the ROW and privately owned properties. The tunnelled and buried sections of the Fuel Pipeline will be decommissioned, capped, or concrete filled, and abandoned in-place.

The NB Power owned infrastructure at the West Wharf includes mechanical booms with articulating joints and steel piping, the PIG launcher station and the West Wharf Pumphouse that facilitate the off-loading and delivery of fuel from ships to the Plant Site Bulk Storage Tank Farm. Additional infrastructure associated with the West Wharf Pumphouse also includes an above-ground nitrogen tank, nitrogen heat exchange unit, two transformers and underground septic tank. The leasing agreement for the use of property owned by the Port of Dalhousie (West Wharf) states that the landowner may request that the lessee's structures and improvements be removed. Requirements for decommissioning on-wharf structures (PIG launcher station, ship-to-wharf connection booms, and the heavy wall pipeline to the pump station) need to be agreed to by the Port of Dalhousie but for the purpose of this document it is assumed the West Wharf infrastructure owned by NB Power will be removed and buildings demolished. The end land use of the leased West Wharf property will return to the Port of Dalhousie for continued port operations.

The location of existing Fuel Pipeline and West Wharf Infrastructure to be decommissioned is shown on Figures 2.2. A blow-up of the West Wharf Pumphouse and associated infrastructure is shown on Figure 2.3.

### **BMSWD Site**

The BMSWD Site has operated as a solid waste landfill associated with the DTGS since the late 1970s. The BMSWD Site includes a Fixated Ash Cell, an active solid waste disposal cell (Cell #1), two Coal Ash disposal areas, two sediment ponds, and three leachate ponds. The Coal Ash Areas were covered in 1994 when the Plant Site converted to Orimulsion®. The capped Fixated Ash Cell was constructed in 1994 and received vanadium-rich fly ash and bottom ash from the burning of Orimulsion® between 1994 and 1998. The Fixated Ash Cell was capped and closed in 2000 with the closure methodology previously approved by the NBDELG (Environmental Impact Assessment Registration dated May 5, 2000 and NBDELG Approval to Construct I-2631). The active solid waste disposal cell at the BMSWD Site (Cell #1) is a bermed, 500 m by 175 m



geo-membrane lined waste receiving cell divided into three separate waste receiving areas. Leachate from Cell No. 1 is collected into Leachate Pond No. 3 which discharges via overland flow to Hamilton Brook.

Based on the available information, the Coal Ash Cells have been previously closed and completed with vegetative cover that is satisfactory for continued closure subject to minor modifications. Similarly, the Fixated Ash Cell closure was previously approved by the NBDELG, including final cover, and is in satisfactory condition for continued closure with modifications restricted to reconfiguration of the associated Leachate Pond 1 and 2.

Decommissioning and closure activities associated with the BMSWD Site therefore include:

- Coal Ash Areas - Limited vegetation re-establishment or ash removal, perimeter ditch grading and infiltration gallery installation.
- Cell #1 - Receipt of demolition debris from decommissioning activities at the Plant Site, Fuel Pipeline and West Wharf, and BMSWD Site, and from WWTP operations followed by capping and closure at the end of the Facility Closure Project. An option to retain the usage of Cell #1 for the receipt of ash from NB Power's Belledune Thermal Generating Station is also included in the conceptual closure plan for the BMSWD Site. The receipt of ash from NB Power's Belledune operation is included in the current BMSWD Approval to Operate I-7782. The final design plans will be completed in consultation with NBDELG representatives as part of the Approval to Construct application past the current Approval I-7782 expiry date of October 31, 2016.
- Leachate Pond No. 3, Sediment Ponds Nos. 1 and 2 - Pond depth and inlet/outlet structures re-configured for conversion to wetlands. Leachate Pond No. 3 would remain in its current configuration (not converted to a wetland) if the option to keep Cell #1 open for the receipt of ash from Belledune is included in the Approval to Construct application to the NBDELG.
- Leachate Pond Nos. 1 and 2 - Ponds to be decommissioned and leachate from capped fixated ash cell diverted to converted wetlands at Sediment Pond No. 2.

Currently there is a transmission line that bisects the BMSWD Site in an approximate east-west direction. The transmission line extends from the Eel River HVDC and connects to a primary transmission line servicing the Town of Dalhousie and therefore is not to be decommissioned as part of the BMSWD Site closure activities.

The location of existing and former BMSWD Site infrastructure to be decommissioned and closed is shown on Figure 2.4. A current BMSWD Site Drainage Plan is included as Drawing C-1 of Appendix C. Conceptual Site grading and drainage plans for BMSWD Site are included in Drawings C-2 to C-5 of Appendix C.

### **Rail Siding**

The Rail Siding was formerly used for receiving coal and ceased operation in 1994 when the DTGS converted to the use of Orimulsion and Bunker C. NB Power therefore notified CN Rail that use of the rail siding is no longer required and should be removed. CN Rail subsequently dismantled a portion of the rail tracks to disconnect the siding from the main rail line. The Rail Siding decommissioning activities will therefore include dismantling of the existing steel beam thaw shed building, decommissioning of the coal storage and unloading bays and surface re-grading to allow for the elimination of the existing surface water management system which includes a pump station and fenced pond. The location of existing and former Rail Siding infrastructure to be decommissioned is shown on Figure 2.5. A current Rail Siding Drainage Plan is included as Drawings C-6 of Appendix C. A conceptual site grading and drainage plan for the Rail Siding is included in Drawings C-7 of Appendix C.

## **2.3 PROJECT RATIONALE**

The DTGS is a fossil fuel-fired generating station that was originally commissioned in 1969 and refurbished in 1994. The facility currently generates up to 320 megawatts of electricity (MWe) from the combustion of liquid Orimulsion® or Bunker C (heavy fuel oil) as its primary fuel in two boilers. Prior to refurbishment in 1994, Unit #1 boiler burned heavy fuel oil and Unit #2 burned coal originating from Minto, New Brunswick. The 1994 refurbishment also included the addition of a FGD system (“scrubber”). Although Approvals to Operate the DTGS Facility under the Clean Air Act does not expire until November 30, 2015, NB Power has decided to permanently close the Facility and ceased producing electricity on September 2012 as continued operation of the DTGS was determined not to be economically viable. In addition, NB Power has determined continued operation of the DTGS is not required to meet current or future energy requirements for the Province of New Brunswick. Electricity previously produced by this facility is being off-set by new electricity generation projects from renewable resources with substantially lower green-house gas emissions. The purpose of initiating the decommissioning program as soon as possible is to utilize DTGS employees in various aspects of the decommissioning work. NB Power understands that the decommissioning of the DTGS cannot be initiated prior to the EIA determination.

## 2.4 PROJECT LOCATION

### Plant Site

The Plant Site is approximately 57 hectares in total area located southern limits of the Town of Dalhousie (Town) which is located at the mouth of the Restigouche River at its discharge point into Chaleur Bay. The Plant Site is located within a primarily commercial/residential area of the Town and is also located along the shoreline of Eel Bay of Chaleur Bay. There is also a 36 hectare water lot property (PID No. 50341288) associated with the Plant Site including approximately 650 metres of marine shoreline frontage. The main access route to the Plant Site is via Thermal Lane which is connected to Renfrew Street (the main thoroughfare through the Town) by Bay Breeze Drive. Pothier Street is located directly west of the Plant Site (PID No. 50054840) with several NB Power owned properties also located on the west side of Pothier Street. Thermal Lane, Pothier Street and Tait Street service numerous residential properties adjacent to the Plant Site. The main Plant Site properties (PID Nos. 50102839, 50054840, 50241603, 50103555, and 50102821) and the vacant NB Power owned properties to the south (PID Nos. 50182468, 50182450 and 50053651) are split by a commercial property (PID No. 50053438) owned by General Construction Ltd. Vacant land associated with the Eel River First Nation Community is located directly south of the vacant land area owned by NB Power (PID No. 50182468). The Eel River Bar First Nation community is located approximately 3 kilometres south of the Plant Site.

The nearest water bodies relative to the Plant Site include:

- Eel Bay (Chaleur Bay) - directly east of the Plant Site
- Tait Brook - transects the Plant Site from northwest to southeast, discharging into Chaleur Bay
- A small regulated wetland area located at the discharge point of Tait Brook in the southeast corner of the Plant Site (PID Nos. 50220920, 50054485, 50055631, 50054477, 50220912, 50053636, 50220938, 50220946, 50055201, 50055649, and 50182526)
- Miller Brook located approximately one kilometre south of the Plant Site
- Eel River located approximately three kilometres south of the Plant Site
- An unnamed tributary approximately 500 metres north of the Plant Site

The Plant Site properties are located directly south of Dalhousie Mountain with the north portion of the Plant Site formed by rock walls of the mountain. There is an approximate 20 metre high sheer cliff on the northern portion of the Plant Site. The

entire Plant Site property slopes from west to east, towards Eel Bay (Chaleur Bay). The Plant Site ranges from approximately 4 metres above sea level along the shoreline to approximately 25 metres above sea level in the vicinity of the Bulk Storage Tank Farm.

The north - south coordinates of the Plant Site are 2509748.43 m, 7672823.21 m to 2509248.90 m, 7671533.09 m (NAD 83CSRS98 NB stereographic).

A 1:50,000 topographical map identifying the project Site relative to existing communities, roads, residential areas, etc. is presented as Figure 1.1. A property map and aerial photograph identifying the Plant Site and surrounding land use are presented as Figures 1.3 and 1.4, respectively

### **Fuel Pipeline and West Wharf**

The pipeline is approximately 3.9 kilometres in total length and extends through private residential land, private commercial properties and municipal properties. A large section of the Fuel Pipeline was constructed in the same linear corridor as the municipal water supply pipelines from Eel River and Charlo River. This ROW corridor is owned by the RDC. The Fuel Pipeline ROW corridor ends at the municipal fire station properties located at the corner of William and Renfrew Streets. The majority of the Fuel Pipeline is above grade and passes under two roadways (including the municipal hospital parking area) and through two hills which contain tunnelled sections. The Fuel Pipeline also crosses an unnamed tributary on the north side of Dalhousie Mountain, approximately 500 metres north of the Plant Site. The above ground portion of the Fuel Pipeline extending from the Plant Site to the corner of William and Renfrew Street is located directly adjacent to residential properties and dwellings as well as municipal recreational parks. The Fuel Pipeline is buried on the municipal fire station properties and beneath Renfrew Street. On the west side of Renfrew Street, the Fuel Pipeline re-emerges above grade and parallels William Street on the AIM mill properties. At the intersection of William Street and the West Wharf entrance, the Fuel Pipeline extends north-south on AIM properties to the NB Power owned Pumphouse and unloading station located on the Port of Dalhousie West Wharf property.

The coordinates for the Fuel Pipeline where it exits the northern boundary of the Plant Site property boundary is 2509848.69 m, 7672834.32 m. The coordinates for the Fuel Pipeline where it enters the West Wharf lease property is to 2509174.42 m, 7674692.32 m (NAD 83CSRS98 NB stereographic).

The NB Power owned mechanical booms and PIG launcher station are located on the West Wharf pier that has a concrete deck. The housing for the booms and PIG Launcher are located within a locked concrete containment berm. These structures are primarily

surrounded by waters of the Dalhousie Harbour. The West Wharf Pumphouse and associated infrastructure are located within a fenced area on the northeast corner of the West Wharf. The Pumphouse infrastructure is surrounded by Dalhousie Harbour to the north, the Port of Dalhousie commercial/industrial infrastructure to the west and south and AIM properties to the east.

The coordinates for the mechanical booms and PIG station located on the West Wharf pier are 2509104.17 m, 7674789.59 m. The coordinates for the center of the West Wharf Pumphouse are 2509174.02 m, 7674708.63 m.

A property map and aerial photograph identifying the Fuel Pipeline and West Wharf infrastructure and surrounding land use are presented as Figures 1.5 and 1.6, respectively.

### **BMSWD Site**

The BMSWD Site is located approximately 6.5 kilometres southwest of the Plant Site in an area called Dalhousie Junction. The BMSWD Site and surrounding area is primarily vacant forested land, cleared agricultural fields or other solid waste disposal sites. The nearest residential dwelling is located approximately 300 to 500 metres west and south of the BMSWD Site, respectively. Directly north of the BMSWD Site, between the BMSWD Site and the Rail Siding, is the capped municipal landfill (PID No. 50189844). This landfill has been decommissioned and reportedly has not accepted waste since 1995. Directly northwest of the BMSWD Site is the former Pioneer Chemical Inc. (PCI) industrial waste landfill site (PID No. 50135490). PCI produced sodium hydroxide and chlorine gas for the pulp and paper industry and it is reported that mercury impacted process material was disposed of at this landfill. This landfill is reportedly not currently receiving solid waste but the landfill decommissioning date or capping plan is unknown. Directly west of the BMSWD Site is the industrial landfill (PID No. 50142181) for the AIM mill (formerly Bowater) located in the Town of Dalhousie.

The BMSWD property (PID No. 50134428) is located on the southern and eastern slope of a hill that has an elevation of approximately 80 metres above sea level. The northern portion of the BMSWD Site (landfill area) is approximately 60 metres above sea level and slopes southeast towards Hamilton Brook. The southeast corner of the BMSWD Site is approximately 30 metres above sea level. There is an approximate 30 metre elevation change from northern portion to the southern portion of the BMSWD Site.

The nearest water bodies relative to the BMSWD Site include:

- Hamilton Brook – located on the southern portion of the BMSWD Site flowing west to east and associated contiguous regulated wetland
- Small regulated wetland located directly east of the Sediment Pond #1
- Small regulated wetland area primarily located on the PCI landfill site and the northwest corner of the BMSWD Site
- Black Brook – located approximately 500 metres to the east
- Eel River - located approximately one kilometre to the south
- Restigouche River located approximately two kilometres to the northwest

The north – south coordinates of the BMSWD Site are 2502748.58 m, 7670341.41 m to 2502983.55 m, 7669397.37 m (NAD 83CSRS98 NB stereographic).

A property map and aerial photograph identifying the BMSWD Site and surrounding land use are presented as Figures 1.7 and 1.8, respectively. A detailed plan of the BMSWD Site with elevation contours is presented as Figure 2.4.

### **Rail Siding**

The Rail Siding is located approximately 700 metres north of the active BMSWD Site in Dalhousie Junction. The Rail Siding infrastructure including a thaw shed, concrete coal storage containment area, a surface water catchment sump and settling pond are located directly south of the main CN Rail line that extends from Campbellton, NB to Bathurst, NB. The Rail Siding elevation adjacent to the CN rail line is approximately 26 metres above sea level. The Rail Siding thaw shed and sediment pond are elevated approximately 6 m above the concrete coal storage pad and associated sump.

The area surrounding the Rail Siding is primarily vacant forested land excluding the capped municipal landfill (PID No. 50189844) located directly southeast of the Rail Siding. The nearest residential dwelling would be located at a distance greater than 1 kilometre to the southwest on Blair Malcolm Road and northwest on Highway 11. Directly north of the BMSWD Site, between the BMSWD Site and the Rail Siding, is the capped municipal landfill (PID No. 50189844).

The nearest water bodies relative to the Rail Siding include:

- The two small regulated wetland areas located approximately 500 metres to the south and associated with the BMSWD Site
- Black Brook and associated contiguous regulated wetlands located approximately 400 metres to the north and east

- Restigouche River located approximately two kilometers to the northwest

The approximate east - west coordinates of the Rail Siding parallel to the CN Rail line are 2502829.69 m, 7670687.16 m to 2502450.81 m, 7670848.35 m (NAD 83CSRS98 NB stereographic).

A detailed plan of the Rail Siding with elevation contours is presented as Figure 2.5.

## **2.5 SITING CONSIDERATIONS**

Siting considerations for the Facility Closure project were generally not included as this is an existing facility. The disposal options for construction debris generated as part of the decommissioning activities and the required fill materials are summarized in Section 2.7.

The Plant Site and West Wharf structures are located on the shoreline or adjacent to the marine waters of Eel Bay and Dalhousie Harbour, respectively. These waters are known to provide sensitive habitat for aquatic and semi-aquatic flora and fauna. In addition, Tait Brook transects the Plant Site from northwest to southeast and Hamilton Brook transects the BMSWD Site flowing west to east. The Fuel Pipeline also crosses an unnamed tributary north of Dalhousie Mountain. Specific mitigation measures will therefore be implemented to protect these sensitive environments including obtaining a Watercourse and Wetland Alteration (WAWA) permit(s) as well as approvals from the NBDELG, renewing Approvals to Operate and Construct from NBDELG, and consultation with Fisheries and Oceans Canada (DFO) as part of the EIA submission. Consultation with the NB Energy and Utilities Board (NBEUB) as well as the NB Department of Natural Resources (NBDNR) is also currently on-going to determine the permit requirements related to decommissioning of the Fuel Pipeline infrastructure. As the Fuel Pipeline is also located on municipal and private land, property access agreements with various property owners will also be required for the Fuel Pipeline decommissioning.

## 2.6 PHYSICAL COMPONENTS AND DIMENSIONS OF THE PROJECT

### 2.6.1 PLANT SITE

#### General Description

The DTGS Plant Site encompasses a total area of approximately 75 ha with a 36 ha water lot as outlined in Figure 1.3. The entire DTGS Plant Site is included in the decommissioning program with the intent of selling the properties for future commercial/industrial redevelopment. As such, only the 138 kV Switch Yard identified on Figure 1.4 and associated Transmission Lines will remain on the property. The decommissioning of existing structures will be contained to within NB Power property boundaries excluding the off-Site transportation of potential hazardous building materials, salvageable/recyclable metals, non-hazardous building materials, ASTs and valuable assets.

Primary access to the Plant Site for passenger vehicles and light duty construction vehicles is currently through Thermal Lane which connects to Provincial Highways 134 and 275 (Figure 2.1). Although passenger vehicle access to the Plant Site via Thermal Lane will remain, access into and out of the Plant Site for transport trucks and construction vehicles during the decommissioning work will occur through the former Truck Haul Road (Pothier Street extension; see Figure 2.1). This road was specifically constructed for the transportation of coal from the Rail Siding to the Plant Site and provides direct access to the junction of Millar Road and Provincial Highway 134. This road is currently used for transportation of goods and materials into and out of the Plant Site. The Truck Haul Road has limited development in its vicinity and is primarily vacant forest area with access to Provincial Highway 134 and Highway 11. Use of this road will eliminate truck traffic through residential areas of Thermal Lane and Pothier Street.

From 1969 to 1994, the thermal electricity generation process at this Facility used coal, in combination with heavy oil that was transported to the Plant Site from the Rail Siding. During this period, approximately 3000-4000 tonnes of coal were transported to the Plant Site by trucks on a daily basis via the Truck Haul Road. Since 1994, coal has not been used at the Plant Site and therefore truck traffic utilizing the Truck Haul Road has significantly reduced. It is estimated that approximately 5 to 6 transport trucks (or 80 tonnes of material) are imported/exported to the Plant Site per day during routine DTGS operations. As such, the import/export of materials and equipment from the DTGS facility during its decommissioning is expected to be similar to current vehicular traffic during recent operations but will be substantially less than traffic that occurred prior to 1994. It is also noted the former Bowater pulp and paper mill (now owned by



AIM) located on William Street in Dalhousie was decommissioned between approximately 2010 and 2012. Vehicular traffic during the DTGS Facility Closure project is expected to be approximately equal to vehicular traffic incurred during decommissioning activities of the former Bowater mill. However, minimal increases in vehicular traffic directly on William Street (the primary commercial street in the community) are expected with decommissioning of the DTGS compared to decommissioning of the former Bowater mill.

Detailed Plant Site plans showing existing infrastructure as well as buried services are presented as Drawings B-1 to B-6 in Appendix B.

### **Bulk Storage Tank Farm**

The DTGS receives fuel by ship at the West Wharf in the Town of Dalhousie. The fuel is pumped from the West Wharf Pumphouse along a steel pipeline into five above ground fixed roof storage tanks located at the Plant Site within a bermed Bulk Storage Tank Farm. The bermed tank farm covers a total area of approximately 3.4 hectares. There are two discreet areas that make up the tank farm. The original unlined area to the east contains three aboveground storage tanks (ASTs), each having a capacity of 27 million litres (171,000 bbl). The more recent geomembrane lined area to the west contains two ASTs, each having a capacity of 48 million litres (300,000 bbl).

Surface water in the Bulk Petroleum Tank Farm area is currently directed to the tank farm oil/water separator which directly discharges into Tait Brook and eventually Eel Bay. Tait Brook enters the northwestern portion of the Plant Site property via an approximate 20 degree sloped drainage channel from Dalhousie Mountain, and then follows the contour of the eastern edge of the Bulk Storage Tank Farm flowing south.

As part of the Plant Site Facility Closure plan, bulk fuel storage tanks and associated infrastructure will be cleaned before dismantling and removal. In addition, the tank farm berms will be used for overall Plant Site re-grading activities. Wastewater generated during the bulk storage tank farm cleaning will be collected and processed using the on-site WWTP which includes oil/water separator pre-treatment. The intent of utilizing the WWTP for processing wastewater is to reduce potential impacts to Tait Brook from Facility Closure activities. As such, the continued operation of the WWTP facility for receiving wastewater will be sequenced into the decommissioning plan. In addition, the current stream channel configuration of Tait Brook will also be maintained to allow for continued re-naturalization of the stream channel from past disturbances. Details on the Bulk Storage Tank Farm decommissioning and grading plan are discussed in Section 2.7.

### **Plant Buildings**

The existing power plant building (the Plant) including Administration/Services Building, Turbine and Boiler Rooms for Units #1 and #2, the FGD Building and associated infrastructure, Water Treatment and Services Building, Precipitator Buildings and Flyash Handling areas cover an approximate area of three hectares. Demolition of all building structures will commence once the structures have been abated, regulated materials and wastes have been removed, and the structures have been cleaned as required. Cooling water (CW) used in the electricity generating process is obtained from Eel Bay from two CW pumphouses (CW Pumphouse #1 and #2) that intake seawater through concrete lined, enclosed, sumps. The CW is then pumped into the basements of Turbine Rooms #1 and #2 with the flow of water into the Plant during operation is estimated at approximately 130 m<sup>3</sup>/minute (35,000 US gallons/minute). CW Pumphouse #1 and #2 are approximately 6.5 and 9.0 metres in width, respectively. The concrete foundations and sumps for each CW Pumphouse Building extend approximately 5 metres into the waters of Eel Bay. Decommissioning of the CW Pumphouse Buildings will be completed as part of the DTGS Facility Closure project and will require work within waters of Eel Bay.

The CW is released from the eastern end of the DTGS Facility into Eel Bay from a combined CW Outfall, Boiler Blow-down Outfall and WWTP Outfall. The combined outfall is an approximate 2.5 metre wide by 7 metre high concrete discharge trench. The concrete trench terminates at the Eel Bay Shoreline. The combined outfall structure will require decommissioning, infilling and shoreline contouring as part of the DTGS Facility Closure project. CW supply and return lines (1,800 mm and 1,200 mm diameter lines) from the CW Intake structures to the facility and from the facility to the combined CW Outlet structures will be partially excavated, crushed, and backfilled.

A 450 metre long rip-rap breakwater structure in Eel Bay separates the CW Intakes from the CW Outlet to prevent short-circuiting of the cooling water. The decommissioning plan outlined in Section 2.7 involves the dismantling or removal of the infrastructure cited above excluding the breakwater. The breakwater will remain at its current location. Plans for the existing CW Pumphouse structures as well as the CW Outlet are presented as Drawings B-10 to B-12 in Appendix B.

### **Industrial Wastewater Treatment Plant**

Industrial wastewater is generated at the Plant Site as part of the DTGS operation and is directed to the WWTP Oil/Water Separator and then to the WWTP Building. Chemical releases or spills as well as water infiltration in Boiler Rooms #1 and #2, the FGD Building and the Water Treatment and Services Building are captured in the floor drains of these buildings and also directed to the WWTP. Treated wastewater is discharged to

Eel Bay (Chaleur Bay) by a combined sanitary and industrial wastewater outfall pipe located at the CW Outlet. As part of the Facility Closure, various components of the DTGS will be purged, rinsed, and otherwise cleaned, prior to demolition. Wastewater generated during the cleaning process will be contained, collected and directed to the Industrial WWTP, including the oil/water separator pre-treatment. The Facility Closure plan has therefore been sequenced to allow the Industrial WWTP to remain operational throughout the Plant Site decommissioning process along with the outfall structure. This will require that buried services "cuts and caps" segregate the WWTP; and the final cleaning of the WWTP would be one of the final stages of the decommissioning process.

There are two surcharge lagoons located between the WWTP Oil/Water Separation Building and the Industrial WWTP. These lagoons served as the primary wastewater treatment prior to the construction of the current WWTP in 1994. The lagoons are approximately 30 m by 40 m in area and approximately 2.5 m deep. The operation of the WWTP lagoons resulted in vanadium impacted sediment in the lagoons and surface soil adjacent to the lagoons (further discussed in Section 3.0). Prior to demolition of the Plant Site buildings, the adversely impacted sediment and soil will be excavated and transported to the BMSWD Site for disposal (with approval from NBDELG). Groundwater encountered during the excavation program will be processed through the WWTP. The lagoons are not required as part of the current WWTP operation.

The lagoons, WWTP, CW Intakes and CW Outlets are located within 30 metres of Eel Bay and decommissioning of these structures may require approval from the NBDELG under the WAWA regulation. In addition, the WWTP Approval to Operate (I-5878) indicates approval from the NBDELG may also be required for decommissioning of these facilities as they may be located in Zone A or Zone B as defined by the Provincial Coastal Area Protection Policy.

### **Plant Site Services**

There are currently two water mains that transect the Plant Site from south to north and are located within the same ROW corridor as the Fuel Pipeline within the Town of Dalhousie. One water main is the municipal water supply that extends from the Charlo River to the municipal water treatment building on the West Wharf. The second water main is the industrial water supply from Eel River that extends to the AIM (former Bowater) mill property on the West Wharf. The industrial water supply also formerly supplied process water for the Plant Site. However, due to the closure of the AIM mill, the industrial water main was abandoned in the summer of 2010. The Plant Site now directly obtains process water from the municipal water main where it bisects the Plant Site property (prior to municipal treatment). Potable water wells or process water wells are not located on the Plant Site. As part of the DTGS decommissioning activities, the

process water lateral line from the municipal water main will be isolated and capped. The active municipal water main will remain on the Plant Site property following DTGS decommissioning activities.

Storm water at the Site is conveyed through five separate storm sewer systems. Three of the systems discharge to Tait Brook and the other two systems discharge to Eel Bay. A third discharge pipe to Eel Bay was formerly abandoned in-place. The storm sewer system that collects storm water runoff from the Bulk Storage Tank Farm area passes through the Oil/Water Separation Building prior to discharging to Tait Brook. As part of the Facility decommissioning, the five storm water sewer systems will remain in place to allow for surface water drainage at the Plant Site to remain operational. A storm water services plan that was updated in 2010 is included in Appendix B (Drawing B-6). The proposed storm water drainage and grading plan for the Plant Site following decommissioning is also included in Appendix B.

## **2.6.2 FUEL PIPELINE AND WEST WHARF**

As previously indicated, the decommissioning plan includes removing the aboveground sections of the Fuel Pipeline from the ROW corridor for off-Site disposal and recycling. The buried and tunnelled sections of the Fuel Pipeline will be abandoned in-place as outlined below. An approximate 240 m underground section of the Fuel Pipeline located on the municipal fire station properties and beneath Renfrew Street is in the process of being abandoned in-place in consultation with the NBEUB. This section of the Fuel Pipeline was previously replaced due to a malfunctioning heat trace tape that prevented this section of the line to be cleaned using the PIG system. Approximately 120 metres (50%) of the redundant (former) underground line was abandoned in 2011 by removing residual petroleum product and mechanical capping. The remaining 50% of the redundant line will be decommissioned and abandoned in the summer of 2013. Details on the previous Fuel Pipeline abandonment procedures are provided in Appendix D.

The active Fuel Pipeline decommissioning requirements such as removal and abandonment procedures, required permits and access agreements are currently being developed in consultation with the EUB and NBDNR. For the purpose of this assessment, the proposed Fuel Pipeline decommissioning requirements include the following:

- Entire length of active Fuel Pipeline will be cleaned by pigging to removal residual petroleum product

- Pipeline insulation will be removed from all above-ground sections of the Fuel Pipeline including tunneled sections
- All above-ground sections of the Fuel Pipeline will be manually removed from the ROW for off-Site disposal and recycling
- Tunneled sections of the Fuel Pipeline will be abandoned in-place by mechanical capping
- Buried sections of the Fuel Pipeline will be abandoned in place by filling with concrete and mechanical capping

Access to the Fuel Pipeline will utilize municipal roadways and land areas to access the ROW corridor. The Fuel Pipeline decommissioning will involve decommissioning activities within residential areas of the Town of Dalhousie and therefore light duty construction vehicles and equipment (tandem dump trucks and rubber tire backhoe) will be utilized in an effort to minimize physical disturbances, exhaust emissions and ambient noise levels. It is estimated that less than 10 transport truckloads of material will be imported/exported from the Fuel Pipeline work areas on a daily basis. In addition, the Fuel Pipeline decommissioning work is expected to be limited to a six week period.

The West Wharf infrastructure is limited to the Pumphouse building, mechanical booms and PIG launcher station. Demolition of buildings and associated infrastructure will commence once the structures have been abated, regulated materials and wastes have been removed, and the structures have been cleaned as required. The only access to the West Wharf infrastructure is through Van Horne Drive and the Port of Dalhousie private access road. This is the main access point for goods and materials being imported/exported through the Port of Dalhousie West Wharf operations. The decommissioning of existing West Wharf structures will be contained to within NB Power property boundaries currently under lease from the Port of Dalhousie and associated pier area excluding the off-Site transportation of potential hazardous building materials, salvageable/recyclable metals, and valuable assets. It is estimated that approximately 30 transport trucks (or 450 tonnes of material) will be exported from the West Wharf during the decommissioning activities. This volume of vehicle traffic required for decommissioning the West Wharf infrastructure is not expected to significantly impact the Port of Dalhousie operations.

### **2.6.3 BMSWD SITE**

The active landfill area (Cell 1) construction consists of an under drain system, a single composite lined cell, and a leachate collection system. Cell 1 is divided into three separate waste receiving areas (Cells 1A, 1B, and 1C). Waste is landfilled in Cells 1A and 1C. A quantity of gypsum was originally stockpiled in Cell 1B, however this material has since been recovered. Leachate from Cell 1 is conveyed by gravity to Leachate Pond 3, which discharges via overland flow to Hamilton Brook to the south. The under drain system also discharges via overland flow to Hamilton Brook.

Leachate from the Fixated Ash Cell is collected and conveyed by gravity to Leachate Pond 2. Previously, leachate was conveyed by gravity to Leachate Pond 1 and Leachate Pond 2, however this practice was discontinued given that Leachate Pond 2 contained sufficient volume for leachate generated from the Fixated Ash Cell. Leachate Pond 2 drains into a sediment pond (Sediment Pond 2) that also receives surface water from the southern portion of the BMSWD Site.

### **2.6.4 RAIL SIDING**

Included with the BMSWD Site is a Rail Siding Area where coal was historically bottom dumped into a concrete holding area prior to transport to the Plant Site. The Rail Siding area was developed in the 1980s and ceased operation in 1994. The area currently contains the former rail siding building (i.e., thaw shed), concrete coal storage containment area, a surface water catchment sump and settling pond. The Rail Siding area is located approximately 700 metres north of the BMSWD Site.

The rail siding building is steel beam construction with metal siding. The building is approximately 40 metres in total length and approximately 10 metres in width. The rail siding tracks extend through the building so coal could be bottom dumped into a concrete holding area. Based on property plan information available from Service New Brunswick (SNB), the rail siding building appears to be on land owned by CN. The concrete coal storage containment area, the surface water catchment sump and the associated sediment pond are on land owned by NB Power. NB Power owns the Rail Siding infrastructure including the thaw shed building but CN owns the rails, ties and switchgear.

The concrete storage pad is approximately 60 m by 20 m in area and has an approximate 1 m high concrete retaining wall encompassing the pad. The storage pad is approximately six metres lower in elevation than the rail line. There is also an active

concrete sump (approximately 10 m by 5 m in area) located in the southeastern corner of the concrete coal storage pad. A 6 m by 8 m wooden frame building that contains the sump pump and a dry transformer is situated over the eastern end of the concrete sump. This sump is to control storm water within the concrete pad. Water in the sump is pumped to the Rail Siding sediment pond located directly west of the concrete storage pad. This sediment pond is approximately 35 m by 15 m in area.

The Rail Siding configuration is shown on Figures 1.8 and 2.5. Photographs are included in Appendix I.

## **2.7 DEMOLITION AND CLOSURE DETAILS**

As noted in Section 2.2, the closure and decommissioning of the existing DTGS is proposed to occur in distinct Tasks over a four year period followed by a Site clean-up and monitoring period. Facility Closure activities associated with the DTGS decommissioning will be initiated as soon as the EIA Determination is received from the NBDELG along with other requisite approvals/permits. The purpose of initiating the Facility Closure as soon as the operational permits expire is to maximize employee work time by having non-retirement age employees participate in seamless employment following the facility closure date. The proposed Facility Closure tasks and schedule for each task is outlined below. Individual components of the proposed project and the proposed schedule are provided in Table 1.

It is noted that the proposed yearly schedule is conceptual and specific tasks are considered to be interchangeable between the four years based on demolition contractor availability, preferred demolition sequencing, etc. In addition, the engineered designs for tasks such as bulk storage tank decommissioning, landfill capping as well as demolition sequencing and methodology are based on the information available at the time of the EIA document preparation. Final design plans for the Facility Closure will be based on contractor requirements, certificates of approval or other provincial/federal approvals and public consultation. In addition, the Facility Closure sequencing described in this section assumes hazardous materials removal and cleaning activities will be completed before any building demolition activities are initiated. This decommissioning sequencing (i.e. hazardous materials removal/cleaning followed by demolition) will be applied to all buildings but the timing of the activities may be completed on a building by building basis. As such, it is possible that some buildings at the Plant Site may be abated and demolished before hazardous materials removal/cleaning activities have been initiated in other buildings.

The Truck Haul Road and Blair Malcolm Road will be the primary access route for the transportation of equipment and materials into and out of the Plant Site and BMSWD Site, respectively. Both of these roads connect directly to provincial highways. The West Wharf access road connects directly to Provincial Highway 134 and this will be the main access route into and out of the West Wharf Pumphouse area. Highway 134 (Renfrew and William Streets) will also serve as the primary route for transporting Fuel Pipeline materials back to the Plant Site for disposal and recycling. The use of municipal streets such as Princess, Goderich, Calvent, Victoria and Adelaide will also be required to directly access the Fuel Pipeline for decommissioning (see Figure 1.5). The use of highway registered trucks from private trucking companies that are of similar size to trucks currently transporting waste and process materials into and out of these various Facilities will mitigate any potential impacts associated with vehicle traffic patterns. If however, during the course of the proposed Facility Closure project, oversize or overweight loads are required for various project tasks, an engineered traffic management plan will be prepared and a permit obtained from the Transportation Branch of the NB Department of Transportation.

## **2.7.1 YEAR 1 – APRIL 2013 TO MARCH 2014**

### **2.7.1.1 TASK I – PRE-DECOMMISSIONING ENGINEERING**

Following the submission of the EIA registration document and receipt of the EIA Determination, a number of pre-decommissioning engineering commitments will be required in order to obtain the necessary approvals for decommissioning the Facilities, and to prepare tender documents to retain contractor(s) to implement the decommissioning activities. Completion of the pre-decommissioning engineering requirements will be the focus of Year 1 activities with actual physical decommissioning activities to be initiated in Year 2. The following pre-decommissioning engineering tasks include:

- (i) *Public Information Session and Aboriginal Engagement*
- (ii) *Stakeholder Consultation and Agreement*
- (iii) *Regulatory Approval Planning*
- (iv) *Hazardous Materials Audit*
- (v) *Hamilton Brook Ecological Risk Assessment (May/June 2013)*
- (vi) *Detailed Design and Tender Document Preparation*



(i) **Public Information Session and Aboriginal Engagement**

To meet the requirements of the EIA registration process, public involvement activities must be completed and a report on the involvement activities submitted to the NBDELG within 60 days of project registration. As such, a public information session and separate aboriginal engagement will be scheduled following registration of the project and has tentatively been scheduled for the winter (January/February) of 2013. The Public Information Session and Aboriginal Engagement that will be completed following the EIA registration are outlined in Section 6.0 of this report.

(ii) **Stakeholder Consultation and Agreement**

As several components of the Facility decommissioning project involve decommissioning structures on privately/publicly owned land or land being leased by NB Power, consultation and access agreements with various landowners will be required to finalize the Facility Closure plans and implement the decommissioning activities. The Facility Closure activities likely to require stakeholder consultation and access agreements include:

- West Wharf infrastructure in consultation with the Port of Dalhousie
- Fuel Pipeline within the municipal ROW as well as buried portion of the pipeline beneath Victoria and Renfrew Streets and the municipal fire station properties in consultation with the Town of Dalhousie
- Fuel Pipeline within the former Bowater mill properties in consultation with AIM
- Rail Siding building (thaw shed) in consultation with CN

(iii) **Regulatory Approval Planning**

Assuming successful approval of the EIA, including public consultation, it is anticipated that several provincial, federal and municipal permits will be required prior to implementing the decommissioning activities. As such, federal, provincial and municipal officials will be engaged during Year 1 activities to determine potential approval/permit requirements of the Facility Closure project in addition to conditions outlined in the EIA Determination. It is not expected that all applicable approvals/permits will be applied for or approved during the first year of the decommissioning project as physical decommissioning activities are sequenced over a four year period. The regulatory permits/approvals likely to be required over the duration of the Facility Closure project are further discussed in Section 7.0.

(iv) **Hazardous Materials and Chemical Inventory**

In order to complete the detailed design and to obtain the approvals identified above, additional data specific to hazardous materials will be required. Year 1 of the project therefore includes the completion of a detailed hazardous material inventory related to the Plant Site, Fuel Pipeline, West Wharf and Rail Siding. The hazardous materials inventory will include but is not limited to ozone depleting substances (ODS), nuclear devices, mercury switches, batteries, lead based paint and polychlorinated biphenyls (PCB). As part of Phase I and II Environmental Site Assessment (ESA) work previously completed at the Site in 2010 (see Section 3.11), an initial list of hazardous materials observed or potentially present at the Facilities was generated and is included as Table 2. It is expected that the hazardous materials identification and inventory program will be completed using DTGS employees intimately familiar with the operation of the facility to identify potential hazardous materials. The purpose of hazardous materials and inventory program is to develop a detailed list of hazardous materials and associated quantities present at the DTGS Facilities that will be used to develop appropriate removal and disposal plans. The hazardous materials identified during previous investigations and approximate quantities that will be used as a basis for completing subsequent inventories are presented on Table 2.

**Asbestos Containing Materials**

In 2002, All-Tech completed a survey of potential asbestos containing material (ACM) at the DTGS Facilities. The information obtained during the survey was entered into an Asbestos Trakker® computerized program. An asbestos management plan was also developed by All-Tech (report dated March 2002) to establish procedures for building maintenance and renovations, to remove or repair ACM identified in the assessment report and to provide training and equipment to workers at the Plant Site. ACM encountered in specific areas during maintenance activities completed at the Plant Site since 2002 has been removed and the work completed has been recorded in Plant Site ACM Management files. An Electronic copy of the Asbestos Assessment Report and Asbestos Management Plan prepared by All-Tech in March 2002 is included in Appendix E-1. Removal of ACM is included in Year 2 activities and further described as Task III, Section 2.7.2. Minor ACM removal may occur during demolition due to access limitations in select pieces of equipment.

**PCBs**

The previous Phase I/II ESAs completed for the Plant Site in 2010 (see Section 3.11) noted that a PCB storage barn (small storage shed) is located between the Oil Transfer Pumphouse and the Bulk Storage Tank Farm Oil Water Separator building. This building previously contained PCB storage containers but the building has not been in

use for approximately 15-20 years. No other PCB storage containers were noted to be present at the DTGS Facilities during previous assessment programs and NBDELG records indicate that the Plant Site (PID Nos. 50102821, 50102839, 50054840, 50241603, and 50103555) and BMSWD Site (PID No. 50134428) are not registered with the department as PCB Storage sites.

During the previous Phase I/II ESAs, a list of known transformers located on the Plant Site and West Wharf Pumphouse was prepared by NB Power. Transformers located within the Plant Site Switch Yard area were not included on the list as the Switch Yard is not included in the Facility Closure project. The interim list of transformers present at the Facility is included in Appendix E. As part of Year 1 activities, a detailed inventory of all known or suspected oil containing transformers, circuit breakers, bushings, potheads, cables or other associated instruments currently present at the DTGS Facilities will be prepared and a sampling program implemented to determine the potential PCB content in equipment at the DTGS Facilities. Results of the transformer inventory and associated sampling program will be provided to NBDELG along with a PCB Management Plan.

### **ODS**

There are several central heating, ventilation and air conditioning units as well as various cooling systems on the Plant Site. A yearly inspection and inventory of ODS equipment at the Plant Site is maintained by NB Power along with yearly leak tests completed by an independent, licensed contractor. The current inventory of Air Conditioning/Refrigeration and Water Coolers located on the Plant Site along with the refrigerant type, location description, make, model and leak test verification is included in Appendix E-2. As part of Year 1 activities, this ODS inventory will be updated and verified and the information obtained used to develop an Ozone Depleting Substance (& other Halocarbons) Work Plan for submission to the NBDELG.

### **Other Hazardous Materials**

Several other hazardous materials were identified as being present at the DTGS Facilities and include ionizing radiation sources including smoke detectors (0.5 g Americium-241) and self-illuminating EXIT signs (Tritium) (E-6), mercury containing devices and waste mercury (E-3) as well as potential lead-based paint (E-7). The location and quantity of these potential hazardous materials will be verified as part of the Year 1 activities with specific removal and disposal procedures included in contractor tender specifications and contracts.

(v) *Ecological Risk Assessment (Hamilton Brook)*

Hamilton Brook parallels the southern boundary of the BMSWD Site and discharges into Eel River approximately 3 km southeast of the BMSWD Site. Hamilton Brook is a relatively small, low flow tributary that receives effluent from Sediment Pond #2 and Leachate Pond #3 via overland flow. NB Power completes daily, weekly, monthly and quarterly analysis of lagoon effluents and under drain discharges at the BMSWD Site as part of the landfill Approval to Operate. In addition, there are 11 existing nested piezometers at the BMSWD Site that are also monitored on a quarterly basis. Effluent and groundwater samples are collected for analysis of pH, suspended solids, sulphate, selected metals, and fish toxicity. Results of the monitoring program over the last three years indicate effluent quality has been within discharge limits set in the Approval to Operate and toxicity test results on the samples collected were non-lethal. However, two sediment samples (BMHB-1 and BMHB-2) collected from Hamilton Brook as part of the 2010 Phase II ESA program had metal concentrations exceeding applicable Canadian Council of Ministers of the Environment (CCME) guidelines as well as having elevated Total Petroleum Hydrocarbon concentrations (see Section 3.11). The Phase II ESA program recommended that background conditions of the brook be further investigated and an ecological risk assessment completed to determine if the elevated metal and petroleum hydrocarbon concentrations in sediment present a risk to ecological receptors of the brook.

An additional sediment sampling program and Ecological Risk Assessment (ERA) will therefore be completed for Hamilton Brook. The ERA will be completed consistent with general accordance with A Framework for Ecological Risk Assessment: General Guidance (CCME, 1997). The ERA is scheduled for the spring/summer period (May/June) of 2013. Results of the additional sediment sampling plan and ecological risk assessment will be presented to NBDELG along with recommendations for remedial action (if required).

(vi) *Detailed Design and Tender Document Preparation*

Detailed design of the decommissioning work is required, including preparation of tender documents, following which the tender packages will be issued for public tender such that NB Power may obtain competitive quotes for implementation of the DTGS Facility Decommissioning. The tender documents will include instructions to bidders, contract, general and technical specifications, detailed design drawings, and form of bid. The finalized detailed design and tender package documents will be provided to NBDELG for review and comment prior to public release.

### **2.7.1.2 TASK II - PLANNING AND MANAGEMENT ACTIVITIES**

As part of Year 1 Facility closure activities, NB Power personnel will undertake a an asset planning and inventory program to identify specific DTGS assets such as equipment, raw materials, containerized materials that can be salvaged for sale or re-use at another NB Power facility. Included in the Task II activities will be the establishment of an electrical disconnection plan that will allow critical areas of the Plant Site to remain energized for the duration of the decommissioning activities (i.e. WWTP). Activities to be completed by NB Power personnel prior to and during Year 1 activities include:

- Consumption and recycling of raw materials such as fuel and chemicals to minimize waste disposal quantities
- Deactivation and de-energizing of selected electrical generating equipment
- Draining and purging of process lines (final draining and purging will be completed by the demolition contractor)
- PIG cleaning of the operational sections of pipeline
- Collection of miscellaneous waste containers in the associated buildings/structures (PIG launcher/receiver buildings and the West Wharf pumping station)
- Coordination of the decommissioning and return of the rented Nitrogen Gasification System at the West Wharf pumping station

#### **Chemical Management**

An inventory of potentially hazardous or harmful chemicals currently being stored and used at the facility has been prepared by the DTGS Acting Chemical Control Supervisor (Mr. Malcolm Manderville) and is presented in Table 3. As part of the Year 1 activities, all potentially hazardous chemicals will be removed from the property and transported off-Site for disposal or re-use at other facilities. The chemical quantities listed in Table 3 are based on quantities being stored at the DTGS at the time of the EIA registration document preparation and will likely be different than the chemical quantities present at the time of the DTGS decommissioning.

Included with the chemical removal program will be selective draining and flushing of hydraulic and waste oil from stationary equipment. Final draining and flushing will be the responsibility of the demolition contractor.

Throughout Year 1, salvageable materials that are recyclable or are considered to be a valuable asset will be removed from the property. This may include removal of equipment and materials from the DTGS Facility buildings such as tools, spare parts and selected equipment. Items that are considered valuable assets and may be transported off-Site for re-use at other NB Power facilities or sold are listed in Table 4.

Removals by NB Power during this Task will focus on re-usable and recyclable materials. Residuals in tanks, gearboxes, pumps and lines will be managed as part of the demolition contracts.

## **2.7.2 YEAR 2 - APRIL 2014 TO MARCH 2015**

### **2.7.2.1 TASK III - SITE PREPARATION & HAZARDOUS MATERIALS REMOVAL - PLANT SITE**

Year 2 of the project includes the removal of hazardous materials from the Plant Site buildings including but not limited to ODS, nuclear devices (level and flow indicators), mercury switches, batteries, lead based paint and PCB containing materials. The hazardous materials removal program will be based on data obtained during the Hazardous Materials Identification and Inventory program and subsequent removal and disposal plans prepared as part of Year 1 activities. The removal and disposal of hazardous building materials such as ODS, nuclear devices and mercury switches will be completed by appropriately licensed technicians as well as trained NB Power staff and in accordance with individual hazardous materials management plans to be submitted to NBDELG following the EIA determination (i.e. ACM Inventory and Management Plan, PCB Management Plan, and ODS Work Plan). The decommissioned hazardous materials and equipment will be transported using a contracted transportation company and disposed of at provincially or federally approved disposal facilities. The approximate quantity and location of potentially hazardous materials to be removed, the transportation method and destination is outlined in Table 2 but this list will be updated as part of Year 1 activities.

Scheduling of hazardous material removal is tentative and subject to final award of the demolition tender award. The successful demolition contractor may choose to schedule hazardous material removal throughout the demolition period on an area by area basis resulting in a multi-stage, multi-year hazardous materials removal schedule.

### ACM Removal

Prior to demolition, the removal of ACM will be completed by a licensed asbestos abatement contractor and consist of the removal of both ACM insulating materials (such as on piping and vessels) and ACM building siding material (galbestos). The updated asbestos inventory prepared for the Plant Site Facility in Year 1 will be used as the basis to define the scope of work for ACM abatement. Abatement of the vessel, piping, and other equipment insulation will likely be within constructed individual containment areas around the equipment. Alternatively, glove bagging may be used for individual pipe fittings, elbows, and piping. ACM will be removed in Year 2 prior to any demolition activities to the extent possible. Minor amounts of ACM may be removed during demolition due to access limitations.

The galbestos siding material is a non-friable material and unlike the ACM insulation, no enclosure or glove bagging is required. Galbestos will be removed as part of the demolition tender and be scheduled with general building demolition. The panels will probably be removed with a high reach excavator and stored on site pending on-site compacting for efficient landfilling at the BMSWD site. Siding storage and compacting areas will be cleaned of any flaked Galbestos which will be disposed at the BMSWD site.

Salvageable equipment will be completely removed prior to abatement work within the structures. The friable ACM insulation abatement will occur before removal of Galbestos siding. The ACM abatement will be completed prior to cleaning where the use of high-pressure water blasting is required (see next sub-section). Once the siding is removed, the structures will be exposed to the environment. Therefore, the siding removal will be coordinated with decommissioning cleaning (next section) and building demolition (Tasks IX and X; Section 2.7.4).

The abatement contractor awarded the contract will be required to prepare a site specific health and safety plan and abatement plan. For the purpose of this document, it is assumed that friable asbestos will be disposed at an approved municipal landfill and non-friable asbestos will be transported and disposed at the BMSWD Site (Cell #1) but will require prior approval from NBDELG.

Small amounts of inaccessible friable ACM may be removed during the general demolition contract due to access limitations but an approved ACM contractor will be used and disposal of friable ACM will be at an approved municipal landfill.

### **Plant Washing**

As part of the decommissioning of the DTGS, equipment, tanks, piping, pits, sumps, floor trenches, catchbasins, stacks and surfaces will be purged, rinsed, and otherwise cleaned, prior to demolition as determined necessary by visual inspection. This cleaning will remove accumulated solid residue and oils or other liquids that otherwise may be released during demolition activities. The level of cleaning will also be determined by the need to remove potentially hazardous dust. Cleaning will render the recyclable materials free of gross process residue, enabling shipment of salvage materials.

- Techniques for cleaning will include low volume, high-pressure water blasting, steam cleaning, washing with detergent, and other means and methods. Wastewater will be contained and collected. Water required for the plant washing activities will be obtained from the existing untreated municipal water supply.

Wastewater will be contained and processed using the on-Site WWTP which includes oil/water separator pre-treatment. The continued operation of the WWTP for receiving wastewater will be sequenced into the decommissioning plan (Task II). This will require that electrical "cuts and caps" segregate the WWTP and the final cleaning of the WWTP would be sequenced accordingly. Treated water will continue to be discharged to Eel Bay through the combined CW Outlet structure. The Plant Site areas anticipated to require cleaning and thereby generating wastewater are shown on Drawing B-8 of Appendix B.

#### **2.7.2.2 TASK IV - BULK STORAGE TANK FARM DECOMMISSIONING**

The second task to be completed in Year 2 of the Facility Closure project is the decommissioning of the five Bulk Storage Tank Farm ASTs (two 48-million litre (ML) and three 27-ML tanks) and associated infrastructure. Prior to closure of the Plant Site, NB Power have maximized efforts to re-suspend any fuel-related solids in the bulk storage tanks to minimize the amount of solids remaining as sludge to be managed as part of decommissioning.

The tender documents prepared in Task I of Year 1 will include cleaning and decommissioning of the Bulk Storage Tank Farm ASTs by a qualified petroleum contractor with previous experience decommissioning bulk petroleum storage tanks. The tender will likely include a provision to assess the quantity and quality of sludge



remaining in the bulk storage tanks when the DTGS ceases operation. The sludge information collected will be used to identify the best available technology to effectively treat/dispose of or recycle the remaining sludge material.

As part of the tank decommissioning program, it is expected that the interior of each tank will be accessed by cold cutting an opening in the tank wall. Decommissioning activities will commence with the bulk removal of Bunker C sludge from the tanks, possibly in combination with a solvent addition, followed by pressure washing of the interior glycol heaters, piping, walls, and floor to remove residual waste and oil. Tanks will be verified empty prior to release for demolition.

The treatment and disposal options for the bulk sludge removed from the tanks will be dependent on the quantity/quality of the product as well as contractors bidding on this contract and their approaches. However, for the purpose of this document, it is expected that the sludge treatment option would involve mobilization of a trailer mounted treatment system to the Plant Site for centrifuge and processing of the sludge. The purpose of centrifugation is to segregate residual oil in the sludge from solids. The solids would be transported to an approved disposal facility for further treatment and recycling, while the oil would be recycled and sold for subsequent use. This is the preferred option for handling the bulk petroleum sludge compared to other disposal options such as off-site shipment for incineration and disposal. The centrifugation and recycle option is considered to be the most “environmental friendly” alternative compared to off-site incineration.

It is anticipated that a final rinse of the tanks will be required prior to demolition to remove fuel residue which will generate wastewater. As such, the wastewater generated during the tank cleaning process will be collected and directed to the on-site WWTP which includes oil/water separator pre-treatment. In addition, the Bulk Storage Tank Oil/Water Separator will remain in operation during the cleaning process to ensure residual product is not released to Tait Brook during the cleaning process.

The steel bulk storage tanks will be salvaged for recycle value and therefore will likely be decommissioned by cutting the tanks into sections and loaded onto tandem axle dump trucks or transport trailers for transport to a recycling facility. It is expected the tank decommissioning activities will utilize truck mounted cranes or track mounted excavators for decommissioning and loading the recyclable steel. Insulation will be disposed at the BMSWD site. The work will be completed by a sub-contractor hired through the NB Power tendering system and monitored by NB Power staff or its representatives.

Fuel storage handling equipment exterior to the tankfield berms such as the Electrical Switchgear Room, Redundant Oil Pumphouse, Fuel Oil Transfer Pumphouse, Fuel Recirculation System and Tank Farm Orimulsion/Water Separation Building will be decommissioned in association with the overall Plant Site building demolition work which are included in Tasks IX and X in Years 3 and 4 of the Facility Closure project.

Following the bulk storage tank and associated infrastructure cleaning and decommissioning, the tank farm berms will be used for overall Plant Site re-grading activities. The Bulk Storage Tank Farm area will be graded to match the existing hard surfaces and to achieve positive drainage to the remaining storm sewer system. Site grading activities are included in Task XI of Year 4 Facility Closure activities. A final grading plan for the Plant Site is included as Drawing B-7 of Appendix B.

For this Task, construction equipment will generally be limited to the initial mobilization of truck mounted sludge treatment unit and required demolition equipment such as specialized excavators or truck mounted crane. This equipment will remain at the Plant Site for the duration of the Facility Closure project. Privately contracted tandem axle dump trucks or highway registered transport trucks with trailers will also be used to transport recyclable steel to the contracted recycling facility. Trucks will generally mobilize to the Site in the morning and be traveling into and out of the Plant Site throughout the day via the Truck Haul Road. The majority of truck traffic associated with this task will be the transport of recyclable metal off-site. Re-routing of traffic or other vehicular impacts are not expected to be associated with this task. The estimated working hours for decommissioning of the Bulk Storage Tank Farm ASTs is from 7:00 AM to 7:00 PM Monday to Friday which is consistent with the current hours of operation for transport of goods and materials into and out of the Plant Site. Decommissioning of the Plant Site including the Bulk Storage Tank Farm may also extend into the weekends (Saturday and Sunday) at the discretion of the tendered contractor and NB Power.

The fuelling of construction equipment will be limited to portable tanks registered under the NB Petroleum Product Storage and Handling Regulation and used at the discretion of the contractor. The fuelling of highway registered equipment belonging to contractors, such as transport trucks, will occur off-site and will be the responsibility of the contractor. Maintenance and re-fuelling of the equipment will be completed in designated areas of the Plant Site located a minimum of 30 metres from any existing surface water body, drainage channel or watercourse. The EPP developed for this project will specifically outline equipment re-fuelling and equipment maintenance protocols for the Facility Closure project.

### **2.7.2.3 TASK V - FUEL PIPELINE AND WEST WHARF DECOMMISSIONING**

The Fuel Pipeline and West Wharf preparation and decommissioning is scheduled to be completed concurrent with the Bulk Storage Tank Farm AST decommissioning program (Task IV). It is the intent of NB Power to remove these facilities through a demolition program that will meet the following objectives:

- Meet the decommissioning requirements of the Port of Dalhousie as the lessee of the West Wharf including the loading booms, pumphouse, PIG launcher station, and Fuel Pipeline
- Meet the decommissioning requirements of the Town of Dalhousie for the pipeline located in the shared ROW corridor and municipal fire station properties
- Meet the decommissioning requirements of AIM for the pipeline located on the former Bowater mill properties
- Minimize potential impact of decommissioning activities on adjacent residential/commercial landowners
- Minimize waste disposal by maximizing economic opportunities for reuse and recycling of materials

As part of the Pre-Decommissioning Engineering (Task 1), consultation and access agreements with various landowners will be finalized and incorporated into the Fuel Pipeline and West Wharf Decommissioning. In addition, as ACM material was previously identified on the Fuel Pipeline joint coatings, an update to the ACM audit will be conducted to identify the type and quantity of ACM at the DTGS Facilities as part of Task 1 and incorporated into the final decommissioning.

#### **Fuel Pipeline Cleaning**

The Fuel Pipeline from the West Wharf to the Plant Site will be cleaned before dismantling. The pipes will initially be cleaned using the existing PIG system and then flushed and rinsed. Wastewater generated during the Fuel Pipeline decommissioning activities will be collected in the PIG receiving building at the Plant Site and processed through the WWTP.

#### **ACM Removal and Disposal**

Prior to demolition, the ACM previously identified on the Fuel Pipeline exterior as well as the West Wharf buildings will be removed by a licensed asbestos abatement contractor. The ACM removal sequencing and methods for removal are the same as those outlined in Task 3 for the Plant Site. In addition, there is the potential for ACM

material to be present in soil within the tunnelled sections of the Fuel Pipeline. As such, part of the ACM abatement program will include the removal of potential ACM impacted soil in the tunnel. The soil collected from the tunnels will be transported and disposed at the BMSWD Site with the bagged ACM. The Fuel Pipeline ACM removal will be completed in conjunction with the Plant Site ACM removal contract.

### **Industrial Cleaning**

As part of the decommissioning of the Fuel Pipeline and West Wharf, equipment, tanks, piping, pits, sumps, floor trenches, catchbasins, and surfaces will be purged, rinsed, and cleaned, as required, prior to demolition. The cleaning will remove accumulated solid residue and oils or other liquids that otherwise may be released during demolition activities. Cleaning will render the recyclable materials free of gross process residue, enabling shipment of salvage materials. The method of cleaning may incorporate a low volume, high temperature cleaning technique such as high pressure steam with surfactant. Wastewater generated during the cleaning process will be contained to within the NB Power infrastructure, collected using a vacuum truck and transported to the Plant Site for treatment in the WWTP.

### **Fuel Pipeline Decommissioning**

The next phase of the Fuel Pipeline and West Wharf decommissioning will be the physical decommissioning of the 3.9 km Fuel Pipeline. The preferred decommissioning procedures for the existing Fuel Pipeline will be the removal of all above ground infrastructure associated with the Fuel Pipeline including the 0.3 m diameter standard schedule carbon steel pipe, insulation, metal jacket, and metal cradles for transport to the Plant Site. At the Plant Site, the Fuel Pipeline materials will be segregated for recycling. Non-recyclable materials such as insulation will be transported to the BMSWD Site for disposal (with approval from the NBDELG). Concrete support pillars for the Fuel Pipeline will be demolished to surface grade and the resulting concrete debris transported to the Plant Site or Rail Siding and used for backfill in building voids.

The Fuel Pipeline decommissioning will be completed by sub-contractors awarded through the NB Power tendering program. The final Fuel Pipeline decommissioning methodology will therefore be dependent on the contractors bidding on this contract and their approaches but it is expected that the Fuel Pipeline will be decommissioned in sections using standard construction equipment such as rubber-tire backhoes or small track mounted excavators equipped with pinching shears and tandem axle dump trucks. Access to the pipeline will utilize municipal roadways and land areas to access the ROW corridor. As the majority of the aboveground sections of the Fuel Pipeline are in residential or commercial areas of the Town of Dalhousie, decommissioning activities

will be limited to 7:00 AM to 7:00 PM Monday to Friday which is consistent with standard construction practices in the municipality. One section of the Fuel Pipeline located directly north of Dalhousie Mountain bisects an unnamed tributary. As such, decommissioning of this section of the pipeline will involve work within 30 metres of a watercourse and is therefore subject to the conditions of the Watercourse and Wetland Alteration Regulation under the NB Clean Water Act (Regulation #90-80). As such, the EPP being developed as part of the proposed Facility Closure project will also specifically include a sedimentation and erosion control plan for this area to minimize potential impacts to the unnamed watercourse.

The preferred Fuel Pipeline decommissioning methodology for the tunnelled sections of the pipeline will be capping and abandonment in-place. The Fuel Pipeline is located within the same tunnels as the operating municipal water line and therefore decommissioning within these tunnels presents issues related to protecting the integrity of the municipal water main and workers health and safety (confined space entry). Cleaning, capping and abandoning the Fuel Pipeline in-place is therefore considered to be protective of the environment, ensures the integrity of the municipal water main is not jeopardized and minimizes risks to construction worker safety. The buried section of the Fuel Pipeline on the municipal fire station property and beneath Renfrew Street will be concrete filled and abandoned in place to minimize disturbances to critical infrastructure of the fire station and vehicle traffic on Renfrew Street. As previously stated, the active Fuel Pipeline decommissioning requirements such as removal and abandonment procedures, required permits and access agreements are currently being developed in consultation with the EUB and NBDNR. The final Fuel Pipeline decommissioning plan will be discussed with municipal officials and the NBDELG prior to initiating the decommissioning activities.

### **West Wharf Infrastructure Decommissioning**

Similar to the Fuel Pipeline decommissioning, the existing West Wharf Pumphouse Building and associated infrastructure will be completed by subcontractors hired through the NB Power tendering program. It is anticipated that demolition of the West Wharf infrastructure will be tied to the contract awarded for decommissioning the Plant Site buildings. The exact demolition methodology will therefore be determined by the successful contractor but the contractor will be subject to the following conditions:

- Light ballasts will be removed from all rooms and buildings within the West Wharf Pumphouse and inspected for potential PCB content. Light fixtures that are identified to be non-PCB containing will be recycled to the extent possible with

non-recyclable materials disposed at the BMSWD Site (with approval from NBDELG). Potential PCB containing light ballasts will be identified, labelled and transported off-Site for disposal at an approved facility.

- All economically salvageable and recyclable material such as structural steel, metal piping, etc. will be sorted and transported to an approved recycling facility.
- Non-hazardous demolition debris that is not salvageable or recyclable (i.e., concrete, brick, etc.) will be placed in the concrete basement of the Plant Site building with surplus material transported to BMSWD for disposal (with approval from NBDELG).
- The final demolition methodology will be completed consistent with standard industry practices and in a manner that is protective of human health and the environment.

To meet the conditions of the tender, it is anticipated that the building demolition will utilize track mounted excavators equipped with hydraulic shears and hammers.

Although completion of this work does not involve removal of infrastructure or access to Dalhousie Harbour, the demolition activities will involve work within 30 metres of Dalhousie Harbour shoreline and may be subject to the conditions of the WAWA Regulation under the NB Clean Water Act (Regulation #90-80) or the provincial Coastal Area Protection Policy. The EPP being developed as part of the proposed Facility Closure project will also specifically include a sedimentation and erosion control plan for this area to minimize potential impacts to Dalhousie Harbour.

### **2.7.3      YEAR 3 - APRIL 2015 TO MARCH 2016**

#### **2.7.3.1    TASK VI - AST REMOVAL**

Excluding the Bulk Storage Tank Farm ASTs, there are also seven additional above ground petroleum storage tanks and one underground waste oil tank located on the Plant Site that will be decommissioned and transported off-Site by a licensed petroleum contractor. The eight tanks are:

- The active 53,000 litre AST containing Orimulsion® is located adjacent to the switchyard termed the “re-circulation tank”. Concrete barriers surround and protect the tank from vehicular traffic.
- Three active 900 litre diesel ASTs located in the basement of Unit #1. The ASTs are located in concrete dyke areas or in rooms with concrete floors.

- One active 900 litre diesel AST located in the CW Pumphouse #2.
- Two active 50,000 litre double wall steel tanks located along the east wall of Boiler Room #1. The tanks are located within a concrete containment dyke and concrete barriers surround the tanks from vehicular traffic.
- One active 2,270 litre fibreglass reinforced plastic waste oil tank.

The storage tanks are licensed under the NB Petroleum Storage Site Licence #1880 and require decommissioning in accordance with the NB Petroleum Storage and Handling Regulations as part of the Facility Closure project. The NB Petroleum Storage Site Licence is included in Appendix F.

In addition to petroleum storage tanks, several other above ground chemical storage and mixing tanks located within the Water Treatment and Services Building, the WWTP, and the basements of Unit #1 and #2 at the Plant Site. The chemical tanks will also be decommissioned as part of Year 3 activities excluding the tanks associated with the WWTP as this system will stay in operation for the duration of the decommissioning program. A list of chemical storage and mixing tanks on the Plant Site is included in Table 3.

Prior to decommissioning and disposal of the chemical storage tanks, the tanks will be drained and the chemicals transported off-Site for disposal at a provincially approved facility or re-used at another NB Power facility. The chemical tanks will be decommissioned and cleaned by the general demolition contractor and transported off-Site using contracted transport trucks equipped with flatbed trailers.

### **2.7.3.2 TASK VII - SERVICES REMOVAL AND DECOMMISSIONING**

There are currently no known potable water wells or production wells associated with the Site. The current Administration Building is serviced by the municipal potable water system and domestic waste water system. This system will stay in service for use by NB Power staff and construction workers until the Administration Building is demolished in Year 4. The original eastern portion of the Plant Site (original Administration Building, Water Treatment and Services Building) is serviced by an on-Site septic system consisting of an aeration basin and polishing pond. This system will be decommissioned as part of the services removal and decommissioning program completed in Year 3.

The services (sanitary sewer, storm sewer, and watermains) at the Plant Site will generally remain in place with only the service connections to the buildings abandoned. Each service connection abandoned outside of the building(s) footprint will be marked using wood posts prior to backfilling and GPS coordinates recorded. Abandoning of service connections will be completed prior to building demolition. Chambers to remain will be protected during demolition activities to maintain the integrity of the system and to prevent the collection of debris within the sewer systems.

As part of the Facility Closure, the five storm water sewer systems will remain in place to allow for surface water drainage at the Plant Site to remain operational. The storm water piping sizes generally range from 0.3 to 0.6 m in diameter and are constructed from a variety of materials including PVC, corrugated steel, and cast iron. Service connections to Plant Site buildings will be abandoned through cutting and capping of the sewer pipe outside of the buildings. Capping will be completed using concrete. Catchbasins to be abandoned will be removed to a depth of 0.9 mbgs, sewer connections capped, and the chamber backfilled with crushed brick, concrete block, or concrete generated from the building demolition and clean fill.

The municipal water main from the Charlo River transects the Plant Site from south to north. The process water lateral that services the Plant Site from the municipal water main will be capped and disconnected. The municipal water main will remain in its current location for the duration of the decommissioning project and for the foreseeable future. The Facility Closure project is not anticipated to affect operation of the municipal water supply system.

The Plant Site uses electricity generated by DTGS or received from the provincial grid. Electrical services will be disconnected prior to building decommissioning but the electrical system to several various buildings will be isolated to remain in service during the decommissioning program (i.e. Industrial WWTP). NB Power will provide temporary electrical power to the demolition contractor as needed.

Cooling water for operation and use at the Plant Site is currently obtained from Eel Bay from two CW Intake Pumphouses with concrete foundations. The CW Intake structures are located on the on the shoreline of Eel Bay and extend approximately 5 metres into the bay from the ordinary high water mark. These structures will be demolished in Year 3 or Year 4 with the main Plant Site buildings and is described in Section 2.7.3. The CW is released from the eastern end of the DTGS facility into Eel Bay from a combined CW Outfall. This outfall along with the WWTP is to remain active for the duration of the Facility Closure project and will be one of the last structures to be decommissioned as part of the Facility Closure project.



The cooling water pipes from the CW Intake structures to Units #1 and #2 and from plant to the CW Outlet structure will be partially excavated, crushed, and backfilled when the CW Intake and Outlet structures are decommissioned.

The existing buried services plans and proposed final grading plan for the Plant Site are presented on Drawings B-1 to B-7. Specific details on decommissioning of the CW Intake Pumphouses and combined CW Outlet structure are presented on Drawings B-10 to B-13 of Appendix B.

### **2.7.3.3 TASK VIII - PLANT SITE REMEDIATION**

There are two surcharge lagoons located between the WWTP Oil/Water Separation Building and the Industrial WWTP. These lagoons served as the primary wastewater treatment prior to the construction of the Industrial WWTP in 1994. The lagoons are approximately 30 m by 40 m in area and approximately 2.5 m deep. The lagoons are reportedly clay lined with the bottoms covered with asphalt to facilitate sediment removal. The lagoons have approximately 0.3 to 0.5 m of accumulated sediment at the time of the EIA report preparation. The operation of the WWTP lagoons resulted in vanadium impacted sediment in the lagoons. Prior to demolition of the Plant Site buildings, the adversely impacted sediment will be excavated and transported to the BMSWD Site for disposal (with approval from the NBDELG). Groundwater encountered during the excavation activities will be processed through the WWTP.

A human health risk assessment was completed for the Plant Site by CRA (CRA, 2010e) to determine if current metal concentrations in soil at the Plant Site pose a risk to human health for continued commercial land use (see Section 3.11). The risk assessment indicated that only the soil samples collected from PSMW-13 located directly east of the surcharge lagoons had metal concentrations (vanadium) in soil exceeding the human health Site-Specific Target Level (SSTL). Soil at this location will therefore be excavated in conjunction with the WWTP lagoon sludge and similarly disposed of at the BMSWD Site subject to approval by NBDELG. An estimated 250 tonnes of metal impacted soil and sediment requires excavation and disposal at the BMSWD Site. Confirmatory soil sampling will be completed to document soil quality prior to backfilling. The excavation area will be backfilled with clean fill and crushed brick, concrete block, and/or concrete generated through the building demolition. The lagoons are not required as part of the continued operation of the Industrial WWTP.

Localized hydrocarbon impacted soil was also identified during the 2010 Phase II ESA (CRA, 2010b) in the vicinity of the vapour extraction vents located along the north exterior wall of Turbine Rooms #1 and #2. Surface staining is visible in this area and to a smaller extent at three other locations along the same wall. As part of Year 3 activities, petroleum hydrocarbon impacted soil will be excavated and disposed of at a site approved by NBDELG. An estimated 50 to 100 tonnes of hydrocarbon impacted soil requires excavation and off-site disposal. Following removal of impacted soil, confirmatory soil sampling will be completed to document soil quality prior to backfilling. The excavation will be backfilled with clean fill, crushed brick, concrete block, and/or concrete generated through the building demolition.

#### **2.7.3.4 TASK IX - FACILITY DEMOLITION AND DISPOSAL**

##### **Building Demolition**

It is expected the Plant Site building demolition work will be initiated in Year 3 activities and carried forward into Year 4. The existing building demolition program will be completed by sub-contractors awarded through NB Power tendering program. The exact demolition methodology will therefore be determined by the successful contractor but the contractor will be subject to the following conditions:

- Fluorescent light ballasts and High Intensity Discharge (HID) lights will be removed from all rooms and buildings within the Plant and inspected for potential PCB content. Light fixtures that are identified to be non-PCB containing will be recycled to the extent possible with non-recyclable materials disposed either at the BMSWD site or an approved off-Site location. Confirmed and potential PCB containing light ballasts will be identified, labelled and transported off-Site for disposal at an approved facility. Light bulbs which are mercury containing will be removed and segregated for approved disposal.
- All economically salvageable and recyclable material such as structural steel, metal piping, etc. will be sorted and transported to an approved recycling facility.
- The removal of footings and foundations will occur to a depth of 0.9 m below finished grade and piers to finished grade. Basement floors will be fractured for drainage. Existing slab on-grade concrete foundations may remain in-place dependent on the final Plant Site grading requirements.
- Clean concrete block, brick, and concrete will be crushed and placed in basement and excavation voids as backfill along with fill material from the tank farm berms. Excess material may be used as surface grading material. No off-site transportation of this material is anticipated.

- Non-recyclable demolition material will be handled and disposed of as debris in Cell 1 at the BMSWD Site, pending approval by NBDELG. The non-recyclable materials consist of wood, non-asbestos insulation, roofing materials, and non-recyclable plastic.
- The final demolition methodology will be completed consistent with standard industry practices and in a manner that is protective of human health and the environment.

Building demolition will consist of removal of all structures by progressive demolition and the controlled gravitational fall of structural components. To meet the conditions of the tender, it is anticipated that the building demolition will utilize track mounted excavators equipped with hydraulic shears and hammers. As part of mechanical demolition, demolition debris, concrete, concrete block, brick, and ferrous and non-ferrous metals will be removed and segregated. The ferrous and non-ferrous metals will be sized to either mill sizing or other shipment size depending on the salvage contract to achieve maximum asset value. An on-Site scale may be utilized to track quantities of all types of salvage materials.

This task will also involve decommissioning the existing CW Intake structures located on the shoreline of Eel Bay, east of the south of the turbine and boiler buildings. As decommissioning this infrastructure will require work below the high water mark of Eel Bay, DFO will be consulted regarding the decommissioning requirements. Based on previous decommissioning procedures of similar CW intake structures at another NB Power facility, the existing water intake structure will be decommissioned in a manner that reduces shoreline alteration below the high water mark to the extent possible.

To minimize disturbance of shoreline on either side of the CW Intake Pumphouses, the concrete walls of the existing CW Intake structures will be demolished inward and the building debris pulled back towards the shoreline. The concrete debris will be used for filling landside voids of the CW Intake building sumps and other voids. The concrete walls of the buildings will be demolished to approximately 1 metre below existing shoreline grade. Local rip rap armour stone (approximately 30 to 60 cm in diameter) will be used to in-fill the building and create a new shoreline face that will be tapered into the existing shoreline on either side of the building. Rock intrusion in Eel Bay is not expected to extend beyond the existing footprint of each CW Intake building. A conceptual demolition and grading plan for the CW intake trench demolition work is included in Appendix B (Drawings B-10 to B-12).

The demolition work for the CW Intake Pumphouses will be completed during low water levels of the summer months. There is an existing floating debris boom that extends from the shoreline of the CW Intake channel to the rip-rap breakwater. A silt curtain will be installed and remain in place for duration of the Task to minimize sedimentation into the bay and the potential for fish to enter the work area.

#### **2.7.4 YEAR 4 - APRIL 2016 TO MARCH 2017**

##### **2.7.4.1 TASK X - CONTINUED PLANT SITE DECOMMISSIONING**

###### **Building Demolition**

It is anticipated that the Plant Site building demolition activities will continue into Year 4 of the Facility Closure program and will follow the same procedures as outlined in Task IX. The Plant Site decommissioning work will be completed in a manner that maximizes the redevelopment potential of the Plant Site by maintaining site services and surfaces including storm water system, potable water service, and paved surfaces. In addition, to manage storm water runoff from the Plant Site in a manner that is protective of human health and the environment, the WWTP will remain in operation throughout the building demolition process to the extent possible. Demolition of the WWTP building will therefore be completed towards the end of the Plant Site decommissioning program.

###### **Stack Demolition**

One phase of the Facility Closure will be the demolition of the existing FGD stack and redundant Unit #2 stack. The FGD stack is approximately 167 m in height with an outside diameter at the base of 14 m and constructed of concrete with interior brick lining and a stainless steel thimble and breeching duct. The redundant Unit #2 stack is approximately 162 metres tall with an outside diameter of 13 metres at its base and is constructed of slip-form concrete with steel re-enforcing and steel flue. The preferred demolition methodology will be a controlled drop of both stacks. The brick mortar in the FGD stack was not tested in 2009 for potential asbestos as the stack was constructed in the 1990s.

Demolition of the stacks will be completed by sub-contractors awarded through NB Power tendering program. The final stack demolition methodology will therefore be dependent on the contractors bidding on this contract and their approaches. The final demolition methodology will be determined after the tender is awarded and will require a Certificate of Approval from the NBDELG prior to initiation of the demolition

activities. It is anticipated that prior to the stack demolition, the interior of the stack will be cleaned and the resulting wastewater directed to the WWTP or collected using a vacuum truck.

Demolition of the stacks will be sequenced to occur when most demolition activities are complete. The brick and concrete materials from the stack will be used for backfill aggregate at the Plant Site subject to appropriate testing.

#### **2.7.4.2 TASK XI - PLANT SITE GRADING**

Following completion of the demolition activities, the surface areas disturbed during decommissioning will be graded to match into the existing hard surfaces to remain and to achieve positive drainage to the remaining storm sewer system catchbasins and ditches. As previously indicated, the five storm water sewer systems will remain in place to allow for surface water drainage at the Plant Site to remain operational. Drawings of the existing surface drainage at the Plant Site and future conceptual drainage patterns of the facility are included in Drawings B-6 and B-7 of Appendix B.

Fill material will be obtained from the Bulk Storage Tank Farm Area berms and used as backfill along with the crushed brick, concrete block, and concrete to fill voids created through demolition of the Plant Site infrastructure. The Bulk Storage Tank Farm Area will be covered with topsoil or existing soil amended and the area hydroseeded. The eastern portion of the Plant Site, the area containing most of the Plant Site buildings will be covered with granular material (i.e., berm material). The existing asphalt or concrete slab on-grade surfaces will remain in-place and the re-vegetated or granular covered areas tapered into the asphalt or on-grade concrete surfaces. Sediment and erosion controls will be constructed and maintained during and post decommissioning in accordance with the EPP developed specifically for this project concurrent with the final Facility Closure design plans. The sediment and erosion controls will remain in-place until planted/seeded vegetation is established to minimize sediment laden runoff into the storm water system. Anticipated void areas created through the Plant Site decommissioning activities are shown on Drawing B-9 of Appendix B.

The Administration/Services Building parking area, the west side of the FGD Building, the south side of the Coal Ash Handling Facility and the Crusher Building contain storm water catchbasins that directly discharge to the lower end of Tait Brook. The outlet of Tait Brook is through a 60 metre long corrugated steel culvert that discharges into Chaleur Bay. However, this culvert is not currently functioning (blockage and collapse). The Plant Site re-grading activities will therefore include replacement of the Tait Brook

discharge culvert or removal of the culvert and re-grading as an open channel. Replacement of the discharge culvert is subject to the conditions of the WAWA Regulation under the Clean Water Act (Regulation #90-80). Regulatory consultation and detailed designs of the culvert replacement or removal will be included as part of the Pre-Decommissioning Engineering work completed as Task I. In addition, the EPP being developed will therefore also specifically include a sedimentation and erosion control plan specific to Tait Brook to minimize potential impacts to related to overall decommissioning activities as well as culvert replacement.

Although the original drainage pattern of Tait Brook has likely been re-routed during construction and subsequent up-grade activities of the DTGS, the brook has been identified to provide functional ecological habitat and therefore will not be disturbed or re-routed as part of the Plant Site grading activities excluding removal or replacement of the discharge culvert (see Section 3.11.2.11).

#### **2.7.4.3 TASK XII - BMSWD SITE CLOSURE**

The BMSWD Site includes a Fixated Ash Cell, an active solid waste disposal cell (Cell 1), two Coal Ash Areas, two sediment ponds, and three leachate ponds. The closure activities associated with the BMSWD Site has therefore been divided into separate sub-tasks to address closure of specific areas within the BMSWD Site. Decommissioning and closure of the BMSWD Site has been sequenced into the overall DTGS Facility Closure program to allow for the continued disposal of waste (i.e. sludge, sediment, soil) associated with the operation of the industrial WWTP, as well as non-recyclable demolition debris (with approval from the NBDELG). An existing conditions plan of the BMSWD Site is presented as Figure 2.4. The overall closure plan for the BMSWD site is shown on Drawings C-2 to C-5 in Appendix C.

There are also four transmission towers located within the property boundary of the BMSWD Site that will remain in service following the facility closure activities. The location of these transmission towers is not anticipated to affect the BMSWD Site closure activities and modifications to the towers are not anticipated.

#### **Closed Coal Ash Areas**

Coal Ash Areas 1 and 2 were previously closed and completed with a vegetated cover ranging in depth from 0.1 m to 0.6 m. In isolated areas the vegetative soil cover is absent and exposed coal ash can be observed. Surface water runoff from the closed cells is controlled by perimeter ditches as well as overland flow. The side slopes of the closed cells are generally 3:1 horizontal to vertical or flatter (H:V). The side slopes of some

perimeter ditches are somewhat steeper with slopes of 1:1 being observed in some areas. A leachate seep (Seep 1) was also observed on the side slope of Coal Ash Area 1. Three leachate seeps (Seep 2, 3, and 4) were observed in Coal Ash Area 2 (see Figure 2.4).

The primary objectives of the final cover for Coal Ash Areas are to prevent future physical contact with coal ash and reduce the amount of surface water infiltration and subsequent leachate generation. The existing vegetative cover has generally met these objectives and appears to be suitable given that the groundwater quality at the BMSWD Site was found to be in compliance with applicable groundwater quality standards, and surface water discharge from Sediment Ponds 1 and 2 and in the ditch discharging to the eastern property boundary meet the Permit to Operate criteria (see Section 3.11). As such, it is determined that the closure works previously implemented are suitable for permanent cell closure with the following maintenance/modifications:

- Exposed Coal Ash - Small areas of exposed coal ash were identified in Coal Ash Areas 1 and 2 and will be completed with vegetative cover. The vegetative cover will consist of 150 mm seeded topsoil. It is estimated that the exposed coal ash represents less than 5% of the existing surface area of Coal Ash Area 1 and less than 1% of existing surface area of Coal Ash Area 2.
- Perimeter Ditch Slopes - Some areas of the existing side slopes between the perimeter ditch and the landfill cover are steep; approximately 1:1. To improve slope stability and minimize long term maintenance, these steep slopes will be graded to 2:1. Excavated side slopes will be seeded following final grading. Detail 1 presented on Drawing C-3 of Appendix C shows the proposed ditch modifications.
- Seeps 1 and 4 - The hydrogeological characteristics of Seeps 1 and 4 were evaluated based on the Phase II ESA (CRA, 2010b) and will be addressed by the installation of a vertical reinfiltration galleries (e.g., clear stone trench) to provide a preferential downward pathway for leachate infiltration. The reinfiltration galleries will be approximately 3 m deep and extend 10 m<sup>2</sup> in area.
- Seeps 2 and 3 - To address Seep 2 and 3 the coal ash along the southern boundary of Coal Ash Area 2 will be excavated and placed within the active landfill cell (Cell 1). The coal ash will be excavated from the south limit of coal ash until top of coal ash contour elevation 32.0 m. Excavation to this elevation will reduce the potential for groundwater exfiltration through the waste, based on observed groundwater elevations in the area. The excavated waste face will be graded to a 3:1 slope, and completed with 150 mm seeded topsoil. Additional excavation of waste along the west side of Coal Ash Area 2 will be undertaken to address leachate Seep 3 and to accommodate modifications to Leachate Pond 3 (refer to subsequent sub-sections).

### **Closed Fixated Ash Cell**

The Fixated Ash Cell was constructed with a liner and leachate collection system; and was completed with a 0.6 m thick low permeable final cover system in 2000. Leachate from the Fixated Ash Cell is collected and conveyed by gravity to Leachate Pond 2. Previously, leachate was conveyed by gravity to Leachate Pond 1 and Leachate Pond 2, however this practice was discontinued given that Leachate Pond 2 contained sufficient volume for leachate generated from the Fixated Ash Cell. Leachate Pond 2 drains into a sediment pond (Sediment Pond 2) that also receives surface water from the southern portion of the BMSWD Site.

As part of closure at the BMSWD Site, Leachate Ponds 1 and 2 will be eliminated as discussed in the subsequent sub-sections. No other changes to this cell are proposed. The proposed drainage plan for the Fixated Ash Cell is presented on Drawing C-5 of Appendix C.

### **Cell 1**

As outlined in the Approval to Operate (I-7782), the maximum height of waste permitted to be landfilled in Cell 1 is 10 m. Assuming 4:1 side slopes and a total waste height of 10 m, the air space remaining for disposal of waste in Cell 1 is approximately 250,000 m<sup>3</sup>. Prior to closure of Cell 1 an estimated 3,000 m<sup>3</sup> of waste will be landfilled in this cell. This waste includes demolition debris from decommissioning activities at the Plant Site, Fuel Pipeline and West Wharf, and BMSWD Site, and from WWTP operations during decommissioning. Therefore, upon completion of the Facility Closure activities, it is not likely that Cells 1A and 1C will have reached final capacity, and Cell 1B will remain unused. As such, there are currently two conceptual options for Cell #1 as part of the overall Facility Closure plan. The first option (Option #1) is the complete capping and closure of Cell 1 with the conversion of Leachate Pond 3 to an engineered wetland. The second option is to cap Cells 1A and 1C but retain the usage of Cell 1B for the receipt of ash from NB Power's Belledune Thermal Generating Station. Under this plan, Cell #1 would remain active along with the associated Leachate Pond 3.

The complete closure of Cell 1 (Option 1) will consist of grading and compacting existing and new waste, supply and installation of final cover soil, and the construction of perimeter ditches. Under closure conditions, leachate generated within Cell 1 will be discharged to Wetland 3, to be constructed where Leachate Pond 3 currently exists (refer to subsequent sub-section). In addition, the Cell 1 under drain that discharges on the east side of Leachate Pond 3 will be modified to discharge through Wetland 3.



A maximum of 4:1 and a minimum of 20:1 slopes will be used for the final slopes for Cell 1. The maximum depth of waste will be 10 m. The toe of the slope will tie into the existing leachate collection system to direct surface water runoff to future Wetland 3. The maximum slope of 4:1 will promote surface water runoff while minimizing soil erosion during surface water runoff events, and facilitates access for final cover construction and maintenance. A minimum slope of 20:1 will maintain adequate surface water runoff.

Following the disposal of WWTP waste as well as demolition debris in Cell 1, the active landfill cell will be capped with low permeability soil cover material ( $k = 1 \times 10^{-6}$  cm/s). Based on previous investigations completed by CRA, the required low permeability soil cover material can be obtained from a local Dalhousie borrow pit and transported to the BMSWD Site via Blair Malcolm Road. A capping plan was completed by CRA as part of the Facility Closure plan and consists of a 0.6 m thick low permeable cover overlaid with a 0.15 m topsoil layer and vegetative cover. Using a clayey material in the landfill cover construction will minimize the amount of surface water infiltration through the waste and leachate generation. The preliminary contours for Cell 1 are presented in Drawing C-4 of Appendix C but the final contours and cap design will be adjusted based on the total volume of waste landfilled in Cell 1 prior to closure.

Option 2 for Cell 1 is to progressively cap Cells 1A and 1C with a low permeable soil cover material as described above but Cell 1B would remain in its present condition to allow for the future receipt of coal ash from NB Power Belledune operations. Under this scenario, Leachate Pond 3 would also remain operational including adherence to the Terms and Conditions outlined in the current Approval to Operate I-7782. The final design plans will be completed in consultation with NBDELG representatives as part of the Approval to Construct application past the current Approval I-7782 expiry date of October 31, 2016. Under this option, a renewed Approval to Operate the BMSWD Site past October 31, 2016 would also be required.

### **Leachate Pond 3 and Sediment Ponds 1 and 2**

Leachate Pond 3 and Sediment Ponds 1 and 2 convey storm water runoff and attenuate leachate to the natural environment at the BMSWD Site. To meet the closure objectives, three closure options were considered for the ponds as follows:

- Do nothing; maintain ponds as is
- Eliminate the ponds
- Convert the ponds to wetlands

Leaving the ponds in place would require NB Power to undertake long term maintenance of the ponds, including maintaining the security fence, maintaining the piping (influent and effluent), and potentially sediment management. Removing the ponds completely is undesirable as the ponds provide equalization of storm water and attenuated leachate prior to discharge to the natural environment. Converting the ponds to wetlands provides attenuation through natural attenuation process, eliminates the fencing around the ponds, and eliminates long term maintenance. In addition, the conversion of the ponds to wetlands maintains a fixed discharge location where effluent can continue to be monitored and controlled if needed.

Based on the above, Leachate Pond 3 and Sediment Ponds 1 and 2 will be converted to wetlands as part of the final site closure works. Conversion of the ponds to wetlands will occur after the modifications to the Coal Ash Areas and capping of Cell 1 are completed, to minimize the potential for leachate discharge to the wetlands. As discussed in the previous paragraphs, if the option to keep Cell 1B active for the receipt of coal ash from Belledune is implemented, Leachate Pond 3 would also remain in-place and be subject to the current Terms and Conditions outlined in the current Approval to Operate I-7782.

Conversion of the ponds to wetlands will generally consist of removal of liner systems, if any, construction of inlet and outlet weirs, infilling the existing ponds with the side berms or fill material, and placement of 0.3 m of amended topsoil seeded with a native wetland seed mixture on the base and side slopes of the wetland. The base of the wetlands would be established at the natural water table elevation to ensure root saturation. The outlet weirs would be constructed with an elevation of approximately 0.5 m above the average groundwater elevation. This will promote attenuation through the wetlands, while allowing for overflow during large storm events. The side slopes of the wetlands will range from 2.5:1 to 3:1, similar to the existing pond side slopes. Applying a seed mixture to the wetland compared to physical planting of selected plant species will allow the vegetative species to be established based on in-situ wetland characteristics (e.g., water depth, pH, and temperature). Given that the water table elevation may vary in the wetland, at a minimum, grass seed will be planted in areas where wetland vegetation does not establish (i.e., due to a lower water table).

The proposed layout for Wetlands 1 and 2 are provided on Drawing C-3, Details 2 and 3 of Appendix C. The proposed layout for Wetland 3 is presented on Drawing C-5, Detail 6 of Appendix C. Conversion of the ponds to wetlands is expected to generate approximately 26,900 m<sup>3</sup> of surplus soils. These soils will be used as backfill at the Rail

Siding as discussed in Section 2.7.4.4 (Rail Siding Decommissioning). If Leachate Pond 3 is not converted to a wetland (Option to keep Cell 1B and Leachate Pond 3 active is implemented), importation of fill for the backfilling of the Rail Siding will likely be required.

### **Leachate Ponds 1 and 2**

Currently, the raw leachate from the Fixated Ash Cell is in compliance with the Permit to Operate discharge criteria, with the exception of pH. The effluent from Leachate Pond 2 meets the discharge criteria, as does the effluent from Sediment Pond 2. As such, only minimal attenuation of the leachate generated from the Fixated Ash Cell is required. With the conversion of Sediment Pond 2 to a wetland (Wetland 2), adequate attenuation of the leachate from the Fixated Coal Ash Cell would be achieved through Wetland 2. Therefore, Leachate Ponds 1 and 2 will be removed as part of the closure works, and leachate from the Fixated Coal Ash Cell will be conveyed to Wetland 2. The area where Leachate Ponds 1 and 2 are currently constructed will be excavated, graded, and seeded to provide open channel flow towards the west where a ditch inlet catchbasin will be installed to connect the open channel to the existing leachate effluent pipe and drop structure. With the elimination of the ponds, the surface water runoff from the service road to the south will be redirected to the west and the existing culvert connecting the existing ditch to the perimeter ditch adjacent to Coal Ash Cell 1 will be removed. The proposed grading for the elimination of Leachate Ponds 1 and 2 is presented on Drawing C-5, Detail 5 of Appendix C. Elimination of the ponds is expected to generate approximately 6,750 m<sup>3</sup> of surplus soils. These soils will be used as backfill for the Rail Siding Decommissioning as discussed in Section 2.7.4.4.

During the Phase II and III ESA, a seep was identified west of Leachate Pond 2 (Seep 5). This seep is likely a result of surcharging leachate in the manhole conveying leachate from the Fixated Ash Cell to the associated leachate lagoons. This seep was a result of a closed valve and the issue was subsequently rectified by NB Power employees. The seep was not present during subsequent inspections of Leachate Pond 2 in 2011 and 2012 (personal communication with Malcolm Manderville, DTGS Chemical Control Supervisor). The creation of a new ditch to convey leachate from the Fixated Ash Cell and elimination of the leachate manhole will also eliminate the potential for this seep to re-occur.

### **BMSWD Site Remediation**

During the Phase II ESA (CRA, 2010b), a total of 13 sediment samples were collected from the drainage channels or Hamilton Brook for metal and TPH analysis. Seven of the 13 sediment samples collected contained concentrations of arsenic, cadmium or zinc exceeding applicable CCME guidelines. The sediment samples with elevated metal

concentrations are generally located down-gradient of the capped coal ash cells (Cell 1 under drain and Sediment Ponds 1 and 2). As part of BMSWD Site closure works, impacted sediment located in the drainage channels identified during the Phase II ESA will be excavated and placed in Cell 1. The volume of sediment in the drainage channel requiring excavation will be determined as part of the Pre-Decommissioning Engineering work scheduled to be completed in Year 1. In addition, results of the ERA for Hamilton Brook included as Task I will be incorporated into the final remedial action plan developed for the BMSWD Site and included in the detailed landfill closure plan. Results of the additional sediment sampling and ERA planned as part of the Pre-Decommissioning Engineering work will be provided to NBDELG prior to or as part of the detailed BMSWD Site closure plan.

#### **2.7.4.4 TASK XIII - RAIL SIDING DECOMMISSIONING**

The decommissioning of the Rail Siding involves a number of activities to address decommissioning of associated structures under the property lease arrangement with CN and other infrastructure and environmental controls. CN owns and will remove rails and ties associated with the rail siding. The scope of the decommissioning with respect to CN leased lands needs to be agreed to by stakeholders and is included in the Pre-Decommissioning Engineering (Task I).

The decommissioning of the Rail Siding has been divided into two categories of activities: building infrastructure decommissioning and civil infrastructure decommissioning (e.g., removal/abandonment of site services, surface water management works, and final site grading). The decommissioning activities and sequencing requirements for each are discussed in the following sections.

##### **Building Infrastructure Decommissioning**

Similar to demolition of the Plant Site and West Wharf building decommissioning, an updated ACM audit will be conducted to identify the type and quantity of ACM at the Rail Siding (if any) as part of the Pre-Decommissioning Engineering work (Task I). Prior to demolition, the ACM will be removed by a licensed asbestos abatement contractor in conjunction with the Plant Site ACM removal program (Task III). ACM removal sequencing and methods for removal and testing are the same as those outlined in Section 2.7.2.1 for the Plant Site. If present, friable and non-friable ACM material will be

transported to a municipal landfill or Cell 1 at the BMSWD Site, respectively, for disposal. As the Rail Siding area has been sitting idle since 1994, removal of consumables as well as collection of waste containers has already been completed by NB Power staff.

As part of the decommissioning of the Rail Siding, equipment, sumps, catchbasins, and surfaces will be purged, rinsed, and otherwise cleaned prior to demolition. The cleaning will remove accumulated solid residue and oils or other liquids that otherwise may be released during demolition activities. It is anticipated that the Rail Siding cleaning activities will be limited to the coal thaw shed and storm water sump and small sump pump building. Techniques for cleaning will include low volume, high-pressure water blasting, steam cleaning, washing with detergent, and other means and methods. As such, the cleaning activities are expected to generate a limited volume of wastewater which will be contained to within the concrete coal storage area and collected for treatment and disposal at the Plant Site WWTP or another approved off-site disposal location.

Demolition activities will commence after structures have been cleaned and put into a zero-energy state. All economically salvageable and recyclable material such as structural steel, metal piping, etc. will be transported to an approved recycling facility. Non-hazardous demolition debris that is not salvageable or recyclable will be placed in Cell 1 at the BMSWD Site (with approval from the NBDELG). The removal of footings and foundations will occur to a depth of 0.9 m bgs (or as otherwise determined by CN) and the clean concrete crushed and placed on the coal storage pad as fill material. The concrete coal storage pad will be fractured for drainage and backfilled to the proposed final grade discussed in the following section.

### **Civil Infrastructure Decommissioning**

Decommissioning of the civil infrastructure at the Rail Siding considers site services, surface water management controls, and final site grading. The services at the Rail Siding are limited to electrical services. The electricity will be disconnected and the branch line to the siding will be removed as part of the decommissioning activities.

Following building demolition activities, the surface of the Rail Siding area will be re-graded. As previously noted, the Rail Siding consists of an elevated rail siding on a concrete rail trestle, a thaw shed, coal storage and unloading bays, and a surface water management system including a sediment pond.

As part of final grading, the low area created by the coal storage and unloading bays will be backfilled using on-site materials and surplus fill from the BMSWD Site. The final grading plan will convey storm water runoff to the existing storm water ditch east of the sedimentation pond as shown on Drawing C-7 of Appendix C, and thereby eliminate the existing surface water management system (pump station and fenced pond). Prior to grading, the concrete pad will be fractured to promote surface water infiltration. The sediment pond will also be eliminated and the associated liner removed and/or punctured to promote surface water infiltration. Approximately 19,000 m<sup>3</sup> of imported fill material (from the BMSWD Site) will be placed and compacted to achieve the final grading plan. Following final grading, the fill will be completed with 150 mm topsoil and seeded.

## **2.7.5      YEAR 5 - APRIL 2017 TO AUGUST 2017**

### **2.7.5.1    TASK XIV - SITE CLEAN-UP**

Final site clean-up will be completed the summer of 2017. It is expected that this activity will generally be limited to re-vegetation of specific areas (if required) for final end use requirements for each decommissioned area associated with the DTGS Facility. Conceptual grading and drainage plans for the Plant Site, BMSWD Site and Rail Siding are included in Drawings of Appendices B and C.

This task will also involve the collection of surface soil samples from various areas of the Plant Site property to ensure the final soil cover material is protective of human health and the environment. If areas of the Site are identified to contain contaminants in surface soil above applicable guidelines or risk-based criteria (CRA, 2010e), a remedial action plan will be developed for the area consistent with the NBDELG Guidelines for the Management of Contaminated Sites (2003). The purpose of the surficial soil collection program is to ensure the protection of human health from direct ingestion or dermal contact of potentially impacted surface soil. A Record of Site Condition will be prepared for submission to NBDELG.

## **2.7.6      POST FACILITY CLOSURE**

Following completion of the Facility Closure demolition activities, the final task of the Project will involve the monitoring of groundwater and surface water quality as well as re-establishment of vegetation at the DTGS Facilities for a proposed period of two years.

The following activities and tasks will be conducted to complete this phase of the project:

- Collection of groundwater samples from existing monitor wells at the Plant Site and BMSWD Site, in particular from perimeter monitor wells, three times annually for a period of two years. The groundwater samples collected will be submitted for laboratory analysis and the analytes selected to meet the NBDELG Guidelines of Management of Contaminated Sites and the protection of on and off-Site aquatic receptors. The existing groundwater monitor wells at the Plant Site and BMSWD Site are shown on Figures 2.1 and 2.4, respectively.
- Collection of surface water samples from storm water outfalls at the Plant Site that discharge to Eel Bay and Tait Brook. It is proposed that the samples be collected from each storm water outfall (or nearest accessible manhole/catch basin) three times annually for a period of two years. The sampling will be completed during rainfall events or with 24 hours of rainfall event of >15 mm. The storm water samples collected will be submitted for laboratory analysis and the analytes selected for comparison to discharge limits set in the current Approvals to Operate the WWTP (I-5878).
- Collection of surface water samples from Tait Brook located on the Plant Site property, three times annually (April, July and October) for a period of two years. It is proposed that the surface water samples be collected from the Upper, Middle and Lower reaches of Tait Brook on the Plant Site property (outlined in Section 5.0) The surface water samples collected will be submitted for laboratory analysis and comparison to freshwater aquatic life guidelines.
- Collection of surface water samples from the outlets of the newly constructed wetlands (Wetlands 1, 2 and 3) at the BMSWD Site, three times annually for a period of two years. The storm water samples collected will be submitted for laboratory analysis and comparison to discharge limits set in the current Approval to Operate the BMSWD Site (I-7782). If the option to retain the usage of Cell 1B for the receipt of ash from NB Power's Belledune operation as well as the associated Leachate Pond 3 is implemented, the Terms and Conditions outlined in the current Approval to Operate I-7782 will be followed which includes continued testing and monitoring requirements.
- Collection of surface water samples from Hamilton Brook located on the BMSWD Site, three times annually. It is proposed that the same surface water sample locations be used for the Post Facility Closure as was used by NB Power during on-going sampling program (Upper and Lower Hamilton Brook (outlined in Section 3.11). The surface water samples collected will be submitted for laboratory analysis and comparison to freshwater aquatic life guidelines.

- Monitoring of the Plant Site, BMSWD Site and the Rail Siding will also include evaluating the effectiveness of re-vegetation for a period of two years. Corrective action (i.e., re-seeding) will be implemented should stabilization of grassed areas be less than 90% effective. Similarly, monitoring of newly constructed wetlands will be completed over a two year period to ensure wetlands have been colonized by native hydrophytic vegetation. Corrective action (i.e., re-seeding or direct plantings of wetland vegetation) will be implemented should aquatic vegetation be absent from wetland areas.
- Monitoring and maintenance of temporary erosion control structures (i.e. sediment fence, etc.) will be undertaken until vegetative stabilization of the DTGS Facilities is achieved.
- Annual Site inspection for a period of two years to ensure overall Site use is consistent with design plans such as: No permanent structures (excluding the 138 kV Switch Yard), Site drainage is functioning as designed, soil caps remain intact, etc.

## 2.8 OPERATION AND MAINTENANCE DETAILS

Wastewater generated during the plant washing activities as well as precipitation and surface water drainage from the Site is expected to be treated using the existing Industrial WWTP prior to discharge to Eel Bay. The current Certificate of Approval to Operate the Industrial WWTP (I-5878) is valid until March 31, 2013. To meet the operational requirements of the Facility decommissioning plan, the Industrial WWTP is to remain active until approximately Year 4. Application for a new Certificate of Approval to operate the Industrial WWTP will therefore be submitted to the NBDELG as part of the Pre-Decommissioning Engineering work (Task I) completed in the first year of the Facility closure plan. Regular sampling of the WWTP effluent will be required to ensure that water discharging from the lagoon meets conditions outlined in the current Certificate of Approval to Operate. In addition, during the Plant Site demolition and grading activities, sumps will be constructed in the vicinity of the Plant to further reduce potential discharge of surface water from the Site directly into Eel Bay or Tait Brook. The size and location of the sumps will be determined during the construction activities and at the discretion of the on-Site NB Power representative. It is anticipated that water accumulated in the sumps will be treated utilizing the Industrial WWTP prior to discharge into Eel Bay. The potential use of sumps for controlling surface water will only potentially occur during the Plant Site construction activities (Tasks I to XI) and the sumps will be removed or re-graded at the end of the construction period.



Cell 1 at the BMSWD Site will also continue to receive metal impacted sludge, sediment and soil related to current and past operation of the industrial WWTP during Facility decommissioning activities. As part of the Facility Closure plan, Cell 1 will receive non-friable ACM material and non-hazardous demolition debris. The current Approval to Operate Cell 1 of the BMSWD Site (I-7782) is valid until October 31, 2016 and would therefore meet the operational requirements of the Facility Closure plan scheduled for completion in Year 4. However, the current Approval to Operate does not contain an allowance for the disposal of non-friable ACM or non-hazardous waste. Application for a revised Certificate of Approval to Operate Cell 1 of the BMSWD Site to receive waste from the Plant Site Industrial WWTP as well as non-friable ACM and non-hazardous materials from decommissioning of the DTGS Facility will therefore be submitted to the NBDELG as part of the Pre-Decommissioning Engineering work (Task I) completed in the first year of the Facility closure plan.

There are currently two conceptual options for Cell 1 as part of the overall Facility Closure plan. The first option (Option #1) is the complete capping and closure of Cell 1 with the conversion of Leachate Pond 3 to an engineered wetland. The second option is to cap Cells 1A and 1C but retain the usage of Cell 1B for the receipt of ash from NB Power's Belledune operations. Under this plan, Cell 1 would remain active along with the associated Leachate Pond 3. Under this option, renewal of the current Approval to Operate the BMSWD Site (I-7782) would be required. The final design plans will be completed in consultation with NBDELG representatives as part of the Approval to Construct application past the current Approval to Operate I-7782 expiry date of October 31, 2016.

Based on conceptual decommissioning and grading plans, the majority of granular fill material required for backfilling and cover material will be obtained from existing berms and crushing of clean concrete debris. It is expected that the importation of granular fill or cover materials related to the DTGS Facility Closure project will generally be limited to the following:

- Armour stone required to stabilize the Plant Site shoreline in the vicinity of CW Intake and Outlet
- Top soil required for re-vegetating the western portion of the Plant Site, the Rail Siding, and selected portions of the Coal Ash Areas at the BMSWD Site
- Low permeability soil (i.e., clay) and top soil for capping Cell 1
- Clear stone for the construction of the infiltration galleries at the BMSWD Site

- Fill material, rip rap and amended top soil for construction of the BMSWD Site wetlands and associated drainage systems
- Importation of fill for the backfilling of the Rail Siding if Leachate Pond 3 remains active

Imported granular fill material for backfilling and cover material will be obtained from private local pits. The sub-contractor retained to complete the earthwork will be required to identify the source of the granular fill upon contract award to ensure the material meets final design specifications. Armour stone required to stabilize the Plant Site shoreline as well as construction of the BMSWD Site wetlands will be also be obtained from local quarries. The rip rap armour stone will be tested for potential acid generation and the laboratory test results provided to NBDELG as part of the final Facility Closure plan design.

Demolition and grading equipment including cranes, excavators, bulldozers, water transfer pumps utilized for this project will require fuel. Fuel for the demolition equipment will be provided by direct refuelling through commercial fuel deliveries or contractor supplied and NBDELG approved on-Site fuel storage tanks equipped with secondary containment. Maintenance and re-fuelling of the equipment will be completed in designated areas of the Site located a minimum of 30 metres from any existing surface water body, drainage channel or watercourse. The EPP to be completed will specifically outline equipment re-fuelling and maintenance protocols for the Facility.

The existing lunch room/washroom facilities in the Plant Site Administration building will be utilized by on-Site workers during Years 1 through 3 of the Facility Closure plan. Temporary construction trailers will be used for office and lunch room purposes throughout the duration of the project. Portable washrooms will also be brought to the Facility for use throughout the duration of the project. Sanitary waste contained in the portable washrooms will be removed at regularly intervals and disposed off-site in accordance with the EPP. Domestic garbage, such as paper, food wrapper, beverage containers, etc. will be collected in the designated lunch room in accordance with EPP.

## **2.9 FUTURE MODIFICATIONS, EXTENSIONS, OR ABANDONMENT**

As noted in Section 2.6, the purpose of the Facility Closure project is to demolish existing facilities, infrastructure and services associated with the DTGS excluding the 138 kV Switch Yard and transmission lines. The intended future land use for the Facilities includes the following:

- Plant Site - All infrastructure to be decommissioned/removed from Plant Site properties excluding Switch Yard and associated transmission lines. Following decommissioning activities, all Plant site-related properties will be available for sale and commercial redevelopment.
- BMSWD Site - Two conceptual options being considered with landfill(s) to be closed in general accordance with Facility Closure plan and associated land titles for properties PID Nos. 50134428, 50229590 and 50211663 held in the long term by NB Power.
  - Option 1 - All infrastructure to be decommissioned excluding transmission lines that bisect the property.
  - Option 2 - Same as Option 1 but Cell 1B and associated Leachate Pond 3 would remain in-place for the future receipt of the coal ash from NB Power Belledune operations.
- Fuel Pipeline - Fuel Pipeline infrastructure in ROW easements to be removed or decommissioned in place (as applicable) and ROW easements to remain with current land owner.
- West Wharf - West Wharf infrastructure is on leased land. Infrastructure to be decommissioned and leased property returned to owner.
- Rail Siding - All infrastructure to be decommissioned and area re-graded in accordance with Decommissioning Plan. NB Power owned properties associated with the Rail Siding retained by NB Power with potential for future sale and commercial development. Leased portion of the Rail Siding to be returned to CN.

## **2.10 PROJECT RELATED DOCUMENTS**

Approval to Operate the existing 320 MWe DTGS facility filed under the Clean Air Act of the Province of New Brunswick (file number I-7185) expires on November 30, 2015. Approvals to Operate the associated Industrial WWTP filed under the Clean Water Act (file number I-5878) and the domestic wastewater filed under the Clean Environment Act (file number S-1457) of the Province of New Brunswick both expire on March 31,

2013. Approval to Operate the Blair Malcolm industrial landfill under Industrial Approvals Regulation and the Air Quality Regulation of the Clean Water Act (File Number I-5778) expires on October 31, 2016. The Approvals to Operate associated with the DTGS Facilities as well as other provincial and federal licenses associated with the DTGS facility are attached in Appendix F.

As part of the EIA registration document preparation, a number of studies and documents have been prepared or are in preparation. A list of project related documents is included in Table 5. Previous assessment reports are provided in Appendix G.

In preparation of this document a number of provincial and federal agencies were contacted to discuss various aspects of the Facility Closure project. Table 6 outlines the agencies contact and items discussed.

### 3.0 DESCRIPTION OF THE EXISTING ENVIRONMENT

#### 3.1 OVERVIEW

The DTGS Facility is separated into four main areas that include the Plant Site, Fuel Pipeline and West Wharf, BMSWD Site and Rail Siding. A description of each area and surrounding land use is previously described in Section 2.4. Property maps and Site Plans for each area are also included in Figures 1.3 to 1.8.

The Plant Site is located on the shoreline of Eel Bay of Chaleur Bay with approximately 700 metres of shoreline frontage. Chaleur Bay is an arm of the Gulf of St. Lawrence located between northeastern New Brunswick and Gaspé Québec. This bay, covering over 3000 km<sup>2</sup>, is partially isolated from the rest of the Gulf of St. Lawrence. Over a distance of approximately 150 km from the Plant Site, Chaleur Bay widens and deepens to reach a width of 45 km. However, the bay is only approximately 3 to 4 km in width between the Town of Dalhousie and Miguasha Point in Québec. The shores of Chaleur Bay include numerous beaches, particularly on the southern shore. Many rivers also form barrier beaches such as Eel River Bar located at the mouth of Eel River, approximately 2.5 km south of the Plant Site. This is also the location of the Eel River Bar First Nation community.

The Town of Dalhousie is at the western end of Chaleur Bay as it transitions into the estuary of the Restigouche River. The West Wharf infrastructure is located on the Port of Dalhousie pier and adjacent shoreline of Dalhousie Harbour. Dalhousie Harbour is situated at the confluence of the Restigouche River outfall into the western portion of Chaleur Bay. The Restigouche Estuary was designated an Important Bird Area of International Significance in June 2000 (the first in New Brunswick) because it is the largest staging area in eastern North America for black scoter (*Melanitta americana*). The Restigouche River and associated tributaries is also known to be a significant spawning grounds for migratory fish such as the Atlantic salmon (*Salmo salar*). The western portion of Chaleur Bay and the Restigouche River estuary contains both year-round and seasonal residential housing developments.

The West Wharf in the Town of Dalhousie is an operational port owned by the Port of Dalhousie Ltd. Services include receiving and shipment of bulk/dry products as well as containerized cargo with a 10 ha lay down area. Adjacent to the West Wharf is the former Bowater pulp and paper mill which is currently owned by AIM and undergoing demolition and property rehabilitation.

The BMSWD Site and associated Rail Siding are located near Dalhousie Junction, approximately 6.5 km southwest of the Plant Site. The BMSWD Site encompasses an approximate area of 112 ha and is located in a primarily undeveloped area. The nearest residential property is approximately 300 to 500 m west and south of the BMSWD Site. However, there is a closed municipal landfill located directly north of the BMSWD Site as well as other industrial landfills east and west of the BMSWD Site. The status of the industrial landfills (i.e. in operation or closed) is not currently known.

### **3.2 SITE INFRASTRUCTURE AND HISTORY**

The Approvals Branch of the NBDELG has developed a Facility Profile document (May 2010) which describes the Plant Site history, design, air quality control and compliance (Appendix H). The information presented below provides an overview of the Site history and infrastructure associated with the DTGS.

**1969 - Plant originally commissioned.** Plant originally consisted of Unit #1 boiler burning Bunker C or heavy oil and capable of producing 105 MWe. The heavy fuel was pumped from ships arriving at the Port of Dalhousie through a 3.9 km pipeline to three bulk storage tanks at the Plant Site.

**1979/80 - Unit #2 commissioned.** Unit #2 is capable of producing 215 MWe and originally burnt coal that was transported to the Plant Site from Minto, NB. The coal was transported via rail from Minto, to the Rail Siding in Dalhousie Junction (BMSWD Site) and then trucked from Dalhousie Junction to the Plant Site. The BMSWD Site was established to receive solid waste produced as part of the Plant Site operation (i.e. coal ash). An additional bulk petroleum storage tank (Tank #4) was added to the Plant Site.

**1994 -** The DTGS was refurbished with a Flue Gas De-Sulphurization (FGD) system ("Scrubber"). The FGD uses limestone and water to react with sulphur dioxide to produce gypsum which is sold as a by-product. Both Unit #1 and #2 of the DTGS were refurbished to burn Orimulsion® fuel which is a natural bitumen-based emulsion from Venezuela. The Orimulsion® was also pumped from ships arriving at the Port of Dalhousie through the original fuel pipeline to the Plant Site. Coal shipments to the Plant Site (and Rail Siding) ceased and the Plant Site Coal Pile was decommissioned. A new administration building, stores and service building as well as a WWTP was also added to the DTGS in 1994. An additional bulk petroleum storage tank (Tank #5) added to the Plant Site in 1993/1994. The coal ash cells at the BMSWD Site were covered in

1994 when the Plant Site converted to Orimulsion®. A fixated ash cell was constructed at the BMSWD Site in 1994 and received vanadium-rich fly ash and bottom ash from the burning of Orimulsion®.

**1998** – The Fixated Ash Cell at the BMSWD Site was capped and closed. Ash produced at the Plant Site has since been recovered and sold for the purpose of metals recovery. A bermed, 500 m by 175 m geo-membrane lined waste receiving cell constructed and currently in use at the BMSWD Site (Cell # 1).

**2000** – Wet electrostatic precipitator added to the FGD stack to remove sulphur trioxide

Effluents at the Plant Site are processed through the on-Site WWTP prior to discharge to Eel Bay via the combined CW Outlet.

Leachate from the closed and active cells at the BMSWD Site are collected using drainage channels and or buried collection systems and directed to one of five on-Site leachate/sediment collection ponds.

The Rail Siding area also has a storm water management system consisting of a concrete sump, transfer pump and sediment pond.

Site Plans showing the existing DTGS layout are included as Figures 2.1 to 2.5. Historical aerial photographs of the DTGS and surrounding area are included in Appendix A. Photographs of the DTGS facility are included in Appendix I.

### **3.3 TOPOGRAPHY AND DRAINAGE**

The primary source of surface discharge from the DTGS is the combined CW Outlet located in the northeastern portion of the Plant Site that discharges WWTP effluent, domestic sanitary effluent and cooling water into Eel Bay. There are also several Plant Site surface water collection systems which flow into below surface-grade drainage pipes before discharging into the WWTP, Eel Bay or Tait Brook as outlined below:

- The Administration/Services Building parking area and west side of FGD Building contain catch basins that directly discharge to Tait Brook.
- The south side of the Coal Ash Handling Facility and Crusher Building area contain catch basins that directly discharge to Tait Brook.

- Asphalt covered areas north of the Administration/Services Building, south of the Switch Yard and in the vicinity of the Stores Warehouse and Unit #2 Warehouse contain catch basins that directly discharge to Eel Bay (outfall located north of CW Pumphouse #2).
- The east side of Unit #1 and Unit #2, the Fly Ash Batch Plant, Precipitation Buildings, east of the FGD Stack, and west side of the sanitary sewer system contain catch basins that discharge into the WWTP Oil/Water Separator. Roof drains from Unit #1 also directly discharge into this storm water system. A by-pass valve located directly west of the WWTP Oil/Water Separator can also be used to discharge storm water directly into Eel Bay in the event of an oil/water separator malfunction or overload.
- Surface water in the Bulk Storage Tank Farm area is directed to the Tank Farm Oil/Water Separator which directly discharges into Tait Brook.
- A drainage ditch located south of the Switch Yard discharges to an Oil Spill Collection Pond located directly east of the Stores Warehouse. The Oil Spill Collection Pond discharges to Eel Bay. It is noted that at the time of the Site inspection the drainage channel feeding the Oil Spill Collection Pond and the outfall of the pond were dry.

The current surface water drainage collection system for the Plant Site is presented as Drawings B-1 to B-6 in Appendix B. Photographs showing the WWTP and effluent discharge are also included in Appendix I.

Precipitation that contacts the BMSWD Site either infiltrates into permeable Site surfaces, or is collected by one of several storm water catch basins or drainage channels located on the BMSWD Site. Surface water in the north portion of the Site is collected in a drainage channel surrounding the capped coal ash cell in this area of the landfill and is directed to Sediment Pond #1. This pond discharges to a wooded area at the western property boundary. Surface water in the central portion of the BMSWD Site is collected in drainage ditches and directed to Sediment Pond #2. Leachate from the capped fixated ash cell is directed to Leachate Ponds #1 and #2 which also discharge into Sediment Pond #2. Sediment Pond #2 discharges into Hamilton Brook via overland flow. Surface water in the southwestern portion of the BMSWD Site is collected in catch basins within the active landfill cell (Cell 1) and then directed to Leachate Pond #3. Leachate Pond #3 is batch discharged into Hamilton Brook via overland flow. Surface water drainage ditches and flow patterns obtained from NB Power are included on Figure 2.4. Existing Conditions and Conceptual Site drawings of the BMSWD Site are also included in Appendix C.



The DTGS Facilities are located in an area referred to as the Northern Uplands Ecoregion which arcs across northernmost New Brunswick between the two separate portions of the Highlands Ecoregion (NBDNR, 2007). The northern edge of this eco-region, where the DTGS is located, borders the lower Restigouche River and Chaleur Bay. Restigouche River estuary covers a distance of approximately 50 km between Matapédia and Miguasha Point, flowing through an incised valley and gradually mixes with the sea water of Chaleur Bay. This zone has all the features of a typical estuary environment: shallow water (less than 10 m deep), big tidal range (average range of 2.2 m at Restigouche), very pronounced upstream-downstream salinity gradient and deposition of fine sediment in the intertidal zone in summer, conducive to the development of intertidal marshes (Gagnon, 1997).

Chaleur Bay receives an annual average of 730 m<sup>3</sup>/s of fresh water from its drainage basin: 3,000 m<sup>3</sup>/s when water levels are high (in May) and 220 m<sup>3</sup>/s when they are low (in February). Chaleur Bay is a saline environment (salinity greater than 17 parts per thousand) except during the spring freshet. In summer, the salinity of the surface water of the bay (depth of 0–30 m) is on the order of 28 parts per thousand, and its temperature can exceed 18°C (Gagnon, 1997). The main tributaries that discharge into Chaleur Bay include the Restigouche, Cascapédia, Bonaventure, Petite Cascapédia, Nouvelle, Charlo, Nigadoo, Tetagouche and Nepisiguit rivers. Elevations in the area range from sea level or low coastal cliffs at Chaleur Bay up to a maximum height of about 150 m on the western boundary. Instead of highlands, there are several linear outcroppings including Black Brook Escarpment south of Dalhousie where a narrow resistant ridge of rock called a diabase intrudes the landscape.

### **3.4 ECOLOGICAL SETTING**

#### **3.4.1 ECOREGION**

The Northern Uplands Ecoregion in the northernmost portion of New Brunswick can be separated into two separate portions of the Highlands Ecoregion. Its northern edge borders the lower Restigouche River and Chaleur Bay, and its east side follows the geological contact between flat-lying sedimentary rocks and rugged igneous landscape. The ecoregion climatically is intermediate between the colder Highlands Ecoregion and the slightly warmer and wetter Central Uplands Ecoregion. Its vegetation and fauna consequently display a mixture of northern and southern affiliations that give the area an ecologically distinctive character. The DTGS Facilities are in an Eco-District of the Northern Uplands Ecoregion referred to as the Nicolas Denys Eco-District. This

Ecodistrict averages only 10 km wide and is the most subdued of all ecodistricts in the Northern Uplands Ecoregion. Its rock formations are similar to those of other ecodistricts, but are topographically much less dramatic than elsewhere in the ecoregion (NBDNR, 2007).

The long history of human settlement has reduced the ecodistrict's formerly extensive coniferous forest cover to small patches of coniferous forests scattered in a predominantly mixed forest. The low, acidic flatlands are now covered with a forest dominated by intolerant hardwoods such as trembling aspen, red maple, and white birch, with associated balsam fir, white spruce, and cedar representing the more tolerant coniferous climax community. The acidic slopes tend to support mixed forests of balsam fir, red maple, and cedar accompanied by sugar maple and yellow birch. Black spruce and cedar grow on broad valleys and flatlands that are moderately to poorly drained. This ecodistrict has a high overall frequency of cedar, due to the prevalence of calcareous soils. Sugar maple, yellow birch, and beech are less common, and generally accompany conifers on calcareous slopes (NBDNR, 2007).

One characteristic feature of the Eco-district feature here is the estuaries, tidal flats and salt marshes that have developed where its rivers meet Chaleur Bay in a confluence of salt water and fresh water. These diverse and vulnerable sites contain many unusual or rare species of flora and fauna. The Maritime ringlet butterfly is found only a handful of locales in the world outside the Nicolas Denys Ecodistrict. This species and its habitat are protected under federal and provincial legislation. Local salt marshes also host the more common salt-marsh copper, another endemic species of butterfly.

The Restigouche River watershed is known to be a significant spawning area for the Atlantic salmon and the Canadian Wildlife Services has also designated the river as an Important Bird Area (IBA). The IBA Site can be identified as the area between McLeods Siding to the west, the West Wharf of Dalhousie to the east, and extending north to the Quebec shoreline. The width of this area varies from four to six km and is approximately 15 km in total length. The Restigouche River Estuary IBA is noted to be significant primarily due to the number of black scoters that stage there during spring migration. During the last few years over 11,000 Black Scoters have been observed in the Estuary between mid to late April and the end of May and represents between 3% and 14% of the eastern North American population. Marshes at the mouth of Restigouche River are also home to several rare plant species and valuable habitat for migrating and nesting waterfowl.

Eel River Cove located approximately 4 km south of the Plant Site is also a local birding spot and hosts the one of the few known provincial occurrences of the rare plant white water crowfoot. This area is protected from the Bay of Chaleur by the 1-1/2 km long Eel River Bar and is reported as being one of the most nesting freshwater bird species in NB, along with having the densest population.

The Nature Trust of New Brunswick Inc. (NTNBI) list of Environmentally Significant Areas (NBESAs) identified the Black Brook Escarpment (Site #002), Bonamy Rocks (Site #003), Dalhousie Junction Orchid Site (Site #004), Dalhousie Mill and Harbour (Site #005), and Eel River Cove (Site #006) as important areas for birds and plants within approximately 5 kilometres of the DTGS Facilities. Although the NTNBI and Atlantic Canada Conservation Data Centre (ACCDC) databases do not identify specific locations as supporting species at risk, the environmentally significant areas listed in the vicinity of the DTGS, as a whole, were identified as supporting rare, vulnerable, and relict species; supporting an unusually high diversity of plant and/or animal communities; containing plant and/or animal associations, and/or habitats, which make it an outstanding example as a representative of its type; and providing critical habitat of limited range, as well as breeding shelter or feeding site for wildlife. The ACCDC database also identified the Restigouche River Estuary IBA as being present within five kilometres of the DTGS Facility. The five environmentally significant areas listed above are generally located greater than 500 metres from the Plant Site, BMSWD Site and Fuel Pipeline and are therefore not anticipated to be adversely impacted by the majority of Facility Closure project activities. The West Wharf forms the western limit of the Restigouche River Estuary IBA and is also located directly adjacent to the Dalhousie Mill & Harbour ESA. Facility Closure activities related to NB Power owned infrastructure is limited to structures on the West Wharf pier and are not anticipated to adversely impact these adjacent ESAs.

The ACCDC database information is included in Appendix J.

### **3.4.2 FISH AND FISH HABITAT**

Chaleur Bay contains a mosaic of aquatic habitats reflecting the many possible combinations of biophysical variables that determine the distribution and abundance of aquatic organisms. As previously discussed, estuaries and lagoon barachois of Chaleur Bay and the mouth of the Restigouche River are particularly conducive to the development of highly productive salt marshes and subtidal eelgrass beds that many fish and aquatic birds use for breeding and feeding. The salt-meadow grass marshes typical of the salt marshes of the St. Lawrence Estuary are found only in the Restigouche

River Estuary of the bay. In some estuarine barachois and some sheltered bays, as well as in lagoon barachois, there are shallow ponds (or lagoons) that are not directly influenced by fresh water. These environments, which are conducive to the development of *eelgrass beds*, are home to benthic invertebrates dominated by polychaetes, sea worms and bivalves, including soft-shell clams. The main species of fish are small ones such as sticklebacks, salt-water minnows and black-striped topminnows. Several rivers such as the Restigouche River have no barachois at their mouths, and these estuarine environments provide a migration corridor for anadromous species (Atlantic salmon, brook charr, rainbow smelt, Atlantic tomcod) and catadromous species (eels), as well as a wintering area for smelt and winter flounder, among others (Gagnon, 1997).

DFO indicates there can be are over hundred fish species, 150 species of seaweed, a thousand invertebrate species found in Chaleur Bay during some portion of their life cycle. The main species fished commercially in Chaleur Bay are Snow crab, American lobster, Atlantic cod, Atlantic herring, Canadian plaice, rainbow smelt, giant scallop, Atlantic mackerel, Atlantic oyster, Soft-shell clam and Winter flounder. Atlantic salmon, rainbow smelt, Atlantic cod and mackerel are the species most favoured by sport fishers, as well as digging for soft-shell clams. Chaleur Bay and associated estuaries and rivers are also traditional fishing areas for members of the North Shore Micmac District Council, including Eel River Bar First Nation. The area's pelagic zone is one of the most productive in the Gulf of St. Lawrence thanks to its abundance of zooplankton. It is an important environment for the spawning, rearing and feeding of capelin, Atlantic mackerel, Atlantic herring, Atlantic cod and Canadian plaice. The schools of fish are in turn eaten by Northern gannets, Black-legged kittiwakes and other sea birds (DFO website; DFO, 1997).

Eight species of marine mammals have been reported in the Chaleur Bay at various times of year, including six species of whales. There are two species of toothed whales (Harbour porpoise and White-beaked dolphin) and four species of baleen whales (Minke, Fin, Humpback and Blue; Gagnon, 1997).

The Chaleur Bay shoreline in the vicinity of the DTGS Facility generally contains rip rap armour stone as well as pebble to cobble sized beach stone. Small depositional areas with coarse-grained sand and gravel are also present. Shoreline vegetation adjacent to the Plant Site generally consists of low growth shrubs and grasses with several areas of the Plant Site having ornamental lawns and shrubs that extend directly to the shoreline. Due to the rocky substrate present along the shoreline of Chaleur Bay directly adjacent to the DTGS, submerged or semi-submerged aquatic plants are limited in this area of the

bay. The combined CW Outfall and the CW Intake structures are the only structures associated with the DTGS Facility that are located below the high water mark of Chaleur Bay which would potentially be considered fish habitat.

As previously indicated, a small tributary named Tait Brook is located on Plant Site. The brook originates northwest of the Plant Site, transects the Plant Site from northwest to southeast and discharges into Chaleur Bay in the southeast corner of the Plant Site. The portion of Tait Brook located on the Plant Site is generally 2 to 8 metres wide and approximately 800 metres in length, with the original drainage pattern re-routed during construction and subsequent up-grade activities of the DTGS. During the previous ERA program completed for Tait Brook, the brook was considered ecological habitat for a variety of water dependent birds and mammals but would be considered low quality fish habitat given the low volume of water, highly disturbed nature and presence of several fish passage barriers including the collapsed culvert located at the brook outfall to Eel Bay. However, during the ERA field investigation, several minnow sized fish (not speciated) were observed in Tait Brook within the Plant Site boundaries. The brook is not known to support cold water fish species like brook trout (*Salvelinus fontinalis*) or Atlantic salmon (*Salmo salar*).

A small tributary named Hamilton Brook is located on the southern portion of the BMSWD flowing west to east. The brook is relatively small, low flow tributary that originates west of the BMSWD Site. East of the BMSWD Site the tributary has been channelized to parallel the CN Rail line before discharging into Eel River. The portion of Hamilton Brook on the BMSWD Site is highly influenced by beaver workings creating ponded water areas. The tributary contains areas with soft silty sediment as well as sections of gravel bottoms and likely provides habitat for resident brook trout as well as smaller minnow species. Hamilton Brook is not considered to be habitat capable of supporting larger migratory fish species such as Atlantic salmon.

### **3.4.3      FLORA**

As previously noted, the DTGS is an industrial facility that has been in operation since the 1970s and as such vegetation is generally limited to decorative grasses, adventive weed species, low growth shrubs and early successional tree species such as white birch, pin cherry, aspen, willow and alder. The Plant Site borders Dalhousie Mountain to the north which contains mixed mature deciduous and coniferous trees that extend along northern boundary of the Plant Site.

Similarly, the disturbed areas of the BMSWD Site such as the former Coal Ash Cells and the Fixated Ash Cell are grass covered and also contain interspersed woody shrubs. The active cell (Cell 1) primarily lacks vegetation. The perimeter of the BMSWD Site and the Rail Siding contain mixed mature deciduous and coniferous trees that extend along northern Site boundary.

A review of the NBDNR Protected Natural Area database indicated that current or proposed provincially Protected Natural Areas are not located in the DTGS project footprint or within 5 km of its boundaries. In addition, the Closure of the DTGS generally includes decommissioning of infrastructure in previously developed areas of Dalhousie and Dalhousie Junction and “old growth” forest habitat or deer wintering areas are not known or expected to be present within the project footprint.

#### **3.4.4 FAUNA**

Given the extended industrial use of the Plant Site, Fuel Pipeline ROW and West Wharf, and the general lack of functional habitat over the majority of the Site, terrestrial wildlife associated with the subject DTGS Facility is likely restricted to a variety of small terrestrial mammals (e.g., meadow vole), soil invertebrates, transient birds and potentially smaller upper trophic level terrestrial mammals (e.g., fox). Based on a review of aerial photographs, information obtained from NBDNR and a Site walk-over, the Plant Site, Fuel Pipeline ROW and West Wharf likely do not contain habitat sufficient to support larger mammals (i.e., deer and moose).

Tait Brook located on the Plant Site has been identified as potentially providing ecological habitat for a variety of water dependent birds and mammals (see Section 3.11). A small wetland area created by beaver workings in Tait Brook is also located in the southeast corner of the Plant Site. Previous evaluations completed at the Site, a variety of fauna (or their markings) was observed in the lower portion of Tait Brook including: surface water invertebrates (nymphs and beetles), frogs (*Rana* sp.), several species of small transient birds [e.g., flycatcher (*Empidonax* spp.) and killdeer (*Charadrius vociferous*)], water-dependent birds [e.g., ducks (*Anas* sp.)], water dependent small mammals (beaver (*Castor canadensis*) and muskrat (*Ondatra zibethicus*)] and several minnows (species not identified).

Similar to the Plant Site, the BMSWD Site has undergone significant alteration during the DTGS operation and terrestrial wildlife associated with the subject Site is likely restricted to a variety of small terrestrial mammals, soil invertebrates, and transient birds. However, given that a large proportion of the BMSWD Site has previously been

closed (Coal Ash Cells and Fixated Ash Cell) and effectively re-vegetated with grasses surrounded by mixed forest habitat, larger mammals such as deer, moose or black bear may utilize the BMSWD Site for foraging. In addition, Hamilton Brook located on the southern portion of the BMSWD Site may also provide habitat for semi-aquatic birds and mammals. Beaver markings and lodges within Hamilton Brook on the BMSWD Site were previously identified during the 2010 Phase I/II ESA programs.

Wildlife most likely to utilize the DTGS Facilities on a regular basis are typically associated with developed areas and relatively insensitive to anthropogenic activities. Opportunistic observations of species in the Dalhousie area were recorded during previous investigations completed at the DTGS Facility. Several species of small transient birds [e.g., robin (*Turdus* spp.), vireo (*Vireo* spp.), flycatcher (*Empidonax* spp.)], invertebrates [e.g. butterflies (not identified to species)] and water-dependent birds (e.g., ducks (*Anas* sp., and *Mergus* sp.) and water dependent mammals (i.e., beaver) were observed at various locations of the Plant Site and BMSWD Site. Between 2003 and 2009, Mr. Charlie McAleenan completed a series of Barrow's Goldeneye (*Bucephala islandica*) surveys in the Dalhousie area with one of the survey points being the marine waters directly adjacent to the DTGS Plant Site. The surveys were completed during the winter months to determine if the Restigouche River Estuary and Bay of Chaleur in the Dalhousie area provides wintering habitat for waterfowl, specifically avian species at risk. Barrow's Goldeneye is listed as a special concern species under Schedule 1 of the federal Species at Risk Act. Barrow's Goldeneye along with other waterfowl were observed to be present in the marine waters adjacent to Plant Site area of the DTGS during each of the surveys completed. However, the birds proximity to the shoreline DTGS shoreline area was dependent on ice flows and the presence of open waters at the time of the survey. The reports prepared by Mr. McAleenan are included in Appendix J.

The Chaleur Bay region is in the Atlantic flyway for migratory birds and provides critical breeding, staging, migration habitat for waterfowl. As previously noted, a wetland habitat in the southeast corner of the Plant Site property has developed due to the lack of a functioning culvert on the outlet of Tait Brook. The wetland has been identified to be approximately 0.5 to 1 hectares in total size and is considered to be anthropogenic in origin with low diversity of vegetation and is not considered to be sensitive or critical habitat for wildlife. Available wetland mapping from the Province of New Brunswick on GeonB Map Viewer (<http://geonb.snb.ca/geonb/DNR>) also indicated there are three small wetland habitats associated with the BMSWD Site. These wetlands are not considered to support or provide critical habitat for migratory waterfowl. The wetlands associated with the DTGS Facility are further described in Section 4.2.6 of this report and the corresponding wetland mapping is provided in Appendix K.

### 3.4.5 SPECIES AT RISK

NBDNR was contacted to determine if the provincial database listed provincial species at risk in the vicinity of the DTGS Site. The database did not identify provincially listed species at risk in the general proximity of the project Site.

Information obtained from the ACCDC regarding the historical and current occurrence of animal and plant species of concern in the Dalhousie and Dalhousie Junction area was used to determine if potential species at risk occur in the vicinity of the DTGS Facilities. The ACCDC database identified three Species at Risk (SAR), under Schedule 1 of the federal Species at Risk Act (SARA), as potentially occurring within 1 km of the Plant Site. The three Schedule 1 species are: Canada warbler (*Wilsonia canadensis*), olive-sided flycatcher (*Contopus cooperi*) and wood turtle (*Glyptemys insculpta*). SAR were not identified as occurring within approximately 1 km of the BMSWD Site (including the Rail Siding), Fuel Pipeline or the West Wharf.

<i>Common Name</i>	<i>Scientific Name</i>	<i>ACCDC Provincial Rank<sup>(1)</sup></i>
Canada Warbler	<i>Wilsonia canadensis</i>	S3S4B
Olive-sided Flycatcher	<i>Contopus cooperi</i>	S3S4B
Wood Turtle	<i>Glyptemys insculpta</i>	S2

Note:

(1) Definitions of provincial ranks are provided in Appendix J.

#### Canada Warbler

The Canada warbler is listed as a threatened species under SARA (Schedule 1; March 2010) but is not listed under the NB Endangered Species Act. The only reported occurrence of the Canada warbler within 1 km of the subject Site occurred in 1989 with the confirmed activity being breeding. The Canada Warbler is found in a variety of forest types, but it is most abundant in wet, mixed deciduous-coniferous forest with a well-developed shrub layer. It is also found in riparian shrub forests on slopes and in ravines and in old-growth forests with canopy openings and a high density of shrubs and typically builds its nest on or very close to the ground, often in dense ferns or fallen logs. The Plant Site generally lacks mixed deciduous-coniferous forests but the lower portion of Tait Brook does have a well-developed shrub layer that could be used as habitat by the Canada warbler.



### **Olive Sided Fly-Catcher**

The olive-sided flycatcher is listed as a threatened species under SARA (Schedule 1; March 2010) but is not listed under the NB Endangered Species Act. The only reported occurrence of the olive-sided flycatcher within 1 km of the subject site occurred in 2007 with the activity being bird in habitat. The olive-sided flycatcher is most often associated with open areas containing tall live trees or snags for perching. These vantage points are required for foraging. The olive-sided flycatcher nests are typically constructed in coniferous trees using twigs and rootlets. As such, the habitat to support the feeding and nesting requirements of the olive-sided flycatcher is generally lacking at the Plant Site. In particular, the area surrounding Tait Brook is generally manicured lawns or industrial areas.

### **Wood Turtle**

The wood turtle is listed as threatened under SARA (March 2010) and is noted as potentially occurring within 5 km of the Site. However, specific observations of wood turtles within 5 km of the subject Site were not available in the ACCDC database. Wood turtles are generally associated with rivers and streams with sandy or gravelly-sandy bottoms and prefer clear meandering watercourses with a moderate current. Natural nesting sites for wood turtles are found on sand or gravel-sand beaches and banks. Although they prefer riparian areas with diverse, patchy cover, females also lay eggs in gravel holes, at the edges of roads and railways, in utility right-of-ways, in farming fields, pastures and former fields. Although a wood turtle specific survey has not been completed at the Site, there are no historical reports of turtles being observed at the Plant Site and Tait Brook generally does not provide the preferred habitat of wood turtles. In addition, given the industrial land use of the Plant Site, altered nature of Tait Brook and general lack of gravelly-sandy channel bottom, wood turtles are not expected to be present within the Brook.

The ACCDC database also identified 37 vascular flora within 5 km of the DTGS Facilities. These species include:

<i>Catabrosa aquatica</i> var. <i>laurentiana</i>	Water Whorl Grass
<i>Carex glareosa</i> var. <i>amphigena</i>	Gravel Sedge
<i>Carex viridula</i> var. <i>elatior</i>	Greenish Sedge
<i>Carex backii</i>	Back's Sedge
<i>Stellaria crassifolia</i>	Fleshy Stitchwort
<i>Arabis x divaricarpa</i>	Limestone Rockcress
<i>Arnica lonchophylla</i>	Northern Arnica
<i>Polygonum viviparum</i>	Alpine Bistort
<i>Chenopodium capitatum</i>	Strawberry-blite
<i>Hackelia deflexa</i> var. <i>americana</i>	Nodding Stickseed
<i>Stuckenia pectinata</i>	Sago Pondweed

<i>Calypso bulbosa var. americana</i>	Calypso
<i>Blysmus rufus</i>	Red Bulrush
<i>Carex gynocrates</i>	Northern Bog Sedge
<i>Chenopodium rubrum</i>	Red Pigweed
<i>Atriplex franktonii</i>	Frankton's Saltbush
<i>Barbarea orthoceras</i>	American Yellow Rocket
<i>Galium obtusum</i>	Blunt-leaved Bedstraw
<i>Valeriana uliginosa</i>	Swamp Valerian
<i>Equisetum palustre</i>	Marsh Horsetail
<i>Liparis loeselii</i>	Loesel's Twayblade
<i>Carex vaginata</i>	Sheathed Sedge
<i>Carex ormostachya</i>	Necklace Spike Sedge
<i>Viola nephrophylla</i>	Northern Bog Violet
<i>Geocaulon lividum</i>	Northern Comandra
<i>Thalictrum venulosum</i>	Northern Meadow-rue
<i>Myriophyllum sibiricum</i>	Siberian Water Milfoil
<i>Betula pumila</i>	Bog Birch
<i>Corallorhiza maculate</i>	Spotted Coralroot
<i>Aquilegia Canadensis</i>	Red Columbine
<i>Galium labradoricum</i>	Labrador Bedstraw
<i>Rumex pallidus</i>	Seabeach Dock
<i>Equisetum palustre</i>	Marsh Horsetail
<i>Ranunculus gmelinii</i>	Gmelin's Water Buttercup
<i>Hudsonia tomentosa</i>	Woolly Beach-heath
<i>Stellaria humifusa</i>	Saltmarsh Starwort
<i>Lechea intermedia</i>	Large-pod Pinweed

The ACCDC information obtained for the Plant Site indicated that two provincially uncommon plant species [saltmarsh starwort (*Stellaria humifusa*) and Labrador bedstraw (*Galium labradoricum*)] have historically been identified along the Chaleur Bay shoreline in the vicinity of the Plant Site. A Rare Plant Species Survey was therefore completed at the Plant Site on August 19 and 20, 2010 by B&B Botanical. The purpose of the survey was to determine if provincially rare plant species are located on or directly adjacent to the Plant Site. The survey covered a total distance of 7.2 km and included the shoreline of Chaleur Bay adjacent to the Plant Site as well as the portion of Tait Brook on the Plant Site property. The survey indicated that two uncommon plant species were present at the Plant Site and included:

- *Equisetum variegatum* (variegated scouring-rush) was located in Tait Brook west of the Bulk Storage Tank Farm
- *Suaeda calceoliformis* (sea blite) was found in abundance on the gravelly shoreline near the CW Inlets

These two plant species are not protected provincially or federally and have provincial rarity rankings of S3 or S4. These rarity rankings indicate these two plants are uncommon (S3) to fairly common (S4) throughout their range in the province. The B&B Botanical rare plant survey is included in Appendix G.

As noted in the previous section, an evaluation of Barrow's Goldeneye presence in the Dalhousie area was completed by Mr. Charlie McAleenan between 2003 and 2009. Barrow's Goldeneye is a federally listed species at risk and was identified to be present in the marine waters of Chaleur Bay and the Restigouche River estuary. Specific to the DTGS, Barrow's Goldeneye were present in the marine waters adjacent to the DTGS during each of the winter surveys completed between 2003 and 2009. The birds were identified in the marine waters adjacent to the Plant Site but were not observed directly on the Plant Site properties.

### **3.5 REGIONAL GEOLOGY**

Based on a review of available records, the geology in the vicinity of the Plant Site and Fuel Pipeline typically consist of Pre-Quaternary age rock generally weathered and partially disintegrated, glacial molded surfaces underlain by Devonian age bedrock comprised of mafic to intermediate volcanic rocks of the Dalhousie Group. The geology in the vicinity of the BMSWD Site consists of Late Wisconsinan or Early Holocene age blankets and plains (sand, silt, some gravel, and clay) generally 0.5 m to 3.0 m thick and underlain by Pennsylvanian or younger bedrock comprised of sandstone, conglomerate, and siltstone.

#### **Plant Site**

The overburden stratigraphy at the Site generally consists of a loose sand and gravel fill with organics, localized wood debris ranging in depth from surface cover to a maximum depth of 2.0 metres. Compact and dense, brown to grey sand and gravel with silt and clay underlies the fill in the southern portion of the Plant Site and extends to greater than 6 metres depth. Peat was observed in boreholes along the shoreline at depths of 3 metres to 6 metres depth. The Plant Site is located directly south of Dalhousie Mountain with the north portion of the Plant Site formed by rock walls of the mountain. Bedrock at the Site consisted grey of greywacke exposed at surface on the northern portion of the Site to greater than 9.0 metres depth in the southern portion of the Site.

Previous investigations completed at the Plant Site related to the coal pile decommissioning identified a low permeability marine clay layer in this area of the Plant Site. The marine clay layer has created a shallow (perched) aquifer and a deeper aquifer in the area.

### **Blair Malcolm Solid Waste Disposal Site**

The stratigraphy of the BMSWD Site generally consists of compact brown silty sand and gravel from surface to depths of approximately 5.4 metres. Underlying bedrock at the BMSWD Site consists of red conglomerate.

## **3.6 WATER SUPPLY/GROUNDWATER USAGE**

The Plant Site, Fuel Pipeline and West Wharf as well as the surrounding areas have potable water supplied by the Town of Dalhousie. The potable water supply for the Town is obtained from the Charlo River located approximately 12 km south of the Plant Site. The DTGS obtains water for Plant operation from the two CW Intake buildings with enclosed, concrete sumps located on the northeastern property boundary. Potable water wells or production wells are not located on the DTGS properties.

The BMSWD Site does not have potable water supply on-Site and is not serviced by the municipal water supply. The surrounding area obtains potable water from private wells with the nearest private residential potable water well located approximately 300 to 500 m west and south of the BMSWD Site.

## **3.7 WATER QUALITY**

### **Surface Water**

The waters of Chaleur Bay (including Dalhousie Harbour) are known to provide a high level of recreational use and support a wide range ecological function and biodiversity. As the Plant Site and West Wharf is located directly adjacent to Chaleur Bay, the protection of surface water quality in the bay is a primary concern related to the decommissioning of the DTGS Facility. In addition, two small tributaries (Tait Brook and Hamilton Brook) that ultimately discharge to Chaleur Bay transect the Plant Site and BMSWD Site. As such, surface water monitoring programs for Tait Brook and Hamilton Brook have been completed by the NB Power and CRA between 2007 and 2010 to provide baseline surface water chemical quality data in the vicinity of the DTGS

Facilities when the plant is in operation and during shut-down periods. Results of the previous surface water monitoring programs are further described in Section 3.11 and the full assessment reports are provided in Appendix G.

In addition to chemical quality of Chaleur Bay and associated tributaries, erosion and sediment run-off from the project Site to the on-Site tributaries and Chaleur Bay is also a concern during and following demolition activities. The use of the WWTP for the control and treatment of surface water run-off and plant wash water generated during the demolition activities is expected to significantly minimize silt and other chemical contaminants from entering Tait Brook or Chaleur Bay from the demolition area. Similarly, existing sediment and leachate ponds at the BMSWD Site will be utilized during the BMSWD Site closure activities to control surface water run-off at the site. Physical and chemical properties of the WWTP effluent as well as BMSWD Site sediment and leachate ponds are currently monitored and will be monitored for the duration of the Facility Closure program in accordance with conditions specified in the Certificate of Approval to Operate.

### **Groundwater**

Groundwater in the area of the DTGS Facilities is generally not being used as a source of potable water for local residents. The Phase II ESA program completed by CRA in 2010 was therefore completed to investigate groundwater conditions on the Site and determine if there is actual or potential migration of contaminants associated with the Plant Site to Eel Bay or Tait Brook. The Phase II ESA also investigated groundwater conditions migrating onto the BMSWD Site from up-gradient sources and groundwater conditions leaving the BMSWD Site property boundaries.

A total of 22 monitor wells were constructed and sampled at the Plant Site including the construction of nine monitor wells along the shoreline of Eel Bay. Five pairs of existing nested monitor wells surrounding the former coal pile and Tait Brook (ten wells total) as well as one monitor well located along the shoreline of Eel Bay, directly down-gradient of the wastewater treatment lagoons, were also sampled during the 2010 Phase II ESA program. A total of 12 nested monitor wells (24 wells total) and one single monitor well were installed and sampled at the BMSWD Site and the Rail Siding, respectively. Results of the Phase II ESA program indicated BTEX/TPH, metal, Polycyclic Aromatic Hydrocarbons (PAHs) and Polychlorinated Biphenyl (PCB) concentrations in groundwater at the DTGS Facilities are below applicable Atlantic RBCA Tier I Risk Based Screening Levels (RBSLs) as well as Ontario Ministry of Environment (MOE) guidelines for the protection of aquatic life. The MOE guidelines for groundwater

within 30 metres of a water body were applied to the Plant Site and BMSWD Site as this is a non-potable area and the primary contaminant pathway and receptor associated with the Facilities is groundwater discharge to Eel Bay, Tait Brook and Hamilton Brook.

The analytical data for the 2010 Phase II ESA program completed by CRA, which includes the perimeter well analytical results, is further discussed in Section 3.11 and the assessment reports are included in Appendix G.

### **3.8            SOIL QUALITY**

Historical operation of the Plant Site property as a thermal generation facility, exposure of former coal stockpiles to the atmosphere, handling and storage of fly/bottom ash and the storage of petroleum hydrocarbons on-Site has the potential to negatively impact soil quality at the Plant Site compared to background conditions. Similarly, the use of the BMSWD Site as an industrial landfill and disposal location of coal ash, petroleum ash and gypsum is also suspected to potentially impact soil quality at the BMSWD Site. The 2010 ESA programs completed for the DTGS Facilities by CRA therefore included the chemical analysis of soil from the Plant Site, Fuel Pipeline and West Wharf, BMSWD Site and Rail Siding consistent with NBDELG Guidelines for the Management of Contaminated Sites (2003). The results of the 2010 ESA programs are described in Section 3.11.

The discussion of soil quality in this report is only related to on-Site conditions. Investigations pertaining to off-Site soil conditions in the Dalhousie area have previously been completed as part of the Provincial contaminated sites framework and therefore not included in this assessment. Cantox et al. completed a study of soil conditions within the Town of Dalhousie in 2006 titled “The Study of Soils in the West Wharf Area” for Noranda Inc. The study used existing environmental reports to screen a full suite of metals in soil into a subset of metals which were sampled and assessed further (arsenic, cadmium, copper, iron, lead, thallium and zinc). The Study included soil and vegetation sampling throughout residential and commercial properties of the Town and concluded that metals in soil were not predicted to adversely affect the health of residents.

### 3.9 SEDIMENT QUALITY

As part of the 2010 ESA programs completed by CRA, sediment samples were collected from the Plant Site WWTP lagoons, Tait Brook, Hamilton Brook, BMSWD Site sedimentation and leachate ponds, BMSWD Site pond outlet channels and the Rail Siding sediment pond. The information collected was intended to provide information on sediment quality in these areas that could be used in designing the Facility Closure plan. Based on the sediment quality data obtained from the lower portion of Tait Brook on the Plant Site, supplemental sediment sampling program was completed in November 2010 and an Ecological Risk Assessment (ERA) completed to evaluate potential risk to ecological receptors in the brook from exposure to chemicals of concern in sediment. Results of the screening and preliminary quantitative ERA determined concentrations of BTEX, TPH and PAH constituents in sediment and surface water of Tait Brook pose a low risk to aquatic receptors including benthic invertebrates and upper trophic level aquatic or semi-aquatic receptors. Results of the 2010 Phase II ESA as well as the supplemental sediment sampling program and ERA are summarized in Section 3.11 and the full CRA reports are included in Appendix G.

### 3.10 AIR QUALITY

#### Meteorology

The project Site is located within the northeastern climatic region of New Brunswick, where the climate is relatively dry and cool, with temperature extremes moderated by Chaleur Bay. The nearest climate station with historical data is the Charlo climate station (ID #8100880) operated by the Meteorological Service of Canada (MSC). The station is located approximately 7 km south of the Project Site (47° 59'00.000", 66°20'00.000"W).

The following is a summary of average climate conditions at the Charlo station, based on climate normals published by EC for the period from 1971 through 2000/2002.

Mean annual total precipitation is 1,054 mm, which includes 392 cm of average snowfall per year (345 mm water equivalent). Precipitation is generally uniform throughout the year, with the most precipitation occurring in July and least precipitation occurring in February. Measurable precipitation occurs on an average of 179 days per year, with 113 days of measurable rainfall and 66 days of measurable snowfall.

The extreme one day rainfall for the station is 113 mm on July 11, 2001 and extreme one day snowfall is 49 cm on February 6, 2001.

Average temperature is 3.2°C, with an average range from -12.8°C to 17.9°C. Temperature extremes can range from -36.5°C to 35.2°C. There is an average of 266 days per year with an average temperature above 0°C.

Predominant wind direction is westerly but changes to easterly during the spring months (April, May and June). Wind speeds ranged from 11.4 to 16.3 km/h with maximum gust speeds of 89 to 129 km/h. Plant Site specific climatic data has also been collected from the DTGS as part of on-going air quality monitoring and is further discussed in Section 3.11.

#### Total Suspended Particulates

Site specific data has been collected from the DTGS as part of on-going air quality monitoring and is further discussed in Section 3.11.

#### Airborne Emissions

Site specific data has been collected from the DTGS as part of on-going air quality monitoring and is further discussed in Section 3.11.

### **3.11 PREVIOUS DATA COLLECTION**

#### **3.11.1 ENVIRONMENTAL MONITORING ACTIVITIES**

##### **Air Emissions**

Routine environmental monitoring activities were completed during operation of the DTGS as part of the Approval to Operate Licence #I-7185 which includes ground level sulphur dioxide (SO<sub>2</sub>) monitoring at five fixed locations (Pointe à la Garde, Point la Nim, Bayview, Dalhousie Tower and Charlo) and one semi-mobile station, operation of the Provincial Acid Rain Deposition Monitoring Network, supplementary control system modeling, stack monitoring and opacity, source compliance testing (nitrogen oxide (NO<sub>x</sub>), particulate matter, metals (vanadium) and SO<sub>2</sub>). Electronic copies of the Annual Ambient Air Quality Summary reports for the Dalhousie Thermal Generating Station that have been submitted to the NBDELG over the last three years (2009 to 2011) are included in Appendix G.

##### **Plant Site Effluent**

Monitoring of the WWTP effluent quality being discharged to Eel Bay through the combined CW Outlet as well as effluent quality discharged to Tait Brook from the Bulk Storage Tank Farm Oil/Water Separator is required to meet the conditions of Approval #I-5878, issued April 1, 2008 by the NBDELG under the Industrial Approvals



Regulation of the Clean Water Act (valid to March 31, 2013). The compliance monitoring included a monthly wastewater monitoring report outlining results of the Waste Management Effluent (WME) and the Tank Farm Orimulsion Water Separation (TFOW).

The WME monitoring includes a Daily Report containing pH, total suspended solids values and flow rates, a Weekly Report containing total weekly composite analysis (i.e. metals) and weekly average suspended solids calculated from the daily values, weekly composite analyses of metals, average weekly flow rates, and weekly chemical addition amounts. The WME monitoring also includes a Monthly Report with the monthly average for each parameter from the weekly composite data, a monthly average suspended solids value calculated from the daily data and a monthly composite value for mercury and modified petroleum hydrocarbons. The WME monitoring also included Fish Toxicity Testing twice annually.

The TFOW monitoring includes a Daily Report containing flow rate data and a Weekly Report for oil/grease on weekly composites and Monthly Report containing monthly average for oil/grease that is calculated from the weekly composites. The Monthly Report also includes Total Petroleum Hydrocarbons on the monthly composite sample. Electronic copies of the Annual Monitoring reports submitted to the NBDELG as part of the Approval to Operate conditions for the years 2009 to 2011 are attached in Appendix G.

### **BMSWD Site Effluent**

Monitoring of the effluent quality being discharged to Hamilton Brook through the various sediment/leachate ponds is required to meet the conditions of Approval #1-7782, issued November 1, 2011 by the NBDELG under the Water Quality Regulation of the Clean Environment Act and Air Quality Regulation of the Clean Air Act (valid to October 31, 2016). The compliance monitoring included a monthly wastewater monitoring report outlining results of samples collected from the Leachate Holding Pond #3 (LHP3), Sedimentation Ponds #1 and #2 (SP1 and SP2), groundwater monitoring wells, the Upper and Lower Hamilton Brook (UHB and LHB), West Underdrain of Cell 1 (WUC1) and the Leachate Pond #3 Underdrain (LP3U).

The BMSWD Site monitoring includes a Monthly Report containing daily pH and total suspended solids values as well as composite weekly samples for chemical analysis (i.e. sulphate and metals) from SP2 and LHP3. The SP2 and LHP3 monitoring also includes Fish Toxicity Testing three times annually. The remaining underdrains (WUC1, LP3U), sedimentation pond (SP1) as well as Hamilton Brook (UHB and LHB) are sampled on a monthly to quarterly basis for pH, suspended solids, sulphate and selected metals. The

11 nested piezometers at the BMSWD Site are also monitored on a quarterly basis for of pH, sulphate, selected metals and conductivity. On a quarterly basis the WWTP sludge taken to the BMSWD Site for disposal is characterized including approximate quantities, trace metal concentrations, leachability analysis and grain size.

Electronic copies of the Annual Monitoring reports submitted to the NBDELG as part of the Approval to Operate conditions for the years 2009 to 2011 are attached in Appendix G.

### **3.11.2 ENVIRONMENTAL ASSESSMENT**

#### **3.11.2.1 COAL PILE DECOMMISSIONING**

In 1992/1993, Roy Consultants (Roy) completed a detailed testing and decommissioning plan for the Coal Pile at the Plant Site (now the gypsum storage area). The testing program included the construction and sampling of five nested monitor wells surrounding the former coal pile that determined the coal pile is underlain by a low permeability marine clay layer that has created a shallow (perched) aquifer and a confined deeper aquifer in this area of the Plant Site. The shallow aquifer adjacent to the coal pile showed low levels of metal contamination from coal pile leaching as well as a minor impact from discharges into Tait Brook. The soil quality of the clay liner under the coal was determined to be within 1991 CCME guidelines. Based on the assessment data, the coal pile was decommissioned with approval from the NBDELG by relocating residual coal to the Belledune Thermal Generation Station, mixing agricultural limestone within the coal pile granular layer, implementing erosion control measures and re-vegetation. Removal of coal was determined to eliminate the source of contamination to the shallow groundwater and Tait Brook and additional remedial action not required. Documentation is included in Appendix G-3.

#### **3.11.2.2 CLOSURE OF FIXATED ASH CELL - BMSWD SITE**

Environmental Impact Assessment Registration for the Closure of the Fixated Ash Cell at the Blair Malcolm Solid Waste Disposal Facility was prepared by NB Power, May 5, 2000. Approval to Construct I-2631 was issued for closure activities associated with the Fixated Ash Cell at the Dalhousie Generating Station Waste Disposal Site. Documentation is included in Appendix G-4.

### **3.11.2.3 ASBESTOS MANAGEMENT**

An asbestos inventory was completed at all Facilities associated with the DTGS in 2002 by All-Tech Environmental Services Limited (All-Tech). The asbestos surveyed identified a total of 450 homogeneous sampling areas within the Plant Site. Another 30 sampling points were identified on the Fuel Pipeline and 3 sample points in the West Wharf Pumphouse. One additional sampling point was also identified in the small shed building located at the BMSWD Site. Of the total 514 homogeneous sampling areas (excludes HVDC facility), 197 were determined to contain asbestos. In addition to the homogeneous sampling areas, visual identification of ACM was noted based on the experience of the survey consultant. The information obtained during the survey was entered into an Asbestos Trakker® computerized program. An asbestos management plan was also developed by All-Tech (report dated March 2002) to establish procedures for building maintenance and renovations, to remove or repair ACM identified in the assessment report and to provide training and equipment to workers at the Plant Site. NB Power has removed ACM encountered in specific areas during maintenance activities completed at the Plant Site since 2002 and has recorded the removals in the Plant Site ACM Management files.

Potential ACM materials throughout the Plant Site, West Wharf Pumphouse and Fuel Pipeline have previously been labeled (by All-Tech) as either “Non-asbestos” with a blue label or as “Asbestos” with a yellow label. The labels also display a unique identification number and sample number.

### **3.11.2.4 LIMITED REMEDIAL ACTION - TAIT BROOK**

On April 6-7, 2010, the Bulk Storage Tank Farm Oil/Water separator unit malfunctioned resulted in the release of a small volume of Bunker C fuel being released into Tait Brook (actual quantity release not known). Emergency measures were immediately initiated including the installation of oil absorbent booms in Tait Brook as well as collection of visible oil along stream bank. NBDELG opened an occurrence file #4208 on April 20, 2010. Dillon Ltd. (Dillon) subsequently completed visual confirmatory observations on April 26/27, 2010. An email obtained from NBDELG on July 8, 2010 confirmed that the information provided is sufficient and further remedial action is not necessary.

A copy of the Record of Site Condition is included in Appendix G-6.

### **3.11.2.5 PHASE I ENVIRONMENTAL SITE ASSESSMENT**

In 2010, CRA conducted a Phase I ESA of the buildings and properties associated with the DTGS Facility, including the Plant Site, Fuel Pipeline and West Wharf and the BMSWD Site. The purpose of the Phase I ESA was to determine if evidence of potential or actual environmental contamination exists in connection with the Facility, which may be present as a result of current or past activities or neighbouring properties. Conclusions and recommendations made as part of the Phase I ESA include:

#### **Plant Site**

- Soil, groundwater, and/or surface water at the Plant Site may have been negatively impacted from the past storage and use of coal and heavy fuel, and potentially impacted soil, groundwater, and/or surface water may have migrated off site
- Plant Site effluent discharge quality to Eel Bay from the automatic boiler blow-down, storm water catch basins, and the former lagoon wastewater treatment (prior to the WWTP) is not known
- Sediment quality within Tait Brook and the Oil Spill Collection Pond drainage channel at the Plant Site is not known
- Presence of metal impacted dust inside and outside the ash handling facilities as well as on equipment in these areas of the Plant Site is not known
- Presence of stained surface soil around the concrete bases of the transformers in the Transformer Bank area of the Plant Site
- Presence of stained surface soil and hydrocarbon odours directly beneath the vapour extraction vents on the north exterior wall of Turbine Rooms #1 and #2
- Various hazardous materials such as asbestos containing materials (ACM), PCBs, ODS, ionizing radiation, lead and lead based paint, and mercury based materials were identified at the Plant Site
- Presence of a waste oil UST

#### **Fuel Pipeline and West Wharf**

- Soil along the Fuel Pipeline may have been negatively impacted from historic operations
- Report of a small release of Bunker C on the north side of the West Wharf Pumphouse that was remediated, however confirmatory soil analytical data were not available
- Small releases of petroleum product were reported in the vicinity of line expansion joints and junction box of the fuel pipeline

- Potential ACM was identified on the fuel pipeline

#### **BMSWD Site**

- Exposed coal ash was observed at surface and beyond the known limits of waste
- Groundwater quality data (including seeps) downgradient from the coal ash areas are limited
- Groundwater quality from the upgradient off-Site landfills migrating to the BMSWD Site is not known
- Sediment quality within the sediment ponds, leachate ponds, and effluent discharge channels or receiving waters such as Hamilton Brook at the BMSWD Site is not known

#### **Rail Siding**

- Remediation of impacted soils at the Rail Siding was undertaken in the early 1990s, however documentation of clean closure was not available
- Sediment quality within the sediment pond and downstream receiving water is not known

An electronic version of the 2010 Phase I ESA report prepared by CRA on behalf of NB Power is attached in Appendix G-7.

### **3.11.2.6 PHASE II ENVIRONMENTAL SITE ASSESSMENT**

Between August and September 2010, CRA completed a Phase II ESA program to investigate potential areas of concern as identified in the Phase I ESA. The objectives of the Phase II ESA work were:

- To determine potential contaminant sources associated with the Plant Site and assess soil and groundwater quality for specific contaminants of concern including petroleum hydrocarbons (BTEX and TPH), PCBs, metals and polycyclic aromatic hydrocarbons (PAHs) (where applicable)
- To determine if there is actual or potential migration of contaminants associated with the Plant Site to Eel Bay or Tait Brook
- To assess sediment and surface water quality of on-Site drainage channels (i.e., Tait Brook) at the Plant Site
- To assess groundwater conditions migrating onto the BMSWD Site from up-gradient
- Sources and groundwater conditions leaving the BMSWD Site property boundaries

- To assess current seep and sediment conditions associated with leachate outfalls at the BMSWD Site
- To assess current soil and groundwater conditions at the Rail Siding area
- To investigate soil conditions in the vicinity of the Fuel Pipeline ROW and associated West Wharf Pumphouse
- Assess the potential presence of sensitive ecological receptors such as species at risk (SAR), migratory birds, and wetlands within the Transmission Line ROW as well as potential SAR at the Plant Site or BMSWD Site
- To determine if potential contaminant concentrations associated with the Facilities require additional evaluation prior to developing potential management options

The Phase II ESA boreholes were constructed during the summer of 2009 and an initial environmental monitoring event was completed in July 2009 with a follow-up monitoring event completed at the Site in September 2009. The results of the draft Phase II ESA (CRA, November 2010) along with conclusions and recommendations for additional investigation are summarized below. The complete Phase II ESA report is included in Appendix G-8. The Phase II ESA sampling points are shown on Figures 2.1 to 2.5.

### **Plant Site**

The Phase II ESA program completed at the Plant Site included the construction and sampling of 22 monitoring wells and 5 boreholes in potential contaminant source areas, including:

- Six monitoring wells surrounding the Bulk Storage Tank Farm
- Five monitoring wells in the vicinity of other petroleum AST and UST locations
- Two monitoring wells in the Switch Yard/Transformer Bank area
- Nine monitoring wells along the shoreline
- Five boreholes near or in the former coal pile

Groundwater samples were also collected from five pairs of previously existing nested monitoring wells (10 wells total) and one previously existing shoreline monitoring well.

In addition to the drilling and groundwater sampling program, surface water was collected from one location, surface soil samples were collected from 48 locations across the Plant Site, and sediment samples were collected from four locations within Tait Brook and one location in the Oil Spill Collection Pond.

The analytical results for samples collected during the Phase II ESA are as follows:

- *Groundwater* – BTEX/TPH, metal, PAH, and PCB concentrations in groundwater at the Plant Site were below applicable Atlantic RBCA Tier I RBSLs, as well as MOE guidelines for the protection of aquatic life.
- *Surface Water* - One surface water sample was collected from the lower portion of Tait Brook (near the brook discharge point to Eel Bay) for petroleum hydrocarbon and metal analyses. All concentrations were below applicable CCME screening criteria.
- *Soil* - A substantial quantity of soil samples collected (16 of 36 subsurface samples, all 12 surface samples, and two ditch samples) contained concentrations of arsenic or nickel above CCME SQG guidelines. In addition, two soil samples contained vanadium concentrations above applicable CCME guidelines. In particular, the vanadium concentration in the soil sample collected from PSMW-13 (1,700 mg/kg) exceeded the CCME guideline value of 130 mg/kg. This sample was collected directly adjacent to the WWTP lagoons. This elevated vanadium concentration is assumed to be related to cleaning of equipment or handling of waste material associated with the flyash or bottom ash at the Plant Site and is confined to a small area in the vicinity of the WWTP lagoons. Soil results for the Plant Site showed limited hydrocarbon impact, with one soil sample (out of a total of 35 samples) containing TPH concentrations above applicable Tier I RBSLs. This sample [PSSS-19 {0.3-0.6 m below ground surface (bgs)}] contained a TPH concentration of 30,000 mg/kg but is localized to surface soil directly beneath a steam vent line located along the north exterior wall of the Turbine Units. All PAH and PCB concentrations were found to be below the applicable CCME guidelines.
- *Sediment* – Three of the four sediment samples collected from Tait Brook contained concentrations of arsenic, lead, or zinc at concentrations above applicable CCME guidelines. The samples with elevated metal concentrations were collected from the portion of the brook adjacent to the former coal pile and storm water outfall locations. These elevated metal concentrations are likely related to the former use and storage of coal at the facility. TPH concentrations in the sediment samples collected from Tait Brook, as well as from the Oil Spill Collection Pond, ranged from 250 mg/kg to 860 mg/kg as fuel oil. As screening values for TPH in sediment are generally not available, a qualitative inspection of Tait Brook was completed by CRA

in August 2010, in addition to the stream inspection work completed by Dillon in April 2010. The qualitative inspection of the brook did not identify visual or olfactory evidence of hydrocarbons in surface water or sediment of the brook.

Based on the Phase II ESA investigation, the following conclusions and recommendations for additional investigation (if required) at the Plant Site include:

- 1) Groundwater quality at the Plant Site is within applicable guidelines for the parameters tested and additional evaluation is not required.
- 2) Soil quality at the Plant Site is within applicable guidelines for PCBs and PAHs and additional evaluation is not required.
- 3) Hydrocarbon concentrations in soil at the Plant Site were within Atlantic RBCA Tier I RBSLs excluding one small area of surface stained soil.
  - *Recommendation* - Remediation of this area should be included in future remedial action plans developed for the Plant Site.
- 4) Metal concentrations in surface soil across the Plant Site exceed applicable CCME guidelines.
  - *Recommendation* - A human health risk assessment should be completed to determine if the metal concentrations in soil present a health risk to workers or visitors of the Plant Site.
- 5) Metal concentrations in sediment of Tait Brook exceed applicable CCME guidelines.
  - *Recommendation* - Background conditions should be determined and an ecological risk assessment completed to determine if the metal concentrations observed pose a risk to aquatic ecological receptors of Tait Brook.
- 6) Elevated TPH concentrations were observed in Tait Brook and the Oil Spill Collection Pond. The hydrocarbon concentrations are suspected to be non-petrogenic in origin.
  - *Recommendation* - Resample selected locations within Tait Brook and the Oil Spill Collection Pond and submit sediment samples for hydrocarbon analysis with silica gel clean-up as well as grain size analysis and fraction of organic carbon; and
  - *Recommendation* - An ecological risk assessment should be completed to determine if the hydrocarbon concentrations (petrogenic origin) observed pose a risk to aquatic ecological receptors of Tait Brook.



### **Fuel Pipeline and West Wharf**

Ten surface soil samples were collected along the pipeline and two surface soil samples were collected in the vicinity of the West Wharf Pumphouse. All twelve of the soil samples had hydrocarbon concentrations below applicable Tier I RBSLs. All PAH analytical data were determined to be below the applicable CCME guidelines, with the exception of one sample collected from an area of the pipeline within the fenced area of the Plant Site property. No PCBs were detected in the four samples collected adjacent to two exterior transformers within the fenced area of the West Wharf Pumphouse.

Based on the Phase II ESA investigation, the following conclusions and recommendations for additional investigation (if required) associated with the Fuel Pipeline include:

- 1) Surface soil quality along the Fuel Pipeline and at the West Wharf is within applicable guidelines for the parameters tested excluding PAH concentrations in one soil sample collected beneath the Fuel Pipeline in the northeast portion of the Plant Site property.
  - *Recommendation* - Additional evaluation of surface soil along the Fuel Pipeline within the Town of Dalhousie or at the West Wharf is not required; and
  - *Recommendation* - Collect additional confirmatory PAH samples around the Fuel Pipeline in the northeast portion of the Plant Site property and develop a remedial action plan if required.

### **BMSWD Site and Rail Siding**

The Phase II ESA program at the BMSWD Site included the construction and sampling of 12 nested wells (one shallow and one deep well per nest) at the BMSWD Site and one monitoring well and one borehole at the Rail Siding. Five of the nested well locations were constructed upgradient from the BMSWD Site solid waste disposal areas to assess whether any third party disposal sites are influencing groundwater quality on the BMSWD Site. Potential upgradient groundwater contaminant sources include the former Town of Dalhousie municipal solid waste site, the AIM (formerly Bowater) solid waste site, and the PCI mercury waste disposal site. In addition to the drilling program, a total of nine sediment samples, one surface water sample, and two seep samples were collected from the BMSWD Site; and four sediment samples were collected from the Rail Siding.

Groundwater samples were collected from two sets of previously installed nested monitor wells (six wells total) at the BMSWD Site and one existing well at the Rail Siding. Groundwater samples collected from the BMSWD Site were analyzed for

general chemistry, BTEX/TPH, and metals with selected samples also analyzed for PAHs. Water samples collected from the existing nested wells, the two seeps, and the surface water sample were only analyzed for dissolved metals. Sediment samples collected were analyzed for BTEX/TPH and metals. The results included the following:

- *Soil* - No hydrocarbon impact was detected for soil samples collected from the Rail Siding area where a previous diesel release and subsequent soil excavation program were completed. One soil sample collected near the rail road tracks (BMBH-13) contained a nickel concentration [62 mg/kg (0-0.6 m bgs)] slightly above applicable CCME guidelines (50 mg/kg).
- *Groundwater* - No impact upgradient or downgradient from the cells was detected as all hydrocarbon (TPH and BTEX), PAH, and metals analytical results were below applicable screening values.
- *Surface Water* - One surface water sample and two seep samples were collected from the BMSWD Site. The surface water sample collected from the influent of Sediment Pond #1 and Seep 1 (located in the northern portion of Coal Ash Area 1) were in compliance with the Permit to Operate discharge criteria for metals. Seep 2 collected from the southeastern corner of coal ash Area 2 contained iron concentrations above the Permit to Operate discharge criteria.
- *Sediment* - A total of 13 sediment samples were collected from the lagoons or associated drainage channels, as well as from Hamilton Brook at the BMSWD Site for petroleum hydrocarbon and metals analyses. The five sediment samples contained total petroleum hydrocarbon concentrations ranging from non-detect to 820 mg/kg as lube oil. BTEX constituents were not detected in the sediment samples collected. At the time of this investigation, Atlantic PIRI did not have screening guidelines for petroleum hydrocarbons in sediment. Nine of the 13 sediment samples contained concentrations of one or more individual metal (arsenic, cadmium, and zinc) concentrations above applicable CCME guidelines.

Based on the Phase II ESA investigation, the following conclusions and recommendations for additional investigation (if required) at the BMSWD Site include:

- 1) Groundwater quality at the perimeters of the BMSWD Site is within applicable guidelines for the parameters tested and additional evaluation is not required.
- 2) Metal concentrations in sediment within drainage channels down-gradient of capped coal ash cells exceed CCME guidelines.

- *Recommendation* - Remediation of drainage channels at BMSWD Site should be included in future remedial action plans or closure plans developed for the Plant Site.
- 3) Metal concentrations in sediment of Hamilton Brook exceed applicable CCME guidelines.
- *Recommendation* - Background conditions should be determined and an ecological risk assessment completed to determine if the metal concentrations observed pose a risk to aquatic ecological receptors of Hamilton Brook.
- 4) Elevated TPH concentrations were observed in Hamilton Brook and several drainage channels of the BMSWD Site but it is not known if the hydrocarbon concentrations are petrogenic in origin.
- *Recommendation* - Resample selected Hamilton Brook and the selected drainage channel locations and submit sediment samples for hydrocarbon analysis with silica gel clean-up as well as grain size analysis and fraction of organic carbon; and
  - *Recommendation* - An ecological risk assessment should be completed to determine if the hydrocarbon concentrations (petrogenic origin) observed pose a risk to aquatic ecological receptors of Hamilton Brook.
- 5) Metal concentrations in surface water and seep samples down-gradient or within the capped coal ash cells exceed CCME guidelines.
- *Recommendation* - Remediation/removal of seeps along with elimination of coal ash erosion should be included in future remedial action plans or closure plans developed for the BMSWD Site.
- 6) Soil, sediment and groundwater quality at the Rail Siding is generally within applicable guidelines for parameters tested (excluding a slight exceedance of nickel in surface soil) and additional evaluation is not required.

### **3.11.2.7 RARE PLANT SURVEY**

A Rare Plant Species Survey was completed on August 19 and 20, 2010 by B&B Botanical to determine the presence or absence of rare plant species on the Plant Site property. ACCDC information obtained for the Plant Site indicated that two provincially uncommon plant species [saltmarsh starwort (*Stellaria humifusa*) and Labrador bedstraw (*Galium labradoricum*)] have historically been identified along the Chaleur Bay shoreline in the vicinity of the Plant Site.

The purpose of the survey was to determine if provincially rare plant species are located on or directly adjacent to the Plant Site. The survey covered a total distance of 7.2 km and included the shoreline of Chaleur Bay adjacent to the Plant Site as well as the portion of Tait Brook on the Plant Site property. The survey indicated that two uncommon plant species were present at the Plant Site and included:

- *Equisetum variegatum* (variegated scouring-rush) was located in Tait Brook west of the Bulk Storage Tank Farm
- *Suaeda calceoliformis* (sea blite) was found in abundance on the gravely shoreline near the CW Inlets

These two plant species are not protected provincially or federally.

An electronic version of the letter report is included in Appendix G-9.

### **3.11.2.8 PHASE III ENVIRONMENTAL SITE ASSESSMENT**

A Phase III ESA was completed by CRA in between October and November 2010 to fill data gaps identified during the Phase II ESA and in support of developing the Facility Closure plan. The Phase III ESA consisted of the excavation of and sampling 30 test pits, the collection of 18 surface water samples, 17 sediment samples and one surface soil sample. Results of the Phase III ESA are summarized below and additional Phase III ESA information is presented in Appendix G-10.

#### **Plant Site**

Sediment samples collected from Tait Brook and the Oil Spill Collection Pond at the Plant Site were identified during the Phase II ESA program to contain elevated TPH concentrations. It could not be confirmed if the hydrocarbons concentrations identified were petrogenic in origin. A total of four confirmatory sediment samples were therefore collected from Tait Brook (PSSS-34B to PSSS-36B) and the Oil Spill Collection Pond (PSSS-32B) for petroleum hydrocarbon analysis using the silica gel clean-up methodology for the extractable hydrocarbons. Hydrocarbon concentrations in the four confirmatory sediment samples ranged from 120 to 240 mg/kg compared to 250 to 860 mg/kg observed during the Phase II ESA. Three of the sediment samples were also analyzed for PAHs. The three samples collected contained PAH concentrations below CCME sediment quality guidelines for the protection of freshwater aquatic life.

The Phase II ESA also identified elevated metal concentrations in several sediment samples collected from Tait Brook. Three additional sediment samples (PSSS-53B and PSSS-54B) were therefore collected from Tait Brook in the northwestern corner of the Plant Site property and submitted for metal analysis as part of the Phase III ESA program. The sediment samples collected had metal concentrations below applicable CCME guidelines except for the arsenic concentration identified in the sediment sample PSSS-50.

Two sediment samples were also collected from the equalization lagoons beside the WWTP for metal analysis. The sediment samples collected contained elevated metal concentrations (e.g., arsenic 12 to 160 mg/kg, chromium 290 to 320 mg/kg, molybdenum 250 to 980 mg/kg, nickel 430 to 1,500 mg/kg, lead 12 to 140 mg/kg and vanadium 9,100 to 91,000 mg/kg). The equalization lagoons now operate as holding ponds and do not discharge to the environment.

#### **Fuel Pipeline and West Wharf**

The Phase II ESA indicated surface soil quality along the Fuel Pipeline and at the West Wharf is within applicable guidelines for the parameters tested excluding PAH concentrations in one soil sample (PL-10) collected beneath the Fuel Pipeline in the northeast portion of the Plant Site property. A confirmatory surface soil sample (PL-10B) was therefore collected from this sample location as part of the Phase III ESA program and submitted for PAH analysis. The confirmatory sample had PAH concentrations below applicable CCME total potency equivalent (TPE) guidelines for carcinogenic compounds and Ontario MOE guidelines for non-carcinogenic compounds.

#### **BMSWD Site**

- *Limits of Coal Ash and Depth of Cover* - Test pitting activities carried out at 30 locations identified coal ash ranging from 0.45 m to greater than 4.8 m in depth, and extending horizontally to the south beyond the identified limit of Coal Ash Area 2. The depth of cover across coal ash Areas 1 and 2 primarily consisted of less than 0.1 to 0.6 m of vegetation cover.
- *Leachate Quality Cell 1* - Leachate quality was sampled from four locations within Cell 1 and was characterized by relatively elevated total dissolved solids (TDS) (1,940 to 2,990 mg/L), dissolved sulphate (1,300 to 1,770 mg/L), and metals concentrations (e.g., cadmium: ND to 12.9 µg/L; molybdenum: 29 to 4,590 µg/L; and vanadium ND to 1,510 µg/L). However, all values were within the BMSWD Site Approval to Operate discharge limits, where criteria are identified.

- *Leachate Quality Capped Fixated Ash Cell* - Leachate quality was sampled from one location and was characterized by elevated TDS (6,190 mg/L), total alkalinity (2,800 mg/L), pH (12.2), dissolved sulphate (1,300 mg/L), and metals concentrations (e.g., arsenic: 37 µg/L; cadmium: 7.70 µg/L; molybdenum: 3,010 µg/L; and vanadium 11,700 µg/L). However all values were within the BMSWD Site Permit to Operate discharge limits, where criteria are identified, with the exception of pH.
- *Surface Water Quality influent to Sediment Pond 2* - Surface water quality upstream of Sediment Pond 2 (representing a combination of effluent from Leachate Pond 2 and surface water) was substantially less impacted when compared to the raw leachate from the Fixated Ash Cell ( e.g., TDS: 137 to 264 mg/L; total alkalinity: 86 to 150 mg/L; pH: 7.90 to 7.99; dissolved sulphate 28 to 74 mg/L; arsenic: 1.3 to 2.0 µg/L; cadmium: 0.031 to 0.058 µg/L; molybdenum: ND to 8.4 µg/L; and vanadium 19.7 to 35.8 µg/L).
- *Seep Discharge* - water collected from the seep in Coal Ash Area 2 near the under drain of Cell 1 was impacted with copper (927 µg/L), iron (21,800 µg/L), and zinc (157,000 µg/L) above the Permit to Operate discharge limits. The presence of white floc material was observed in a seep located at the east side of Leachate Pond 2 and is characterized by elevated TDS (2,700 mg/L), hardness (1,400 mg/L), dissolved sulphate (1,600 mg/L), and metal concentrations (e.g., arsenic: 492 µg/L and iron 52,700 µg/L). Seep was created by a closed valve on the leachate outlet manhole and the issue was subsequently rectified by NB Power employees. *Sediment Pond 1* - The effluent of Sediment Pond 1 was in compliance with BMSWDS Permit to Operate discharge limits. It was observed that a northern perimeter ditch circumvents Sediment Pond 1. The surface water quality in the ditch was in compliance with the BMSWD Site Permit to Operate discharge limits.
- *Sediment* - Sediment was collected from Leachate Pond 3, Sediment Pond 1, and in the drainage channel between Leachate Pond 2 and Sediment Pond 2. The sediment analyzed was characterized as containing elevated sulphate (210 to 3,500 mg/kg) and metal concentrations (e.g., aluminum: 13,000 to 21,000 mg/kg; iron: 26,000 to 73,000 mg/kg; and vanadium: 80 to 2,900 mg/kg). No fine grained sediment was available to be sampled from Leachate Pond 2 or Sediment Pond 2. In addition, confirmatory sampling showed modified TPH concentrations ranging from non-detect to 160 mg/kg, substantially lower than the 260 to 820 mg/kg measured in the Phase II ESA in the Hamilton Brook, Sediment Pond 1 inlet and outlet channels, and Sediment Pond 2 outfall. The Phase III ESA analysis was modified by adding a silica gel clean up step to remove hydrocarbon concentrations of non-petrogenic origin (i.e., naturally occurring).

### **Rail Siding**

Three surface water samples were collected from the surface water control system at the Rail Siding and analyzed for general chemistry, metals, and petroleum hydrocarbons. Results of the analytical data indicate all metal concentrations are within the Approval to Operate discharge limits. Petroleum hydrocarbons were not detected in any of the surface water samples. Furthermore, TPH and BTEX were not detected in the sample collected from the Rail Siding sediment pond.

### **3.11.2.9 HUMAN HEALTH RISK ASSESSMENT - PLANT SITE**

The previous ESA programs completed at the Plant Site identified metal, petroleum hydrocarbon and PAHs impacted soil and sediment above applicable guidelines as a result of historical operations. In October 2010 CRA conducted a preliminary quantitative risk assessment (PQRA) for the Plant Site to evaluate risk to human health associated with the historical and future intended land use of the Plant Site. The potential exposures were evaluated based on commercial land use without daycare.

This PQRA was conducted in general accordance with Health Canada's (HC) document *Federal Contaminated Site Risk Assessment in Canada, Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 2.0* (HC, 2009a) and *Part II: Health Canada Toxicological Reference Values (TRVs) and Chemical-Specific Factors* (HC, 2009b), both by the Contaminated Sites Division (CSD), Safe Environments Programme, Health Canada, Ottawa.

Plant Site analytical data previously collected from the Plant Site by CRA were evaluated to determine the contaminants of potential concern (COPCs) for the Plant Site and were used as inputs into the PQRA. The maximum concentrations of each constituent were used in the screening process. Based on the screening process, the COPCs identified for further assessment were as follows:

<i>Media</i>	<i>Chemicals of Potential Concern (COPCs)</i>
Soil	Arsenic, Nickel, and Vanadium
Sediment	Vanadium

Modified TPH (lube oil source) was also identified as a soil COPC. However, the presence of modified TPH (lube oil source) above guidelines was limited to an area near the transformer banks with visibly soil staining, this area will be remediated as part of the Facility Closure plan and therefore TPH (lube oil source) was not in the PQRA.

The exposure assessment provides a systematic analysis of the potential mechanism by which a receptor may be exposed to COPCs at/or originating from, the site. Based on the anticipated land use, commercial land use without day care, the potential human populations considered relevant to the PQRA include commercial workers, potential visitor of the Plant Site (infant, toddler, child, teen, and adult visitors), and construction/utility workers. Based on these receptors and the results of the COPC selection, the media and potential human exposure pathway identified for the PQRA include:

<i>Critical Receptor</i>	<i>Exposure Medium</i>	<i>Exposure Pathway</i>
Commercial Workers, Visitors (infant, toddler, child, teen, and adult), and Construction/Utility Workers	Soil	incidental ingestion, dermal contact, particulate inhalation
	Sediment	incidental ingestion, dermal contact

The toxicity assessment weighs the available evidence regarding the potential for a particular COPC to cause adverse effects in exposed individuals and estimates the extent of exposure and possible severity of adverse effects.

The risk characterization integrates the exposure assessment and toxicity assessment to provide a complete evaluation of the potential human health risks/hazards associated with exposure to COPCs at or near the Site. The estimated individual and cumulative carcinogenic risks resulting from exposure to the COPCs were compared to a target carcinogenic risk level of 1.0E-05. Estimated non-carcinogenic hazards were calculated and compared to a target non-carcinogenic hazard level of 0.2, consistent with Health Canada Protocol (2009a).

The results of the PQRA indicate that the carcinogenic risks calculated for the visitor's exposure to carcinogenic COPCs in soil and sediment, the commercial worker's exposure to carcinogenic COPCs in soil and sediment, and the construction/utility worker's exposure to carcinogenic COPCs in sediment did not exceed the target carcinogenic risk of 1.0E-05. However, carcinogenic risk calculated for the construction/utility worker's exposure to arsenic was above the target carcinogenic risk of 1.0E-05.

The Hazard Indices (HI) calculated for the visitor's exposure to non-carcinogenic COPCs in soil and sediment, the commercial worker's exposure to non-carcinogenic COPCs in soil and sediment, and the construction/utility worker's exposure to non-carcinogenic COPCs in sediment did not exceed the target HI of 0.2 with the exception of the



non-carcinogenic hazard calculated for the construction/utility worker's exposure to vanadium in soil which marginally exceeded the target non-carcinogenic hazard index with a value of 0.228.

In accordance with Health Canada 2009 guidance, Site-Specific target levels (SSTLs) were developed for the COPCs and exposure pathways that exceed the carcinogenic risk and/or non-carcinogenic hazard levels of 1.0E-05 and 0.2, respectively. Therefore, SSTLs were only developed for the construction/utility workers direct contact exposure to arsenic and vanadium in soil. A summary of the SSTLs developed for the construction/utility worker is presented below.

<b>Construction/Utility Worker Direct Contact to Soil Exposure Pathway</b>			
<i>COPC</i>	<i>Site-Specific Target Level (mg/kg)</i>	<i>Maximum Soil Concentration (mg/kg)</i>	<i>Exposure Point Concentration (EPC) (mg/kg)</i>
<b>Arsenic</b>	41	57	29
<b>Vanadium</b>	349	1,700	308

There were four locations with detected concentrations of arsenic greater than the SSTL, including PSMW-13, PSBH-3, PSBH-4, and PSSS-31. Only one location (PSMW-13) at the Site has a vanadium concentration greater than the SSTL. The arsenic and vanadium exposure point concentrations based on the 95 percent upper confidence limit (UCL) of the mean were below the calculated SSTLs.

Protection of construction/utility workers, when working in direct contact with arsenic and/or vanadium impacted soil, can be addressed through the development and implementation of a site-specific Health and Safety Plan (HASP). The HASP would identify personal protective equipment required to be worn by workers during construction related activities that expose the worker to direct contact with arsenic and/or vanadium impacted soil. Therefore, no remediation of arsenic and/or vanadium impacted soils at the Plant Site is recommended provided a site-specific HASP be developed for future construction related activities.

A copy of the PQRA for the Plant Site is provided in Appendix G-11.

### **3.11.2.10 ECOLOGICAL RISK ASSESSMENT - PLANT SITE (TAIT BROOK)**

Tait Brook is a small tributary that originates northwest of the Plant Site, transects the Plant Site from northwest to southeast, and discharges into Chaleur Bay in the southeast corner of the Plant Site. As previously noted, three of the storm sewer systems present at the Site discharge to Tait Brook, including the effluent from the Tank Farm Oil/Water Separator. Previous ESAs, remedial programs, and monitoring programs related to Tait Brook have been completed at the Plant Site between 1993 and November 2010, and identified concentrations of total petroleum hydrocarbons (TPH) and metals in sediment of the brook that exceed applicable CCME guidelines or other applicable benchmarks.

In November 2010, CRA completed a Screening Level and Preliminary Quantitative Ecological Risk Assessment (ERA) for Tait Brook on the Plant Site. The ERA program included the collection of additional sediment samples from the lower portion of Tait Brook in November 2010. The purpose of collecting additional samples from the lower portion of Tait Brook was to supplement previous data collected and to delineate the lateral extent of constituents of potential ecological concern. The ERA also included a qualitative evaluation of Tait Brook habitat and potential ecological receptors that occur or are likely to occur within the brook. The ERA focused on the aquatic system and receptors of Tait Brook, including ecological receptors that may use this brook as a food source. The lower portion of the brook (south of Thermal Lane) is considered habitat capable of supporting a diversity of aquatic and semi-aquatic plant and animal species. During the qualitative evaluation, a variety of ecological receptors (or their markings) was observed in the lower portion of Tait Brook. Although minnows were observed in Tait Brook, the brook would be considered low quality fish habitat given the low volume of water and presence of several fish passage barriers. Tait Brook is not known to support larger fish species. Faunal species at risk were not identified to be associated with Tait Brook.

The primary valued ecosystem component (VEC) associated with the Plant Site is the aquatic habitat associated with Tait Brook, which includes bottom dwelling invertebrates, fish, and water-dependent birds. Wildlife that feed on the aquatic resources of the brook were also considered to be VECs.

The results of the November 2010 sampling program, together with the data previously collected by CRA in 2010 as well as existing NB Power data, were used to complete the preliminary ERA and determine whether metals or petroleum hydrocarbons potentially associated with the operation of the DTGS present an unacceptable risk to populations, communities, and the ecosystem of Tait Brook. Results of the screening and preliminary quantitative ERA determined that the concentrations of metals and petroleum

hydrocarbons present in the sediment and surface water do not present an unacceptable potential for risk to vertebrate aquatic or semi-aquatic receptors (i.e., fish, herpetiles, mammals, or birds) of Tait Brook. In particular, simple food chain models and eco-toxicity characterization evaluations were used to determine that the metal and hydrocarbon concentrations in the sediment and surface water do not pose risk to semi-aquatic mammals and birds (i.e., muskrat, mink, heron, and mallard) that may inhabit the brook.

The preliminary ERA could not, however, conclusively determine whether metal concentrations in sediment of the lower portion of the brook pose a risk to sediment dwelling invertebrate populations (i.e., benthic organisms). The potential risk to benthic invertebrates is based on specific sediment samples collected in the lower portion of Tait Brook having metal concentrations exceeding applicable ecological benchmarks. Additional evaluation of the effects of Site-related metals on the macroinvertebrate community, such as physio-chemical analysis, toxicity testing, and macroinvertebrate community evaluation, would be required to determine whether metal concentrations in sediment pose an actual risk to benthic organisms of the brook. However, as the area of Tait Brook with metal concentrations exceeding applicable benchmarks is generally confined to isolated areas within a small stretch of the brook (approximately 250 m in length), the risk to the overall benthic invertebrate community in the brook is considered low. In addition, the metal concentrations do not pose an unacceptable risk to upper trophic level receptors (i.e., fish, herpetiles, mammals, and birds), and the area of the brook identified to have sediment concentrations exceeding applicable guidelines is also the area where the most biological activity was observed during Site reconnaissance completed in 2010. Based on the above rationale, additional evaluation or remediation of Tait brook is not recommended.

A copy of the ERA for Tait Brook is provided in Appendix G-12.

#### **3.11.2.11 ECOLOGICAL AND HUMAN HEALTH RISK ASSESSMENT- RAIL SIDING**

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In November 2010 CRA completed a preliminary screening level risk assessment for the nickel impacted soil identified at the Rail Siding (Appendix G-13). The CCME SQG for nickel (50 mg/kg) is based on direct contact with soil dependent organisms. Although the nickel concentration at borehole BMBH-13 exceeds the CCME SQG for ecological soil contact, surface soil in the vicinity of BMBH-13 generally consists of sand and gravel fill material that would provide low quality habitat for soil dependent organisms. In addition, other jurisdictions such as the Ontario Ministry of Environment (MOE) have

established 100 mg/kg as the guideline value for nickel in surface soil for the protection of soil invertebrates and plants (Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario, April 2011). The nickel concentration identified in soil collected at borehole BMBH-13 is below the MOE guideline. Given the low quality ecological habitat and anticipated future decommissioning activities, nickel concentrations in soil at the Rail Siding were identified to present a low risk to ecological receptors and further evaluation or remediation of metals in soil is not required.

Currently the CCME does not have human health guidelines or check values for nickel in surface soil. However, MOE has established a nickel guideline of 510 mg/kg in coarse-grained soil at commercial/industrial land use sites for protection of human health. The maximum nickel concentration identified in soil at the Rail Siding during the Phase II ESA program is below the MOE guideline for commercial/industrial land use. In addition, the PQRA completed for the Plant Site (refer to Section 5.1) evaluated nickel in soil for commercial land use without a day care. The PQRA evaluated exposure of nickel to commercial workers as well as potential visitors to the Plant Site (infant, toddler, child, teen and adult visitors). The PQRA concluded that a nickel exposure point concentration of 102 mg/kg in soil does not pose an unacceptable risk to workers or visitors at the Plant Site. As the anticipated future land use for the Rail Siding is also assumed to be commercial without a day care, it is reasonable to assume that the maximum nickel concentration of 62 mg/kg identified at the Rail Siding does not pose an unacceptable risk to human health. Additional evaluation or remediation of metals in soil at the Rail Siding for the protection of human health is therefore not required.

#### **3.11.2.12 LEAD BASED PAINT SURVEY - PLANT SITE**

In December 2010, a total of 11 paint samples were collected from buildings at the Plant Site that may require special handling during future demolition (Appendix G-14). Painted surfaces where the metal substrate would be sent to a smelter for recycling were eliminated from consideration as were surfaces constructed after 1976 when lead in paint manufacturing regulations would have eliminated potential hazard. Paint was scraped from various substrates using a commercial paint scraper over a minimum area of 100 cm<sup>2</sup> and stored in ZipLock bags. Substrate surfaces included wood, plaster, poured concrete and concrete block and represented various colours on the construction media. Substrate surfaces, estimated painted areas, colours and location were recorded. Samples were analysed by Maxxam Analytical laboratory in Bedford, NS. Where lead in

paint content exceeded 1,000 mg/kg, Maxxam was instructed to complete EPA TCLP leachate testing. Only one sample requested for leachate testing could not be completed due to insufficient sample size.

Eight of the 11 paint samples tested had lead concentrations below 1,000 mg/kg indicating the material is suitable for disposal in a provincially approved Construction and Demolition (C&D) site. Two of the three samples exceeding 1,000 mg/kg were tested for lead leachate. The lead leachate concentrations of the two samples tested were less than 5 mg/L and therefore may be disposed in a provincially approved municipal landfill sanitary waste cell. One sample collected had lead concentrations exceeding 1,000 mg/kg but could not be tested for lead leachate due to insufficient sample size and therefore requires additional sampling.

Based on the construction standards of Cell 1 at the BMSWD site, NB Power will request approval from NBDELG to dispose any lead painted materials suitable for municipal landfill disposal in Cell 1.

### **3.11.2.13 TRANSFORMER ASSESSMENT AND DECOMMISSIONING**

NB Power previously stored PCB materials in the PCB Storage Barn (located between the Oil Transfer Pumphouse and the Bulk Storage Tank Farm Oil Water Separator building) approximately 15-20 years ago. The PCB Storage Barn is currently empty. The barn is no longer an approved PCB storage facility.

NB Power have a list of 145 transformers located on the Plant Site and West Wharf Pumphouse. The list contains transformers located within various building interiors as well as ground level transformers located exterior to the buildings. Many of the transformers are noted as dry type. Transformers located within the Switch Yard area (owned by Transco) are not included in the list.

NB Power completed an extensive PCB removal program at the DTGS in the 1990s. As part of this program, known or suspected equipment containing PCB oils, such as transformers or capacitors, were drained and the PCB containing oil transported off-Site for disposal. The transformer oil was subsequently replaced with mineral oil or other suitable non-hazardous oil. The PCB removal program included transformers on building exteriors as well as transformers/capacitors within the building. Oil containing transformers that had PCB oils removed or never contained PCB oils are generally labeled as "Mineral Oil, Non-PCB" with a test date. Some on-Site transformers may still contain PCB oils.

The PCB removal program was intended to focus on all sizes of transformers that potentially contained PCBs but did not include small electrical equipment such as light ballasts. The Plant Site buildings contain numerous fluorescent and HID light fixtures with potential PCB containing light ballasts, particularly in the older buildings. Unit #2 was constructed and commissioned in the late 1970s, and so these buildings may also contain PCB containing equipment. The Administration/Services Building, FGD Building and WWTP were constructed in the early 1990s and therefore likely do not contain light fixtures with PCB content.

NB Power personnel were not aware of potentially PCB containing paper insulated lead cables (PILC) at the DTGS.

An equipment testing program for PCB will be completed as part of Pre-decommissioning Engineering in Year 1.

### **3.12 CULTURAL FEATURES**

The DTGS Facility has operated as an industrial fossil fuel powered generation facility since 1969. In addition, the community of Dalhousie has a history of industrial activity including pulp and paper manufacturing, shipping, and chemical production. Much of the pulp and paper manufacturing industry ceased operations in the Town with the closure of the Bowater mill formerly located on Williams St. In addition, chemical production of chlorine and sodium hydroxide at Pioneer Chemicals has been discontinued in approximately the last 5 years.

The nearest Aboriginal communities to the Project Site would be the Eel River Bar First Nation in Eel River located approximately 4 km south of the Plant Site. Eel River Bar First Nation is known to have an active fisheries associated with Chaleur Bay. In addition, Native communities in northern NB, specifically the Bay of Chaleur region, are represented by North Shore Micmac District Council Inc. and have access to specific fish species on all tributaries of the bay. Given that the decommissioning of the DTGS Facilities is being generally restricted to within NB Power owned properties, leased properties or specific ROWs that have been highly disturbed over the last 40 years, an archaeological survey is not planned as part of the EIA submission.

## 4.0 SUMMARY OF ENVIRONMENTAL IMPACTS OF CLOSURE & DECOMMISSIONING

The objectives of this evaluation are to identify interactions between project activities and aspects of the natural and socio-economic environment. The discussion of environmental impacts is focused on the issues of greatest ecological and socio-economic concern, addresses regulatory (provincial and federal) requirements, integrates engineering design and mitigative measures into a comprehensive environmental management planning process.

The analysis of Valued Environmental Components (VECs) is based on the Project description, the environmental setting, and stakeholder input. The environmental assessment evaluates the potential effects, including cumulative effects, of each Project task, (i.e., building demolition), predicts the seriousness of the impact to the VEC and suggests methods for avoiding or mitigating the potential the impact.

### 4.1 IDENTIFICATION OF ISSUES

The potential environmental effects of the Facility Closure have been evaluated consistent with the guidance provided in the NBDELG *Guide to Environmental Impact Assessment in New Brunswick* document (NBDELG, 2007), with respect to an environmental effect, an adverse impact in the context of its magnitude, geographic extent, duration, frequency, degree of reversibility, possibility of occurrences or any combination of the foregoing. Environmental effects rating criteria have been established based on information obtained during scoping; available information on the status and characteristics of the VEC; environmental standards, guidelines or objectives, where these are available; and by drawing on the experience and professional judgment of the study team. Environmental effects can therefore be evaluated through degrees of potential impact as well as how these VECs are expected to respond to those activities (either positively or negatively). The degree of predicted impact will be described by one of five categories: no impact, minimal impact, possible impact, probable impact, definite impact.

An important factor in the assessment process is the determination of spatial and temporal boundaries, that is, those periods during which, and the areas within which, the VECs are likely to interact with, or be influenced by, the Facility Closure project. Temporal boundaries encompass the times that project activities, and their effects, overlap with the presence of a VEC. Spatial boundaries are the areas within which the project activities are undertaken and the facilities are located, and the zone of influence

of effects of the project. Such boundaries are identified for each VEC as an integral part of the analysis. The environmental boundaries are confined to the immediate area of the Site and the down gradient receptors.

Table 7 provides a summary of the project activities, the various VECs associated with the project, and how these activities are predicted to affect the VEC.

## **4.2 DISCUSSION OF THE ISSUES**

### **4.2.1 ENVIRONMENTAL MEDIA**

The overall environmental quality of soil, groundwater, surface water or air in the vicinity of the DTGS Facilities could be negatively impacted by the presence of potentially hazardous materials associated with the existing plant building such as lead based paint, nuclear gauges, ACM, PCBs, chemicals, and other hazardous wastes. Proper identification, removal, separation and disposal of potentially hazardous building materials is required as part of the DTGS closure plans to minimize the potential impact that these materials may have if released to the environment. The proposed project therefore requires and has incorporated hazardous materials identification, removal and disposal that also includes identification of potentially recyclable non-hazardous materials.

Another possible concern is the transportation of hazardous and non-hazardous materials into and out of the Plant Site, Fuel Pipeline and West Wharf areas. Private trucking contractors will be retained for transporting materials into and out of the DTGS Facilities. The trucks utilized will be high-way registered and of similar size to the transport trucks (rated capacity of 12 to 20 tonnes) currently accessing the Plant Site and West Wharf area on a daily basis. The Truck Haul Road will be the primary access route for trucks and equipment into and out of the Plant Site. Provincial highways and municipal roads will be used to access the Fuel Pipeline/West Wharf, BMSWD Site, and Rail Siding. In addition, Facility Closure activities such as decommissioning of the Fuel Pipeline that require work in residential areas of the Town will utilize typical construction equipment such as tandem axle transport trucks and rubber tire back-hoe to the extent possible. Working periods adjacent to residential areas within the Town of Dalhousie will be limited to 7:00 AM to 7:00 PM in an effort to minimize disturbances to residents in the area. Although there will be periods of increased vehicular traffic accessing the DTGS Facilities, the use of highway registered vehicles on existing roadways with Facility Closure activities generally being restricted to NB Power owned



properties or leased ROWs, decommissioning activities are not anticipated to significantly impact current vehicle traffic patterns and the requirement of a traffic control plan is not anticipated.

In addition to hazardous materials, there are specific operational and maintenance activities that will be completed throughout the course of the project that have the potential to negatively impact environmental quality of the surrounding area if not properly managed or controlled. The specific operation and maintenance activities that have the potential to impact environmental quality include maintenance and re-fuelling of the equipment, storm water management and control, sedimentation and erosion control, domestic and sanitary waste collection and disposal, and air emission (fugitive dust). NB Power will include sections in the EPP that include erosion and sedimentation control to address potential environmental impacts from operational maintenance activities associated with the Facility Closure project. The EPP will be prepared as part of the final DTGS closure plan designs (i.e., final demolition methodology and sequencing, final landfill capping plan, etc.). Conceptual surface water drainage plans (before and after the proposed project) that will require erosion control structures as part of the final Facility Closure plan and EPP are shown in Appendices B and C.

Other potential environmental impacts associated with specific tasks of the proposed project and specific natural media are discussed below.

#### **4.2.1.1 SURFACE WATER AND SEDIMENT QUALITY**

With the historical operation and proposed closure of the DTGS Facility, the physical water quality of discharges and changes to the receiving waters (i.e. Tait Brook, Hamilton Brook and Eel Bay) are important considerations in designing and implementing the closure plan. Several tasks outlined as part of the proposed project have the potential to impact surface water and sediment quality of these tributaries/bays and include the decommissioning of Bulk Petroleum Tankfarm, excavation of lagoon sediment/soil, washing of the Plant Site and West Wharf infrastructure, demolition of shoreline infrastructure (CW inlet and outlet structures and West Wharf Infrastructure), as well as BMSWD Site grading, wetland construction and capping activities.

The chemical quality of water being discharged into Tait Brook and Eel Bay at the Plant Site and Hamilton Brook at the BMSWD Site is also an important consideration in the closure plan. As indicated in Section 3.11, several environmental assessments have been completed at the DTGS Facility between 1992 and 2010 to investigate surface water and

sediment quality of Tait Brook and Hamilton Brook in the vicinity of the DTGS as well as groundwater potentially discharging to the tributaries and Eel Bay. Results of the assessments indicate groundwater at the Plant Site has COPC concentrations below guidelines for the protection of aquatic life. Similarly, monitoring of the WWTP effluent has indicated effluent being discharged through the combined CW Outlet is within criteria in the existing approval to operate. Surface water quality in Tait Brook was also identified to be within applicable CCME Freshwater Aquatic Life (FAL) guidelines. However, the quality of water being directly discharged to Tait Brook or Eel Bay via the Plant Site storm water collection system is not known as monitoring of this water quality is not a requirement of the current approval to operate.

Sediment samples previously collected from Tait Brook contained COPC concentrations exceeding applicable CCME sediment quality guidelines. An ERA was therefore subsequently completed on Tait Brook and results of the ERA determined that the concentrations of metals and petroleum hydrocarbons present in the sediment and surface water do not present an unacceptable potential for risk to vertebrate aquatic or semi-aquatic receptors (i.e., fish, herpetiles, mammals, or birds) of Tait Brook.

The previous assessments also identified metal and hydrocarbon concentrations in sediment of Hamilton Brook adjacent to the BMSWD Site exceeding applicable screening criteria. A preliminary ERA for Hamilton Brook will therefore be completed as part of Task I of the Facility Closure plan and is intended to identify background conditions in the area and to determine if COPC concentrations in surface water and sediment of Hamilton Brook pose an unacceptable risk to ecological receptors of the brook. The information obtained from the ERA will be used to refine the final closure design plan for the BMSWD Site.

The capping and closure of the BMSWD Site along with the creation of wetlands for passive treatment of landfill leachate and surface water is expected to significantly improve the long-term chemical quality of surface water and sediment of Hamilton Brook adjacent to Site.

#### **4.2.1.2 GROUNDWATER QUALITY**

Potable groundwater wells are not located in close proximity to the DTGS Facility infrastructure. The nearest potable water well to existing DTGS Facility infrastructure would be associated with the residential dwellings located approximately 300 to 500 metres west and south of the BMSWD Site, respectively. Potential impacts to adjacent residential water supplies are not anticipated as soil excavation proposed as

part of the Project is generally limited to the overburden material and will not include blasting or excavation of the underlying bedrock. In addition, groundwater levels are not anticipated to be affected from Project activities as water usage for the demolition activities is generally limited to the washing which will utilize water from the municipal water supply. Dewatering of the Sediment and Leachate Ponds at the BMSWD Site is also limited to draining existing standing water from the ponds to existing drainage channels and will not include pumping from any extraction wells. The proposed project is therefore not anticipated to impact the quantity or quality of potable groundwater supplies in the Dalhousie area.

Results of the environmental assessment completed by CRA in 2010 indicated concentrations of potential contaminants (i.e., TPH/BTEX, PAHs, PCBs and metals) in groundwater samples collected from wells at the Plant Site, BMSWD Site and Rail Siding, including perimeter wells located between the DTGS Facility and adjacent watercourses/waterbodies, were below Atlantic RBCA Tier I RBSLs and applicable guidelines for the protection of aquatic life. The proposed Facility Closure project is not anticipated to negatively impact the chemical quality of groundwater compared to existing conditions. The excavation and consolidation of sediment/soil from the Plant Site lagoons and exposed coal ash from the BMSWD Site is expected to positively impact groundwater quality at the Site by reducing the potential leaching of contaminants in coal ash to groundwater.

The installation of monitor wells between the DTGS Site and adjacent off-Site aquatic receptors completed as part of the 2010 assessment activities also provides a means to monitor water levels and water quality of the groundwater during and post Facility Closure activities.

#### **4.2.1.3 SOIL QUALITY**

Similar to groundwater quality, results of the Phase II/III ESA completed by CRA in 2010 indicated that several areas of the Plant Site have metal concentrations in surface soil exceeding applicable regulatory criteria. One small area of the Plant Site with observed surface staining was also identified to contain petroleum hydrocarbon concentrations exceeding Atlantic RBCA RBSLs. A human health risk assessment (HHRA) was therefore completed for the Plant Site to determine if metal concentrations in soil pose a risk to human health for intended future land use as commercial redevelopment. The HHRA determined that metal concentrations in soil do not pose unacceptable risk to visitors or commercial workers of the Plant Site. However, the risk assessment did identify four locations with detected concentrations of arsenic or

vanadium greater than the SSTL calculated for protection of construction/utility worker. Protection of construction/utility workers, when working in direct contact with arsenic and/or vanadium impacted soil, can be addressed through the development and implementation of a site-specific HASP. The Facility Closure activities include excavation of soil adjacent to the Plant Site lagoons which contained the maximum concentration of vanadium and arsenic in soil at the Site (PSMW-13). The excavation and consolidation of soil/sediment from the Plant Site to the BMSWD Site is expected to improve overall soil quality at the Plant Site. The area with visible hydrocarbon surface staining near the transformer bank will be excavated as part of Facility Closure activities and transported off-Site for disposal. After Site demolition activities, surface soil in at the Plant Site will be re-sampled and analyzed for metals. If metals in surface soil exceed applicable screening criteria, a remedial action plan, such as soil cover, will be developed and implemented consistent with the NBDELG Guideline for the Management of Contaminated Sites. Similarly, confirmatory soil samples will be collected from the area of petroleum impacted soil following excavation activities to ensure residual petroleum hydrocarbon concentrations in soil are below applicable Atlantic RBCA Tier I RBSLs for intended future land use.

Surface soil samples collected from the Fuel Pipeline and West Wharf during the Phase II/III ESA programs completed in 2010 had BTEX/TPH, PAH and PCB concentrations below applicable guidelines.

Soil samples collected from the Rail Siding had BTEX/TPH and metal concentrations below applicable guidelines excluding nickel which slightly exceeded CCME guidelines. A risk assessment completed for the Rail Siding indicated that nickel concentrations in soil pose a low risk to ecological receptors or human health and additional evaluation is not required. The excavation and consolidation of exposed coal ash from selected Coal Ash Areas, is expected to improve overall soil quality at the BMSWD Site. In addition, covering and capping of Cell 1 (i.e., Cells 1A and 1C) is also considered to improve overall soil quality at the BMSWD Site. Closure activities associated with the BMSWD Site and Rail Siding are not anticipated to negatively impact soil quality.

The Facility Closure activities that have the potential to impact soil quality at Site are decommissioning and removal of the on-Site ASTs, Fuel Pipeline and transformers. The on-Site ASTs will be decommissioned and removed by a licensed petroleum contactor. The transformers and chemical ASTs will be decommissioned by NB Power personnel as well as private contractors. The Fuel Pipeline decommissioning will likely also be completed by the same contractor that decommissions the Bulk Storage Tank Farm ASTs. There is the potential for petroleum products or chemicals to be released with

these activities, negatively impacting soil quality. PCB impacted soils above applicable screening levels were not identified during the 2010 assessment program. Other Facility Closure activities are not anticipated to negatively impact soil quality.

Off-site soil quality with respect to metals in the Town of Dalhousie has been assessed by others (Cantox et al., 2006) and no adverse health effects were predicted for residents (refer to Section 3.8).

#### **4.2.1.4 AIR QUALITY**

It is expected that air-borne particulate matter will be generated during building and stack demolition phases and subsequent grading activities of the Project. Exhaust from construction vehicles and equipment plus fugitive soil dust from winds and equipment operation will be the anticipated air emissions at the DTGS Facility. Emissions produced will include carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), NO<sub>x</sub> and SO<sub>2</sub>. The air emissions generated during the proposed project are not expected to significantly increase compared to current emissions generated at the Site along with its operation such as the transportation of ash and gypsum off-Site. There is however, the potential for an increase in dust generation during explosive demolition of the stack. The short-term increase in dust production will be dependent on the stack demolition methodology which has yet to be determined but can be controlled by various mitigation means. The long term ambient air quality is anticipated to be positively impacted with the closure of the DTGS Facility.

Data are not available for ambient background sound levels at or in the vicinity of the DTGS Facility. However, given that the Plant Site has operated as a power generation facility for 40 years, it is not anticipated that the proposed project will generate ambient noise levels above current Plant Site operation levels. The one exception may however be during stack demolition. Again, depending on the stack demolition methodology to be used, there could be a short term significant increase in noise during demolition of the stack.

#### **4.2.2 FISH AND FISH HABITAT**

The proposed project has the potential to impact fish and fish habitat. The demolition of the CW Intake buildings will involve the placement of armour stone directly in Eel Bay below the high water mark. The total area of encroachment into Eel Bay below the high water mark following demolition and restoration is not estimated to exceed the current

footprint. This activity is not identified to impact fish habitat as this area represents a small fraction of the Chaleur Bay shoreline and the CW Intake area is not considered suitable habitat for fish rearing or spawning. Removal of the CW Intake Pumphouse buildings may actually be beneficial to aquatic organisms as bivalves and medusa (jellyfish) have been identified to periodically be drawn into the CW Intake chamber and pumping system. The demolition of the CW Intake will therefore remove the potential for fish to be harmed by entering into the CW Intake chamber.

The demolition of the combined CW Outlet also has the potential to negatively impact fish and fish habitat. As previously noted, the CW Outlet structure is aligned with the existing shoreline topography and generally does not extend into Eel Bay. The combined CW Outlet will therefore be decommissioned on land side of the high water mark and the shoreline contoured to match grades and elevations. It is not expected that decommissioning of the CW Outlet will extend into the waters of Eel Bay beyond the existing CW Outlet structure footprint. Demolition of the CW Outlet and infilling of the associated void west of the shoreline only is therefore anticipated to have low probability of impacting fish or their habitat.

A potentially more significant impact to fish and fish habitat is related to surface water quality during and after the facility demolition. Surface water and sediment quality was discussed in Section 4.2.1 but the potential impact to fish and fish habitat is also discussed in this section. During the demolition activities such as Bulk Storage Tank Farm decommissioning and grading, lagoon dewatering and sediment excavation, plant washing, coal ash excavation, and landfill capping there is the potential for chemicals and sediment to be released into Tait Brook, Hamilton Brook and Eel Bay that would be detrimental to fish and fish habitat health. There is the potential for unplanned releases or accidents to occur which may negatively impact fish and fish habitat. As such, the NB Power EPP will include erosion and sedimentation control to address potential environmental impacts from activities associated with the proposed project. The EPP will be prepared as part of the final DTGS closure plan designs (i.e. final demolition methodology and sequencing, final landfill capping plan, etc.) and will be designed to mitigate potential negative impacts to surface water and sediment quality as well as fish and fish habitat.

The anticipated long-term positive impacts to fish and fish habitat are the improvement of water quality directly adjacent to the Plant Site from the cessation of Plant Site operations and the permanent end to WWTP effluent being discharged into Eel Bay.

#### **4.2.3 FLORA**

The potential for the proposed project to negatively impact flora during the demolition and closure of the DTGS is limited to the temporary disturbance of grassed areas of the Plant Site, Fuel Pipeline and BMSWD Site. Grubbing and grading activities to remove shrubs, stumps and topsoil is not considered to be required as part of the Facility Closure activities. The DTGS closure activities is therefore considered to have low impact to the overall flora community in the Dalhousie area as the vegetation likely to be disturbed at the Plant Site and Fuel Pipeline ROW is ornamental and native grasses that are currently regularly manicured. Vegetation within the riparian area of Tait Brook, Hamilton Brook and Eel Bay will not be removed or altered during the decommissioning activities excluding vegetation in close proximity to the damaged culvert at the outlet of Tait Brook (culvert to be replaced) and the CW Intake and Outlet structures. Harvesting of commercial tree species is not anticipated as part of the Facility Closure activities. The definite long term positive impacts of the Facility Closure is that the Coal Ash Areas of the BMSWD Site lacking vegetation will be re-vegetated and allowed to grow undisturbed indefinitely. In addition, a 30 metre vegetation buffer along Tait Brook and Eel Bay at the Plant Site will be re-established naturally as part future commercial redevelopment plans in accordance with the provincial Watercourse and Wetland Alteration regulation and Coastal Area Protection Policy.

#### **4.2.4 FAUNA**

The possible negative impact to wildlife during the Facility Closure project is closely linked to re-grading activities as this vegetation may represent a limited food supply and cover for wildlife. Due to the industrial use of the DTGS Facility for the past 40 years and adjacent residential development surrounding the Plant Site and Fuel Pipeline, terrestrial mammals that may be present in the vicinity are likely limited to small fur-bearing animals such as fox, raccoon, rabbit, rodents (i.e., mice, voles, squirrels, etc.) and domestic animals (i.e., cats and dogs). Small aquatic mammals such as muskrat, mink and beaver are also potentially present in Tait Brook and Hamilton Brook within the DTGS project boundaries as evidenced by beaver workings in both tributaries. However, since these forms of wildlife are generally mobile, and similar resources or habitat can be found in adjacent areas, the likelihood of impact is only rated as “possible”.

The BMSWD Site and the surrounding area has large undeveloped mixed forest areas that likely support larger mammals such as deer, moose, and bear. It is therefore possible that these upper trophic level wildlife species may utilize the BMSWD Site

during different periods of the year as a food source. However, it is unlikely that closure activities of the BMSWD Site would negatively impact fauna in the area. However, closure of the BMSWD Site including re-vegetation of exposed Coal Ash Areas as well as establishment of wetland areas will likely positively impact the use of the BMSWD Site by fauna in the area.

It is anticipated the only situation in which negative impacts to fauna may be more significant would be if the DTGS Site contained critical habitat. The Eel Bay shoreline adjacent to the Plant Site as well as Tait Brook has been re-structured during historical operation of the DTGS Facility and the available information does not suggest critical wildlife habitats occur on the DTGS Facility.

#### **4.2.5 SPECIES AT RISK**

With respect to species at risk, the available information did not identify provincially listed species at risk species under the Provincial Endangered Species Act or species listed under Schedule 1 of the Federal Species at Risk Act as occurring within or directly adjacent to the DTGS Facilities. The only record for a sensitive species to occur in the region of Dalhousie was the Canada warbler and olive sided fly-catcher. These species have not been identified at the DTGS Facilities and are generally found in areas with mature trees or shrubs. The areas of the DTGS Facilities requiring decommissioning are generally highly disturbed and additional clearing/grubbing of mature forest areas is not anticipated. The wood turtle was also identified as potentially occurring in the Dalhousie area but specific observations of the turtle within 5 km of the DTGS Facilities were not available in the ACCDC database.

During the file review, there were reports of two species of rare flora to potentially occur within 1 kilometre of the Plant Site. The rare flora included the saltmarsh starwort and Labrador bedstraw. A detailed vegetation survey for the rare plants on the shoreline of Plant Site property as well as Tait Brook was conducted in August 2010 by B&B Botanical. The rare plant survey did not identify rare plants (listed as S1 or S2 by ACCDC) as occurring on the DTGS property. The rare plant survey information is included in Appendix G-9.

As noted in the previous section, an evaluation of Barrow's Goldeneye presence in the Dalhousie area was completed by Mr. Charlie McAleenan between 2003 and 2009. Barrow's Goldeneye is a federally listed species at risk and was identified to be present in the marine waters of Chaleur Bay and the Restigouche River estuary. This diving duck primarily breeds and winters in Canada with the eastern population migrating in



May to breed in small high elevation lakes and rivers within boreal forests of Quebec. Males migrate further north in June to moult in areas such as Hudson Bay and Labrador. During the non-breeding or winter season (November to April), the species spends time in the coastal waters of the Gulf of St. Lawrence and sheltered coastlines in the Maritimes (Species at Risk Public Registry accessed October 2012, Government of Canada, [www.sararegistry.gc.ca](http://www.sararegistry.gc.ca)). The presence of this species directly on terrestrial areas of the Plant Site properties is therefore considered unlikely.

Based on the information available and previous field surveys, rare or endangered species are not expected to occur within the Facility Closure project footprint or be negatively impacted by the decommissioning project. However, the intended green space habitat including the creation of small wetland areas planned as the final land use for the BMSWD Site may actually attract species at risk and have a positive impact. Specialized habitats to promote colonization or use of rare flora or fauna species are not included in the current green space development plan.

#### **4.2.6 WETLANDS**

A review of the available wetland mapping from the Province of New Brunswick on GeoNB Map Viewer (<http://geonb.snb.ca/geonb/DNR>) indicates there is one regulated wetland in the southeast corner of the Plant Site property and a regulated wetland in the southeast corner of the BMSWD Site. As previously mentioned, the Plant Site wetland is located adjacent to a 60 metre long culvert of Tait Brook that discharges into Chaleur Bay. The improper functioning of this culvert along with the beaver workings has created a seasonally flooded palustrine scrub-shrub wetland type habitat dominated by speckled alder. The wetland area is located south of Tait Brook and covers an approximate area of 0.5 to 1 hectare in the southeast corner of the property. Similarly, the mapped wetland on the BMSWD Site is contiguous to Hamilton Brook and has developed into a natural shallow water impoundment or shallow water wetland due to beaver workings in the area. The mapped wetland located directly south of the BMSWD Site is approximately 4 hectares in area. Two small wetlands (approximately 1 to 2 hectares each) were also identified to encroach on the northwest and northeast property boundaries of the BMSWD Site. The majority of these two wetlands are located on the lands associated with the PCI landfill (northwest of BMSWD Site) and the AIM Landfill. The wetland on the AIM property appears to be a forest wetland (based on aerial photography) and has likely developed due to the continuous discharge of water from Sediment Pond #1 on the BMSWD Site. The mapped wetland areas and corresponding 30 metre buffer associated with the DTGS Facilities obtained from the GeoNB Map Viewer are presented in Appendix K.

As previously noted, the current stream channel configuration of Tait Brook will be maintained as part of the Closure Plan and any in-stream work will be limited to replacement of the improperly functioning culvert located at the outlet to Chaleur Bay. This work is not anticipated to negatively impact the wetland area which is located south of Tait Brook and the main Plant Site infrastructure. Activities associated with the Tait Brook culvert replacement will require permitting through the WAWA program (Regulation #90-80) of the NB Clean Water Act.

The three wetlands associated with the BMSWD Site are located in undeveloped forested areas property. Construction activities related to capping/closure of the BMSWD Site are generally not anticipated to occur within the three mapped wetland or their associated 30 metre buffer. The only anticipated closure/capping activities that may occur within 30 metres of the BMSWD Site wetlands would be redevelopment of the leachate channels associated with Sediment Pond #1 and Leachate Pond #3. Activities associated with the creation of passive wetlands from the existing Sediment and Leachate Ponds and redevelopment of the leachate channels will be discussed with NBDELG to determine if permitting through the WAWA program (Regulation #90-80) of the NB Clean Water Act is required.

#### **4.2.7 MIGRATORY BIRDS**

Under the Migratory Birds Convention Act, it is a punishable offence to kill, capture, injure, take or disturb migratory birds or to damage, destroy, remove or disturb the nests of migratory birds unless otherwise authorized by the federal Minister of Environment. This legislation is responsible for the general practice of clearing vegetation from large project areas during the non-nesting period for birds which extends from September to May. As clearing/grubbing of vegetated areas is generally not required or included as part of the Facility Closure requirements, the decommissioning project is not expected to negatively impact migratory birds.

#### **4.2.8 SPECIAL AREAS**

With respect to special areas in the Dalhousie region, the environmentally significant areas identified in the ACCDC and Nature Trust of New Brunswick Inc. (NTNBI) databases are generally located greater than 500 metres from the DTGS Facilities and are not anticipated to be impacted directly or indirectly by the project.

#### **4.2.9**      **LAND USE**

The DTGS Facility and associated lands have been used or disturbed as part of the historical industrial facility operations. The entire Plant Site and BMSWD Site is owned by NB Power or its affiliates.

The end land use of the Plant Site properties following the decommissioning work is the potential sale of the properties for commercial/industrial redevelopment with title transferred to the purchaser.

It is anticipated that the proposed closure of BMSWD Site and conversion to a vacant green space is an environmentally positive impact. The end land use as a green space (Option 1) or continued operation as a landfill (Option 2) will be controlled by NB Power ownership and will limit future re-development.

The Fuel Pipeline ROW will remain as a ROW for the municipal water line that is owned and maintained by Regional Development Corp.

The West Wharf leased property will return to the Port of Dalhousie for continued port operations.

Similarly, the leased Rail Siding property will be returned to CN under the current lease agreement. NB Power owned properties associated with the Rail Siding will remain vacant for potential sale and future development.

#### **4.2.10**      **NAVIGABILITY**

Impacting vessel traffic on navigable waters such as Eel Bay is regulated under the *Navigable Waters Protection Act*. The only activities proposed with the project that may potentially impact navigable waters is the decommissioning of the CW Pumphouse buildings and combined CW Outfall. The decommissioning of these structures is only anticipated to affect navigability in the short term as the shoreline in these areas will be restored to similar conditions as part of the decommissioning work. However, as a precaution, warning signs of construction activity and the presence of possible boat traffic will be erected during the demolition work for these shoreline structures.

The rip rap breakwater structure currently extending approximately 400 metres from the shoreline between the CW Pumphouse buildings and the combined CW Outfall is not being decommissioned as part of the proposed project. The breakwater structure will remain in its current configuration indefinitely.

#### **4.2.11 CULTURAL RESOURCES**

The proposed project is not anticipated to impact Aboriginal culture or land but Eel River Bar First Nation is located approximately 4 km south of the Plant Site. In addition, vacant land owned by Eel River Bar Corp. is located directly south of Miller Road, approximately 750 metres south of the Plant Site infrastructure requiring decommissioning.

The waters of Eel Bay, directly adjacent to the Plant Site, are used for traditional, commercial and recreational fishing purposes. As noted in Section 4.2.2, the proposed project is not anticipated to significantly impact fish or fish habitat as decommissioning work below the high water mark of Eel Bay is generally limited to decommissioning of the CW Pumphouse buildings. In addition, effluent quality discharged from the WWTP has met the guidelines set out in the current Approval to Operate. Closure of the DTGS will also include discontinuing the extraction of water from Eel Bay and the inadvertent impact to marine organisms as part of the cooling water system for the plant. As such, the proposed project is anticipated to reduce the potential for contaminant discharge into Eel Bay as well as the consumption/use of marine water for process cooling over the long term. The proposed project is therefore not anticipated to negatively impact cultural resources of the area and may provide a net positive impact.

#### **4.2.12 SOCIO-ECONOMIC**

There are definite positive as well as negative socio-economic impacts expected with the Facility Closure project. The most obvious negative socio-economic impact is the loss of employment for NB Power employees associated with the closure of the DTGS. The closure of the DTGS will also likely indirectly affect specialized trade workers, service providers and the Port of Dalhousie who may rely solely or partially on the DTGS operational contracts as a source of revenue. Currently there are approximately 22 NB Power employees at the DTGS. The Facility Closure project is therefore planned to be initiated as soon as possible and NB Power employees utilized, to the extent possible, in various activities of the Facility Closure project. In addition, private local contractors and equipment will be utilized, to the extent possible, in various aspects of the Facility

Closure. The utilization of NB Power employees and local contractors in the Facility Closure as well as other employment mitigation measures discussed in Section 5.12 is anticipated to reduce the short-term local economic burden associated with the DTGS closure.

The most obvious positive impact of the DTGS Facility Closure project is the visual and aesthetic benefits to local residents as well as improvements to local and long-range air quality by eliminating the industrial combustion of fossil fuels.

## 5.0 SUMMARY OF PROPOSED MITIGATION

### 5.1 ENVIRONMENTAL MEDIA

The presence of potentially hazardous building materials and chemicals at the DTGS Facility have the potential to negatively impact environmental quality at the DTGS Facilities and off-Site if not properly identified and managed as part of the overall Facility Closure plan. As described in Sections 3 and 4, the first task of the Facility Closure project therefore includes completion of detailed hazardous material inventory that will utilize both DTGS employees intimately familiar with the operation of the facility as well as external consultants/contractors. An initial quantity, type and location of potentially hazardous materials and chemicals associated with the DTGS Facility has been developed based on the 2010 Phase I/II ESA and is summarized in Tables 2 and 3, respectively. The removal and disposal of hazardous building materials and chemicals will be completed by NB Power Generation, Transco and independent contractors dependent on the type of material. As part of the hazardous materials and chemical decommissioning plan, an internal NB Power manifest tracking system that identifies where the materials were generated, the carrier and the receiver will be used to ensure the materials or chemicals are properly transported and disposed in accordance with provincial and federal regulations. The hazardous materials and chemicals removal program will be overseen and audited by NB Power representatives to ensure the materials are being removed, sorted and disposed of in accordance with the manifest system.

As indicated in Sections 3 and 4, an initial list of transformers associated with the DTGS has been developed and included in Appendix E-4. A detailed inventory of all known or suspected oil containing transformers, circuit breakers or other associated instruments currently present at the DTGS Facilities will be prepared and an equipment sampling program implemented to determine the potential PCB content in equipment at the DTGS Facilities. Results of the inventory and associated sampling program will be provided to NBDELG along with a PCB Work Plan.

An inventory of potential PCB containing light ballasts has not been completed at the facility at this time due to the elevated locations of numerous light fixtures. However, as part of the building demolition plan, inspection and sorting of light ballasts and HID lights in each building will be included in the demolition contract by personnel who are trained and knowledgeable of PCB containing equipment. The inspection, sorting and appropriate disposal options will be the responsibility of the demolition contractor but the work will be overseen and audited by NB Power representatives.

In addition to hazardous materials, non-hazardous building materials such as scrap metal will be sorted for recycling and re-use. The sorting of non-hazardous materials that can be recycled/re-used will be completed by the demolition contractor and will be a condition of the demolition contract. The sorting of non-hazardous building materials will be overseen and audited by NB Power personnel to ensure compliance with the demolition contract. An assessment of potential lead based paint on building materials was also previously completed with additional confirmation sampling to be completed prior to initiating the building demolition work. The initial lead based paint sampling program indicated lead concentrations on non-recyclable building materials is suitable for disposal at an approved C&D site or municipal landfill. Building materials containing lead paint (above 1,000 mg/kg and meeting the leachate requirements) will be separated as part of the demolition contract and disposed in Cell 1 of the BMSWD (with permission from NBDELG).

Specific operational and maintenance activities that will be completed throughout the course of the Facility Closure project have also been identified to have the potential to negatively impact the environment if not properly managed or controlled. The development and adherence to the project specific EPP being developed concurrent with the final DTGS closure design plans will effectively mitigate potential environmental impacts associated with the routine operation and maintenance of the DTGS Facilities for the demolition period. The EPP will include protocols for specific activities such as refuelling equipment, leak and spill prevention plans, work near surface water bodies, domestic and sanitary waste collection, erosion and sedimentation control plans, contingency plans including spill notification and clean-up protocols, Facility access plans, and storm water management plans. A dedicated NB Power representative will be responsible to ensure the EPP is being followed by other NB Power personnel and sub-contractors working at the Facilities for the duration of the project.

Other potential environmental impacts associated with specific tasks of the proposed project and specific mitigation measures are discussed in the subsequent sections.

### **5.1.1 SURFACE WATER AND SEDIMENT QUALITY**

With any construction project that involves large-scale land disturbances, there is the possibility of soil erosion and siltation of adjacent surface water bodies. The adherence to the EPP, including sedimentation and erosion control, being developed concurrently with the final closure design plan will effectively mitigate silt and chemical contaminants from entering into receiving waters. Specific mitigation measures that will be included in the Facility Closure project to protect adjacent surface waters include:

- Temporary capping of existing storm water catch basins at the Plant Site to prevent direct discharge of storm water to Tait Brook or Eel Bay during construction activities
- Continued operation of the WWTP during demolition activities to treat wastewater generated during Plant Site decommissioning activities
- Diversion of surface water from selected areas such as the Plant Site lagoons as well as wastewater generated during the industrial cleaning activities (bulk storage tanks, Fuel Pipeline, plant, etc.) to the WWTP
- Construction of sumps for controlling and treating surface water run-off during the construction activities
- The use of armour stone for backfill in areas adjacent to Eel Bay
- Grading and covering exposed coal ash areas at the BMSWD Site including re-grading perimeter ditching that diverts surface water to the constructed wetland areas

As noted in Section 4.2.1.1, monitoring of the WWTP effluent has indicated effluent being discharged to Eel Bay through the combined CW Outlet is within criteria in the existing approval to operate. Similarly, surface water quality in Tait Brook and Hamilton Brook was also identified to be within applicable CCME FAL guidelines. However, the quality of water being directly discharged to Tait Brook or Eel Bay via the Plant Site storm water collection system is not known as monitoring of this water is not a requirement of the current approval to operate.

Surface water quality discharging to Eel Bay from the Plant Site WWTP and any other constructed sumps will be monitored throughout the construction period for potential contaminants of concern such as general chemistry parameters (i.e., pH, dissolved oxygen, conductivity levels, etc.), petroleum hydrocarbons and metal concentrations. The WWTP effluent sampling frequency and required analytes will be determined in consultation with NBDELG but for the purpose of this report it is assumed the monitoring program will be completed consistent with the current Approval to Operate licence.

The Plant Site storm water collection system is intended to remain in place following the Facility Closure to allow for the continued surface water drainage. However, during the decommissioning period, the catch basins in the area of demolition or grading activities will be capped to ensure contaminants or silt laden water is not directly released to Eel Bay or Tait Brook. In the event that the storm water collection system is to remain active during the construction period, the quality of storm water being collected at the Plant



Site and discharged to the Eel Bay or Tait Brook will be monitored with a specific emphasis on collecting water samples during (or within 24 hours) of a significant rain event (i.e., >15 mm of precipitation). In addition, it is proposed that surface water quality in Tait Brook, within the Plant Site property boundaries, will also be monitored three times (April, July, October) during each year of the Facility Closure project. The proposed surface water samples will be collected from the upper, middle and lower reaches of the brook on the Plant Site property. This monitoring is in addition to the two year Post Facility Closure monitoring that will also include storm water effluent, surface water and groundwater quality monitoring at the Plant Site (discussed in Section 2.7.5). The samples collected will be analyzed for general chemistry parameters as well as petroleum hydrocarbons and metal concentrations. The collection and analysis of surface water quality during and following the Facility Closure project will identify any need to implement mitigation measures as a result of unanticipated impacts to Eel Bay or Tait Brook.

As capping and closure of the BMSWD Site is not anticipated until Year 4 of Facility Closure Plan, surface water quality monitoring during the first three years of the Facility Closure program will be completed consistent with monitoring requirements and criteria in the existing approval to operate. During the capping and closure activities at the BMSWD Site and Rail Siding (Year 4), effluent and storm water quality being discharged off-Site (to Hamilton Brook and the regulated wetland in the northeast corner of the BMSWD) will continued to be monitored for contaminants of concern such as general chemistry parameters, petroleum hydrocarbons and metals. Hamilton Brook will also be monitored three times per year (April, July, and October) during the BMSWD Site capping and closure period. This monitoring is in addition to the two year Post Facility Closure monitoring that includes the two sample locations in Hamilton Brook (Upper Hamilton Brook and Lower Hamilton Brook) that are part of the current approval to operate as well as constructed wetland effluent quality, and wetland vegetation monitoring. The surface water samples collected will be analyzed for general chemistry parameters as well as metal concentrations. This monitoring program assumes that Cell 1 will be closed and capped along with the conversion of Leachate Lagoon 3 to a wetland. The collection and analysis of surface water quality during and following the BMSWD Site closure program will identify any need to implement mitigation measures as a result of unanticipated impacts to Hamilton Brook (or other surface water receiving areas).

As previously stated, if Cell 1B and Leachate Pond 3 are retained to receive coal ash from NB Power's Belledune operations, testing and monitoring requirements outlined in the current Approval to Operate I-7782 would be adhered to as well as any additional requirements included in the renewed Approval to Operate past October 31, 2016.

### **5.1.2 GROUNDWATER QUALITY**

Specific activities related to the Facility Closure project are not anticipated to negatively impact groundwater at the Site or off-Site. Groundwater sampling completed at the Plant Site and BMSWD Site indicated that groundwater quality at each down-gradient property boundary, between the DTGS Facility and adjacent watercourses/waterbodies, were below Atlantic RBCA Tier I RBSLs and applicable CCME guidelines for the protection of aquatic life. In addition, potable water wells are not located approximately 300 to 500 m from the DTGS Facilities and therefore not anticipated to be impacted by the Facility Closure project. It is proposed that monitoring of groundwater quality and water levels in existing wells between the demolition/closure areas and waterbodies (Eel Bay, Tait Brook, and Hamilton Brook) will be completed twice annually during the decommissioning period. This monitoring is in addition to the proposed Post Facility Closure monitoring being proposed and will facilitate the need to implement mitigation measures as a result of an unanticipated impacts to groundwater.

### **5.1.3 SOIL QUALITY**

Results of the Phase II ESA completed by CRA in 2010 indicated that some areas of the Plant Site have metal concentrations exceeding applicable regulatory criteria as part of historical Site operations. A HHRA was therefore completed for the Plant Site which determined that metal concentrations in soil did not pose a risk to human health for the intended future land use as commercial redevelopment. However, the risk assessment did identify four locations with detected concentrations of arsenic or vanadium greater than the SSTL calculated for protection of construction/utility workers but this could be controlled by the temporary use of Personal Protective Equipment (PPE). An area of visible hydrocarbon surface staining was also identified directly adjacent to the Turbine rooms (transformer bank). A remedial action plan will be developed to manage these areas consistent with the NBDELG Guidelines for the Management of Contaminated Sites and will likely consist of excavating vanadium impacted sediment/soil in the vicinity of the Plant Site lagoons for disposal at the BMSWD Site. Hydrocarbon impacted surface soil will also be excavated for off-site disposal at an approved disposal facility. Confirmatory soil samples will be collected from the excavated areas to ensure contaminant concentrations (petroleum hydrocarbons and metals), meet applicable regulatory criteria. A Site Closure report will be prepared for the Plant Site property(s) following completion of the Facility Closure project and submitted to the NBDELG for acknowledgement consistent with the NBDELG Guideline for the Management of Contaminated Sites.

Decommissioning and removal of the on-Site ASTs was also identified to potentially impact soil quality through the accidental release of petroleum hydrocarbons or chemicals. The petroleum AST decommissioning and removal program will however be completed by a licensed petroleum contractor, consistent with the NB Petroleum Storage and Handling Regulation, minimizing the potential for accidental releases. The chemical storage tanks will also be decommissioned by private contractors or NB Power employees familiar with appropriate tank decommissioning techniques and residual chemicals transported off-Site for disposal at an approved facility or re-use at another NB Power facility. Soil samples will be collected from beneath and surrounding the AST for petroleum hydrocarbon analysis or other potential contaminants as deemed necessary. The results will be included in the Site remedial action plan (if required) as discussed in the previous paragraph. In the event of an accidental spill during the AST decommissioning program, the release will be managed in accordance with the EPP.

#### **5.1.4      AIR QUALITY**

The implementation of this project is not expected to significantly impact air quality at or adjacent to the DTGS Facilities compared to existing air quality and therefore mitigation measures proposed are limited to:

- Restrict demolition activities related to the Fuel Pipeline to daylight hours (7 AM to 7 PM, Monday to Friday) to limit noise nuisance for adjacent residences
- Use standard construction equipment and existing municipal access roads/ROWs for decommissioning of the Fuel Pipeline
- Restrict demolition activities related to the Plant Site, BMSWD Site and West Wharf to daylight hours (7 AM to 7 PM) but work periods may be extended to include weekends at the discretion of the tendered contractor and NB Power
- Maintaining an adequate buffer between the Plant Site and adjacent residential neighbours and the use of Truck Haul Road (Pothier Street extension) for movement of equipment and materials into and out of the Plant Site
- Use existing provincial roads/highways for the movement of equipment and materials into and out of the BMSWD Site and West Wharf
- Limit the construction equipment to land-based equipment typically used on other construction projects in the area
- No excessive idling of construction vehicles
- Use of wet suppression controls as required to minimize dust produced by on-site vehicles and equipment

- Routine inspection of construction equipment by the qualified field staff and/or a NB Power representative to ensure efficient operation

Selection and tendering of the stack demolition methodology will include an evaluation of potential impacts on noise and dust to the adjacent residences. The contractor awarded the stack demolition contract will be responsible to ensure the stacks are demolished in a safe manner that does not pose an unacceptable health or safety risk to adjacent residential neighbours or the general public. The stack demolition methodology and potential mitigation measures will be reviewed with the NBDELG prior to demolition. Demolition by explosive charge is expected due to the height (160 m) of both stacks.

## **5.2 FISH AND FISH HABITAT**

The proposed project activities that are suspected to directly impact fish and fish habitat are restricted to the demolition of the CW Intake buildings and combined CW Outlet structure. The total footprint of potentially impacted fish habitat is anticipated to be no greater than the footprint of the present structures. Proposed mitigation measures to reduce the impact on fish habitat include:

The demolition work for the CW Intake structure will be completed during the summer months during low water levels. There is an existing floating debris boom that extends from the shoreline of the CWI inlet channel to the rip-rap breakwater. A separate silt curtain will be installed and remain in place for duration of the Task to minimize sedimentation into the bay and the potential for fish to enter the work area.

- Installation of a silt curtain to minimize silt being released to Eel Bay and prevent fish from entering into CW Intake area during the demolition activities.
- Complete a fish rescue survey to remove fish (if present) within the CW Intake area prior to initiating the demolition activities.
- Rip rap armour stone (approximately 30 to 60 cm in diameter) will be used to in-fill the CW Intake Pumphouse buildings and create a new shoreline face that will be tapered into the existing shoreline. The rip rap will be placed at the base of the existing concrete structures, to allow for safe sloping and minimize demolition debris being deposited into Eel Bay (See Drawings B-10 and B-11 in Appendix B for detailed approach).

- Limit the infilling of the existing combined CW Outfall structure to the existing concrete structure footprint and use rip rap armour stone to profile the shoreline to match existing conditions. The demolition of the combined CW Outfall structure is not anticipated to intrude on fish or fish habitat beyond the existing outfall footprint (See Drawings B-12 in Appendix B for detailed approach).
- Complete work during summer months when water levels are low and outside of the spawning and migration season of Atlantic salmon.
- Limit the construction equipment to land-based equipment.

Other activities completed as part of the proposed project that may indirectly affect fish and fish habitat is potential impacts to surface water and sediment quality of Eel Bay, Tait Brook and Hamilton Brook. Mitigation measures related to the protection of surface water and sediment quality during plant washing, demolition, capping/grading, and dewatering activities as well as routine operation and maintenance activities of the Project were discussed in Section 5.1.1.

### 5.3 FLORA

The anticipated potential impact to flora is the grasses, small shrubs and adventive weed species during re-grading activities at the Plant Site and BMSWD Site. The mitigation measures to compensate for the loss of vegetation at the Facilities is the re-vegetation of sloped surfaces using an engineered hydroseed mulch mixture. The hydroseed will include a mixture of seeds from native grasses and plants. The purpose of applying the hydroseed mulch is to stabilize the exposed soil areas and populate the areas with native plant species. After applying the hydroseed, the Plant Site and BMSWD Site will be allowed to re-vegetate naturally with grasses, shrubs and tree seedlings. Although there will be a reduction in the amount of vegetation present at the Plant Site over the short term, grading and re-vegetation activities is will actually increase the amount of vegetation over the long term. A Plant Site grading plan (Figure B-7) showing the areas to be re-vegetated is included in Appendix B.

In addition to re-vegetating exposed soil areas, Leachate Pond #3 and Sediment Ponds #1 and #2 will be converted to wetlands by applying a native wetland plant seed mixture. Applying a seed mixture to the wetland compared to physical planting of selected plant species will allow the vegetative species to be established based on in-situ wetland characteristics (e.g., water depth, pH, and temperature). Conversion of the leachate and sediment ponds to wetlands is expected to positively impact the flora of the BMSWD Site both in species abundance and diversity.

#### 5.4 FAUNA

It is anticipated that any negative impact of the proposed project with respect to wildlife will be closely linked to grading activities. The background information reviewed for this project did not identify critical wildlife habitat on the DTGS Facilities or directly adjacent to the properties. The only general impact of the grading activities will be the temporary displacement of wildlife to similar or more natural habitat. As existing vegetated areas of the Plant Site and BMSWD Site will be re-vegetated following Facility Closure activities, it is expected the DTGS Facilities will provide more functional wildlife habitat than existing conditions.

NBDNR will be contacted if animal burrows, dens or other structures (i.e. active beaver houses) are identified to be present in areas of the Site scheduled for earth-work activities.

#### 5.5 SPECIES AT RISK

The background information as well as the field surveys completed at the DTGS Site did not identify any specific species at risk that would be impacted by the proposed project. The only record for a sensitive species to occur in the region of Dalhousie was the Canada warbler and olive sided fly-catcher. These species have not been identified at the DTGS Facilities and are generally found in areas with mature trees or shrubs. The areas of the DTGS Facilities requiring decommissioning are generally highly disturbed and additional clearing/grubbing of mature forest areas is not anticipated. The background information also indicated the possible presence of wood turtles in the area. The wood turtle is listed as a threatened species in Schedule 1 of the federal Species At Risk Act. The wood turtle is relatively widespread across the region and is generally associated with shorelines and fields near watercourses. Although there have been no reports of wood turtles within 5 km of the DTGS Facilities, personnel working on the Facility Closure project will be instructed to notify the on-Site NB Power representative if wood turtles are discovered during project activities. The wood turtle would then be immediately moved to a safe, off-Site location.

Previous field surveys have specifically identified Barrow's Goldeneye, which is a federally listed species at risk, to over-winter in the marine waters of the Bay of Chaleur in the Dalhousie area. As decommissioning work associated with the Facility Closure project will primarily be restricted to land-based work, this specific species at risk is not expected to be significantly impacted by the project. In addition, the only proposed project activities that are expected to directly impact the marine waters or the shoreline

of Chaleur Bay is demolition of the CW Intake buildings and combined CW Outlet structure. As such, specific mitigation measures previously discussed for the protection of fish and fish habitat (Section 5.2) such as completing the shoreline work during summer months when water levels are low would also be protective of Barrow's Goldeneye as this species would not be present in the Dalhousie area during the summer months.

The presence of raptor species (eagles, hawks) or their nests were not identified during a Site walk-over completed by CRA personnel in September 2010 or in available literature and therefore are not anticipated to be impacted by the proposed project.

## 5.6 WETLANDS

A desk-top review of regulated wetlands in the area identified one regulated wetland in the southeast corner of the Plant Site property and a regulated wetland in the southeast corner of the BMSWD Site. Two small wetlands (approximately 1 to 2 hectares each) were also identified to encroach on the northwest and northeast property boundaries of the BMSWD Site. Facility closure activities are not expected to impact the three wetlands at the BMSWD Site as construction activities will generally be outside of the wetland 30 metre buffer areas. Mitigation measures to control erosion and sedimentation will be addressed through adherence to the EPP in work areas adjacent to the BMSWD Site. In addition, surface water quality discharging to Hamilton Brook and the associated wetland as well as the wetland adjacent to Sediment Pond #1 will be monitored during and post Facility Closure activities as discussed in Section 5.1.1.

The permanent removal or replacement of the culvert located at the discharge point of Tait Brook at the Plant Site may indirectly impact the small wetland area located directly south of the brook. The removal or replacement of the Tait Brook culvert will require permitting through the WAWA program (Regulation #90-80) of the NB Clean Water Act. The permanent removal or replacement of this culvert will require the installation of a temporary coffer dam (or similar structure) and a surface water by-pass system (relay pump and aboveground piping). In addition, standing water present in the pooled area upstream of the culvert and within the culvert will require draining prior to initiating the culvert corrective action activities. It is anticipated that the temporary by-pass system and the standing water will be directly discharged to Eel Bay. The temporary surface water diversion plan for activities completed in this area of the Plant Site will be included in the final Facility Closure design plans as well as the WAWA

application permit. In addition, standard silt control measures (silt fencing, check dams, stabilizing exposed soil, etc.) will be utilized during culvert construction activities to reduce the potential for soil erosion during this activity.

The culvert removal or replacement activities will not encroach directly into the wetland area. In addition, the wetland is considered to be a product of the damaged culvert and beaver workings classified as a seasonally flooded palustrine scrub-shrub wetland. The culvert work activities are therefore not anticipated to significantly affect the hydrologic regime of the wetland as the work will be conducted during the dry season and of relatively short duration (i.e., 1 to 2 weeks). Following the culvert removal or replacement activities, it is expected that the natural hydrologic regime of Tait Brook and the contiguous wetland will be restored but will be highly dependent on future beaver activities.

## 5.7 MIGRATORY BIRDS

It is unlikely that re-grading activities required for the Plant Site, BMSWD Site, or Rail Siding would potentially impact migratory birds in the area as these areas of the DTGS Facility generally lack vegetation suitable for nesting or breeding migratory birds. Specific mitigation measures for the protection of migratory birds such as completion of a migratory bird survey are therefore not included with the Facility Closure project.

Waterfowl such as the Mallard (*Anas platyrhynchos*), American Black Duck (*Anas rubripes*), Common Goldeneye (*Bucephala clangula*) were observed in marine waters adjacent to the DTGS Plant Site during bird surveys completed between 2003 and 2009 by Mr. Charlie McAleenan. Shoreline work associated with the Facility Closure project is generally restricted to decommissioning the CW Intake Pumphouse buildings and the combined CW Outlet structure. None of these structures are suitable nesting areas for shorebirds or waterfowl and these birds have not previously been identified in close proximity to these structures. As such, specific mitigation measures previously discussed for the protection of fish and fish habitat (Section 5.2) are therefore also assumed to be sufficiently protective of shoreline birds.



## 5.8 SPECIAL AREAS

With respect to special areas in the Dalhousie region, the environmentally significant areas identified in the ACCDC and NTNBI databases are generally located greater than 500 metres from the DTGS Facilities and are not anticipated to be affected directly or indirectly by the project. Specific mitigation measures for the protection of special areas in the region are therefore not included with the Facility Closure project.

## 5.9 LAND USE

Currently most of the lands associated with the DTGS Facility have been used or disturbed as part of the historical operations as an industrial facility. It is anticipated that the proposed closure of the Plant Site for the potential future commercial/industrial redevelopment is environmentally a net neutral impact on land use but is an overall positive impact due to the reduction in greenhouse gas emissions. Similarly, the Fuel Pipeline ROW and West Wharf leased land will remain active as a ROW for the municipal water line and port operations, respectively, resulting in a net neutral change in land use. However, removal of the Fuel Pipeline and associated West Wharf infrastructure along with ceasing the delivery of petroleum fuel to the Plant Site will eliminate the potential for future releases of petroleum product to the environment. This will result in a net positive impact on the environment. Closure of the BMSWD Site and Rail Siding along with the conversion existing sediment/leachate ponds to wetlands is also considered to be an environmentally positive impact. The end land use of the BMSWD Site as a passive green space will be controlled by NB Power and will limit future re-development on the property. This is a specific mitigation measure as it will restrict the future construction of buildings at the BMSWD Site unless re-evaluated under the NBDELG Guidelines of Contaminated Sites and ensures NB Power controls future on-Site activities.

## 5.10 NAVIGABILITY

Impacting vessel traffic on navigable waters such as Eel Bay is regulated under the *Navigable Waters Protection Act*. The only activities proposed with the project that may potentially impact navigable waters is the decommissioning of the CW Intake and Outlet structures. The decommissioning of these structures is only anticipated to potentially affect navigability in the short term as the shoreline in these areas will be restored to similar conditions as part of the decommissioning work. The requirement for approval to complete this work under the Navigable Waters Protection Act will be

determined in consultation with Transport Canada. It is anticipated that warning signs of construction activity and the presence of possible impairment to boat traffic will be erected during the demolition work for these shoreline structures.

#### **5.11 CULTURAL RESOURCES**

The Facility Closure project is not anticipated to impact Aboriginal culture or land as Aboriginal lands and therefore specific mitigation measures related to Native culture are not included with the Facility Closure project. The public involvement process, outlined in Section 6.0, will however include notification to the Eel River Bar First Nation of the proposed Facility Closure project, consistent with NB Power's internal Aboriginal engagement policy.

The proposed project is not anticipated to significantly impact fish or fish habitat or the recreational and commercial fishing value of Eel Bay or Chaleur Bay. However, residents in the vicinity of the DTGS as well as commercial fishing license holders for Eel Bay will be notified directly of the Facility Closure project as part of the public involvement process outlined in Section 6.0.

#### **5.12 SOCIO-ECONOMIC**

There are definite positive as well as negative socio-economic impacts expected with the proposed project. The positive impacts are the overall environmental benefits of reduced green-house gas emissions and potential future chemical release related to the DTGS Facility operation. The negative socio-economic impact is the loss of income for NB Power employees and privately-owned service providers. To mitigate the loss of employment, NB Power employees will be utilized, to the extent possible, in various activities of the proposed Project. Where possible, local private contractors and equipment will also be utilized in various aspects of the Facility Closure. The utilization of NB Power and local contractors in the Facility Closure project as well as the employee income mitigation measures being proposed are anticipated to reduce the local economic burden associated with the DTGS Facility closure.

## 6.0 PUBLIC INVOLVEMENT

To meet the requirements of the EIA registration process, NB Power has tentatively scheduled a Public Information Session (PIS) regarding the Facility Closure project in January 2013. The PIS will take place in a prominent public location within the community of Dalhousie. The exact location of the PIS as well as date and time will be confirmed following the EIA registration submission. Local residents will be informed of the PIS through announcements placed in the local newspaper and other communication media. The purpose of the PIS will be to display information about the proposed Facility Closure project, including a project schedule and discuss the project with interested landowners, stakeholders and invited guests. Environmental consultants and NB Power representatives involved in the project will be in attendance to record concerns, collect additional local knowledge as well as discuss and manage concerns where possible.

A separate PIS is planned for members of the local Aboriginal communities.

Invitations to the PIS will be sent directly to interested stakeholders such as landowners located directly adjacent to the DTGS Facility, the Mayor of Dalhousie and their councils, Rural Planning and Local Service District representatives, representatives of First Nation communities in the area, members of the Community Relation Committee as well as other interested stakeholders.

A report summarizing the public involvement activities including issues or concerns received as part of the public involvement process and responses to the identified responses will be submitted to the NBDELG.

## 7.0 APPROVAL OF THE UNDERTAKING

The permits, licenses, approvals or authorizations that may be required for the undertaking include:

- Determination from NBDELG under the Environmental Impact Assessment Regulation of the Clean Environment Act
- Watercourse and Wetland Alteration Permit issued by the NBDELG under the Watercourse and Wetland Alteration Regulation of the NB Clean Water Act
- Consultation and potential Authorization from the Federal Department of Fisheries and Oceans under the Fisheries Act
- Approval from Transport Canada under the Navigable Waters Protection Act (potentially)
- Approval from the NBDELG under the Petroleum Product Storage and Handling Regulation of the Clean Environment Act
- Approval from Canadian Nuclear Safety Commission under the Nuclear Safety and Control Act
- Approvals to Construct and Approvals to Operate issued by NBDELG under the Clean Environment , Clean Air and/or Clean Air Acts
- Approval of a site-specific Environmental Protection Plan, PCB Work Plan, Ozone Depleting Substance (ODS) (& other Halocarbons) Work Plan from the Manager, Environmental Assessment Section, NBDELG
- Approval of a Remedial Action Plan from the Remediation and Materials Management Section, Impact Management Branch, NBDELG
- Consultation and potential preparation of an Engineered Traffic Management Plan for routing of equipment, materials, wastes, and oversized equipment (potentially)
- Consultation with Municipal District Planning Commission to determine municipal permit requirements
- Approval from NBDELG related to construction activities within 30 metres of Eel Bay Shoreline in accordance with the provincial Coastal Areas Protection Policy
- Approval to Operate the BMSWD Site for receipt of waste and construction materials from DTGS Facilities to end of decommissioning project (2016), Approvals Branch, NBDELG
- Approval to Operate the Dalhousie TGS wastewater treatment plant as required during the decommissioning activities

- Consultation with NBEUB and NBDNR to determine permit requirements for decommissioning the Fuel Pipeline and associated infrastructure
- Consultation with Canadian Environmental Assessment Agency to determine the potential requirements for completing a federal environmental assessment under the new Canadian Environmental Assessment Act (repealed 2012)

## 8.0 FUNDING

The undertaking is 100% funded by the Proponent, NB Power. No federal funding or land is sought for this Project.

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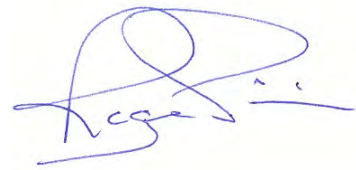
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## 10.0 CLOSURE

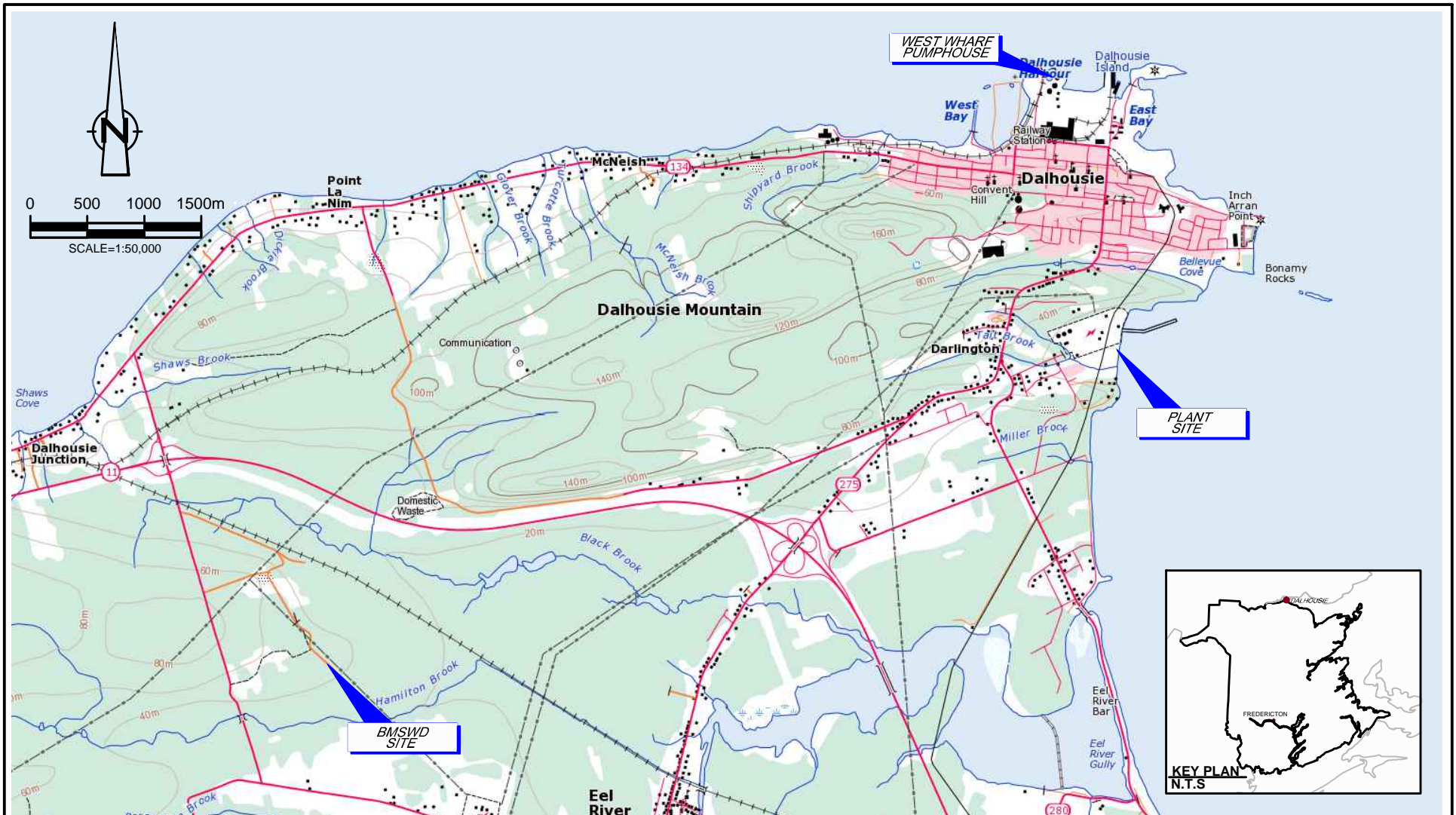
All of Which is Respectfully Submitted,  
CONESTOGA-ROVERS & ASSOCIATES



Troy Small, M.Sc. CE



Roger Poirier, P.Eng.



**LEGEND:**

- BMSWD** - BLAIR MALCOM SOLID WASTE DISPOSAL SITE
- PLANT SITE** - DALHOUSIE THERMAL GENERATING STATION
- WEST WHARF PUMPHOUSE** - INFRASTRUCTURE ASSOCIATED WITH FUEL PIPELINE EXTENDING FROM WEST WHARF TO THE PLANT SITE



figure 1.1  
**SITE LOCATION MAP**  
**ENVIRONMENTAL IMPACT ASSESSMENT**  
**DALHOUSIE THERMAL GENERATING STATION**  
*Dalhousie, New Brunswick*



**LEGEND:**

- - - FUEL PIPELINE
- FACILITIES ASSOCIATED WITH DALHOUSIE GENERATING STATION

figure 1.2

**OVERALL SITE LOCATION PLAN  
ENVIRONMENTAL IMPACT ASSESSMENT  
DALHOUSIE THERMAL GENERATING STATION  
*Dalhousie, New Brunswick***

