



# Keeyask Generation Project Environmental Protection Plan

## Environmental Protection Plan Annual Report

ENVPP-2022-01



# **KEYYASK GENERATION PROJECT**

## **ENVIRONMENTAL PROTECTION PLAN**

REPORT #ENVPP-2022-01

### **ANNUAL REPORT**

**APRIL 2021 - MARCH 2022**

Prepared By

Manitoba Hydro

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# SUMMARY

The *Generating Station Construction Environmental Protection Plan* and the *South Access Road Environmental Protection Plan* (EnvPPs) were developed for the Keeyask Generation Project (the Project) to minimize the environmental impacts of construction on the environment. They contain specific measures for people at site to follow while they are doing their work. All people working at Keeyask are expected to follow the two EnvPPs. The site environmental team is responsible for ensuring the EnvPPs are followed and reporting on what took place. This report describes the efforts that were undertaken April 1, 2021 – March 31, 2022. This report also provides a summary of the entire construction period as this will be the final EnvPP report for the Project now that all seven generating units are in-service and construction is largely complete.

## Aquatic Environment

Fish salvage occurred in the area downstream of the south dam, as well as inside the powerhouse, in 2021-22. As units came into service through the summer of 2021 and due to the very low flows, the station was able to pass all the flow and the spillway gates were closed. The area south of the spillway became dewatered except for some small pools. In September, 243 mainly small-bodied fish were rescued from the pools and released to the Nelson River.

Downstream stop logs were installed in Unit 6 of the powerhouse on September 23, 2021 to de-water the unit and allow further construction. During the de-watering process, fish were seen. A fish salvage of the draft tube was carried out, rescuing 162 fish. The catch had a total of 176 fish, consisting of 140 Longnose Sucker, 26 Lake Sturgeon, seven Lake Whitefish, two Burbot, and one Walleye. The two Burbot, all Lake Sturgeon, and the majority of Longnose Sucker (96%) were released alive into Stephens Lake. The Lake Whitefish and Walleye did not survive.

During unit repair work and dewatering sumps for clean-out, 20 Burbot, four suckers, and one juvenile Lake Sturgeon were rescued and released to the tailrace via the tailrace viewing gallery inside the station. Two dead suckers were also caught.

Protecting water in the Nelson River and other tributaries was a priority throughout the Project. All domestic water and wastewater was stored and treated in accordance with the *Manitoba Environment Act* Licence (Licence) and other regulations, under the close supervision of provincially certified operators. Water used for concrete production was contained, neutralized for pH, and allowed to settle in a series of treatment cells at the Project site before being discharged into vegetation and/or used for dust suppression on roads. Wastewater generated during grouting work and equipment washing was monitored, collected, and disposed appropriately. Drainage/dewatering of impounded water took place throughout construction in accordance with the EnvPPs and Licence for the Project. Where it could not be directly discharged to the river because it did not meet the provincial regulations for the protection of aquatic life, it was discharged into vegetation through different means in order to allow things like sediment and nutrients to be filtered and/or beneficially used by vegetation on the Project site. It was also used for dust suppression.

The presence of aquatic invasive species (AIS) at Keeyask was first observed in 2019, when microscopic zebra mussel veligers were found in Gull Lake. Prior to this and throughout construction, site environment staff enforced new legislation introduced by the province in 2015. This included inspecting all incoming and outgoing watercraft and equipment to confirm it met criteria required under legislation and decontaminating incoming and outgoing boats, trailers and equipment that came into contact with the water. During the Project, 346 pieces of equipment were inspected and 22 vehicles/boats were decontaminated onsite. In-water infrastructure was visually inspected for adult zebra mussels upon removal from the Nelson River at the end of the open-water season and three monitoring stations were deployed in Gull Lake to monitor for zebra mussel colonization in the Nelson River. Adult mussels were first observed on substrates and in-water infrastructure at Keeyask in 2020 and were present again in 2021.

### **Terrestrial Environment**

Wildlife interactions are monitored daily by the Project site environmental staff and other construction personnel. Observations of wildlife at site between April 1, 2021 and March 31, 2022 included: eagle, fox, snowy owl, moose, common nighthawk, marten, frog, caribou, wolf, lynx, and black bear. During this same period, 8 wildlife mortalities were observed at the Project site. Most of these were small mammals and birds. They were recorded and reported to the local Conservation Officer. In the fall 2021, four black bears were removed from site using a bear trap and relocated by the local Conservation Officer.

The Project is being constructed on traditional nesting habitat for some species of gulls and terns. In order to minimize the number of gulls and terns that nest in active construction areas, a bird control program is undertaken each year of construction. The 2021 program was successful in encouraging the gulls and terns to nest outside of the active construction area.

If clearing occurs during the breeding bird nesting period (April 24 to August 25), a pre-clearing survey is required. There was one pre-clearing nest survey conducted in May 2022 and no active nests were found. The majority of the Project clearing is now complete.

In 2021, weed surveys were carried out in most of the cleared Project areas. As expected, some weeds continued to spread within these areas; however, weeds still cover a very small portion (just over one per cent) of the cleared areas. Immediate removal of any new highly invasive weeds by hand continued to be a highly effective method of control. As was done in 2016 through 2020, herbicides were applied in a few key areas in July 2021, followed by mowing in September 2021.

### **Hazardous Material Releases**

Hazardous Materials Spill Response Plans are in place and set the standard for spill prevention planning, how to respond to hazardous materials spills, reporting requirements and how to clean-up spills. All spills, regardless of quantity, are cleaned up. During the reporting period there were 0 hazardous material releases that were reportable quantities as per the *Environmental Accident Reporting Regulation* under the *Dangerous Goods Handling and Transportation Act*.

### **Regulatory Non-Conformance**

There were no regulatory warnings or fines issued from April 1, 2021 to March 31, 2022.

# TABLE OF CONTENTS

<b>1.0</b>	<b>INTRODUCTION.....</b>	<b>1</b>
<b>2.0</b>	<b>CONSTRUCTION UPDATE.....</b>	<b>4</b>
2.1	<b>STRUCTURES .....</b>	<b>7</b>
2.2	<b>EARTHWORKS .....</b>	<b>7</b>
<b>3.0</b>	<b>OVERVIEW OF THE ENVIRONMENTAL PROTECTION PLAN.....</b>	<b>9</b>
3.1	<b>ENVIRONMENTAL PROTECTION PLAN IMPLEMENTATION .....</b>	<b>9</b>
3.2	<b>ENVIRONMENTAL IMPROVEMENT AND STOP WORK ORDERS.....</b>	<b>9</b>
3.3	<b>REPORTING AND COMMUNICATION.....</b>	<b>12</b>
<b>4.0</b>	<b>ENVIRONMENTAL REGULATORY REQUIREMENTS .....</b>	<b>13</b>
4.1	<b>PERMITS AND APPROVALS.....</b>	<b>13</b>
4.2	<b>ENVIRONMENT ACT LICENCE.....</b>	<b>13</b>
4.3	<b>FISHERIES ACT AUTHORIZATION.....</b>	<b>13</b>
4.4	<b>FISHERIES ACT REQUEST FOR REVIEW .....</b>	<b>14</b>
4.5	<b>SITE VISITS AND INSPECTIONS.....</b>	<b>14</b>
4.6	<b>NON-CONFORMANCE, WARNINGS, AND NOTIFICATIONS .....</b>	<b>14</b>
<b>5.0</b>	<b>ENVIRONMENTAL PROTECTION MEASURES .....</b>	<b>16</b>
5.1	<b>PLANTS AND HABITAT .....</b>	<b>16</b>
5.1.1	<b>Invasive Plant Control.....</b>	<b>16</b>
5.1.2	<b>Habitat Fragmentation.....</b>	<b>17</b>
5.1.3	<b>Protection of Sensitive Sites.....</b>	<b>18</b>
5.2	<b>WILDLIFE .....</b>	<b>20</b>
5.2.1	<b>Wildlife Relocations .....</b>	<b>23</b>
5.2.2	<b>Wildlife Mortalities.....</b>	<b>24</b>
5.2.3	<b>Beavers .....</b>	<b>24</b>
5.2.3.1	<b>Beaver Dam Removal.....</b>	<b>24</b>
5.2.3.2	<b>Beaver Cones.....</b>	<b>25</b>
5.2.4	<b>Den Surveys.....</b>	<b>27</b>
5.2.5	<b>Caribou.....</b>	<b>28</b>
5.2.6	<b>Amphibians .....</b>	<b>29</b>
5.3	<b>BIRDS.....</b>	<b>30</b>
5.3.1	<b>Gull and Tern Control Program.....</b>	<b>30</b>

5.3.2 **Pre-Clearing Nest Surveys**..... 34

5.3.3 **Stick Nests** ..... 34

    5.3.3.1 **Bird flight diverters** ..... 35

**5.4 FISH**..... 35

    5.4.1 **Timing Of In-stream Construction**..... 35

    5.4.2 **Blasting** ..... 36

        5.4.2.1 **Quarry Cofferdam** ..... 36

        5.4.2.2 **Cutting and Blasting of Border Ice** ..... 37

        5.4.2.3 **Powerhouse Tailrace Channel Blasting**..... 37

    5.4.3 **Fish Screens**..... 37

    5.4.4 **Fish Salvage**..... 38

        5.4.4.1 **Unit Dewatering to Complete Constructions** ..... 38

        5.4.4.2 **Unit Dewatering to Address Deficiencies** ..... 43

        5.4.4.3 **Dewatering For Sump Clean Out** ..... 43

        5.4.4.4 **Downstream South Side of Spillway**..... 45

    5.4.5 **Fish Passage**..... 49

        5.4.5.1 **South Access Road Stream Crossings**..... 49

        5.4.5.2 **Winter Crossings on the South Access Road Stream Crossings and to Ellis Esker**..... 49

        5.4.5.3 **N-5 and G-3 Causeways** ..... 49

        5.4.5.4 **Trash Racks** ..... 50

**5.5 WATER USE AND PROTECTION**..... 50

    5.5.1 **Potable Water** ..... 50

    5.5.2 **Domestic Wastewater Treatment and Disposal** ..... 50

    5.5.3 **Concrete and Concrete Production** ..... 51

    5.5.4 **Drilling Water**..... 53

    5.5.5 **Equipment Washing**..... 53

    5.5.6 **Drainage**..... 54

**5.6 AQUATIC INVASIVE SPECIES**..... 57

    5.6.1 **On-site Monitoring (2016-2021)** ..... 57

    5.6.2 **Zebra Mussel Control (2016-2021)**..... 59

**5.7 AIR QUALITY** ..... 62

**5.8 EROSION AND SEDIMENT CONTROL**..... 63

**5.9 HERITAGE RESOURCES** ..... 67

**5.10 HAZARDOUS MATERIALS, PETROLEUM PRODUCTS AND EQUIPMENT MAINTENANCE..... 69**

5.10.1 Inventory Control ..... 69

5.10.2 Transportation..... 69

5.10.3 Storage..... 69

5.10.4 Petroleum Products ..... 70

5.10.5 Equipment..... 70

5.10.6 Refueling and Fuel Transfer..... 70

5.10.7 Hazardous Material Releases..... 71

**5.11 WASTE MANAGEMENT..... 74**

5.11.1 Hazardous Waste Disposal ..... 74

5.11.2 Non-Hazardous Waste Management and Recycling..... 74

**5.12 FIRE PREVENTION..... 76**

**6.0 REFERENCES..... 77**



## LIST OF TABLES

Table 1.	Environmental Improvement Orders for the Project .....	10
Table 2.	Total number of fish captured during the Keeyask GS Unit 6 fish salvage in fall 2021, separated by species. ....	39
Table 3.	Number of fish species captured during fish salvage operations downstream of the Keeyask GS spillway, September 2021. ....	46
Table 4.	AIS inspection and decontamination at Keeyask (2016 to 2021). ....	62
Table 5.	Project to Date (PTD) releases since July 2014.....	72

## LIST OF MAPS

Map 1.	Keeyask Project general location.....	3
Map 2.	Keeyask Project construction areas. ....	6
Map 3.	Stream crossings along the South Access Road. ....	25
Map 4.	Area searched for bear dens in November 2021. ....	28
Map 5.	Area where pre-clearing nest survey took place (dashed blue line) on May 3, 2022. ....	34

## LIST OF PHOTOS

Photo 1.	Aerial view of the Keeyask GS in October 2021. ....	5
Photo 2.	Remediation of Work Area C (Area 51, Service Bay Laydown) .....	8
Photo 3.	Common tansy, one of the invasive plants found at the Project site during construction. ....	17
Photo 4.	The N-6 sensitive site, a rare white birch habitat type in the Project region, in September 2021. ....	18
Photo 5.	Site environmental staff putting up purple flagging tape to indicate an environmentally sensitive site. ....	19
Photo 6.	Fox on the Project site. ....	21
Photo 7.	Fox in the Project area.....	21
Photo 8.	Wolf in the Project area.....	22
Photo 9.	Eagle along south dike.....	22

Photo 10. Arctic Fox in Work Area A. .... 23

Photo 11. Muskrat released into Stephens Lake. .... 24

Photo 12. Culvert at the Butnau Wier stream crossing (SC-8) along the South Access Road, in late May, 2016. At this time, beavers were placing woody debris in the culvert opening. .... 26

Photo 13. Culvert at the Butnau Wier stream crossing (SC-8) along the South Access Road, before (left) and after (right) the installation of a beaver cone in November 2018. .... 26

Photo 14. Moose crossing sign along the North Access Road close to the Main Camp. .... 29

Photo 15. One of the boreal chorus frogs in the fridge terrarium. .... 30

Photo 16. Ring billed gull at Project site. .... 31

Photo 17. Kite installed as part of the gull and tern control program. .... 32

Photo 18. Site Environmental Inspector installing kite as part of the gull and tern control program. .... 33

Photo 19. Using noise deterrent as part of the gull and tern control program. .... 33

Photo 20. Bald eagle perched on a constructed nesting platform. .... 35

Photo 21. Fish observed within the lower draft tube of the Keeyask GS Unit 6 prior to fish salvage on September 24, 2021 (left). The salvage crew shut off the pump emptying the draft tube to allow fresh water to enter. .... 40

Photo 22. Fish were lifted out of the draft tube hatch in a dry bag filled with water (left) and transported to the hoist containing fish tubs with fresh water (right). .... 41

Photo 23. Fish tubs were hoisted to the main deck. .... 41

Photo 24. Fish were transported to the Stephens Lake boat launch by truck. Fish were then enumerated by species, weighed and measured (if in good condition), and released. .... 42

Photo 25. Fish were released at the Stephens Lake boat launch. .... 42

Photo 26. Dewatering sump. .... 44

Photo 27. Fish rescued from the dewatering sump were released into the tailrace from the tailrace gallery. .... 45

Photo 28. Location of the 12 ponds fished downstream of the Keeyask GS spillway, September 24, 2021. Drone image was taken on September 29, 2021 and may differ slightly from conditions during salvage. All ponds within the salvage area were inspected. .... 47

Photo 29. Seine netting in ponds downstream of the Keeyask GS Spillway, September 24, 2021. .... 48

Photo 30. Location of concrete batch plant and aggregate pile. .... 52

Photo 31. Treatment cells for green cutting water and sludge. .... 52

Photo 32. Water containing sediment is pressed through a dewatering bag situated within natural vegetation. Water infiltrates into the ground and prevents sediment from entering the Nelson River. .... 54

Photo 33: A Site Environmental Inspector collects a water sample in the field to test its water quality before the water rejoins the Nelson River..... 55

Photo 34. A sprinkler system set up along a haul road sprays water containing high nutrients into a vegetated area. .... 57

Photo 35. Project site staff installing artificial substrate to monitor for zebra mussels in Gull Lake (2018). .... 58

Photo 36. Zebra mussel colony found on the underside of a downstream dock following removal of the dock for the winter (October 2020). .... 59

Photo 37. A boat and trailer are inspected for mud and debris at the Keeyask Site (2019). .... 60

Photo 38. Hot water is used to decontaminate a boat and trailer (2018). .... 61

Photo 39. An equipment tag used as part of the AIS control process at Keeyask. .... 61

Photo 40. Dust control along the North Access Road. .... 63

Photo 41. Sediment fence installed along the North Access Road. .... 64

Photo 42. Mounded soil berm (left), rock-lined drainage channel with turnouts (center) and regraded slopes (right) at northern and western edges of EMPA D-16..... 65

Photo 43. Rock berm along northwestern edges of EMPA D-17. .... 66

Photo 44. A heritage resource (re-touched chert flake) discovered on Caribou Island..... 68

Photo 45. Release remediation efforts within spillway water passage 4. .... 73

Photo 46. Release remediation efforts along South Dike. .... 73

Photo 47. Wildlife proof waste bin. .... 75

Photo 48. Installation of fence around food waste bins to help discourage attracting wildlife. .... 75

# 1.0 INTRODUCTION

The Keeyask Generation Project (the Project) is a 695 megawatt hydroelectric generating station and associated facilities at Gull Rapids on the lower Nelson River in northern Manitoba, immediately upstream of Stephens Lake. The Project is located within the Spilt Lake Resource Management Area and located approximately 30 km west of Gillam (Map 1).

Construction of the Keeyask Generation Project began in July 2014, once the *Environment Act* Licence (the Licence), *Fisheries Act* Authorization (FAA) and other required approvals were in place.

Two Environmental Protection Plans (EnvPPs) were developed to mitigate and manage the potential environmental effects during the construction phase of the Project: The *Keeyask Generation Project, Generating Station Construction Environmental Protection Plan* (July 2014) and the *Keeyask Generation Project, South Access Road Environmental Protection Plan* (July 2014). Both EnvPPs provide detailed, easy to follow, site-specific environmental protection measures that are implemented by the contractors and construction staff to minimize environmental impacts during construction of the Project. The plans were approved by Manitoba Environment, Climate and Parks (formerly Manitoba Conservation and Climate, previous to that Manitoba Sustainable Development and prior to that Project Manitoba Conservation and Water Stewardship) and were implemented throughout construction. The Project had a Site Environmental Lead (SEL), one Environmental Officer and Environmental Inspectors who worked on a rotational basis as the Project is located in a remote location. Environmental site staff conducted daily compliance monitoring to ensure the mitigation measures outlined in the EnvPPs and all environmental legislation and approvals are implemented and followed during construction.

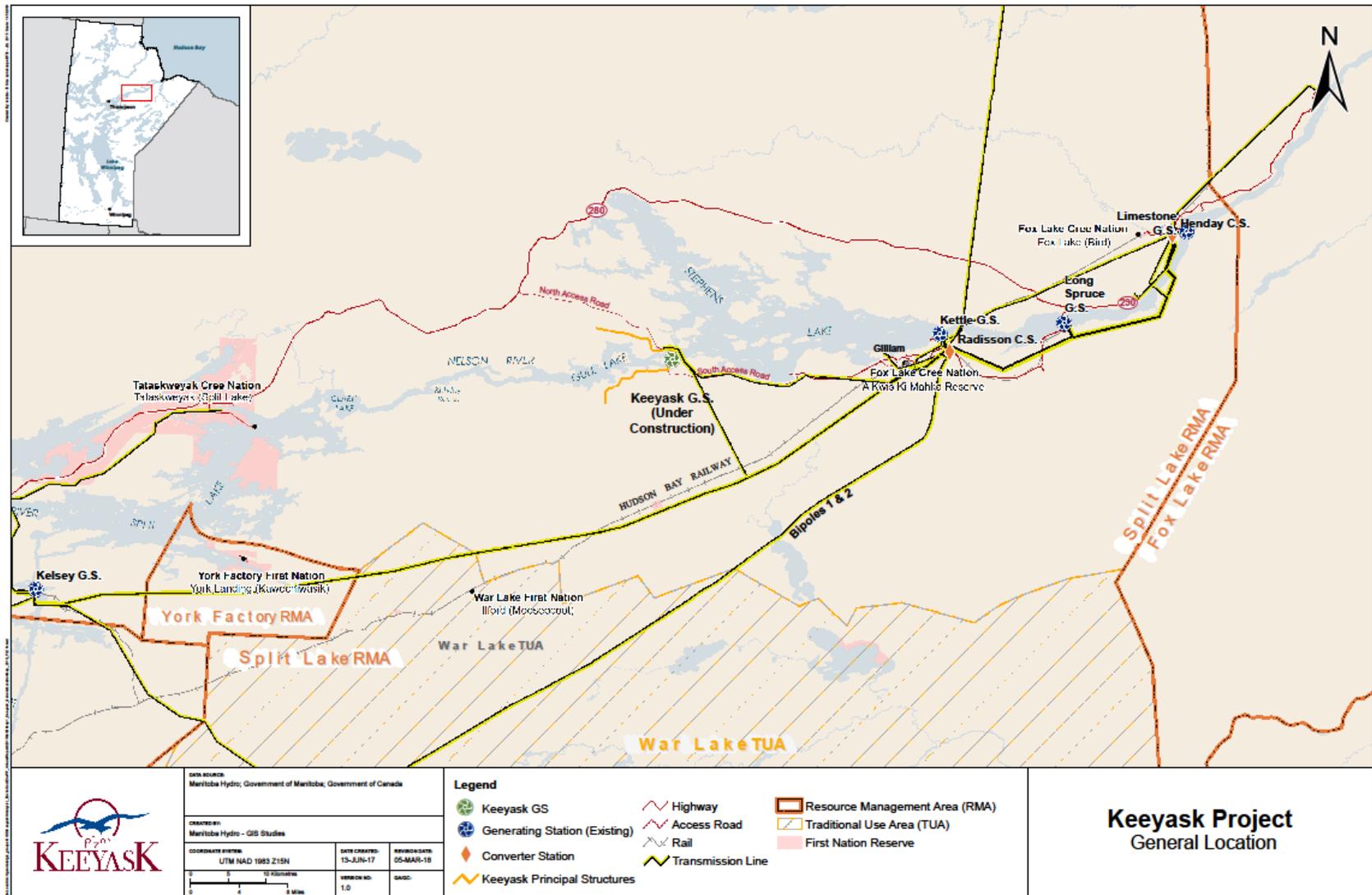
Some of the specific areas that are covered in the EnvPP include (but are not limited to):

- Construction near or in water;
- Fish, wildlife, and terrestrial habitat protection;
- Hazardous material and petroleum products;
- Preventing the spread of terrestrial and aquatic invasive species;
- Erosion and sediment control;
- Specific requirements to follow when clearing, such as the requirement to conduct breeding bird surveys and/or maintaining buffers around wildlife dens, etc.; and
- Heritage resources and the processes to follow when there are discoveries.

All personnel working or visiting the Project site are responsible for following the measures set out in the EnvPPs. As outlined in the EnvPPs, an annual report will be provided to Manitoba Environment, Climate and Parks on the compliance monitoring undertaken during construction of the Project. The report provides an update on construction and a report on the various activities undertaken in accordance with the EnvPPs. The following reports have previously been submitted:

- *Manitoba Hydro, 2015 Keeyask Generation Project 2015. Environmental Protection Plan Monitoring Report – Annual Monitoring Report July 2014 – March 2015. Winnipeg, Manitoba June 2015.*
- *Manitoba Hydro, 2016. Environmental Protection Plan Annual Report April 2015 – March 2016. Keeyask Generation Project Environmental Protection Plan Report # EnvPP-2016-01. June 2016.*
- *Manitoba Hydro 2017. Keeyask Generation Project Environmental Protection Plan Report # EnvPP-2017-01. Environmental Protection Plan Annual Report April 2016 – March 2017. June 2017.*
- *Manitoba Hydro, 2018. Keeyask Generation Project Environmental Protection Plan Report # EnvPP-2018-01. Environmental Protection Plan Annual Report April 2017 – March 2018. June 2018.*
- *Manitoba Hydro, 2019. Keeyask Generation Project Environmental Protection Plan Report # EnvPP-2019-01. Environmental Protection Plan Annual Report April 2018 – March 2019. June 2019.*
- *Manitoba Hydro, 2020. Keeyask Generation Project Environmental Protection Plan Report # EnvPP-2020-01. Environmental Protection Plan Annual Report April 2019 – March 2020. June 2020.*
- *Manitoba Hydro, 2021. Keeyask Generation Project Environmental Protection Plan Report # EnvPP-2021-01. Environmental Protection Plan Annual Report April 2020 – March 2021. June 2021.*

This report summarizes EnvPP monitoring from April 1, 2021 to March 31, 2022. It also provides a summary of the entire construction period as it is the final EnvPP report for the Project since construction is largely complete and the Project has transitioned to an operating station. Work remaining includes decommissioning, revegetation and some other mitigation measures that will be constructed in the future. The progress and completion of those items will be communicated in other EnvPP reports.



Map 1. Keyyask Project general location.

## 2.0 CONSTRUCTION UPDATE

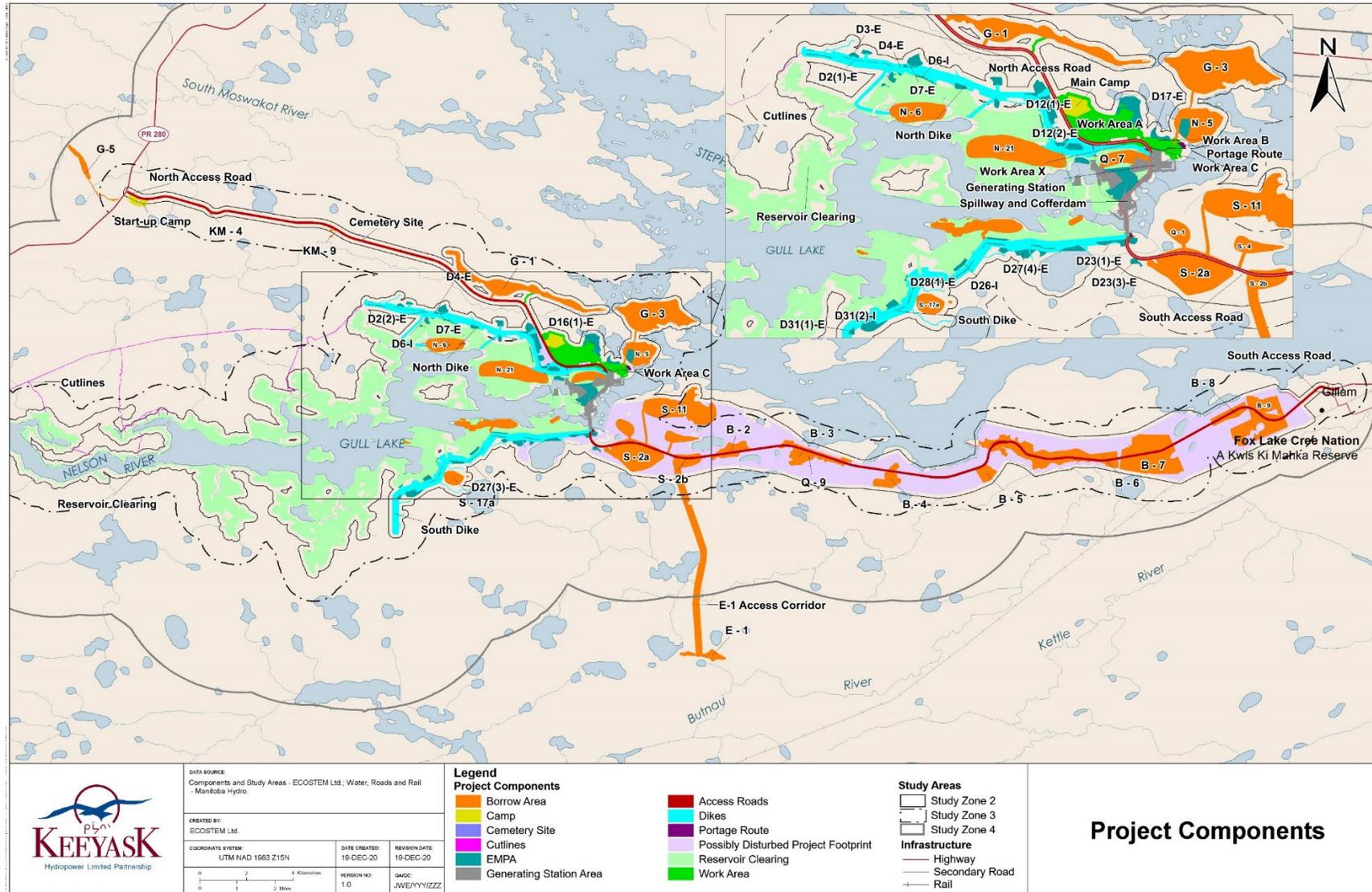
The following milestones were achieved in the 2021/2022 construction season:

- Close out of quarries and haul roads and the removal of temporary structures.
  - Reclamation of Work Area A, including the General Civil Contractor fuel farm.
  - Reclamation of Work Area X, select trailers and materials remain for final demobilization.
  - Work Area C (also known as Area 51; adjacent to Service Bay Parking lot) remediation completed.
  - Close out of excavated material placement areas (EMPAs) D12, D16 and D17
  - Close out of Quarry 1 and Quarry A.
  - Close out of borrow areas G1 and S2a.
  - Removal or narrowing of Haul Roads; HR 7, 2, 13 and 22.
- All seven units within the generating station are operational.
- Repairs and resurfacing of the South Access Road.
- Tree planting of 212,490 jack pine and black spruce trees.
- Installation of guard rails along the dams between and adjacent to the Powerhouse and Spillway.

Photo 1 shows an aerial view of the Keeyask GS in October 2021. Map 2 shows the location of all Project construction areas.



**Photo 1. Aerial view of the Keeyask GS in October 2021.**



Map 2. Keyyask Project construction areas.

## 2.1 STRUCTURES

During the 2021-22 season, the installation of the remaining mechanical and electrical systems continued where work was far enough along to permit the commissioning of all units. The final unit was placed into service on 2022-03-09. The Keeyask Generating Station is providing its own power and transmitting into the electrical grid via the transmission lines.

## 2.2 EARTHWORKS

Efforts related to earthworks focused on preparing sites, including excavated material placement areas (EMPA), borrow pits, quarries, haul roads and work areas for revegetation (Photo 2). Demobilization of the General Civil Contractor (GCC) began in early 2021. All that remains is demobilization of their offices, trailer and equipment from the Service Bay Parking lot, Work Area B, Work Area A, and Work Area X.

Infrastructure repairs to the North and South Access Roads were performed due to settlement and heavy use of the roads; repairs were made to shoulders, slopes, and road surface (resurfacing). Guard rails were installed along the dams adjacent to the Powerhouse and Spillway for public safety of the future PR 280.

Revegetation efforts were completed at multiple sites in 2021, which included the planting of 212,490 trees - 189,810 jack pine and 22,680 black spruce - over an area of 87 hectares at sites that were no longer required for construction. Broadcast seeding of native grasses and Italian ryegrass (a non-invasive annual) were also planted at specific locations to help with stability/erosion of slopes along roads and EMPAs. Where practical, overburden that had been stripped as part of borrow development was spread back over the disturbed area to promote future vegetation regrowth.



**Photo 2. Remediation of Work Area C (Area 51, Service Bay Laydown)**

## **3.0 OVERVIEW OF THE ENVIRONMENTAL PROTECTION PLAN**

### **3.1 ENVIRONMENTAL PROTECTION PLAN IMPLEMENTATION**

To ensure each contractor was in compliance with the expectations of the EnvPP, Manitoba Hydro Site Environmental Inspectors along with management and contractors would conduct daily and weekly contractor site audits, issue inspection reports and follow up on non-compliances to ensure corrective actions were implemented. Manitoba Hydro would generate inspection reports where non compliances were highlighted. These reports were transmitted to the contractor, through Aconex (a document transmittal system). Once implemented, contractors would provide a record of corrective actions. Follow-up inspections occurred to confirm completion of these actions.

Once the construction within a work area was completed, Manitoba Hydro environmental staff would complete a visual site inspection to ensure all construction debris, materials and equipment were removed, all releases were remediated and no outstanding non-compliances remained. This inspection would occur alongside the contractor responsible for that area. The entire construction site was broken down into segments that were signed off on as they were completed to ensure no areas were missed during decommissioning. Locations that were used for storage of hazardous materials, hazardous waste and petroleum products required a remediation plan prior to close out. These higher risk locations were flagged by the Manitoba Hydro Site Environmental Lead (or delegate) and a remediation plan was generated, which included soil sampling to ensure the area was fully remediated.

As the Project progressed, updates were made to the EnvPPs to keep the information in them current in response to changes during the Project, contractor work methods, environmental legislation and guidelines, or technological advancements. Revisions could be initiated through the Site Environmental Lead or directly with the authors of the EnvPPs.

### **3.2 ENVIRONMENTAL IMPROVEMENT AND STOP WORK ORDERS**

During the course of construction, the Environmental Improvement Orders (EIO) were issued to contractors if there were issues with their work practices that were not in compliance with the EnvPP or regulatory requirements. Table 1, below, provides the full list of EIO issued from the start of construction. No environmental stop work orders were issued.

**Table 1. Environmental Improvement Orders for the Project**

<b>Environmental Improvement Order (EIO) #</b>	<b>Date Issued</b>	<b>Details</b>
EIO-01	18-Feb-2015	BBE refuelling equipment near water while not in compliance with their Safe Work Procedure for refuelling equipment near water or with the EnvPP. The contractor was asked to provide training to all personnel outlining their Safe Work Procedures, along with training on section 7.4 and 7.5.4 of the EnvPP.
EIO-02	7-Mar-2015	BBE hazardous material storage not in compliance with EnvPP and appropriate regulations and acts. The contractor was asked to provide a detailed Hazardous Waste Storage Procedure and training to staff.
EIO-03	11-Jul-2015	BBE discharge of sediment laden water to the Nelson River. The contractor was asked to create and implement a Safe Work Procedure for dewatering management and monitoring and provide training to staff.
EIO-04	9-Aug-2015	Amisk construction not in compliance with Section 2.4 of the Fisheries Act Authorization and section 7.19.2 of the EnvPP for erosion protection at Stream Crossings 4, 5, and 6 of the South Access Road. The contractor was directed to implement erosion control measures at these stream crossing locations.
EIO-05	26-Aug-2015	BBE not in compliance with section 7.7 of the EnvPP for adequate animal-proof waste disposal bins in Work Area A. The contractor was directed to provide training to staff and ensure a bear fence was installed around waste disposal area.
EIO-06	25-Oct-2015	Increasing number of hazardous material releases for BBE. The contractor was directed to include a root cause analysis with all spill reports.
EIO-07	13-Feb-2016	BBE did not have fuel tank permits available at their fuel farm location, along with a readily available list of workers who have completed their handling of Ozone Depleting Substances certification. The contractor was instructed to ensure proper permits were available, along with worker certifications were up to date.
EIO-08	16-Apr-2016	Improper discharge of BBE greencut water into Quarry 7. The contractor was instructed to implement a concrete water plan, and provide toolbox talks to staff regarding the topic.
EIO-09	20-Apr-2016	BBE improper storage of hazardous materials and hazardous waste in Work Area A. The contractor was instructed to review appropriate regulations and ensure proper containment and spill supplies were made available at storage locations.
EIO-10	21-Apr-2016	BBE improper disposal of waste oil. The contractor was instructed to provide staff training on waste storage and disposal and provide copies of waste manifests.
EIO-11	23-Apr-2016	BBE had not maintained records required by the Ozone Depleting Substances and other Halocarbons Regulations, under the Ozone

<b>Environmental Improvement Order (EIO) #</b>	<b>Date Issued</b>	<b>Details</b>
		Depleting Substances Act. The contractor was instructed to review the Act requirements, ensure all technicians hold valid certifications, and documentation is provided.
EIO-12	16-May-2016	BBE releases found during a site inspection that require additional cleanup. The contractor was instructed to take soil samples after remediation and provide sample results.
EIO-13	28-Feb-2018	Sodexo utilizing waste cooking oil bin improperly and posing risk to wildlife. The contractor was instructed to develop a checklist for daily activities and housekeeping items, develop a safe work procedure for waste oil disposal, and provide training to staff.
EIO-14	26-Apr-2018	275 cubic metres of high nutrient water released to the Nelson River. The contractor was instructed to implement corrective actions to prevent reoccurrence.
EIO-15	02-Jul-2018	BBE utilized a means of spill cleanup that was not approved by the Site Environmental Lead. The contractor was instructed to provide training to staff.
EIO-16	30-Jun-2018	BBE discharging high nutrient water from S2A (SAR) to vegetation, and from Q1 to vegetation without a sediment bag. The contractor was instructed to provide corrective actions to prevent reoccurrence.
EIO-17	8-Apr-2019	BBE had a large number of diesel releases in March 2019. The contractor was instructed to conduct an investigation into number of diesel releases, develop and implement corrective actions, and provide root cause analysis for the releases.
EIO-18	16-Apr-2019	High pH water was found outside of BBE's high pH holding cell east of the Crusher in Work Area A. The contractor was instructed to construct a functional holding cell and transfer water found outside of the cell immediately. A toolbox talk was also to be provided to both day and night shift vac truck operators.
EIO-19	26-Feb-2021	Ongoing issues with waste kitchen bin lids noted at Sodexo storage area. The contractor was instructed to implement a maintenance schedule for the bins and management to discuss with relevant staff.
EIO-20	29-Mar-2021	Outstanding environmental concerns not addressed in timely manner by NMS. The contractor was instructed to repair equipment leak, discuss reporting protocol to staff,
EIO-21	28-May-2021	BBE environmental protection performance with reference to an increasing number of hazardous materials releases, specifically diesel fuel, directly related to demobilization activities. The contractor was instructed to provide a root cause analysis for the releases, develop and implement corrective actions.
EIO-22	3-Sep-2021	BBE to improve performance relating to food and food waste storage. The contractor was instructed to remove food from trailers at the end of shift, secure access to trailers, and report animal sightings in a timely manner.

### **3.3 REPORTING AND COMMUNICATION**

During construction of Keeyask, environmental site staff undertook daily inspections and prepared daily reports of what occurred. Issues were communicated to the contractors, either verbally or more formally (through Aconex), depending on the severity of the issue. Weekly, joint inspections were completed with each of the prime contractors. Weekly inspection reports were generated and transmitted on Aconex to each contractor for corrective actions to be completed.

The GCC completed weekly and monthly reports summarizing their overall environmental performance. These reports would be reviewed with the Manitoba Hydro Site Environmental Lead and their team of inspectors.

Progress on the Project and environmental issues were discussed at the Monitoring Advisory Committee (MAC), which is the KHLP's forum for all environmental matters. A presentation has been prepared by the Manitoba Hydro representatives on the MAC for each meeting. The presentation includes slides on EnvPP items.

Regular update meetings were held with regulators to keep them abreast of the Project advancements and potential issues that may need their attention, such as schedule changes. This was in addition to communication that occurred onsite with regulators, at site visits that took place prior to the COVID-19 pandemic. There will be one, last site visit in August 2022 to allow Manitoba Environment, Climate and Parks to review the decommissioning and undertake a final inspection.

## 4.0 ENVIRONMENTAL REGULATORY REQUIREMENTS

### 4.1 PERMITS AND APPROVALS

Under the *Crown Lands Act* it was a requirement that an annual Work Permit be issued to Manitoba Hydro that outlined the conditions that must be followed while working on Crown lands. The Fire Equipment Requirements of the Work Permit applied to all land in the Project footprint, including the KHLP's privately owned land. The Site Environmental Lead requested a work permit for both the Keeyask Generating Station Project and the Keeyask Infrastructure Project (KIP) on an annual basis. These work permits were issued by the regional Conservation Officer. Once received, Manitoba Hydro's Project Manager would review the conditions and sign the permits, which were sent back to the Province for their records. These work permits were transmitted through Aconex to the contractors for their records.

Burn permits were also obtained to obtain permission to burn between April 15 to November 15 (see Section 5.12).

### 4.2 ENVIRONMENT ACT LICENCE

*Environment Act* Licence (Licence) No. 3107 was issued on July 2, 2014. There were no requests for alterations made during the 2021-2022 reporting period.

Appendix 1 includes a list of all alteration requests made since 2014.

### 4.3 FISHERIES ACT AUTHORIZATION

*Fisheries Act* Authorization No. 11-HCAA-CA1-01695 (FAA) was issued on July 15, 2014.

As construction of Keeyask proceeded, design modifications were required based on conditions encountered. As a result of these changes, an amendment to the FAA was requested from Fisheries and Oceans Canada (DFO) in August 2020 and follow-up information was submitted to DFO in October 2020. Based on the assessment, the changes to the Project were not expected to materially alter the effects to fish and fish habitat considered during the regulatory review process and additional offsetting was not proposed. In a letter dated November 27, 2020, DFO stated that additional offsetting measures will be required. The offsetting will address the loss of habitat resulting from areas affected as a result of changes to instream, permanent works (Central Dam, Transmission Tower Spur, Spillway Cofferdam Remnant and South Dam Cofferdam) and address the change to the area where the wetland will be constructed. The plan for additional, proposed offsetting was submitted to DFO on September 21, 2021. Refer to Appendix 2 for a list of all requests for amendments since the Project start.

## 4.4 FISHERIES ACT REQUEST FOR REVIEW

Information on the nine stream crossings (SC3 to SC11a) along the South Access Road (SAR) were not included in the Project Environmental Impact Statement (EIS). As such they were sent to Fisheries and Oceans Canada (DFO) for review in three submissions between 2014 and 2015. The submissions included environmental assessment of the streams, construction design, material and methods. DFO responded with Letters of Advice (LOA) that the crossings should not result in serious harm to fish or contravene sections 32, 33 or 58 of the *Species at Risk Act*; therefore, no formal approval was required under the *Fisheries Act* or the *Species at Risk Act*.

## 4.5 SITE VISITS AND INSPECTIONS

Due to COVID-19 related travel restrictions, there were no site visits or inspections conducted by Provincial or Federal regulators between April 1, 2021 and March 31, 2022.

During the course of construction from mid-July 2014 to just before the pandemic lock down in March 2020, regulators visited the Keeyask site numerous times. Most frequently, visits were made by regional provincial conservation and environment officers for tours, inspections or to address wildlife issues. Annually, visitors from Manitoba's Environmental Approvals Branch and Fisheries Branch toured the construction site to see the progress being made. Staff from Fisheries and Oceans Canada and their counterparts from the provincial Fisheries Branch also visited the site and were particularly interested in the tailrace spawning shoal and other works related to fish. Staff from Environment and Climate Change Canada (ECCC) also visited to discuss migratory bird issues. Regulators came to the Project site on approximately 40 occasions over the course of the Project.

## 4.6 NON-CONFORMANCE, WARNINGS, AND NOTIFICATIONS

There were no regulatory warnings, fines or notifications issued by regulators between April 1, 2021 to March 31, 2022. There were also no self-notifications of non-compliance.

Throughout the construction period, there were five occasions (three in 2015 and two in 2016) when Manitoba Hydro notified the Province and DFO staff about seepage water and the need for it to be pumped from behind the cofferdams, directly into the Nelson River, despite it exceeding the end-of-pipe Total Suspended Solids (TSS) concentration of 25 mg/L listed in the EnvPP. TSS is calculated using turbidity measurements as a surrogate, based on a relationship between TSS and turbidity in the Nelson River that was developed specifically for the Project.

On February 8, 2018, Manitoba Sustainable Development issued a warning to the Project for discharging domestic wastewater effluent that exceeded the licensed discharge limits on January

22. The warning did not indicate any follow-up actions and a compliance re-inspection was not required.

On May 22, 2018, the GCC was informed that they would be fined for altering a fueling system in their fuel farm without the supervision of a Licensed Petroleum Technician. The ticket was received on June 7, 2018.

On January 28, 2019, Manitoba Sustainable Development (MSD) issued a warning to Manitoba Hydro after reporting a wastewater release onto the ground from the Keeyask Start-Up Camp's drain field on January 7, 2019. The warning included directions related to shutting down the system, repairing it, and monitoring it.

# 5.0 ENVIRONMENTAL PROTECTION MEASURES

## 5.1 PLANTS AND HABITAT

### 5.1.1 INVASIVE PLANT CONTROL

Invasive and non-native plants are of concern because once they are introduced into newly disturbed areas, which can happen from vehicles or footwear; they can quickly spread and may crowd out native plant species. It was predicted that invasive and/or non-native plants would be confined within human-disturbed areas, and not crowd out native species or change the local vegetation in the Project area. To confirm this, invasive plant (Photo 3) surveys are conducted each year in and around the Project construction areas under the Terrestrial Effects Monitoring Plan (TEMP) to determine if they are affecting native plants.

In 2021, weed surveys were carried out within most of the cleared Project areas. As expected, some weeds continued to spread within these areas; however, weeds still cover a very small portion (just over one per cent) of the cleared areas. A total of 25 non-native plant species were found during the 2021 surveys, which was two fewer than recorded in 2020. No new species were recorded. Three of the species that were recorded in 2020, but were not observed again in 2021 included canola, flixweed and black medick, while one species (ox-eye daisy) that was absent in 2020 was found again in 2021. Common dandelion was the most abundant weed plant in 2021, and two new weed species – canola and flixweed – were found. Neither of these new species were of high invasive concern.

Throughout the construction period, contractors were educated about the importance of cleaning their vehicles, equipment and footwear before travelling to the Project area, to prevent the spread of invasive plant species. This was done through the Project's onboarding training and through initial meetings with individual contractors. As much of the Project's construction equipment was new, there was not a lot of machinery arriving at the site from other areas. When contractors were required to leave site and return with their equipment, the importance of cleaning equipment was reiterated.

Training sessions with the Site Environmental Inspectors was also done by the Project ecologist, to teach site staff to identify the weedy plants of most concern on the Project site. This was done so that if a plant of invasive concern was found on site, it could be immediately flagged and removed.

Throughout the construction period, immediate removal of any new highly invasive weeds by hand continued to be a highly effective method of control. Herbicides were applied in key control areas in the summers of 2016-2020, with targeted application for the most invasive plants. Herbicide was also applied in a few key areas in July 2021, followed by mowing in early September 2021.

Surveys in 2022 will assess the effectiveness of both treatments in continuing to reduce non-native plant cover. Ultimately, vegetation rehabilitation of temporary Project areas will greatly reduce the distribution and abundance of weeds.



**Photo 3. Common tansy, one of the invasive plants found at the Project site during construction.**

### 5.1.2 HABITAT FRAGMENTATION

The portion of Borrow Area N-6 identified as the 'N6 sensitive site' in the environmental assessment (Photo 4) was avoided during Project construction, to minimize effects on the white birch priority habitat types in the terrestrial effects assessment. This area also provides regionally rare habitat for ruffed grouse. Protection measures were implemented to ensure that soil alteration or accidental disturbance within this site did not occur, which was confirmed by the TEMP annual habitat monitoring studies from 2015-2021.



**Photo 4. The N-6 sensitive site, a rare white birch habitat type in the Project region, in September 2021.**

Existing trails, roads or cut lines were used wherever possible to minimize habitat fragmentation in the Project area. An example of this was during the reservoir clearing, where existing trails were followed to a large degree to gain access, so that new clearing for access trails could be minimized.

### **5.1.3 PROTECTION OF SENSITIVE SITES**

In most cases, clearing was kept to the minimum area required to carry out construction activities. In some cases, where the entire cleared area was not required (e.g., in some borrow areas), the surface soil and vegetation within the cleared area were not disturbed, allowing for natural revegetation to occur from the existing seed bank.

Areas within the Green Zone (planned disturbed areas, as indicated in Appendix C of the EnvPPs) that were not required for construction activities were not cleared. Environmentally sensitive sites (Red Zone; Appendix C of the EnvPPs) bordering on planned disturbed areas (Green Zone) within the Construction Phase Project Footprint were clearly marked with flagging tape by the Site Environmental Lead (or their designate), prior to clearing taking place adjacent to these areas (Photo 5).

If clearing needed to occur within a portion of the Red Zone, the contractor put in a request to the Site Environmental Lead. The area within the Red Zone was clearly delineated in a map or spatial file, and the request was sent to Generation Environmental Services (Previously Environmental Licensing & Protection) to review with the Project's terrestrial biologist. The area in question was reviewed as part of the cumulative Project effects assessment, and it was determined whether the clearing could proceed without resulting in additional terrestrial habitat effects. Depending on the environmental sensitivity of the area, mitigation was sometimes prescribed to be carried out prior to/during clearing.



**Photo 5. Site environmental staff putting up purple flagging tape to indicate an environmentally sensitive site.**

Wherever possible, a 100-metre vegetated buffer was maintained adjacent to lakes, streams, marsh wetlands and riparian areas. The exceptions to this buffer were in instances where a planned, permanent Project component (i.e., dam or dike) was located within 100 metres of one of these waterbodies and could not be relocated. In most cases, a portion of this buffer was able to be maintained.

Areas to be hand cleared were identified in Appendix C of the EnvPPs (Sensitive Sites Maps). Low impact clearing methods, mostly hand clearing, were used in all riparian areas, including during reservoir clearing prior to impoundment.

While no chemical vegetation control was used during construction clearing, spot application of herbicides was done in key control areas for highly invasive plants.

Existing trails, roads or cut lines were used wherever possible to avoid disturbance to riparian vegetation. An example of this was during the reservoir clearing, where existing trails were followed to a large degree so that new trail creation would be minimized.

Trees were felled towards the cleared area to avoid damage to standing trees in the adjacent uncleared area.

Slash was not stockpiled within 100 metres of watercourses/bodies. An exception was in the reservoir clearing area, where slash was temporarily piled prior to burning. As most of this clearing and subsequent burning was done during the winter when the ground was frozen, there was limited disturbance to riparian areas.

Solid waste or slash was not pushed within six metres of standing trees. Again, an exception to this may have been temporary piling of slash during the winter reservoir clearing in areas where this distance could not be maintained.

Hand clearing at some mainland locations in the reservoir clearing area allowed for some tree salvage (for use as firewood, saw-logs, cabins, etc.) by local partner First Nations. A pick-up location was identified just outside the Security Gate in the parking lot along the South Access Road in 2017 to allow FLCN members in the Gillam area to pick up wood from Project clearing, rather than it all being burned.

Burning was not permitted between April 1 - November 15 unless a burning permit was obtained from Manitoba Environment, Climate and Parks.

## 5.2 WILDLIFE

Wildlife interactions within the Project footprint were monitored daily during the construction phase of the Project by the site environmental staff and other construction personnel. Observations of wildlife throughout the construction period included: fox (Photo 6 and Photo 7), snowy owl, moose, common nighthawk, marten, river otter, frog, caribou, wolf (Photo 8), lynx, bald eagle (Photo 9) and black bear.

To reduce wildlife attraction to the work areas during construction, food waste was disposed in wildlife-proof containers. Fences were also installed around waste disposal areas. Regular environmental inspections of work areas took place with reminders sent to Project staff to dispose of food waste properly. Project staff were also frequently reminded of the importance of not feeding the wildlife.

No hunting was allowed on-site by Project staff during the construction phase.



**Photo 6. Fox on the Project site.**



**Photo 7. Fox in the Project area.**



**Photo 8. Wolf in the Project area.**



**Photo 9. Eagle along south dike.**



**Photo 10. Arctic Fox in Work Area A.**

### 5.2.1 **WILDLIFE RELOCATIONS**

Despite implementing mitigation measures on the Project sites such as using wildlife proof garbage bins, fencing waste disposal areas and educating on-site staff about co-existing with wildlife, occasionally wildlife posed a safety concern. During the construction phase of the Project, bear culvert traps were set up on the Project site in consultation with the local Conservation Officer to capture and relocate black bears. Between July 2014 and March 31, 2022, 25 black bears were relocated away from the Project site including four during this reporting period (April 1, 2021 to March 31, 2022).

One muskrat (Photo 11) was also moved from the powerhouse into Stephens Lake on September 30, 2021.



**Photo 11. Muskrat released into Stephens Lake.**

## 5.2.2 WILDLIFE MORTALITIES

Between July 2014 and March 31, 2022, 118 wildlife mortalities were reported by the Project. Most of the mortalities were birds and small mammals. Although speed limit signs were posted throughout the site, the most commonly reported cause of wildlife mortality (when the cause was known) was vehicle collisions. Over the course of this reporting period, a total of eight wildlife mortalities were recorded and reported to the local Conservation Officer. Wildlife mortalities reported between July 2014 and March 31, 2022 are shown in Appendix 3.

## 5.2.3 BEAVERS

### 5.2.3.1 BEAVER DAM REMOVAL

Occasionally during Project construction, beaver dams that caused flooding along access roads were removed. Site staff worked with the local trapper and permits were obtained as needed prior to removals.

### 5.2.3.2 BEAVER CONES

In May 2015, Keeyask site staff noticed that the culvert at the Butnau Wier crossing (stream crossing SC-8), along the South Access Road (SAR) was being filled with woody debris by a beaver (Photo 12). This location was identified as possibly requiring a beaver cone to prevent blockage by the beaver and the site was monitored. By summer 2018, the culvert was almost completely blocked.

In November 2018, a 1200 mm diameter beaver cone (see Photo 13) was installed on the culvert at SC-8 by Manitoba Hydro Kettle GS maintenance staff. First, all debris blocking water flow through the culvert was removed, and the area around the inlet of the culvert was cleaned. The metal cone, designed with a port allowing for fish passage at the bottom end, was installed by drilling two holes through the culvert inlet to secure the two plates on the beaver cone. These plates are used to hold the cone securely in place and prevent it from moving or drifting from the culvert inlet.



**Map 3. Stream crossings along the South Access Road.**



**Photo 12.** Culvert at the Butnau Wier stream crossing (SC-8) along the South Access Road, in late May, 2016. At this time, beavers were placing woody debris in the culvert opening.



**Photo 13.** Culvert at the Butnau Wier stream crossing (SC-8) along the South Access Road, before (left) and after (right) the installation of a beaver cone in November 2018.

The location of a second culvert along the SAR (stream crossing SC-7) was identified in 2019 that would benefit from a beaver cone due to blockage from beaver activities. Water levels in spring 2020 and 2021 were too high to allow this culvert to be unplugged and install a beaver cone. This location continues to be monitored by operations staff and will be installed when it is safe to do so.

## 5.2.4 DEN SURVEYS

Black bear are a common mammal species found in the Keeyask region that require dens for the birthing and rearing of young, as well as for hibernating over winter. Other mammals such as grey wolf and fox also use dens.

As needed throughout the construction period, systematic ground surveys were conducted during the fall and winter in areas within the Project footprint that were planned to be cleared during the denning period for black bears and gray wolves. Fieldwork was focused on habitat types where dens were most likely to occur. A gray wolf den survey was conducted in the spring of 2016 and no dens were found. Black bear den surveys occurred in the fall of each year of construction. One active and six inactive black bear dens were found during the construction period surveys. A 100m buffer in which no clearing activities took place were installed around both active and inactive black bear dens to prevent disturbance. The local Conservation Officer was also notified about the presence of the dens. Occasionally, incidental sightings of other mammal dens also occurred on the Project site. In 2016, two fox dens were identified and buffered by 50m. Kits were successfully raised at one of the dens.

The last bear den survey for the construction period occurred on November 3, 2021. Areas surveyed included an area near the proposed wetland (Map 4) and an area to be cleared for safety fencing. No active or inactive bear dens were found during the bear den survey.



**Map 4. Area searched for bear dens in November 2021.**

## 5.2.5 CARIBOU

Blasting was minimized to the maximum extent feasible (i.e., no additional blasting was done to stockpile materials for future construction activities) between May 1 and June 30 to reduce the sensory disturbance effects on calving, female caribou and their young. The maximum extent feasible does not refer to a spatial extent away from the blasting areas but rather it refers to minimizing blasting as much as possible when it is feasible and practicable to do so. To the extent practical, the construction schedule was developed to avoid or reduce work activities during sensitive periods for aquatic and wildlife species.

If caribou were present in the immediate area designated for blasting, the local Conservation Officer (Manitoba Natural Resources and Northern Development) was notified prior to blasting.

Fire prevention measures, such as establishing burning locations for approved wood and cardboard, were employed at the Project site to minimize the risk of habitat loss for caribou.

Future caribou calving islands greater than 0.5 ha in the reservoir area were flagged and left undisturbed to protect the vegetation on these islands during reservoir clearing. This was done to provide future island habitat for caribou and moose that calve in the region following reservoir impoundment. Monitoring under the TEMP in 2021 documented use of this newly formed island habitat by both moose and caribou adults and calves in the year immediately after impoundment.

To prevent and minimize inadvertent vehicle harassment disturbance and to reduce the potential for vehicle-caribou collisions, contractors were briefed on protocols to be used to avoid caribou conflicts. Recommendations were implemented for vehicle speeds, and to stop and wait for caribou groups to clear the roadway if encountered.

Road crossing signs for wildlife were installed along the North Access Road to remind drivers to be aware of wildlife in the area (Photo 14). Information about general wildlife awareness was also provided for workers to reduce the risk of wildlife-vehicle collisions.



**Photo 14. Moose crossing sign along the North Access Road close to the Main Camp.**

## 5.2.6 AMPHIBIANS

In January 2021, three boreal chorus frogs were found in the Keeyask powerhouse. They were living in a drain where water had collected. Normally these frogs hibernate in the winter and it is

suspected that they were already hibernating on supplies or equipment that were later brought inside the station. After this, the frogs came out of hibernation because of the warmer, indoor temperatures. As the frogs had likely depleted much of their energy coming out of hibernation, a decision was made to feed them and keep them in a moist terrarium in a refrigerator (Photo 15) to slow down their biological processes. One frog went missing over the winter and a second one did not survive. The third frog was released on May 28 into a grassy area near Looking Back Creek.



**Photo 15.** One of the boreal chorus frogs in the fridge terrarium.

## **5.3 BIRDS**

Throughout the construction phase of the Project, many protection measures were in place for birds. An Avian Management Plan was developed for the Project, for the purpose of outlining specific measures that would be undertaken to protect birds at the Project site during the construction phase of the Project. It contains reference materials related to birds found on the Project site including species at risk, a summary of bird related regulations, guidelines for management of nests found on site and guidelines for pre-nesting clearing surveys. Specialist staff were available to assist site staff with species at risk identification. As an education component of the Avian Management Plan, awareness training about nesting birds was included in the site orientation process.

### **5.3.1 GULL AND TERN CONTROL PROGRAM**

As part of the Avian Management Plan for the Project, a gull and tern control program was conducted each year during the Project construction phase. Gull Rapids is an area where colonial

waterbirds (ring-billed gulls, herring gulls and common terns) traditionally nest. The rocky islands and reefs found in Gull Rapids traditionally supported hundreds of gulls and terns during the nesting season. The presence of large numbers of gulls and terns in the Project area during construction could potentially lead to property damage and safety issues. The control program helps to protect workers, birds, and eggs, as well as prevent property damage caused by gulls and terns. The control program also created a setback from gull/tern nesting habitat in the construction area to minimize disturbance related to blasting during the nesting period.

In all construction years up to 2020, falconry was used as the preferred, primary gull and tern control method. Falconry is an effective, natural and biologically driven way to deter gulls and terns. As raptors are natural predators of gulls (Photo 16) and terns, they instinctively try to avoid areas where the raptors are present. With COVID-19 related travel restrictions in place, the falconry program was not conducted in 2020 or 2021. Instead, Manitoba Hydro site staff, administered the bird control program through the use of raptor decoy kites (Photo 17), pyrotechnic and acoustic bird deterrents, and frequent foot patrols.

The gull and tern control program began for the season on April 28, 2021 and continued daily until mid-July, 2021.



**Photo 16. Ring billed gull at Project site.**



**Photo 17. Kite installed as part of the gull and tern control program.**



**Photo 18. Site Environmental Inspector installing kite as part of the gull and tern control program.**



**Photo 19. Using noise deterrent as part of the gull and tern control program.**

### 5.3.2 PRE-CLEARING NEST SURVEYS

In order to minimize disturbance to nesting birds, the majority of Project clearing during construction took place outside the general nesting period for birds (the general nesting period for birds at the Project is April 24 to August 25). When there were infrequent instances when clearing was required within the nesting period, a nest survey was conducted prior to clearing occurring. Any nests that were found were protected with a buffer and the area was not cleared until the birds had completed nesting and left the area.

One pre-clearing nest survey was completed in the final year of construction. The survey took place on May 3, 2022 in Work Area C where a permanent fence was planned for installation (Map 5). The survey area was approximately 150m long and 10m wide. The pre-clearing nest survey was conducted within seven days prior to the proposed clearing. No nests were found during the survey.



**Map 5.** Area where pre-clearing nest survey took place (dashed blue line) on May 3, 2022.

### 5.3.3 STICK NESTS

Raptor stick nests were not relocated as part of the Project. Five bald eagle nest platforms (Photo 20) were built and installed to replace bald eagle nests that were removed as part of the Project.

In the future reservoir area, nesting trees were retained for bald eagles until the year prior to reservoir impoundment.



**Photo 20. Bald eagle perched on a constructed nesting platform.**

### **5.3.3.1 BIRD FLIGHT DIVERTERS**

Bird flight diverters were installed on the construction power and generation outlet transmission lines where they cross streams to make the overhead wires more visible and reduce the potential for collisions. Monitoring the diverters occurred as part of the Keeyask Transmission Project.

## **5.4 FISH**

Throughout construction, measures were taken to protect fish and fish habitat including scheduling work around key timing windows for spawning, taking precautions during the use of explosives, and considering fish when designing and installing stream crossings. To ensure overfishing did not occur in areas immediately around the Project, no fishing was permitted by site personnel from shore or by boat.

### **5.4.1 TIMING OF IN-STREAM CONSTRUCTION**

In both Gull and Stephens lakes, which are situated upstream and downstream of Keeyask respectively, spring spawning fish and fall spawning fish are present. This leaves a six-week

window (July 16 to August 31) for unrestricted in-stream construction in northern Manitoba. It is not possible to build the cofferdams, causeways, and rock groins that are essential for creating a dry environment required to construct the Project's powerhouse and spillway in six weeks each year. Authorization from DFO was sought for work on in-stream structures in the fall and winter and a specific schedule was approved. Manitoba's Fisheries Branch was also notified of any applications made to work outside of the six-week unrestricted window. All in-stream construction took place during the authorized prescribed schedule. The number of days of in-stream construction was kept to a minimum. No instream work occurred between May 15 and July 15 of any year to ensure there were no construction activities that may affect Lake Sturgeon spawning.

## 5.4.2 BLASTING

*Fisheries Act* Authorization 11-HCAA-CA1-01695 for the Keeyask Generation Project requires a blasting plan or the use of explosives in or near water. The plan must outline mitigation and monitoring to be implemented and be provided to DFO prior to initiation of blasting activities. In July 2014, the first blast plan was submitted for a blast downstream of the Quarry Cofferdam in what became Quarry 7. A second plan was submitted in January 2015 for the blasting of border ice to create an ice bridge upstream of the Project site. A third plan for extensive blasting in the Tailrace channel was provided to DFO in 2018 and a revised plan was submitted on May 2019. A blast plan for Spillway channel blasting was not submitted to DFO and monitoring for overpressures did not occur.

Blasting was generally done in accordance with *Guidelines for the Use of Explosives in or near Canadian Waters* (Wright and Hopky, 1998) to prevent instantaneous pressure changes (overpressure) greater than 100 kPa and to prevent a peak particle velocity greater than 13 mm·s<sup>-1</sup> in a spawning bed during the period of egg incubation. Blasting took place entirely in the dry, with the exception of the border ice blasting.

### 5.4.2.1 QUARRY COFFERDAM

A blast was required inside of the Quarry Cofferdam on July 29, 2014. It was conducted in the dry and at least 30 m from water. A fish salvage was conducted to exclude fish from the water in proximity to the blast area. However, due to the fluctuating depth of water within this area, it was possible that some fish could still be present within the deeper pools. To address this issue, a bubble curtain was installed to further isolate the work site to exclude fish from within the blast area by forcing large volumes of air through a perforated pipe creating bubbles. The holes were loaded and timed to meet the *Guidelines for the Use of Explosives in or near Canadian Waters*. Setback distance measured from the centre of detonation to fish habitat were sufficient to achieve 100 kPa guideline criteria for various substrates. All charges set in proximity to the water did not exceed the 100 kPa maximum limit. For this blast the contractor used an emulsion that did contain ammonium nitrate fuel oil (ANFO) as a blasting agent.

Following the controlled blast within the isolation area, the aquatic consultant, accompanied by the Site Environmental Inspector for the GCC, accessed the blast site to look for fish mortalities.

Two large pools that were in close proximity to the blast area were surveyed for dead or dying fish; none were found.

### **5.4.2.2 CUTTING AND BLASTING OF BORDER ICE**

In January 2015, high water and ice conditions were creating a major flood risk to the Project. A plan was developed to mobilize a large piece of ice that was adjacent to the open water (border ice), approximately 4 km upstream of the Keeyask construction site by cutting the ice and using a detonating cord to break it loose. The plan was for this piece of ice to move in such a way that it would initiate the formation of a stable ice cover and prevent flooding. Juvenile and adult Lake Sturgeon were known to overwinter in the vicinity of the blast location. Extensive effort to detect the locations of the fish prior to, during, and after the blast were taken and it was determined that tagged Lake Sturgeon were not likely killed during the blasting.

### **5.4.2.3 POWERHOUSE TAILRACE CHANNEL BLASTING**

To allow for blasting of the Powerhouse Tailrace channel in the dry, the Tailrace Cofferdam (TRCD) was constructed, dewatered and salvaged for fish. The mitigation and monitoring followed during this event are detailed in past EnvPP reports (Manitoba Hydro, 2019) (Manitoba Hydro, 2020), including the conservative approach taken during spring 2019 to achieve a maximum peak particle velocity of 13mm/s and to protect Lake Whitefish eggs.

Overpressures were monitored using a hydrophone located in the Nelson River until it was lost when it came into contact with shoreline ice on October 30, 2018. During open water periods, after the “all-clear”, which is sounded approximately 10 minutes after the blast, a visual inspection was undertaken by a Manitoba Hydro Site Inspector. There were no stunned or dead fish observed. Geophones installed along the inside toe of the Tailrace Cofferdam were used to measure the peak particle velocity (ppv). Refer to Appendix 4 for the complete record of predicted peak particle velocities greater than 0 mm/s (blasts that had no predicted ppv in the river are not shown).

## **5.4.3 FISH SCREENS**

Throughout construction, isolated areas were dewatered behind cofferdams to allow work to take place “in the dry”. All dewatering pumps were installed with fish screens on the intake that were designed in accordance with DFO’s *Freshwater Intake End-of-Pipe Fish Screen Guidelines*.

Water used for dust control was normally sourced from quarries. As the quarries were required to generate rock material for the Project, the water that accumulated in them was sometimes pumped and used for dust suppression on the various haul and access roads. The quarry ponds were non-fish bearing, so intake screens were placed over the pump intake. On a few occasions the water for dust control was obtained from the river. When this occurred DFO fish screens were placed over the pump intake.

## 5.4.4 FISH SALVAGE

*Fisheries Act* Authorization 11-HCAA-CA1-01695 for the Keeyask Generation Project requires that fish salvage occur in areas isolated from the main flow of the Nelson River with the intent of preventing undue mortality of fish, in particular those that support a fishery.

Fish salvage was conducted with stipulations specified under Live Fish Handling permits obtained annually from Manitoba's Fish and Wildlife branch. The primary objective of the fish salvage was to capture and release, live and in good health, all fish occupying waters that would no longer be suitable as fish habitat.

Fish salvage occurred during open-water periods each year between 2014 and 2019, primarily in isolated areas behind cofferdams. In 2021, the south side of the spillway became isolated when the spillway was shut down and several small pools remained, requiring fish salvage. Fish salvage also took place from within the station in fall 2021 and winter 2022. Nearly 25 species were represented during these salvages. Approximately 82,000 fish have been rescued, mainly small-bodied fish, and there has been an estimated 95% or greater survival rate of these fish.

Specific fish salvage activities conducted in 2021-22 are detailed below.

### 5.4.4.1 UNIT DEWATERING TO COMPLETE CONSTRUCTIONS

To complete the construction of each of the Project's seven units, the draft tube stop logs had to be installed and, subsequently, the draft tubes were dewatered. The scroll cases were also dewatered in the process of completing each unit. These dewatering events occurred one unit at a time starting in fall of 2020 and were completed in January 2022. Each time a draft tube and scroll case was dewatered an inspection for live fish and mortalities by operations staff occurred.

The number of fish found was generally very low, with the exception of Unit 6. No fish were found in Units 1 to 5. From Unit 7, one Burbot, five Longnose/White Sucker, two Walleye, and one Freshwater Drum were rescued.

Downstream stop logs were installed in Unit 6 of the Keeyask GS powerhouse on September 23, 2021, to de-water the unit for further construction. During the de-watering process, operating staff observed fish activity, including sturgeon and the de-watering pumps were shut off to allow leakage to fill the draft tube until a fish salvage could be coordinated. The draft tube was again de-watered on the morning of September 24 to approximately 0.5 m to recover fish that were stranded. Due to significant numbers of fish in the draft tube, including several large Lake Sturgeon (Photo 21), the aquatic consultant's staff, who were already on site, were brought in to conduct the salvage.

Prior to the salvage, the consultant moved all of the Lake Sturgeon to an area of where there was leakage to ensure they had fresh water (Photo 21). Fish were captured within the draft tube using a combination of seine and dip nets. Lake Sturgeon were assessed as a priority and were removed from the draft tube first. A hoist was used to bring the fish up to the main deck (Photo 22 and Photo 23). The fish were released at the downstream boat launch into Stephens Lake

because of its proximity to the salvage site (to reduce stress to fish during transfer), its ease of access, and water characteristics (an area of calm water out of the main river flow) (Photo 24 and Photo 25). Captured fish were identified to species, enumerated, and measured for fork length (FL; mm). Lake Sturgeon were measured for total length and examined for existing Floy and PIT tags. A subset of fish was weighed (g), however, in order to facilitate quick release of fish and prevent mortalities, approximately half of the Longnose Sucker captured were not weighed. An additional three Lake Sturgeon that were too heavy for the available scale were not weighed. Any mortalities were noted.

The primary objective of the salvage fishery was to capture and release, live and in good health, all fish trapped within Unit 6 of the Keeyask GS powerhouse.

A total of 176 fish were captured during the salvage operation. Five fish species were encountered of which Longnose Sucker were the most common, comprising 80% of the catch (n = 140; Table 2). An additional 26 Lake Sturgeon, seven Lake Whitefish, two Burbot, and one Walleye were captured. All Burbot, all Lake Sturgeon, and the majority of Longnose Sucker (96%) were released alive into Stephens Lake. All Lake Whitefish and Walleye were deceased when captured in Unit 6.

**Table 2. Total number of fish captured during the Keeyask GS Unit 6 fish salvage in fall 2021, separated by species.**

<b>Species</b>	<b>Scientific Name</b>	<b>Released Live</b>	<b>Deceased</b>	<b>Total</b>
Burbot	<i>Lota lota</i>	2	0	2
Lake Sturgeon	<i>Acipenser fulvescens</i>	26	0	26
Lake Whitefish	<i>Coregonus clupeaformis</i>	0	7	7
Longnose Sucker	<i>Catostomus catostomus</i>	134	6	140
Walleye	<i>Sander vitreus</i>	0	1	1
<b>Total</b>		<b>162</b>	<b>14</b>	<b>176</b>

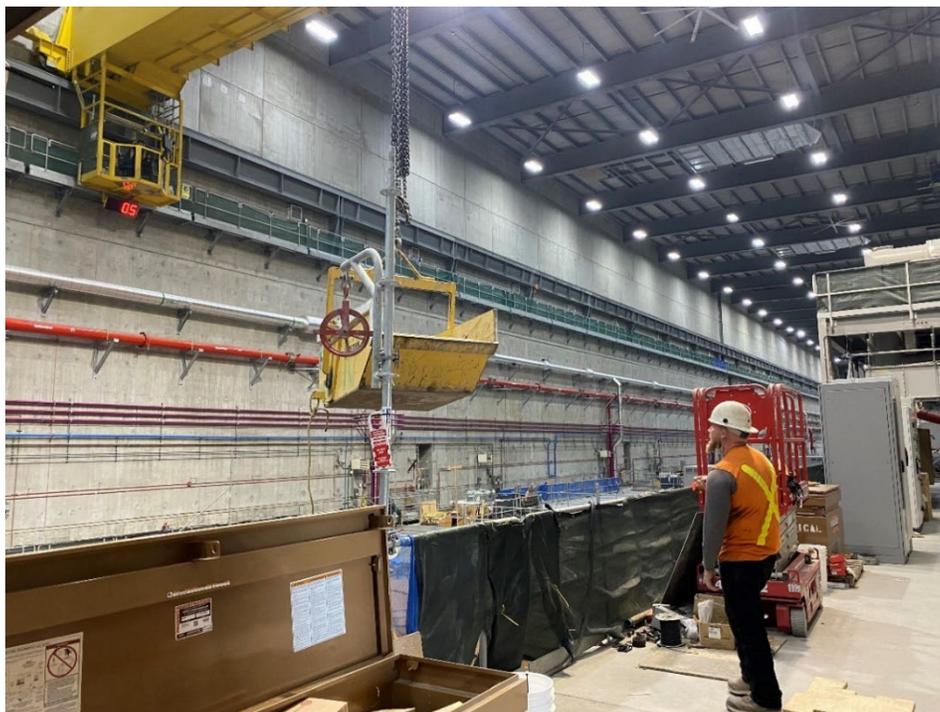
Captured Lake Sturgeon ranged in size from juvenile (min = 395 mm FL) to adult (max = 1,405 mm FL). Thirteen of the 26 captured Lake Sturgeon had previously applied Floy and/or PIT tags. Of these, seven were tagged upstream of the Keeyask GS. These fish were last captured upstream of the GS between 102 and 2,640 days prior to the fish salvage. The remaining six Lake Sturgeon were originally tagged within Stephens Lake.



**Photo 21. Fish observed within the lower draft tube of the Keyyask GS Unit 6 prior to fish salvage on September 24, 2021 (left). The salvage crew shut off the pump emptying the draft tube to allow fresh water to enter.**



**Photo 22.** Fish were lifted out of the draft tube hatch in a dry bag filled with water (left) and transported to the hoist containing fish tubs with fresh water (right).



**Photo 23.** Fish tubs were hoisted to the main deck.



**Photo 24.** Fish were transported to the Stephens Lake boat launch by truck. Fish were then enumerated by species, weighed and measured (if in good condition), and released.



**Photo 25.** Fish were released at the Stephens Lake boat launch.

#### **5.4.4.2 UNIT DEWATERING TO ADDRESS DEFICIENCIES**

Unit 1 was taken out of service on January 4, 2022, to correct deficiencies in its original construction. The scroll case was dewatered that day and it was checked for fish. No fish were found. The draft tube was dewatered on January 14, 2022. Periodically during this time, the water was drawn down slightly to allow new water to enter in order to keep the water well-oxygenated. When it was possible to enter the draft tube, fish salvage occurred. Eleven Burbot were found alive. The fish were rescued and released into the tailrace via the tailrace viewing gallery. The largest Burbot was approximately 26 inches.

Unit 2 was taken out of service in mid-March to correct deficiencies. The unit was dewatered and no fish were found in the scroll case or draft tube.

#### **5.4.4.3 DEWATERING FOR SUMP CLEAN OUT**

As part of the final work to complete construction on the station units, water is pumped out of the dewatering sump pits so they can be cleaned. The sumps are part of the system that is used to dewater a unit's draft tube. One sump (5/6) (Photo 26) was dewatered for cleaning on March 10, 2022, and a 16-inch Burbot was rescued and released alive to the crane/tailrace gallery (Photo 27).

When sump pit 2/3 was dewatered on March 16, 2022, 15 fish were found in the pit by construction staff. Eight Burbot were rescued, seven of which were approximately 12 to 13 inches long, and another that was 26 inches long. Six suckers were found, four were alive and two were dead. They were approximately 11 to 12 inches long. One juvenile Lake Sturgeon that was 15 inches long was also found alive. All live fish were released to the tailrace via the viewing gallery.



**Photo 26. Dewatering sump.**



**Photo 27. Fish rescued from the dewatering sump were released into the tailrace from the tailrace gallery.**

#### **5.4.4.4 DOWNSTREAM SOUTH SIDE OF SPILLWAY**

Low water levels along the length of the Nelson River in 2021 forced the closure of all spillway gates ahead of schedule, prior to the construction of planned fish egress structures. Areas downstream of the spillway then became disconnected from the main river channel and it was concluded the isolated pools required a salvage fishery in compliance with Section 35 of the *Fisheries Act*.

On September 24 and 25, 2021, a fish salvage was conducted in 12 isolated pools downstream of the Project spillway (Photo 28). All isolated pools were fished using a combination of backpack electrofishing, seine netting (Photo 29), dip netting, and gillnetting. Captured fish were retained in a tub filled with fresh water and equipped with an air stone. Fish were identified to species, enumerated, and released into Stephens Lake. Fishing activities continued within the isolated pools until the catch was reduced to zero fish.

In total, 1,472 seconds of electrofishing effort, 21 hours of gillnetting effort, and 32 seine tows were conducted. Fish were captured in seven of the 12 isolated pools. A total of 243 fish comprised of ten different species were captured during the salvage operation. Johnny Darter

(45%) and Troutperch (23%) were the predominate species. All large-bodied species were identified as juveniles based on length and included: 12 Lake Whitefish, 12 Northern Pike, 11 Cisco and one Burbot (Table 3). Overall, fish survival was estimated to be near 100%.

**Table 3. Number of fish species captured during fish salvage operations downstream of the Keeyask GS spillway, September 2021.**

Location	Species										Total
	BURB	CISC	EMSH	JHDR	LKWH	LNDC	NRPK	SLSC	SPSH	TRPR	
Pond 1			2	50	6	2	2	1		9	<b>72</b>
Pond 2											<b>0</b>
Pond 3							1				<b>1</b>
Pond 4	1	6		25	1		7	13	4	16	<b>73</b>
Pond 5	1	5		15	3	2	2	6		15	<b>49</b>
Pond 6					2						<b>2</b>
Pond 7											<b>0</b>
Pond 8											<b>0</b>
Pond 9											<b>0</b>
Pond 10											<b>0</b>
Pond 11							1				<b>1</b>
Pond 12				20		4		6		15	<b>45</b>
<b>Total</b>	<b>2</b>	<b>11</b>	<b>2</b>	<b>110</b>	<b>12</b>	<b>8</b>	<b>13</b>	<b>26</b>	<b>4</b>	<b>55</b>	<b>243</b>



**Photo 28.** Location of the 12 ponds fished downstream of the Keyask GS spillway, September 24, 2021. Drone image was taken on September 29, 2021 and may differ slightly from conditions during salvage. All ponds within the salvage area were inspected.



**Photo 29. Seine netting in ponds downstream of the Keeyask GS Spillway, September 24, 2021.**

## 5.4.5 FISH PASSAGE

### 5.4.5.1 SOUTH ACCESS ROAD STREAM CROSSINGS

Eight new stream crossings were installed along the South Access Road in 2015 and 2016. These crossings consist of single or double corrugated metal pipe culverts, designed to provide fish passage. Culvert sizing is based on hydraulic analysis and using the *Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat* (1996). A ninth at the Butnau Weir required an extension to the existing culvert and was not designed for fish passage (Manitoba Hydro, 2015) (Manitoba Hydro, 2016). Vegetation was only cleared in the area required to construct the actual stream crossing and maintain proper sight lines.

### 5.4.5.2 WINTER CROSSINGS ON THE SOUTH ACCESS ROAD STREAM CROSSINGS AND TO ELLIS ESKER

In January 2015 snow / ice bridges were constructed at stream crossings along the South Access Road to allow for clearing activities along the right-of-way. Snow fills were constructed in accordance with the SAR EnvPP requirements, including use of clean snow, frozen to the bottom/or sufficient ice coverage to allow for vehicle passage.

A stream crossing was required along the winter road to the Ellis Esker (Borrow Area E-1). That crossing presented unique conditions and required construction methods beyond a snow fill or ice bridge. Mitigation measures specific to this crossing were prescribed and followed (Manitoba Hydro, 2018; Manitoba Hydro, 2019).

### 5.4.5.3 N-5 AND G-3 CAUSEWAYS

Originally, three culverts were installed in the causeway to N-5 so that it would not be a barrier to fish moving into and out of Looking Back Creek. In late 2014, the causeway to N-5 was overtopped and erosion of the rockfill occurred at the south abutment, creating a large opening that continued to erode the causeway and shoreline. The culvert at that location likely washed downstream. Similar damage occurred towards the north culvert. The causeway had an emergency repair without reinstalling the culverts at that time with a plan to reinstall them in summer 2015.

A bathymetric survey conducted in July 2015 confirmed that a channel of sufficient depth exists through O'Neil Bay such that even under extreme low winter water levels on Stephens Lake and maximum ice thickness, fish would have at least 1 m of water to pass through O'Neil Bay. Water depth at the mouth of the bay at Stephens Lake under worst case conditions would decrease to 0.5 m; however, fish would be able to pass this area and into the deeper waters of Stephens Lake. Fish in Looking Back Creek and associated ponds have the ability to leave this area in winter if the ice freezes to the bottom in shallow areas or if dissolved oxygen levels reach critically low levels. As there was potential for the causeway could be overtopped again and as the it was determined the barrier to fish movement was not an issue, it was determined that the culverts would not be replaced. Approval for this change was granted.

Similarly, a channel was to be excavated just west of the G-3 causeway (no culverts there) to connect the unnamed creek from Pond 13 to Stephens Lake to address fish stranding caused by fluctuating water levels in Stephens Lake. This was not completed as there was sufficient depth to connect Pond 13 to Stephens Lake under all water level conditions.

#### **5.4.5.4 TRASH RACKS**

Trash racks were installed on the face of each intake to the powerhouse to reduce the risk of injury and mortality to fish. They are approximately 22.7 m tall and 6.4 m wide. The trash racks for Keeyask are comprised of vertically oriented rectangular shaped steel bars with a clear bar spacing of 16.75 cm. The spacing between the horizontal support bars is 50 cm. They should not prevent or interfere with the downstream movement of the vast majority of fish approaching the racks. Only the largest Lake Sturgeon will be prevented from passing.

## **5.5 WATER USE AND PROTECTION**

### **5.5.1 POTABLE WATER**

Raw water was sourced from two different groundwater wells, one to supply each of the Keeyask water treatment plant (WTP) and Keeyask start-up camp WTP. Both WTPs are designated as “Class 2” water treatment facilities, Certificate No. 2014-015 and Certificate No. 2019-009, respectively, under the *Water and Wastewater Facility Operators Regulation 77/2003*. Throughout their use, certified operators have been on-site operating the plants and they monitor free chlorine levels on a daily basis. They also collect bi-weekly samples which are sent to an accredited lab for analysis for total coliform and *E. coli*. All WTP filter backwash water is sent to the Keeyask domestic wastewater treatment plant for treatment and disposal.

A temporary work camp was developed at the side of the South Access Road. Potable water to serve it was sourced from the Town of Gillam’s municipal water supply by the contractor who was constructing the SAR. The potable water was stored in tanks for domestic use. The camp and potable water tanks have since been decommissioned and removed from site. The contractor was responsible for confirming properly treated water was supplied to their employees for the duration of the camp’s occupancy.

### **5.5.2 DOMESTIC WASTEWATER TREATMENT AND DISPOSAL**

The Keeyask Camp wastewater treatment plant is designated as a “Class 3” wastewater treatment facility, Certificate No. 2014-013, under the under the *Water and Wastewater Facility Operators Regulation 77/2003*. Certified operators are on site daily and operate the plant to confirm it is functioning as designed to treat the wastewater, so it meets quality standards for effluent set in *Environment Act* Licence No. 2952R (Licence).

The plant is comprised of a sequencing batch reactor with ultraviolet disinfection to treat and disinfect the wastewater from the camp, before the treated effluent is discharged to Stephens Lake. Treated effluent meets the Licence limits, as follows, before it is released:

- Carbonaceous biological oxygen demand (CBOD) - 25 mg/L;
- Total Suspended Solids (TSS) - 25 mg/L;
- Unionized ammonia - 1.25 mg/L; and
- Fecal Coliform, as indicated by the MPN index, in excess of 200 per 100 mL of sample.

As per the Licence, monthly samples are collected and sent to an accredited laboratory for analysis. Refer to Appendix 5 for a summary of monthly laboratory results.

Settled biosolids are collected and disposed of at a provincially approved waste disposal ground.

### 5.5.3 CONCRETE AND CONCRETE PRODUCTION

Concrete used to build Keeyask was exclusively placed in the dry; no concrete was required to be poured in the wet during Keeyask's construction. Plastic (wet) concrete was not allowed to enter any waterbody. Storage, mixing and placing concrete and grout was undertaken in the contractor's work area, within the confines of a cofferdam, or at least 100 metres from the Nelson River or other waterbodies. Where leftover concrete was generated, it was returned for use in the batch plant or placed in a containment vessel and disposed of in accordance with regulations. If plastic concrete was inadvertently discharged or spilled on the ground, it was treated as a hazardous release and a full clean-up of the ground was undertaken.

To ensure that concrete production did not impact waterbodies, the concrete batch plant was located over 750 metres away from the nearest body of water (Photo 30). An aggregate rock stockpile, which is used in the process, was also located far away (260 metres) from the nearest waterbody (Photo 30), so that any loose dust and other "fines" associated with the stockpile would remain on the land.

The sand required to produce concrete was washed in the G3 borrow pit, from which the sand was sourced. Water used for washing the sand was collected in a containment cell within G3 and continually recycled during the sand washing process.

Water was used extensively during concrete work. Water used during green cutting activities was collected using a vacuum truck (or other means) and treated in large treatment cells (Photo 31) on the Keeyask site. The vacuum trucks used were rinsed out in contained washout bays, and the collected wastewater was sent for treatment.



**Photo 30. Location of concrete batch plant and aggregate pile.**



**Photo 31. Treatment cells for green cutting water and sludge.**

Water that comes into contact with new concrete can be highly alkaline and requires treatment. At Keeyask, water used for concrete cutting was treated through a series of containment cells; one contained a carbon dioxide bubbler to reduce the pH and the others acted as settling ponds, where the suspended particles would drop to the bottom. The General Civil Contractor (GCC) was responsible for managing and treating green cutting water. Prior to discharge, the GCC would test the water using a handheld pH meter to confirm it was within acceptable limits for disposal. Water was discharged either to vegetated areas or used as dust suppression once the pH was neutralized.

During the winter months, when dust suppression was not required and discharge to vegetation was not appropriate, water from the treatment cells was hauled and stored in “Quarry A”, a rock quarry on the Project site area. In the spring, the retained water was discharged into vegetation or used for dust suppression. The GCC would test this water for pH prior to discharge.

After disposing the treated, clarified water into vegetation, the deposited sludge at the bottom of the treatment cells was left to dry and harden, and the hardened material was removed and stockpiled until it was placed into “Quarry A” for final disposal. The concrete wastewater treatment cells were decommissioned once concrete production was complete.

#### **5.5.4 DRILLING WATER**

During construction, it was determined that additional grout work would be required to fill in cracks and fissures in the bedrock that would underlie the Central, North, and South dams, as well as the North and South dikes, where bare rock was exposed. The purpose for the grouting work was to improve the stability of the structure and reduce seepage.

Before grouting could take place, drilling was required into the bedrock into which the grout was inserted. Water and fine rock was used for drilling; no muds or other additives were used. All of the water from the drilling operations was contained within the dewatered areas in which the structures were being constructed. Since drill water was reused/recirculated, very little wastewater was generated, but what was generated was collected in 1m<sup>3</sup> totes and transported to the treatment cell with the carbon dioxide bubbler to reduce the pH.

#### **5.5.5 EQUIPMENT WASHING**

Care was taken to ensure that equipment washing was done in areas where the water could be collected in a way to prevent environmental degradation. Washing machinery and equipment was not permitted in borrow areas or quarries. Contractors submitted written requests to identify their preferred wash areas to Site Environmental Staff for approval. Before approving the contractor's request, they had to confirm that no detergent or degreasing agents would be used.

## 5.5.6 DRAINAGE

Drainage/dewatering of impounded water took place throughout construction in accordance with the EnvPPs and Licence for the Project. Drainage water containing sediment and nutrients was prevented from re-entering creeks and streams using various mitigation techniques where the total suspended solids (TSS) criteria of <25 mg/L could not be achieved. Settling ponds were not the chosen method to manage sediment laden water as they were not practical due to the distance that water would need to be pumped and the maintenance required during the winter. Alternative methods were used.

In 2014, the North Channel was dewatered between August and October. Water was pumped through a dewatering bag into a vegetated area (Photo 32) and allowed to filter through vegetation such that the sediment in it was physically separated before the clarified water rejoined the Nelson River.



**Photo 32. Water containing sediment is pressed through a dewatering bag situated within natural vegetation. Water infiltrates into the ground and prevents sediment from entering the Nelson River.**

This technique of pumping water into vegetation as a means to control sediment and nutrient inputs was used extensively during the Project. Throughout pumping, the water was monitored at the point where it re-entered the Nelson River to confirm it met the <25mg/L criteria. Using a correlated turbidity/TSS relationship that was developed for the Project, turbidity measurements

were taken and the TSS was calculated. Samples were collected (Photo 33) and sent to a CALA lab for TSS analysis to confirm the accuracy of the TU/TSS relationship.



**Photo 33: A Site Environmental Inspector collects a water sample in the field to test its water quality before the water rejoins the Nelson River.**

Much of the time, seepage or impounded water within the various Project infrastructure cofferdams could be pumped directly to the river because it met the 25 mg/L TSS criteria. Continual monitoring by the onsite inspectors took place to confirm this, using the correlation and associated calculation described.

Seepage water from the Nelson River entered the isolated area behind the Powerhouse Cofferdam during the first winter, when pumping water into vegetation is not an option because the ground is frozen and so it was pumped directly to the river in order to keep it dry. The water was monitored for TSS and it did exceed the TSS criteria, however the provincial and federal regulators were informed. This exceedance in pumping water that exceeded the TSS criteria directly to the river happened a number of times for a number of reasons during the first three years and the regulators were informed each time.

In April 2017, a request for an alteration to Manitoba *Environment Act* Licence No. 3107 was made to release water impounded behind cofferdams directly to the Nelson River if the TSS concentration was less than 50 mg/L, as the volume of seepage behind the cofferdams was becoming unmanageable. Various instream modelling was conducted to examine the plume relative to various sensitive fish habitats, and fish biologists determined increasing the allowable concentration to 50 mg/L would have no detrimental effect on aquatic life. The alteration was approved in July 2017. In the fall of 2017, another licence alteration was requested and issued to allow concentrations up to 200 mg/L TSS to be directly discharged to the Nelson River.

As a condition of the alterations, the volume of water between 25 and 200 mg/L of TSS had to be measured and reported each year in the annual report, and when the TSS exceeded 200 mg/L, the discharge pumps sending it to the river had to be shut down. By the end of 2019, large discharges of water from isolated work areas was no longer required, as the various cofferdams and temporary dikes had been decommissioned as the permanent structures were complete.

During the Project, impounded seepage water was also routinely tested for ammonia, nitrite and nitrate. These nutrients are by-products from the compounds used in the blasting agents and so could build up in the water. In 2014, the ammonia levels found in water within two quarries (Quarry 7 and Quarry A) exceeded the Tier II water quality objectives as stated in the Manitoba Water Quality Standards, Objectives and Guidelines (MWQSOGs). Because the quarries were required for rock material for the Project, the water was pumped out and used for dust suppression on the various haul roads and it was not discharged to the river. With respect to using the water for dust suppression, signs were posted along the roads and trails to notify truck operators when they were approaching 100m from a waterbody (causeways, bridges, rock groin, cofferdams) and that dust suppression should not occur in these areas.

In 2017, nutrient levels in Quarry 7 exceeded the MWQSOGs, such that the water could not be released to the Nelson River. The water was stored until the summer and released into a vegetated area, utilizing a series of water pipelines and a sprinkler system (Photo 34), to prevent excess nutrients from entering the Nelson River. Water quality monitoring was conducted along the sprinkler discharge route to ensure water quality the MWQSOGs were met prior to it entering the Nelson River.



**Photo 34. A sprinkler system set up along a haul road sprays water containing high nutrients into a vegetated area.**

## **5.6 AQUATIC INVASIVE SPECIES**

Zebra mussels are an aggressive, non-native, clam-like species that are found in Manitoba's water bodies. They were first detected in southern waterbodies, and later in Lake Winnipeg in 2013. Federal and provincial legislation came into effect in 2015 to contain and prevent their spread throughout the province. Partner First Nations and Manitoba Hydro are attentive to the risks associated with the presence of zebra mussels to the Nelson River. Precautions were taken immediately, once the legislation came into force, to confirm the Project would not contribute to the spread of this invasive species.

### **5.6.1 ON-SITE MONITORING (2016-2021)**

Zebra mussel veliger monitoring in Gull Lake was first conducted in 2016 by the aquatic consultant to monitor for their presence. This work has been repeated annually and the methodology followed and associated results are reported under the *Zebra Mussel Monitoring Plan (ZMMP)* in accordance with the Keeyask *Environment Act* Licence. The first zebra mussel veligers were found in Gull Lake in 2019 and they have been found in all the subsequent monitoring years. Up until that time, there were no documented zebra mussels in the Nelson River.

Adult zebra mussel monitoring was conducted by the environmental site staff from 2018 to 2020 to support the ZMMP. Starting in 2018, a series of three substrates were suspended throughout

Gull Lake, annually, to monitor for the presence of adult mussels (Photo 35). The first, adult zebra mussels were found at Keeyask in 2020 on both the substrates and on in-water infrastructure, (booms, docks, buoys, etc.), which were inspected annually (Photo 36).



**Photo 35. Project site staff installing artificial substrate to monitor for zebra mussels in Gull Lake (2018).**



**Photo 36. Zebra mussel colony found on the underside of a downstream dock following removal of the dock for the winter (October 2020).**

In 2021, adult zebra mussel monitoring was carried out by the aquatic consultant in Clark and Stephens lakes, as well as in the Keeyask reservoir. Zebra mussels were found growing on the suspended substrates and the results are reported in the 2021 ZMMP annual report. Ongoing adult mussel monitoring will be carried out by the aquatic consultant going forward.

### **5.6.2 ZEBRA MUSSEL CONTROL (2016-2021)**

Under provincial legislation, to prevent the spread of aquatic invasive species (AIS) including zebra mussels, inspection and decontamination of watercraft/water-related equipment that is used in a Provincially designated control zone is required. This is to confirm AIS are killed and removed before watercraft and water-related equipment are placed into a different water body.

The Nelson River, including the Keeyask reservoir/Gull Lake and Stephens Lake, is a Provincially designated control zone, therefore inspection (Photo 37) and verified decontamination on each piece of equipment coming to and leaving site is required before and after use in the water.



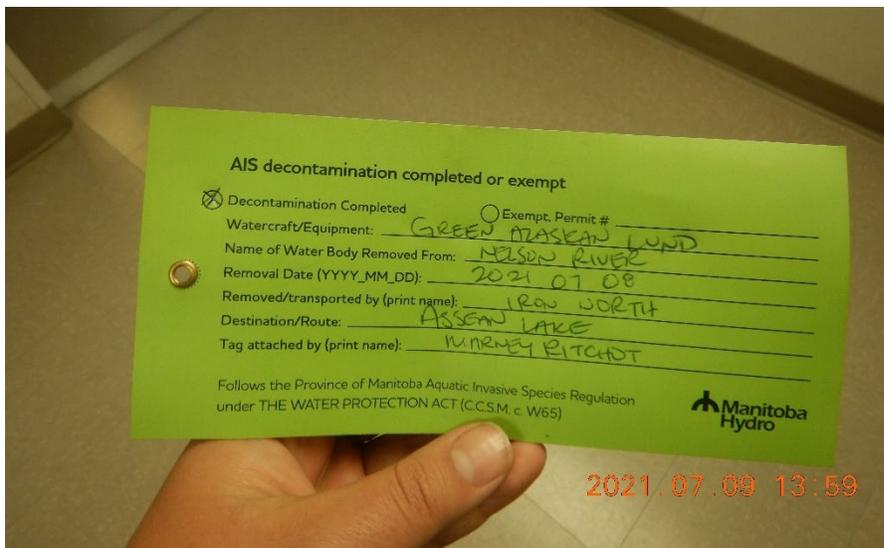
**Photo 37. A boat and trailer are inspected for mud and debris at the Keeyask Site (2019).**

A hot water decontamination unit was installed at the Keeyask site in 2016 to provide decontamination for those boats and other equipment leaving the site. This process involves spraying boats, trailers and any other water-based equipment with hot water (>60°C) over all parts that come into contact with the water (Photo 38). The water runs onto a constructed pad, where it quickly infiltrates into the ground.



**Photo 38. Hot water is used to decontaminate a boat and trailer (2018).**

A tagging system was introduced that recorded the point of origin of each boat, the destination, the decontamination required or undertaken and other information (Photo 39). The colour of the tags (green or red) on the boats and equipment coming through the gate allowed security/site personnel to confirm comings and goings and direct incoming operators for inspection and hot water decontamination, as required.



**Photo 39. An equipment tag used as part of the AIS control process at Keeyask.**

All inspections and decontamination followed the provincial regulations and clauses outlined in the Project EnvPP. The number of inspections and hot water decontaminations carried out over the life of the Project to date, is provided in Table 4.

**Table 4. AIS inspection and decontamination at Keeyask (2016 to 2021).**

<b>Year</b>	<b>Number of AIS Equipment Inspections</b>	<b>Hot Water Decontaminations Undertaken</b>
2016	44	3
2017	34	9
2018	88	1
2019	72	4
2020	42	2
2021	66	3

## 5.7 AIR QUALITY

Mitigation measures to reduce effects on air quality included limiting traffic at the site to construction vehicles/equipment. Personal vehicles were left at the Start-up Camp parking area. Equipment was operated at and within load tolerance and was regularly maintained to reduce noise and vibration emissions. Speed limits were posted as a requirement for safety as well as dust reduction. Reduction in vehicle idling is challenging in the winter months in northern Manitoba. The safety and comfort of people working in the frigid conditions encountered took precedence.

Dust control measures were used by the contractor to minimize the amount of dust generated by construction traffic on the access roads and trails. Only water and dust suppression products approved by the Site Environmental Lead were used to control dust (Photo 40).

In addition to water, magnesium chloride and calcium chloride was used to control dust. To reduce dust when processing aggregate, transfer points were enclosed or shielded to reduce dust generation. Conveyors were also enclosed.



Photo 40. Dust control along the North Access Road.

## 5.8 EROSION AND SEDIMENT CONTROL

Overall, construction activities were designed and executed to prevent the release or settling of any sediment outside of construction boundaries. In 2014, the contractor produced a *Storm Water Management and Erosion & Sediment Control* procedure document for the Project. The purpose of the document was to define measures to be employed that would minimize and mitigate the transport and deposition of sediment beyond construction areas.

Manitoba Hydro site environmental staff worked closely with the contractor to ensure proper erosion and sediment control measures were installed in key areas. Material was sloped in a way that discouraged erosion, sediment fencing was installed, organic material was placed (where available) and rock berms were installed to prevent sediment from entering nearby water bodies.

Manitoba Hydro site environmental staff conducted site inspections daily. Monitoring of erosion and sediment control measures were an aspect of these inspections. Various types of erosion control measures, including sediment fences (Photo 41), maintaining vegetated buffers around sensitive sites and placement of rip rap, were used in active construction areas to help reduce erosion and protect nearby waterbodies. Permanent erosion control (rock armouring) was installed on a portion of the north bank of the Nelson River prior to impounding the reservoir.



**Photo 41. Sediment fence installed along the North Access Road.**

A 100 m setback from any off-system marsh that was outside the Construction Phase Project Footprint was maintained. If the 100 m buffer could not be achieved (i.e., in cases where a planned Project footprint was within 100 m of an off-system marsh), a physical barrier such as clean fill and rock or a sediment fence was put in place to protect against erosion, sedimentation and hydrological alteration.

Wherever practicable, clearing and grubbing was minimized to reduce the exposure of bare ground. In some cases, if an area was cleared, but the entire area was not needed, the additional cleared area was not grubbed in order to keep the soil and surface vegetation intact.

Stockpiled material was located at least 100 metres from any watercourse/body or wetland, where practicable and was surrounded by a berm if it contained a high fines content. Borrow areas and

excavated material placement areas located within 100 m of high quality wetlands were fortified with erosion and sediment control measures to prevent damage to those features. For example, at two of the large EMPAs (EMPA D-16 and EMPA D-17), additional erosion control measures were implemented to address erosion of fine textured material near off-system marshes.

At EMPA D-16, the following erosion and sediment control measures were carried out (Photo 42):

- The northern portion of the EMPA was graded to smooth out the gullies caused by previous erosion;
- A continuous rock berm was constructed around the northern and eastern edges;
- Straw wattles and woody debris were placed in gullies along the western edges to reduce the movement of sediment downhill;
- A rock berm was constructed along the western edge of the EMPA and other portions of the rock berm were reinforced with additional material;
- Additional clay material was placed outside of the rock berm at the northern fringes of the EMPA; and
- A rock-lined drainage channel with turnouts was constructed that ran parallel to the rock berm further upslope.



**Photo 42. Mounded soil berm (left), rock-lined drainage channel with turnouts (center) and regraded slopes (right) at northern and western edges of EMPA D-16.**



**Photo 43. Rock berm along northwestern edges of EMPA D-17.**

Seeding was used as an additional erosion control measure in EMPA D-16 and EMPA D-17 (Photo 43). Italian ryegrass (*Lolium multiflora*) was broadcast seeded in summer 2021 to provide additional stability to the surface soil within these areas. The benefits of planting Italian ryegrass as a cover crop is that it is a fast growing annual, is non-invasive, prevents soil erosion with its extensive soil-holding root system, suppresses weeds, shows good winterkill (*i.e.*, no remnant weedy plants the following year, as can be the case with other agronomic grass species), revitalizes the soil for subsequent plant growth (releases nitrogen back to the soil after it dies), and builds organic biomass that can easily be disced into the soil prior to tree planting.

Most of the timber/slash from Project clearing was burned, but some material was mulched for erosion control at certain sites (e.g., EMPA D-16). Any remaining stockpiles designated for mulch will be burned at the end of the Project.

In steeply sloped areas susceptible to erosion, runoff was directed away from disturbed areas to prevent further site degradation.

Following aggregate extraction and as part of borrow area close-out, side slopes of the borrow areas were shaped to a slope of four horizontal to one vertical, or flatter. Sloping of the borrow area was done to eliminate the overhanging banks, reduce the potential for erosion, and prepare the area for future revegetation efforts.

Disturbed areas were graded, stabilized, vegetated and/or seeded as soon as practicable following construction; tree planting was carried out in decommissioned Project areas in 2016,

2020, and 2021. Native grass seeding was done in 2020, in areas where tree planting could not be done due to overhead transmission lines. Tree planting will continue into operations, as sites that are not required for operations are decommissioned.

Disturbed areas within the Project footprint were also monitored annually through the Project's Terrestrial Effects Monitoring Plan (TEMP) habitat loss/disturbance and wetland monitoring studies. Areas that required further mitigation to correct and/or prevent any future erosion or sedimentation concerns were flagged, discussed with Manitoba Hydro site environmental staff and addressed with the contractor.

## 5.9 HERITAGE RESOURCES

The Heritage Resources Protection Plan (HRPP) provided objectives for the protection of any known, and any discoveries, of heritage resources during the construction of the Project. Site Environmental Inspectors received basic training regarding artifact identification, and their presence in the construction zone facilitates the immediate reporting of discovered heritage resources to the Project Manager and Project Archaeologist. Employees were made aware of the potential for heritage resources to be discovered during construction.

There was one instance during construction where a re-touched chert flake (Photo 44) was discovered on Caribou Island by the Site Environmental Inspectors. A re-touched chert flake is a quickly made stone tool that can be used as a scraper or a knife. The Project Archaeologist was notified, and the location was investigated during scheduled monitoring activities. Subsequently, the site was registered as an archaeological site.



**Photo 44. A heritage resource (re-touched chert flake) discovered on Caribou Island.**

All dewatered areas inside cofferdams underwent an archaeological survey to recover any heritage resources that may have been present prior to construction within those formerly wetted areas. No artifacts were recovered.

A cemetery for reburial of human remains found during construction and operation of the Project was constructed along the North Access Road about 10 km from the junction with Provincial Road 280. Human remains found in 2010, consisting of two elements, a radius and tibia, were carbon dated to ~ 4,300 years ago. The remains were reinterred in the Keeyask cemetery in 2015. Additional skeletal remains of the Gull Lake Ancestor were recovered and may be reinterred in the Keeyask Cemetery in the future (Manitoba Hydro, 2019). The memorial cross along the SAR was fenced off so that it was not disturbed.

Seasonal monitoring for heritage resources was conducted during the course of construction by the Project Archaeologist and members of the partner First Nations. The monitoring was completed in 2019. Over 50 sites were visited during the monitoring program, and three new archaeological sites were recorded.

## 5.10 HAZARDOUS MATERIALS, PETROLEUM PRODUCTS AND EQUIPMENT MAINTENANCE

Environmental protection measures were put in place to ensure proper management of hazardous materials and petroleum products during transportation, storage, and refuelling. Additionally, the Hazardous Materials Spill Response Plans set the standards for spill prevention planning, hazardous material release response, reporting requirements and management of release remediation.

### 5.10.1 INVENTORY CONTROL

Each contractor was required to maintain an inventory record of all hazardous material and petroleum products along with the associated Workplace Hazardous Material Information System (WHMIS) sheets. They were also responsible for establishing their own documented inspection process for all hazardous material and petroleum products. This inspection record was available upon request and audited by Manitoba Hydro Site Environmental Lead or a delegate.

### 5.10.2 TRANSPORTATION

Contractors were responsible to ensure all dangerous goods were transported according to the *Transportation of Dangerous Goods Act SOR/2021-245* (TDG act) and Regulations (TDGR), the *Dangerous Goods Handling and Transportation Act C.C.S.M.c D12 M.R. 195/2015* (DGHT Act) and *ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air* (ICAO). Any person who handles, offers for transport, or transports dangerous goods must be adequately trained and hold a current training certificate which meets the requirements of the legislation associated with the mode of transport. Documentation of training and shipping documents were available upon request and randomly audited by Manitoba Hydro Environmental Inspectors.

### 5.10.3 STORAGE

Contractors were responsible to ensure all hazardous materials and petroleum products were stored in compliance with the Keeyask EnvPPs, regulatory requirements and only within dedicated storage locations. The selection of all hazardous materials and petroleum products storage locations was approved by the Site Environmental Lead or a delegate. Due to the nature of the work and vast Project site, contractors often created smaller staging locations to hold hazardous materials. These areas were not pre-approved by Manitoba Hydro, however these staging areas were limited to only the necessary quantities required to complete the work. Due to the Project location and its proximity to the Nelson River it was important to ensure all chemicals, fuels, and other harmful materials were stored a minimum of 100 metres from a watercourse/body. This was a major factor when selecting staging locations. When a contractor could not achieve the 100 metre distance due to the nature of the work, they were required to

submit a work plan that outlined additional mitigation measures to reduce the risk of a release to a waterbody.

Manitoba Hydro Site Environmental Inspectors conducted daily and weekly inspections of all contractor work sites with a focus on hazardous material storage locations and containers were inspected for signs of leaks, corrosion and other damage. In addition, these locations were inspected to ensure proper secondary containment and spill response kits were present and in use. It was during these inspections that any deficiencies with the storage of and handling of hazardous materials and petroleum products were documented in an inspection report.

#### **5.10.4 PETROLEUM PRODUCTS**

All petroleum storage tanks used during the Project were subject to many legislative requirements plus the mitigation measures outlined in the EnvPP. Contractors were responsible to ensure their petroleum storage tanks followed these requirements. Manitoba Hydro Site Environmental Inspectors conducted daily, and weekly inspections of all contractor work sites with attention on petroleum products. During this inspection petroleum storage containers were checked to ensure spill response kits and secondary containment was present and maintained. Inspection reports were transmitted to the contractor with non-compliances highlighted. Once implemented, contractors would provide a record of corrective actions. Follow up inspections to confirm completion of these actions followed. Contractors were also required to transmit, through Aconex, all petroleum storage tank registration and operating permits to the Site Environmental Lead. During removal of petroleum storage tank systems, all requirements as outlined in the Manitoba regulation 188/2001 were followed and completed.

#### **5.10.5 EQUIPMENT**

Vehicles and equipment came to site clean. The majority of heavy equipment was purchased new for the Project. Equipment was maintained regularly to be free fluid leaks. Drip pans were placed under machinery, vehicles and equipment during maintenance. Large vehicles, such as rock trucks had drip pans underneath whenever they were parked and not in use.

All machinery, vehicles and equipment were stored 100 metres away from any watercourse/body. Prior to operation, all machinery, vehicles and equipment were visually inspected and checked for fluid leaks. Emergency spill kits were present in all vehicles, boats and machinery in the event of a leak or release of petroleum product.

#### **5.10.6 REFUELING AND FUEL TRANSFER**

To reduce the risk of a petroleum product release to the environment, mitigation measures were put into place for all refueling and fuel transfer activities. Of those measures, no refueling of machinery, vehicles and equipment within 100 metres of a watercourse/body was one of the most

effective. This distance could not always be achieved due to the location of the construction work that was occurring.

To lessen the risk of a release, contractors were required to train their staff on refueling and fuel transfer procedures for general refueling and when required, a fuel transfer. Contractors had to develop a specific plan for refuelling and fuel transfer within 100 metres of a waterbody. An example is provided in Appendix 6. These plans would incorporate all the mitigation measures outlined in the EnvPPs as well as site specific amendments which were reviewed and approved by Manitoba Hydro.

To ensure all mitigation measures were fully implemented, Manitoba Hydro Site Environmental Inspectors would inspect these work locations within 100 metres of a watercourse on a more frequent basis to confirm the risk was being managed. A few of the mitigation measures that were particularly focused on during inspections included, but were not limited to, all petroleum storage containers were placed into secondary containment or were double walled; all connection points were also contained within secondary containment; fuel nozzles did not contain a trigger lock; the grounding connection points were free from corrosion and contamination; and all pieces of the equipment were free from defects. Site Environmental Inspectors also checked that fueling activities were not occurring within 100 metres of water that were not approved.

### **5.10.7 HAZARDOUS MATERIAL RELEASES**

The Keeyask Spill Response Plan (SRP) was prepared for the entire Project. It was developed to assist all site personnel to comply with legislative requirements, Manitoba Hydro's Environmental Management System (EMS), Manitoba Hydro procedures, as well as the EnvPPs. Contractors were required to prepare a Project specific Hazardous Material Spill Response Plan (SRP) that included prevention planning and response for hazardous material releases. The contractor SRPs were to provide a resource for their site personnel to minimize the environmental impact in the event of a release. Contractor personnel were required to follow their plan when a release occurred. Each contractor's plan was reviewed and accepted by Manitoba Hydro.

The hazardous materials that had the largest potential impact to the environment during construction were petroleum hydrocarbon products (fuel, oil and lubricants) plus sediment releases to the Nelson River or Looking Back Creek. Due to a number of factors (such as flow rate, surface velocity, river width, and number of available staff) it was not feasible to develop the capacity to place containment booms across the entire width of the Nelson River or Looking Back Creek for the complete containment of spilled petroleum products. For this reason, the main objective of the Spill Response Plan was to prevent petroleum products from entering the Nelson River or Looking Back Creek.

Contractors were responsible to report, manage and remediate all releases, regardless of quantity, that occurred in their work areas. Disposal of contaminated materials was managed as per the contractor's SRP and waste management plan. All releases were reported to the Keeyask Area Spill Response Coordinator (ASRC) who monitored the management of all releases to ensure contractors were in compliance with their SRP, the Project SRP, the Keeyask EnvPP and

Project licence, authorizations and permits. In addition to the Keeyask ASRC, Site Environmental Inspectors supported the monitoring and remediation efforts of all releases to ensure contractors met all the requirements (Photo 45 and Photo 46). Through a combination of visual inspections, on-site analysis and laboratory analysis, remediation efforts were verified to be sufficient. The contaminated material was removed and disposed of as hazardous waste. Soil and/or water samples were subsequently collected around each spill site to ensure the Canadian Council of the Ministers of the Environment soil quality guidelines for the residential/parkland standard were met for all spills. To close-out a release, a Manitoba Hydro Site Environmental Inspector had to sign-off that the remediation was complete.

Contractors were responsible to complete and submit to Manitoba Hydro a release report for every release. These reports included a summary of the release, including the location, product, volume, equipment information, cause of the release and corrective actions. Understanding the cause of releases was important to better focus release reduction efforts and corrective actions. Causes for releases were assigned to one of the following categories: behavioural (failure to follow procedures, failure to ID hazard/operator error, inefficient or inadequate maintenance of equipment), equipment failure, or abnormal operation conditions (inclement weather). The data was analyzed for trends to track where contractors were succeeding and where improvements were required.

During the reporting period, April 1, 2021 to March 31, 2022, there were zero hazardous material releases that were of reportable quantities as per the *Environmental Accident Reporting Regulation* under the *Dangerous Goods Handling and Transportation Act*.

During the reporting period, there were zero hazardous material releases that were considered notification only as per Externally Reportable Releases protocol.

Table 5 outlines a summary of all releases to date on the Keeyask Project site.

**Table 5. Project to Date (PTD) releases since July 2014.**

Event	Manitoba Hydro		Contractors		Totals	
	2022	PTD	2022	PTD	2022	PTD
Reportable releases	0	6	0	98	0	104
Notification only releases	0	0	0	37	0	37
Non-reportable releases	0	121	269	8348	269	8471



**Photo 45. Release remediation efforts within spillway water passage 4.**



**Photo 46. Release remediation efforts along South Dike.**

## **5.11 WASTE MANAGEMENT**

### **5.11.1 HAZARDOUS WASTE DISPOSAL**

The contractor was responsible for the proper disposal of their hazardous materials waste products. In order to address this, a Hazardous Waste and Materials Management plan (Appendix 7) was produced for the Project construction period.

The plan included components such as methods for the collection and disposal of oil products and other hazardous wastes and records of their disposal/recycling.

### **5.11.2 NON-HAZARDOUS WASTE MANAGEMENT AND RECYCLING**

On-site non-hazardous waste was disposed of at licensed landfills in Gillam or Thompson.

Littering on the Project site was prohibited. This included tobacco products. Receptacles to dispose of tobacco products were in place throughout the Project site, including at building entrances.

Site environmental inspectors did weekly inspections of work areas to ensure they were kept neat and tidy, as well as checking that solid waste (including construction waste) was collected for proper disposal and disposal bins were functioning correctly. If deficiencies were noted they were shared with the contractor so they could be addressed.

In order to minimize attractants to wildlife, solid waste that contained food wastes was collected on a regular basis. Animal (bear)-proof bins (Photo 47) and fences around waste disposal areas (Photo 48) were installed and were used to contain food waste until it was disposed of at a licenced landfill.

The contractor's Hazardous Waste and Materials Management Waste Management plan (Appendix 7) included procedures to sort construction waste for reuse or recycling. The plan also included planning to limit the amount of material brought to site that couldn't be reused or recycled.

On-site burning of waste was limited to readily combustible materials such as boughs, leaves, straw, paper products, cardboard, non-salvageable wood and packaging materials derived from wood. Wood containing resins, glues and any other chemicals (plywood, pressure treated lumber, MDF, etc.) was not burned, and was disposed of at a licensed landfill or reused.

No construction, solid or food waste was discarded into borrow areas and/or quarries.



**Photo 47. Wildlife proof waste bin.**



**Photo 48. Installation of fence around food waste bins to help discourage attracting wildlife.**

## 5.12 FIRE PREVENTION

Burning was not permitted between April 1 to November 15 of any year unless a burn permit was obtained from Manitoba Natural Resources and Northern Development. Burn permits were obtained when burning was required during this time frame. Slash, cardboard, and untreated wood was burned under the authorization of burn permits throughout the construction period. Copies of the burn permits were kept onsite with the Site Environmental Inspectors. Burning only occurred at low wind speeds and fires were attended at all times. Contractors provided confirmation to the site environmental staff when they were planning to burn and when fires had been extinguished.

The locations chosen for burning were pre-approved by the Site Environmental Lead. To prevent damages to standing trees, a 15 metre buffer was created for all burning. During reservoir clearing burning occurred in locations that would reduce the risk of a peat fire. Firefighting equipment was available and in proximity during all burning activities. Any unburned material was removed and disposed of as waste.

During clearing activities, as well as construction operations, firefighting equipment was available and inspected on a regular basis to ensure it was in good working order. A 6 metre firebreak was required of contractors performing clearing activities, and the requirement to do so was outlined in pre-clearing communication with contractors.

## 6.0 REFERENCES

- Fisheries and Oceans Canada & Manitoba Natural Resources 1996. Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat. May 1996. 56 pp
- Manitoba Hydro 2015. Annual Monitoring Report July 2014 – March 2015. Keeyask Generation Project Environmental Protection Plan Report #EnvPP-2015-01. June 2015, Winnipeg, Manitoba 63 pp
- Manitoba Hydro 2016. Environmental Protection Plan Annual Report April 2015 – March 2016. Keeyask Generation Project Environmental Protection Plan Report # EnvPP-2016-01. June 2016.
- Manitoba Hydro 2018. Keeyask Generation Project Environmental Protection Plan Report # EnvPP-2018-01. Environmental Protection Plan Annual Report April 2017 – March 2018. June 2018.
- Manitoba Hydro 2019. Keeyask Generation Project Environmental Protection Plan Report # EnvPP-2019-01. Environmental Protection Plan Annual Report April 2018 – March 2019. June 2019.
- Manitoba Hydro 2020. Keeyask Generation Project Environmental Protection Plan Report #EnvPP-2020-01. Environmental Protection Plan Annual Report April 2019 – March 2020. June 2020.
- Wright, D.G., and Hopky, G.E. 1998. Guidelines for the use of explosives in or near Canadian fisheries waters. Canadian Technical Report of Fisheries and Aquatic Sciences No. 2107. 15 pp. + 5 App.

## **APPENDIX 1: ENVIRONMENT ACT ALTERATION REQUESTS**

**Keyyask Environment Act Licence**

Environment Act Licence No. 3107 was issued on July 2, 2014.

The following alterations were submitted and approved by the Environmental Approvals Branch.

	<b>Date Submitted</b>	<b>Date of Response</b>	<b>Root Cause</b>	<b>Description</b>
1	August 21, 2014	August 29, 2014	<ul style="list-style-type: none"> <li>Engineering / Construction – Did not include land adjacent to discharge channel in EIS</li> </ul>	<ul style="list-style-type: none"> <li>Requested increasing the size of the Project footprint to include a 4.23 ha of land adjacent to the powerhouse discharge channel for the purpose of providing access to the powerhouse discharge channel work area during construction. This parcel of land is included in the land tenure, within the Project’s study area and surrounded by land that was originally included as part of the Project footprint.</li> <li>It was determined that potential environmental effects resulting from these alterations are insignificant, alteration approved.</li> </ul>
2	October 7, 2014	October 22, 2014	<ul style="list-style-type: none"> <li>High water levels</li> </ul>	<ul style="list-style-type: none"> <li>Requested extending the length of the North Channel Rock Groin into the south channel of Gull Rapids if monitoring results of water levels, river flows and ice formation during the early winter of 2014 confirm that a stable ice cover is not likely to form upstream of Gull Rapids.</li> <li>It was determined that potential environmental effects resulting from the alteration can be addressed through existing licensing conditions and associated protection measures, alteration approved.</li> </ul>

	<b>Date Submitted</b>	<b>Date of Response</b>	<b>Root Cause</b>	<b>Description</b>
3	December 18, 2014	January 14, 2015	<ul style="list-style-type: none"> <li>Engineering/Construction – To conform to safety standards and for future purposes.</li> </ul>	<ul style="list-style-type: none"> <li>Requested three changes as it relates to the South Access Road:                             <ul style="list-style-type: none"> <li>Widening of the original alignment near Butnau Dam to meet provincial road safety standards;</li> <li>Inclusion of additional borrow areas along the South Access Road Right-of-Way; and</li> <li>Re-alignment of the road as it enters into Gillam.</li> </ul> </li> <li>It was determined that the potential environmental effects resulting from the proposed alteration can be addressed through existing licensing conditions and associated protection measures, alteration approved.</li> </ul>
4	January 12, 2015	January 22, 2015	<ul style="list-style-type: none"> <li>High Water Levels</li> </ul>	<ul style="list-style-type: none"> <li>Requested to undertake cutting and blasting of border ice to facilitate the formation of an ice bridge upstream of the KGS in-stream construction site.</li> <li>Manitoba Conservation and Water Stewardship (MCWS) reviewed the proposed alteration and the potential impacts of the proposed measures to aquatic species, notably the local adult Lake Sturgeon population. MCWS was satisfied that potential environmental effects resulting from the use of detonating cord at Site 1 could be mitigated. The following conditions applied:                             <ul style="list-style-type: none"> <li>Where practical, scare techniques shall be used at three locations near the shoreline along the</li> </ul> </li> </ul>

	Date Submitted	Date of Response	Root Cause	Description
				<p>Site 1 cutline in consultation with Fisheries Branch; and</p> <ul style="list-style-type: none"> <li>• Post-blast monitoring and reporting shall be conducted.</li> <li>• Alteration was approved.</li> </ul>
5	March 23, 2015	April 1, 2015	<ul style="list-style-type: none"> <li>• Environment Canada updated nesting period</li> </ul>	<ul style="list-style-type: none"> <li>• Requested the clearing timing window (intended to minimize the sensitive breeding period for birds) reflect the updated nesting period of April 24 - August 25 for the Keeyask Area as published by Environment Canada. The revised nesting period was published prior to the submission of the Environment Act proposal.</li> <li>• As the proposed alterations reflect the best current information, the alteration was approved.</li> </ul>
6	May 27, 2015	June 22, 2015	<ul style="list-style-type: none"> <li>• Engineering/Design – Design modification</li> <li>• High Water levels</li> </ul>	<ul style="list-style-type: none"> <li>• Requested installation of two additional ice booms.</li> <li>• As the potential environmental effects resulting from the proposed alteration can be addressed through existing licensing conditions and associated protection measures, the alteration was approved.</li> </ul>
7	June 10, 2015	June 14, 2015	<ul style="list-style-type: none"> <li>• High water levels</li> </ul>	<ul style="list-style-type: none"> <li>• Requested to extend the Central Dam Cofferdam north to tie into the Powerhouse Cofferdam beyond the limits identified as “Disturbed Footprint” in the Environmental Protection Plan.</li> </ul>

	Date Submitted	Date of Response	Root Cause	Description
				<ul style="list-style-type: none"> <li>As the potential environmental effects resulting from the proposed alteration are not significant and can be addressed through existing licensing conditions and associated protection measures, the alteration was approved.</li> </ul>
8	September 8, 2015	September 14, 2015	<ul style="list-style-type: none"> <li>Current and future high water/ice levels</li> </ul>	<ul style="list-style-type: none"> <li>Requested that culverts are not re-installed in the causeway to Borrow N-5 and the existing culverts be capped. The proposed work also includes repairs to the abutments.</li> <li>To note, information was originally provided to MCWS on August 11, 2015. It was determined on September 3, 2015 that an alteration to the EAL would be required.</li> <li>As the potential environmental effects resulting from the proposed alteration are not expected to be significant and can be addressed through existing licensing conditions and associated protection measures, the alteration was approved.</li> </ul>
9	November 6, 2015	November 9, 2015	<ul style="list-style-type: none"> <li>Engineering/Construction – Cofferdam leaking at rapid rate.</li> </ul>	<ul style="list-style-type: none"> <li>Requested alteration to temporarily release impounded water from the Central Dam Cofferdam directly to the Nelson River, even if the end-of-pipe Total Suspended Solids (TSS) concentration is greater than 25 mg/L.</li> </ul>

	<b>Date Submitted</b>	<b>Date of Response</b>	<b>Root Cause</b>	<b>Description</b>
				<ul style="list-style-type: none"> <li>The potential environmental effects resulting from the proposed alteration are not expected to be significant, the alteration was approved.</li> <li>The condition is that leakage water with TSS concentrations greater than 25 mg/L discontinues after December 15, 2015.</li> </ul>
10	December 15, 2015	December 16, 2015	<ul style="list-style-type: none"> <li>Expansion was required in order to maintain a 50m treed buffer from the SAR ROW and maintain the same area.</li> </ul>	<ul style="list-style-type: none"> <li>Requested an alteration to Environment Act Licence (EAL) No. 3107 to expand Excavated Material Placement Area (EMPA) D23 (2)-E in order to maintain a 50 m treed buffer from the South Access Road Right-of-Way.</li> <li>To note, information was sent to MCWS on December 11, 2015 with an assumption that an alteration would not be required. However, MCWS indicated a notice of alteration should be submitted since it is outside the area originally identified as an EMPA. An email was received from MCWS on December 11, 2015 indicating that the region did not have any concerns and that the clearing work could proceed but the Notice of Alteration would need to be formalized within the next few days.</li> </ul>
11	April 6, 2016	April 25, 2016	<ul style="list-style-type: none"> <li>Construction/engineering – leaking cofferdam wouldn't allow work in the dry</li> </ul>	<ul style="list-style-type: none"> <li>Requested an alteration to Environment Act Licence (EAL) No. 3107 to                             <ul style="list-style-type: none"> <li>Extend the Central Dam Cofferdam beyond the footprint limits; and</li> </ul> </li> </ul>

	<b>Date Submitted</b>	<b>Date of Response</b>	<b>Root Cause</b>	<b>Description</b>
			<ul style="list-style-type: none"> <li>Scheduling and design change</li> </ul>	<ul style="list-style-type: none"> <li>Re-align the Tailrace Summer Level Cofferdam beyond the footprint limits.</li> <li>The potential environmental effects resulting from the proposed alteration are not expected to be significant, the alteration was approved.</li> </ul>
12	October 28, 2016	November 4, 2016	<ul style="list-style-type: none"> <li>High water levels</li> </ul>	<ul style="list-style-type: none"> <li>Requested an alteration to Environment Act Licence (EAL) No. 3107 to                             <ul style="list-style-type: none"> <li>Re-install the north channel rock groin extension into the south channel of Gull Rapids.</li> </ul> </li> <li>The potential environmental effects resulting from the proposed alteration are not expected to be significant, the alteration was approved.</li> </ul>
13	March 28, 2017	March 30, 2017	<ul style="list-style-type: none"> <li>High water levels</li> </ul>	<ul style="list-style-type: none"> <li>Requested an alteration to Environment Act Licence (EAL) No. 3107 to                             <ul style="list-style-type: none"> <li>Increase the footprint of the North Channel Rock Groin (NCRG) by approximately 1000 m<sup>2</sup>;</li> <li>Conduct work on the NCRG during the restricted activity timing window for in-stream work up until April 15, or 15 days after receiving regulatory approval;</li> <li>Remove material from the NCRG during the summer restricted activity timing window (May 15 – July 15) if the water elevation at the NCRG</li> </ul> </li> </ul>

	Date Submitted	Date of Response	Root Cause	Description
				<p>reaches 156.5 m and there is a forecast for even higher flows; and</p> <ul style="list-style-type: none"> <li>• If portions of the NCRG are removed (by either controlled or un-controlled overtopping), rebuild the NCRG in the summer or fall of 2017 (potentially during the fall restricted activity timing window).</li> <li>• The potential environmental effects resulting from the proposed alteration are not expected to be significant, the alteration was approved. A condition of the approval is that the EAB Branch is notified upon completion of the widening activities and prior to any removal activities.</li> </ul>
14	April 10, 2017	April 13, 2017	<ul style="list-style-type: none"> <li>• Record high precipitation</li> </ul>	<ul style="list-style-type: none"> <li>• Requested an alteration to Environment Act Licence (EAL) No. 3107 to:                             <ul style="list-style-type: none"> <li>• Release water impounded behind cofferdams directly to the Nelson River if the Total Suspended Solids (TSS) concentration is &lt;50 mg/L until approximately May 15, 2017. The management of runoff and melt water during the spring melt reduces the risk of having insufficient capacity in the containment areas for spring precipitation events.</li> </ul> </li> <li>• Requested to extend approval until June 15.</li> </ul>

	Date Submitted	Date of Response	Root Cause	Description
	May 12, 2017	Email – May 15 Letter – May 17		<ul style="list-style-type: none"> <li>• Temporary approval received on May 15 to extent until May 17</li> <li>• Approved on May 17</li> </ul>
	June 27, 2017	July 17, 2017	<ul style="list-style-type: none"> <li>• High precipitation</li> </ul>	<ul style="list-style-type: none"> <li>• Requested an alteration to the EAL by adding the following clause to Section 7.21.2 of EnvPP:                             <ul style="list-style-type: none"> <li>• <i>At designated discharge locations, as shown in Figures 1 and 2, impounded water with total suspended solids (TSS) concentration up to 50 mg/L can be discharged directly to the Nelson River. When TSS concentrations exceed 25 mg/L, water discharge volumes along with corresponding TSS concentrations will be recorded and included in the annual Environmental Protection Plan report.</i></li> </ul> </li> <li>• The potential environmental effects resulting from the proposed alteration are not expected to be significant, the alteration was approved.</li> </ul>
	August 10, 2017	October 13, 2017	<ul style="list-style-type: none"> <li>• Construction – to avoid delays</li> <li>• Environment – increase likelihood of successful fish salvage</li> </ul>	<ul style="list-style-type: none"> <li>• Requested an alteration to the EAL to increase the end-of-pipe concentration of TSS to 200mg/L during dewatering of cofferdams</li> <li>• Potential environmental effects resulting from the proposed alteration are not expected to be</li> </ul>

	Date Submitted	Date of Response	Root Cause	Description
				<p>significant. The alteration was approved with the following conditions:</p> <ul style="list-style-type: none"> <li>• Dewatering shall not occur between May 15 and July 15 in any year;</li> <li>• Dewatering shall only exceed 25 mg/L in which TSS is comprised of materials known to derive from the Nelson River;</li> <li>• MSD shall be notified when dewatering results in TSS concentrations above 25 mg/L; and</li> <li>• A summary table of dewatering discharges exceeding a TSS concentration of 25 mg/L shall be made available to MSD upon request.</li> <li>• Letter of clarification issued May 24, 2018 regarding the first condition. Dewatering activities shall not occur between May 15 and July 15 in any year if TSS concentrations are above 25 mg/L.</li> </ul>
	September 15, 2017	April 26, 2018	<ul style="list-style-type: none"> <li>• Start-up camp space required for lodging</li> </ul>	<ul style="list-style-type: none"> <li>• Requested an alteration to the EAL for continued use of start-up camp and delay of decommissioning until the completion of the KGP.</li> <li>• Approved with 9 conditions.</li> </ul>
	February 9, 2018	February 14, 2018	<ul style="list-style-type: none"> <li>• Ice bridge was no longer safe</li> </ul>	<ul style="list-style-type: none"> <li>• Requested an alteration to the EAL to install a Temporary Creek Crossing on the winter Road to the Ellis Esker</li> </ul>

	<b>Date Submitted</b>	<b>Date of Response</b>	<b>Root Cause</b>	<b>Description</b>
				<ul style="list-style-type: none"> <li>• Approved, conditional on implementation of mitigation measures outlined in DFO letter.</li> </ul>
	April 13, 2018	April 17, 2018	<ul style="list-style-type: none"> <li>• Construction – More space required for excavated material</li> </ul>	<ul style="list-style-type: none"> <li>• Requested an alteration to the EAL to Expand EMPA D23(2)-E</li> <li>• Approved without conditions.</li> </ul>
	May 18, 2018	June 6, 2018	<ul style="list-style-type: none"> <li>• Natural habitat available</li> </ul>	<ul style="list-style-type: none"> <li>• Requested an alteration to the EAL to discontinue installation of tern nesting platforms unless ongoing annual monitoring of terns indicates that platforms are needed in the remaining years of construction.</li> <li>• Approved with note about annual monitoring.</li> </ul>
	July 30, 2018	August 9, 2018	<ul style="list-style-type: none"> <li>• Engineering/Design – to prepare for future high water</li> </ul>	<ul style="list-style-type: none"> <li>• Requested an alteration to the EAL to increase the footprint of the South Dam Cofferdam</li> <li>• Approved without conditions.</li> </ul>
	September 13, 2018	September 19, 2018	<ul style="list-style-type: none"> <li>• Require access to Ellis Esker</li> </ul>	<ul style="list-style-type: none"> <li>• Requested an alteration to the EAL to install a temporary creek crossing on the winter road to the Ellis Esker</li> <li>• Approved, conditional on implementation of any mitigation measures outlined by DFO.</li> </ul>
	October 9, 2018	October 12, 2018	<ul style="list-style-type: none"> <li>• Construction – to reduce risk of delays</li> </ul>	<ul style="list-style-type: none"> <li>• Requested an alteration to the EAL for short term release of seepage water with elevated TSS (&gt;50mg/L) at the South Dam Cofferdam until repairs to the upstream South Dam Cofferdam have been completed (anticipated November, 2018).</li> </ul>

	Date Submitted	Date of Response	Root Cause	Description
				<ul style="list-style-type: none"> <li>Approved until November 23, 2018.</li> </ul>
	November 7, 2018	November 12, 2018	<ul style="list-style-type: none"> <li>Habitat available, platforms never used.</li> </ul>	<ul style="list-style-type: none"> <li>Requested an alteration to the EAL to decommission the construction phase gull nesting habitat.</li> <li>Approved without conditions.</li> </ul>
	January 10, 2020	February 19, 2020	<ul style="list-style-type: none"> <li>Construction</li> </ul>	<ul style="list-style-type: none"> <li>Requested an alteration to the EAL to change the timing of water-up and impoundment.</li> <li>Alteration is approved pursuant to Section 14(2) of The Environment Act                             <ul style="list-style-type: none"> <li>The environmental review indicated that the incremental environmental effects of the alteration are insignificant, the Environmental Approvals Branch concurred with this decision.</li> <li>All mitigation measures and monitoring described in the environmental review are to be implemented.</li> <li>Noted that concerns with the alteration have been identified to me by Tataskweyak Cree Nation, York Factory First Nation, Fox Lake Cree Nation and War Lake First Nation, and that these concerns have not been resolved.</li> </ul> </li> </ul>

## **APPENDIX 2: FISHERIES ACT AUTHORIZATION AMENDMENT REQUESTS**

**Keyyask Fisheries Act Authorization**

Fisheries Act Authorization No. 11-HCAA-CA1-01695 was issued on July 15, 2014.

The following amendments were submitted and approved by the Department of Fisheries and Oceans.

	<b>Date Submitted</b>	<b>Date and Type of Response</b>	<b>Root Cause</b>	<b>Description</b>
1	September 9, 2014 Email	September 12, 2014 Email – Amendment not required.	<ul style="list-style-type: none"> <li>Engineering / Construction - Delay in Construction</li> </ul>	<ul style="list-style-type: none"> <li>Notice that North Channel Stage 1 cofferdam has been delayed, expected to be completed by October 3, 2014. Table 4-A indicated that it was to be completed by September 12, 2014.</li> <li>DFO responded that even though work is delayed, it will be completed in Fall 2014, the authorization condition anticipates extensions of this type.</li> </ul>
2	October 8, 2014 Email	October 15, 2014 – Additional information requested via email  October 30, 2014 – Clarification requested via email	<ul style="list-style-type: none"> <li>High water levels</li> </ul>	<ul style="list-style-type: none"> <li>Proposed to extend the north channel rock groin into the south channel of Gull Rapids.                             <ul style="list-style-type: none"> <li>The north channel rock groin extension would function to slightly raise upstream water levels and reduce water velocities at the ice boom, which would promote the formation of an ice cover.</li> <li>Constructed would occur between November 15 and December 31.</li> <li>The groin extension occurs in an area that has already been identified where serious harm will occur due to conversion from riverine to reservoir conditions following impoundment. An amendment to the Fisheries Act authorization is required as</li> </ul> </li> </ul>

	Date Submitted	Date and Type of Response	Root Cause	Description
		<p>November 12, 2014 – Clarification requested</p> <p>November 12, 2014 – Letter indicating area is covered in FA authorization.</p> <p>November 17, 2014 – Amendment to authorization issued.</p>		<p>the activity occurs during the restricted timing window.</p> <ul style="list-style-type: none"> <li>• October 15, 2014 – Christi Horne requested additional information</li> <li>• October 23, 2014 – Additional information provided.</li> <li>• October 30, 2014 – Richard Janusz requested clarification</li> <li>• October 31, 2014 – Additional information provided.</li> <li>• November 12, 2014 – Richard Janusz asked if removal would avoid the spring spawning window.</li> <li>• November 12, 2014 – Letter indicating the area was already covered in the FA authorization. A separate letter would be provided regarding the timing amendment.</li> <li>• Fisheries Act authorization was amended on November 17, 2014.</li> </ul>
3	November 10, 2014	November 17, 2014 – amendment issued.	<ul style="list-style-type: none"> <li>• Engineering / Construction - Delay in construction.</li> </ul>	<ul style="list-style-type: none"> <li>• Construction of the Causeway to Borrow G-3 was delayed, requested an extension of the in-water work to December 19, 2014.</li> <li>• Fisheries Act authorization was amended on November 17, 2014.</li> </ul>

	<b>Date Submitted</b>	<b>Date and Type of Response</b>	<b>Root Cause</b>	<b>Description</b>
4	January 9, 2015	January 17, 2015 – email indicating that authorization could not be provided.	<ul style="list-style-type: none"> <li>• High water levels</li> </ul>	<ul style="list-style-type: none"> <li>• Fisheries Act authorization application submitted to mobilize a large piece of border ice to form an ice bridge and initiate the ice cover. The proposed work includes a combination of ice cutting and blasting border ice.</li> <li>• Jan 17 - DFO indicated that emergency authorization could not be provided at this time, but that the Province has some confidence that the present plan will avoid impacts to adult Lake Sturgeon which are of greatest concern and has approved the proposed work with some conditions. DFO would not delay a required emergency work of this type at this time for its further review.</li> </ul>
5	January 23, 2015	January 30, 2015 – email received	<ul style="list-style-type: none"> <li>• High water levels.</li> <li>• Access to construct the spillway cofferdam was to be by the CDCD, which was flooded. Proposed to use the NCCD, but needs to be widened to be a haul road.</li> </ul>	<ul style="list-style-type: none"> <li>• Requested to conduct work on the north channel cofferdam during the restricted activity timing window from January 26, 2015 – February 13, 2015. The proposed work involves widening the cofferdam by approximately 25 m. It is anticipated that the work will take approximately 10 days to complete.</li> <li>• Email received indicating that that work can proceed during the timing window.</li> </ul>
6	February 4, 2015	February 10, 2015 – email received	<ul style="list-style-type: none"> <li>• High water levels</li> <li>• Resulted in damage to causeway.</li> </ul>	<ul style="list-style-type: none"> <li>• Requested to conduct repair work on the causeways to Borrow N-5 and G-3 during the restricted activity timing window (work to be</li> </ul>

	Date Submitted	Date and Type of Response	Root Cause	Description
				<p>conducted between February 10 – March 18, 2015).</p> <ul style="list-style-type: none"> <li>Email received indicating that work can proceed during the timing window.</li> </ul>
7	August 11, 2015	September 1, 2015 – Letter indicating that additional serious harm to fish is unlikely	<ul style="list-style-type: none"> <li>High water levels</li> </ul>	<ul style="list-style-type: none"> <li>Requested that culverts are not be re-installed in the causeway to Borrow N-5 and the existing culverts be capped. The proposed work also includes repairs to the abutments.</li> <li>August 27, 2015 - Additional information provided.</li> <li>September 1, 2015 - Letter received indicating that proposed repairs are not presently a concern with respect to the FA authorization. The proposed repairs seem necessary for construction safety and appear unlikely to cause additional serious harm to fish and fish habitat.</li> </ul>
8	April 6, 2016	April 18, 2016 – amendment could not be issued for CDCD, if work proceeds, it is at our own risk.	<ul style="list-style-type: none"> <li>Engineering / Construction - Response based on unforeseen geological conditions - CDCD</li> <li>Engineering / Construction - Change in schedule from based on - PHCD</li> </ul>	<ul style="list-style-type: none"> <li>Requested an amendment to the Fisheries Act Authorization to:                             <ul style="list-style-type: none"> <li>Conduct in-stream work on the Central Dam Cofferdam Extension during the fall and spring restricted activity timing window (up to May 15); and</li> <li>Conduct in-stream work on the Tailrace Summer Level Cofferdam during the fall</li> </ul> </li> </ul>

	Date Submitted	Date and Type of Response	Root Cause	Description
				<p>restricted activity timing window (up to September 15).</p> <ul style="list-style-type: none"> <li>• April 18, 2016 - Email received from DFO                             <ul style="list-style-type: none"> <li>• It was acknowledged that the proposed work changes will not add to, or otherwise substantially change, the serious harm authorized by DFO.</li> <li>• It was acknowledged that provincial fisheries managers do not appear particularly concerned about work occurring in the restricted in-water activity timing windows.</li> <li>• The turnaround time requested for a response was not sufficient; therefore DFO will not be able to provide a timing modification. If work proceeds, it would be at our own risk.</li> </ul> </li> </ul>
9	August 31, 2016	September 30, 2016 – Email indicating that work can proceed with additional mitigation	<ul style="list-style-type: none"> <li>• Engineering / Construction – Delay in construction</li> <li>• Mitigation measure – CD needs to be dewatered fish salvage conducted prior to freezing conditions, if some work is done in advance, it lowers the risk of an unsuccessful fish salvage.</li> </ul>	<ul style="list-style-type: none"> <li>• The original request was made on April 7, 2016 to conduct in-stream work on the Tailrace Summer Level Cofferdam during the fall restricted activity timing window (up to September 15, 2016).                             <ul style="list-style-type: none"> <li>• Work on the cofferdam was delayed, therefore it was requested to continue placing rock fill material until December 15, 2016.</li> </ul> </li> </ul>

	Date Submitted	Date and Type of Response	Root Cause	Description
				<ul style="list-style-type: none"> <li>September 30, 2016 – Emailed received that large rock material for the inner and outer rock groin could be placed with the following mitigation:                             <ul style="list-style-type: none"> <li>Construction of the cofferdam from the upstream to the downstream direction to allow fish to escape as water levels decline; and</li> <li>Not sealing and dewatering the cofferdam until the open water season when a fish salvage can be conducted (July 15, 2017).</li> <li>Indicated that email fulfils section 2.1.2. of the Fisheries Act Authorization # 11-HCAA-CA1-01695.</li> </ul> </li> </ul>
10	October 28, 2016	November 2, 2016 – Letter indicating that work is already considered part of the Project.	<ul style="list-style-type: none"> <li>High water levels</li> </ul>	<ul style="list-style-type: none"> <li>Requested to re-install the North Channel Rock Groin (NCRG) extension to counteract the high flows and promote the formation of an ice cover at the ice boom.</li> <li>DFO indicated that work is already considered part of the Project that is authorized.</li> </ul>
11	March 28, 2017	April 4, 2017 – Letter indicating that work is already considered part of the Project.	<ul style="list-style-type: none"> <li>High water levels</li> </ul>	<ul style="list-style-type: none"> <li>Request to:                             <ul style="list-style-type: none"> <li>Increase the footprint of the North Channel Rock Groin (NCRG) by approximately 1000 m<sup>2</sup>;</li> <li>Conduct work on the NCRG during the restricted activity timing window for in-</li> </ul> </li> </ul>

	Date Submitted	Date and Type of Response	Root Cause	Description
				<p>stream work up until April 15, or 15 days after receiving regulatory approval;</p> <ul style="list-style-type: none"> <li>Remove material from the NCRG during the summer restricted activity timing window (May 15 – July 15) if the water elevation at the NCRG reaches 156.5 m and there is a forecast for even higher flows; and</li> <li>If portions of the NCRG are removed (by either controlled or un-controlled overtopping), rebuild the NCRG in the summer or fall of 2017 (potentially during the fall restricted activity timing window).</li> </ul> <p>DFO indicated that work is already considered part of the Project that is authorized.</p>
12	June 2, 2017	June 16, 2017 – email that work can carry out as planned.	<ul style="list-style-type: none"> <li>Damage to ramp caused by ice</li> </ul>	<ul style="list-style-type: none"> <li>Requested to conduct annual work on the temporary downstream boat launch during the spring and summer restricted activity timing window.</li> <li>DFO indicated in an email that work can carry out as planned.</li> </ul>
13	September 29, 2017	October 17, 2017 – DFO issued letter to modify the dates for in-stream work.	<ul style="list-style-type: none"> <li>Scheduling changes</li> </ul>	<ul style="list-style-type: none"> <li>Requested an amendment to conduct in-stream work on the tailrace cofferdam during the fall and spring restricted activity timing window until May 2018.</li> </ul>

	Date Submitted	Date and Type of Response	Root Cause	Description
				<ul style="list-style-type: none"> <li>DFO approved the amendment to include working in the fall/spring timing window until May 15, 2018.</li> </ul>
14	December 21, 2017	January 18, 2018 – DFO issued letter to modify the dates for in-stream work.	<ul style="list-style-type: none"> <li>Low water levels allowing for winter work in the dry</li> </ul>	<ul style="list-style-type: none"> <li>Requested an amendment to the FA to conduct in-stream work on the South Dam Cofferdam during the fall restricted activity timing window (January 2018- April 15, 2018)</li> <li>DFO approved the amendment to change extensions into the restricted activity timing windows to include:                             <ul style="list-style-type: none"> <li>South Dam Stage II upstream rockfill cofferdam construction (-April 25, 2018)</li> <li>Conduct in-stream work on the Tailrace Cofferdam during the Fall and Spring restricted activity timing windows (Fall 2017 and Spring 2018)</li> </ul> </li> </ul>
15	February 9, 2018	February 14, 2018 – Letter of Advice issued, no formal approval required.	<ul style="list-style-type: none"> <li>Ice bridge being used was no longer safe.</li> </ul>	<ul style="list-style-type: none"> <li>Requested to put a temporary creek crossing in place for the Ellis Esker. Forwarded to DFO from MSD for comment.</li> <li>Letter of Advice issued, no formal approval was required. Letter gave 6 recommendations to avoid potential for serious harm to fish. MSD then gave approval provided that MH follow the conditions in the DFO letter.</li> </ul>

	Date Submitted	Date and Type of Response	Root Cause	Description
16	April 9, 2018  July 20, 2018	June 11, 2018 – DFO issued letter to modify the dates for in-stream work associated with removal of SWCD.  August 27, 2018 - DFO issued letter to modify the dates for in-stream work associated with construction of the South Dam Cofferdams.	<ul style="list-style-type: none"> <li>Schedule delays</li> </ul>	<ul style="list-style-type: none"> <li>Requested a modification to the dates in section 2.1.1 of the FAA to make the following amendments:                             <ul style="list-style-type: none"> <li>Spillways Cofferdam removal (Spring/Summer 2018)</li> <li>South dam Stage II upstream and downstream cofferdams construction (Fall 2018)</li> </ul> </li> <li>DFO approved the amendment to remove the Spillway Cofferdam between July 1 and September 1, 2018.</li> <li>Additional information was provided to DFO on July 20 regarding South Dam Cofferdams.</li> <li>DFO approved the amendment for the construction of the South Dam Stage II upstream/downstream cofferdams in Fall 2018.</li> </ul>
17	September 13, 2018	November 21, 2018 - Letter of Advice issued, no formal approval required.	<ul style="list-style-type: none"> <li>Construction – required for access</li> </ul>	<ul style="list-style-type: none"> <li>Requested a review of a Temporary Creek Crossing Winter Road to Ellis Esker</li> <li>Letter of Advice issued, no formal approval was required.</li> </ul>
18	October 2, 2019	No response	<ul style="list-style-type: none"> <li>Change to original design</li> </ul>	<ul style="list-style-type: none"> <li>Requested to construct the Fish Exclusion Berm downstream of the South Dam; and an amendment to section 2.1.1 of the Fisheries Act Authorization to conduct in-stream work</li> </ul>

	Date Submitted	Date and Type of Response	Root Cause	Description
				associated with construction of the Fish Exclusion Berm (Fall 2019 and Spring 2020).
19	January 10, 2020	February 25, 2020	<ul style="list-style-type: none"> <li>Change of timing from original</li> </ul>	<ul style="list-style-type: none"> <li>Requested to conduct the following in-stream work during the DFO Northern Manitoba restricted activity timing windows:                             <ul style="list-style-type: none"> <li>Powerhouse Tailrace cofferdam removal (Fall 2019, Spring 2020 and Fall 2020);</li> <li>North channel cofferdam removal (Fall 2019 and Spring 2020);</li> <li>Island cofferdam removal (Fall 2019 and Spring 2020); and</li> <li>North channel rock groin removal (Fall 2019 and Spring 2020).</li> </ul> </li> <li>The Fisheries Act Authorization was modified for the in-stream work.</li> </ul>
20	March 5, 2020	Request was withdrawn on March 20, 202	<ul style="list-style-type: none"> <li>Change of timing from original</li> </ul>	<ul style="list-style-type: none"> <li>Requested to amend the Fisheries Act Authorization to impound the reservoir under ice conditions rather than open water.</li> </ul>
21	August 24, 2020  Revision submitted October 1, 2020  Draft offsetting plan submitted on September 21, 2021.	November 27, 2020 – DFO responded that additional offsetting is required.	<ul style="list-style-type: none"> <li>Change to original design</li> </ul>	<ul style="list-style-type: none"> <li>Requested an amendment that included:                             <ul style="list-style-type: none"> <li>Redistribution of the areas affected as listed in “Permanent alteration of habitat” and “Destruction of habitat”;</li> <li>Amendment to section 2.1.1 of the Fisheries Act Authorization to conduct in-stream work</li> </ul> </li> </ul>

	Date Submitted	Date and Type of Response	Root Cause	Description
				<p>associated with construction of the wetland berm, during the fall and spring DFO Northern Manitoba restricted activity timing window for instream work (September 1, 2020 to May 15, 2021 and/or September 1, 2021 to May 15, 2022);</p> <ul style="list-style-type: none"> <li>• Modification of Section 2.13 to “An aeration system is to be utilized to mitigate the risk of winterkill in Little Gull Lake. If, through monitoring, it is determined there is no risk of fish entrapment and/or winterkill, the operation of the aeration system will be discontinued, as approved by DFO”; and</li> <li>• Modification of Section 4.1.3 to “Construction of 5.3 ha of Lake Sturgeon and Walleye spawning shoals in the generating station tailrace (as per Manitoba Hydro memo “Keeyask – Tailrace Shoal” dated August 7, 2020).”</li> <li>• Draft offsetting plan submitted on September 21, 2021.</li> </ul>

## **APPENDIX 3: CONSTRUCTION PERIOD WILDLIFE MORTALITIES**

**Table A3. Wildlife mortalities for the construction period (July, 2014 to March 31, 2022).**

<b>Date</b>	<b>Species</b>	<b>Cause</b>
2014.11.24	Red fox	Vehicle collision
2015.03.01	Gray wolf	Dispatched due to safety concerns
2015.07.17	Groundhog	Vehicle collision
2015.08.08	Peregrine falcon	Unknown, possibly vehicle collision
2015.08.08	Ring-billed gull	Predated by peregrine falcon
2015.11.06	Snowy owl	Unknown, possibly starvation
2016.02.10	Ptarmigan spp.	Vehicle collision
2016.06.03	Spruce or ruffed grouse (only head and neck remained)	Unknown
2016.08.18	Juvenile Ring-billed gull	Attacked by a hawk
2016.08.19	Common nighthawk	Unknown
2016.08.22	Ring-billed gull	Unknown
2016.08.23	Common raven	Unknown
2016.08.29	Common raven	Unknown
2016.10.10	Red fox	Vehicle collision
2016.11.06	Muskrat	Unknown
2016.12.17	Willow ptarmigan	Vehicle collision
2017.03.16	Woodchuck	Vehicle collision
2017.04.05	Spruce grouse	Unknown
2017.05.20	Muskrat	Vehicle collision
2017.05.23	Spruce grouse	Vehicle collision
2017.05.30	Bank swallow	Trapped under box
2017.05.31	Ring-billed gull	Natural predation
2017.06.13	Common nighthawk	Vehicle collision
2017.06.15	Red fox	Vehicle collision
2017.06.17	Red fox	Vehicle collision
2017.07.31	Beaver	Vehicle collision
2017.08.09	Common raven	Vehicle collision
2017.08.14	Yellow warbler	Equipment collision
2017.08.24	Common raven	Unknown
2017.09.12	Muskrat	Vehicle collision
2017.09.15	Muskrat	Vehicle collision
2017.09.26	Spruce grouse	Vehicle collision
2017.10.12	Snowy owl	Vehicle collision
2017.11.05	Willow ptarmigan	Vehicle collision
2017.11.17	Arctic fox	Vehicle collision
2017.11.20	Arctic fox	Vehicle collision
2017.11.20	Snowshoe hare	Vehicle collision
2017.11.24	Arctic fox	Vehicle collision
2017.12.05	Arctic fox	Vehicle collision

<b>Date</b>	<b>Species</b>	<b>Cause</b>
2017.12.06	Arctic fox	Vehicle collision
2017.12.12	Common raven	Unknown
2017.12.17	Willow ptarmigan	Vehicle collision
2017.12.19	Arctic fox	Vehicle collision
2017.12.22	Arctic fox	Natural predation
2018.01.01	Red fox	Vehicle collision
2018.01.03	Arctic fox	Trapped inside work trailer
2018.01.09	Red fox	Vehicle collision
2018.01.25	Willow ptarmigan	Vehicle collision
2018.01.26	Arctic fox	Unknown
2018.01.27	Arctic fox	Vehicle collision
2018.02.03	Cross fox	Unknown
2018.02.09	Willow ptarmigan	Vehicle collision
2018.04.16	Boreal owl	Suspected vehicle collision
2018.04.18	Snowshoe hare	Unknown
2018.04.28	Common nighthawk	Unknown
2018.04.29	Arctic fox	Trapped in crawl space
2018.05.27	Snowshoe hare	Suspected vehicle collision
2018.05.27	Arctic fox	Unknown
2018.06.09	Sharp-tailed grouse	Vehicle collision
2018.07.08	Common raven	Unknown
2018.07.13	Common raven	Suspected power line contact
2018.07.27	Snowshoe hare	Suspected vehicle collision
2018.08.03	Ring-billed gull	Unknown
2018.08.03	Muskrat	Suspected vehicle collision
2018.08.08	Willow ptarmigan	Unknown
2018.08.10	Merlin	Unknown
2018.08.24	Ring-billed gull	Vehicle collision
2018.08.24	American black bear	Vehicle collision
2018.09.06	Muskrat	Unknown
2018.09.08	Red fox	Vehicle collision
2018.09.26	Common raven	Unknown
2018.10.01	Red fox	Vehicle collision
2018.10.04	Spruce grouse	Predator
2018.11.23	Arctic fox	Unknown
2018.12.12	Spruce grouse	Vehicle collision
2019.03.12	Arctic fox	Unknown
2019.03.24	Snowshoe hare	Suspected vehicle collision
2021.05.10	Common nighthawk	Unknown, possibly starvation
2019.04.08	Muskrat	Suspected vehicle collision
2019.04.26	Snowshoe hare	Suspected vehicle collision
2019.06.19	Moose	Unknown
2019.07.26	White-throated sparrow	Unknown

<b>Date</b>	<b>Species</b>	<b>Cause</b>
2019.08.06	Ring-billed gull	Suspected vehicle collision
2019.08.07	Ring-billed gull	Suspected vehicle collision
2019.08.11	Common raven	Likely crane collision
2019.08.12	Ring-billed gull	Vehicle collision
2019.08.17	Green-winged teal	Suspected vehicle collision
2019.08.20	Yellow-bellied flycatcher	Collision with infrastructure
2019.08.20	Common raven	Power line collision
2019.08.21	Common raven	Unknown (broken wing)
2019.09.20	Muskrat	Likely fell from structure
2019.09.24	Gray jay	Vehicle collision
2019.10.19	Common redpoll	Unknown
2019.10.19	Ring-billed gull	Unknown
2019.11.23	Spruce grouse	Vehicle collision
2019.11.29	Spruce grouse	Vehicle collision
2019.12.16	Spruce grouse	Vehicle collision
2020.03.06	Common raven	Vehicle collision
2020.04.02	Sharp-tailed grouse	Vehicle collision
2020.04.14	Willow ptarmigan	Vehicle collision
2020.05.05	Snowy owl	Unknown
2020.05.20	Beaver	Unknown
2020.07.11	Red fox	Vehicle collision
2020.07.13	Common nighthawk	Unknown, possibly vehicle collision
2020.08.03	Red fox	Drowning
2020.08.06	Bank swallow	Vehicle collision
2020.09.20	Red sucker	Trapped between gates
2020.10.19	Mallard	Unknown
2020.11.25	Willow ptarmigan	Vehicle collision
2021.01.20	Red fox	Starvation
2021.03.17	Willow ptarmigan	Unknown, possibly vehicle collision
2020.04.02	Sharp-tailed grouse	Vehicle collision
2021.06.19	Ruffed grouse	Unknown, possibly vehicle collision
2021.07.06	Gull spp.	Unknown, possible vehicle collision
2021.07.10	White-throated Sparrow	Unknown
2021.08.14	Red-necked Phalarope	Unknown
2021.10.29	Snow bunting	Vehicle collision
2021.11.20	Ruffed Grouse	Vehicle collision
2022.03.09	Red fox	Trapped in air duct

**APPENDIX 4:  
POWERHOUSE TAILRACE CHANNEL BLASTING, PREDICTED  
OVERPRESSURES AND PEAK PARTICLE VELOCITIES**

**Table A4. Powerhouse tailrace channel blasting, predicted overpressures and peak particle velocities.**

Blast ID	Date	Charge Weight / Delay (kg)	Distance to River (m)	Overpressure		Peak Particle Velocity		
				Min. Setback <sup>1</sup> (m)	Hydrophone Reading (kPa)	Min. Setback <sup>2</sup> (m)	Geophone (mm/s)	Predicted in River (mm/s)
TR-5	12-Sep-18	4.90	148.60	11.13	<5kPa	33.40	4.57	1.38
TR-7	12-Sep-18	9.00	165.30	15.09	<5kPa	45.27	2.57	0.70
TR-10	15-Sep-18	7.60	162.70	13.87	<5kPa	41.60	3.14	0.76
TR-12	16-Sep-18	3.70	153.60	9.68	<5kPa	29.03	5.92	1.64
TR-15	17-Sep-18	11.60	147.20	17.13	<5kPa	51.39	8.42	2.39
TR-20	18-Sep-18	6.60	144.70	12.92	<5kPa	38.77	16.90	4.14
TR-24	21-Sep-18	6.40	145.10	12.73	<5kPa	38.18	10.48	2.78
TR-28	22-Sep-18	11.00	145.32	16.68	<5kPa	50.05	7.29	2.07
TR-33	27-Sep-18	8.50	160.30	14.66	<5kPa	43.99	3.18	0.88
TR-34	27-Sep-18	16.90	197.30	20.68	<5kPa	62.03	3.14	0.61
TR-41	2-Oct-18	30.00	220.60	27.55	<5kPa	82.65	2.52	0.41
TR-45	7-Oct-18	16.00	165.90	20.12	<5kPa	60.36	3.81	0.97
TR-49	11-Oct-18	16.00	163.36	20.12	<5kPa	60.36	4.97	1.26
TR-50	12-Oct-18	17.50	196.99	21.04	<5kPa	63.13	5.32	0.97
TR-52	14-Oct-18	30.20	194.58	27.64	<5kPa	82.93	3.89	0.75
TR-53	15-Oct-18	3.30	142.71	9.14	<5kPa	27.41	3.27	1.11
TR-54	15-Oct-18	29.30	181.69	27.23	<5kPa	81.68	3.67	0.81
TR-55	19-Oct-18	84.10	230.78	46.13	<5kPa	138.38	2.88	0.43
TR-56	20-Oct-18	26.80	215.17	26.04	<5kPa	78.12	2.71	0.46
TR-57	21-Oct-18	20.00	189.25	22.49	<5kPa	67.48	3.25	0.67
TR-58	22-Oct-18	119.60	237.80	55.01	<5kPa	165.03	3.07	0.43
TR-59	26-Oct-18	155.20	272.20	62.66	<5kPa	187.99	2.20	0.25
TR-60	27-Oct-18	7.40	143.80	13.68	<5kPa	41.05	5.88	1.83
TR-62	29-Oct-18	63.50	220.10	40.08	<5kPa	120.25	4.84	0.73
TR-65	3-Nov-18	148.80	252.38	61.36	N/A	184.07	3.25	0.41
TR-68	7-Nov-18	9.60	173.01	15.58	N/A	46.75	4.34	1.01
TR-69	8-Nov-18	4.50	147.45	10.67	N/A	32.01	2.79	0.91
TR-70	8-Nov-18	7.50	140.78	13.78	N/A	41.33	9.98	3.00
TR-72	10-Nov-18	11.90	145.34	17.35	N/A	52.06	17.40	4.61
TR-73	12-Nov-18	25.60	198.38	25.45	N/A	76.35	4.23	0.78
TR-79	24-Nov-18	47.80	232.10	34.78	N/A	104.33	6.43	0.86
TR-80	25-Nov-18	74.80	273.60	43.50	N/A	130.51	2.82	0.31
TR-82	28-Nov-18	114.30	206.34	53.78	N/A	161.33	5.99	0.99
TR-83	4-Dec-18	123.40	235.34	55.88	N/A	167.63	2.20	0.33
TR-84	6-Dec-18	16.50	196.23	20.43	N/A	61.30	3.43	0.66

Blast ID	Date	Charge Weight / Delay (kg)	Distance to River (m)	Overpressure		Peak Particle Velocity		
				Min. Setback <sup>1</sup> (m)	Hydrophone Reading (kPa)	Min. Setback <sup>2</sup> (m)	Geophone (mm/s)	Predicted in River (mm/s)
TR-85	8-Dec-18	127.30	273.92	56.75	N/A	170.26	6.00	0.60
TR-86	9-Dec-18	87.90	236.88	47.16	N/A	141.48	4.24	0.57
TR-87	20-Jan-19	30.50	231.51	27.78	N/A	83.34	2.75	0.41
TR-88	21-Jan-19	148.60	277.85	61.32	N/A	183.95	4.16	0.43
TR-93	9-Feb-19	99.40	311.53	50.15	N/A	150.45	2.57	0.23
TR-104	2-Mar-19	185.90	273.40	68.58	N/A	205.74	8.16	0.73
TR-105	3-Mar-19	84.90	235.20	46.35	N/A	139.04	5.81	0.77
TR-111	11-Mar-19	134.20	290.54	58.27	N/A	174.81	4.83	0.45
TR-112	12-Mar-19	145.80	256.00	60.74	N/A	182.21	22.53	2.05
TR-113	13-Mar-19	69.40	223.00	41.90	N/A	125.71	22.46	2.38
TR-114	14-Mar-19	113.60	320.00	53.61	N/A	160.83	3.20	0.27
TR-115	15-Mar-19	9.90	195.80	15.83	N/A	47.48	4.13	0.78
TR-116	16-Mar-19	157.40	208.56	63.11	N/A	189.32	23.08	3.14
TR-117	17-Mar-19	130.30	282.47	57.42	N/A	172.25	5.65	0.54
TR-118	21-Mar-19	124.80	309.35	56.19	N/A	168.58	4.00	0.34
TR-119	22-Mar-19	15.00	175.17	19.48	N/A	58.44	7.22	1.55
TR-120	23-Mar-19	12.90	222.80	18.07	N/A	54.20	7.34	1.03
TR-121	25-Mar-19	201.90	226.18	71.47	N/A	214.42	20.53	2.46
TR-122	26-Mar-19	17.90	163.70	21.28	N/A	63.84	13.18	2.94
TR-125	29-Mar-19	175.90	312.58	66.71	N/A	200.13	3.80	0.32
TR-126	30-Mar-19	75.60	209.85	43.73	N/A	131.20	17.82	2.48
TR-127	31-Mar-19	99.30	5.66	0.00	N/A	306.15	150.37	50.12
TR-128	1-Apr-19	82.50	17.42	0.00	N/A	259.05	137.06	45.69
TR-128	1-Apr-19	82.50	20.77	3.27	N/A	193.41	137.06	45.69
TR-129	2-Apr-19	189.90	24.79	2.78	N/A	231.60	207.95	69.32
TR-129	2-Apr-19	189.90	9.26	0.00	N/A	349.00	207.95	69.32
TR-129	2-Apr-19	189.90	4.39	0.00	N/A	649.90	207.95	69.32
TR-129	2-Apr-19	189.90	5.45	0.00	N/A	618.60	207.95	69.32
TR-130	3-Apr-19	47.50	21.70	3.33	N/A	195.62	104.00	34.67
TR-131	4-Apr-19	138.10	18.23	1.19	N/A	323.47	177.33	59.11
TR-131	4-Apr-19	138.10	4.26	0.33	N/A	324.99	177.33	59.11
TR-131	4-Apr-19	138.10	2.42	0.16	N/A	377.05	177.33	59.11
TR-131	4-Apr-19	138.10	3.13	0.20	N/A	368.51	177.33	59.11
TR-132	5-Apr-19	112.60	44.58	6.99	N/A	183.10	160.12	53.37
TR-132	5-Apr-19	112.60	7.43	0.81	N/A	257.31	160.12	53.37
TR-132	5-Apr-19	112.60	4.36	0.27	N/A	367.87	160.12	53.37
TR-133	6-Apr-19	114.90	14.09	1.64	N/A	236.69	161.75	53.92

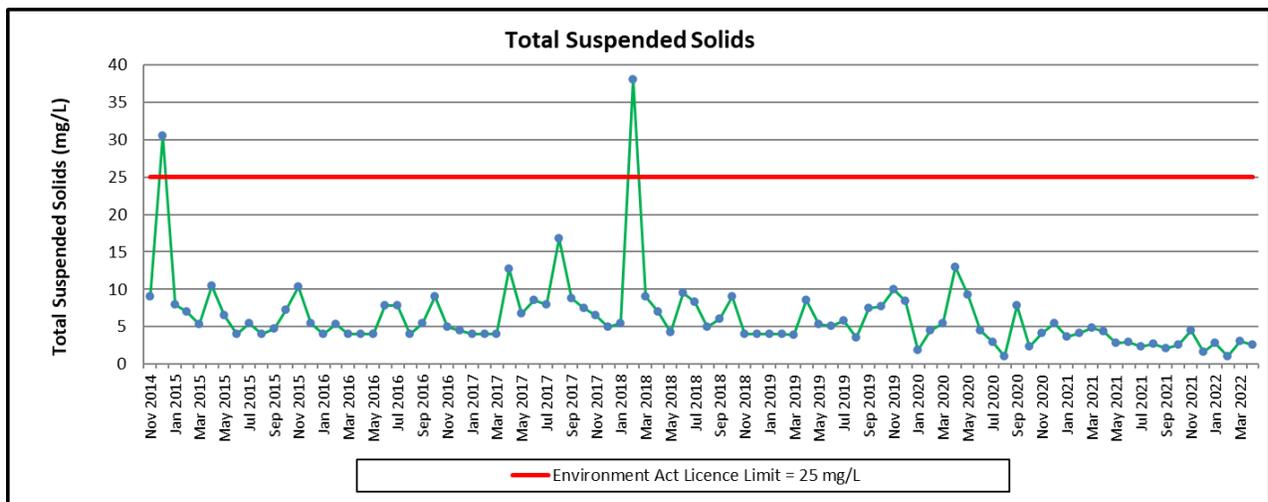
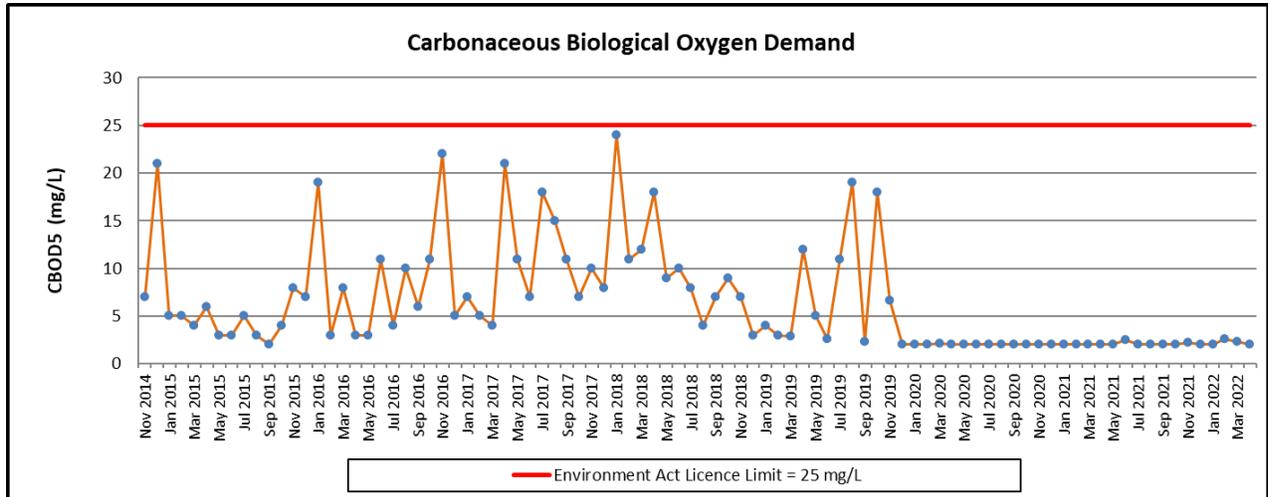
Blast ID	Date	Charge Weight / Delay (kg)	Distance to River (m)	Overpressure		Peak Particle Velocity		
				Min. Setback <sup>1</sup> (m)	Hydrophone Reading (kPa)	Min. Setback <sup>2</sup> (m)	Geophone (mm/s)	Predicted in River (mm/s)
TR-133	6-Apr-19	114.90	8.71	0.86	N/A	269.01	161.75	53.92
TR-133	6-Apr-19	114.90	9.09	0.52	N/A	366.02	161.75	53.92
TR-133	6-Apr-19	114.90	6.71	0.42	N/A	354.87	161.75	53.92
TR-134	7-Apr-19	155.80	7.14	0.63	N/A	291.19	188.35	62.78
TR-134	7-Apr-19	155.80	8.83	0.74	N/A	295.54	188.35	62.78
TR-134	7-Apr-19	155.80	7.63	0.46	N/A	362.16	188.35	62.78
TR-134	7-Apr-19	155.80	6.70	0.43	N/A	352.57	188.35	62.78
TR-135	8-Apr-19	41.30	80.59	13.07	N/A	171.90	96.98	32.33
TR-135	8-Apr-19	41.30	3.41	0.33	N/A	292.60	96.98	32.33
TR-135	8-Apr-19	41.30	2.35	0.13	N/A	420.00	96.98	32.33
TR-136	9-Apr-19	108.00	3.49	0.27	N/A	329.20	156.82	52.27
TR-136	9-Apr-19	108.00	3.12	0.21	N/A	359.90	156.82	52.27
TR-136	9-Apr-19	108.00	5.57	0.34	N/A	368.20	156.82	52.27
TR-136	9-Apr-19	108.00	4.92	0.38	N/A	321.70	156.82	52.27
TR-137	10-Apr-19	25.50	44.46	8.29	N/A	165.80	76.20	25.40
TR-137	10-Apr-19	25.50	4.50	0.55	N/A	249.50	76.20	25.40
TR-138	11-Apr-19	83.30	17.18	2.82	N/A	191.40	137.72	45.91
TR-138	11-Apr-19	83.30	3.74	0.26	N/A	353.70	137.72	45.91
TR-138	11-Apr-19	83.30	4.11	0.26	N/A	365.80	137.72	45.91
TR-138	11-Apr-19	83.30	9.05	1.05	N/A	245.50	137.72	45.91
TR-139	12-Apr-19	75.60	8.88	1.15	N/A	230.90	131.20	43.73
TR-139	12-Apr-19	75.60	5.84	0.40	N/A	343.10	131.20	43.73
TR-139	12-Apr-19	75.60	5.90	0.38	N/A	354.50	131.20	43.73
TR-139	12-Apr-19	75.60	11.05	1.17	N/A	254.50	131.20	43.73
TR-140	15-Apr-19	89.50	4.96	0.44	N/A	300.20	142.76	47.59
TR-140	15-Apr-19	89.50	5.48	0.38	N/A	340.90	142.76	47.59
TR-140	15-Apr-19	89.50	5.59	0.37	N/A	350.10	142.76	47.59
TR-140	15-Apr-19	89.50	9.98	0.85	N/A	291.10	142.76	47.59
TR-141	17-Apr-19	44.50	72.80	12.26	N/A	169.50	100.66	33.55
TR-142	18-Apr-19	125.00	7.23	0.81	N/A	255.00	168.71	56.24
TR-142	18-Apr-19	125.00	8.92	0.96	N/A	255.40	168.71	56.24
TR-142	18-Apr-19	125.00	5.44	0.40	N/A	330.00	168.71	56.24
TR-143	22-Apr-19	95.10	4.48	0.40	N/A	298.60	147.16	49.05
TR-143	22-Apr-19	95.10	7.14	0.67	N/A	281.60	147.16	49.05
TR-143	22-Apr-19	95.10	4.99	0.37	N/A	330.20	147.16	49.05
TR-144	23-Apr-19	80.00	14.33	1.92	N/A	218.10	134.97	44.99

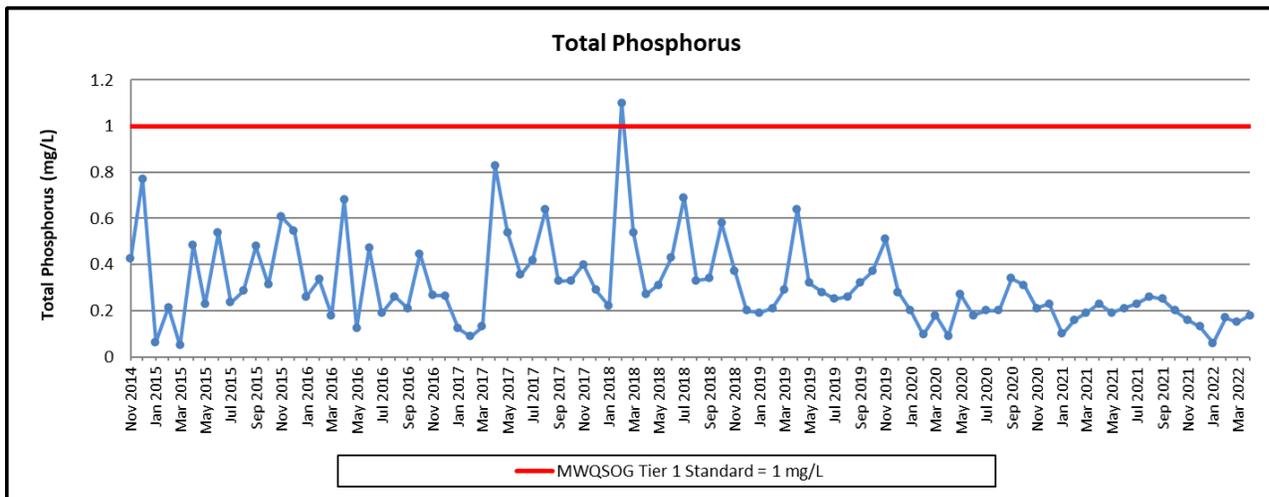
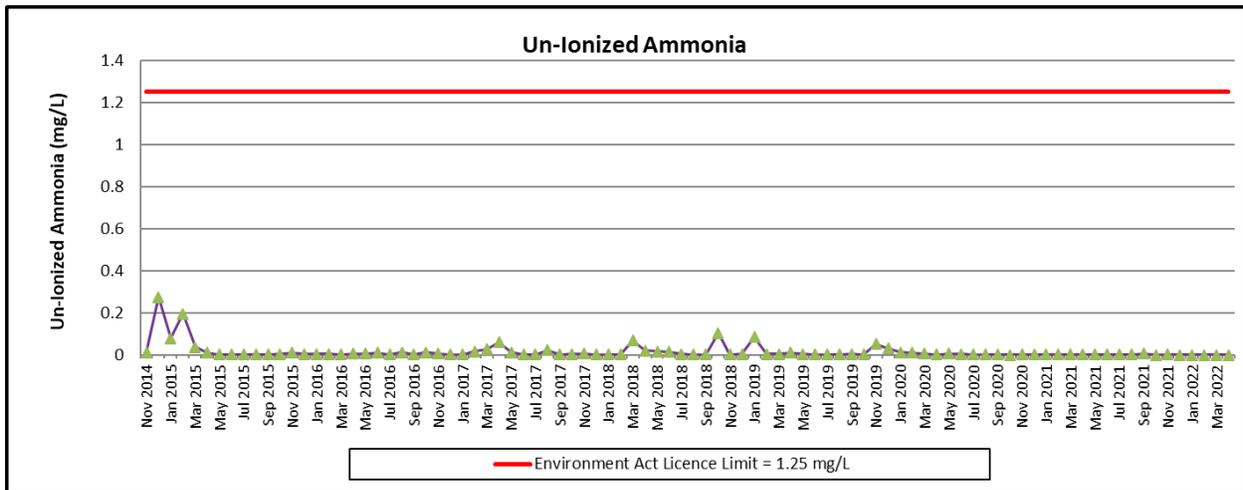
Blast ID	Date	Charge Weight / Delay (kg)	Distance to River (m)	Overpressure		Peak Particle Velocity		
				Min. Setback <sup>1</sup> (m)	Hydrophone Reading (kPa)	Min. Setback <sup>2</sup> (m)	Geophone (mm/s)	Predicted in River (mm/s)
TR-144	23-Apr-19	80.00	8.78	1.06	N/A	240.30	134.97	44.99
TR-144	23-Apr-19	80.00	3.29	0.25	N/A	336.40	134.97	44.99
TR-145	24-Apr-19	92.00	20.22	3.29	N/A	189.99	144.74	48.25
TR-145	24-Apr-19	92.00	9.19	1.15	N/A	234.68	144.74	48.25
TR-145	24-Apr-19	92.00	2.98	0.22	N/A	345.33	144.74	48.25
TR-146	25-Apr-19	135.00	4.79	0.49	N/A	276.20	175.33	58.44
TR-146	25-Apr-19	135.00	8.61	0.92	N/A	257.38	175.33	58.44
TR-146	25-Apr-19	135.00	7.63	0.57	N/A	318.51	175.33	58.44
TR-147	26-Apr-19	84.50	4.15	0.43	N/A	277.91	138.71	46.24
TR-147	26-Apr-19	84.50	4.19	0.34	N/A	319.06	138.71	46.24
TR-148	27-Apr-19	83.00	10.52	1.35	N/A	229.12	137.48	45.83
TR-148	27-Apr-19	83.00	12.22	1.52	N/A	230.47	137.48	45.83
TR-148	27-Apr-19	83.00	3.93	0.32	N/A	321.94	137.48	45.83
TR-149	28-Apr-19	67.90	16.54	2.04	N/A	226.31	124.34	41.45
TR-149	28-Apr-19	67.90	14.13	1.81	N/A	223.70	124.34	41.45
TR-149	28-Apr-19	67.90	3.50	0.26	N/A	339.68	124.34	41.45
TR-149	28-Apr-19	67.90	3.99	0.31	N/A	327.73	124.34	41.45
TR-149	28-Apr-19	67.90	25.28	4.25	N/A	183.51	124.34	41.45
TR-150	16-May-19	120.00	4.11	0.35	N/A	308.07	165.30	55.10
TR-150	16-May-19	120.00	3.08	0.22	N/A	346.62	165.30	55.10
TR-151	17-May-19	50.00	75.63	14.54	N/A	156.61	106.70	35.57
TR-151	17-May-19	50.00	7.16	0.70	N/A	275.55	106.70	35.57
TR-152	18-May-19	40.00	40.36	8.81	N/A	152.50	95.44	31.81
TR-152	18-May-19	40.00	3.45	0.33	N/A	294.50	95.44	31.81
TR-153	19-May-19	40.00	72.79	16.31	N/A	143.83	95.44	31.81

## **APPENDIX 5: WASTEWATER TREATMENT PLANT SAMPLING RESULTS**

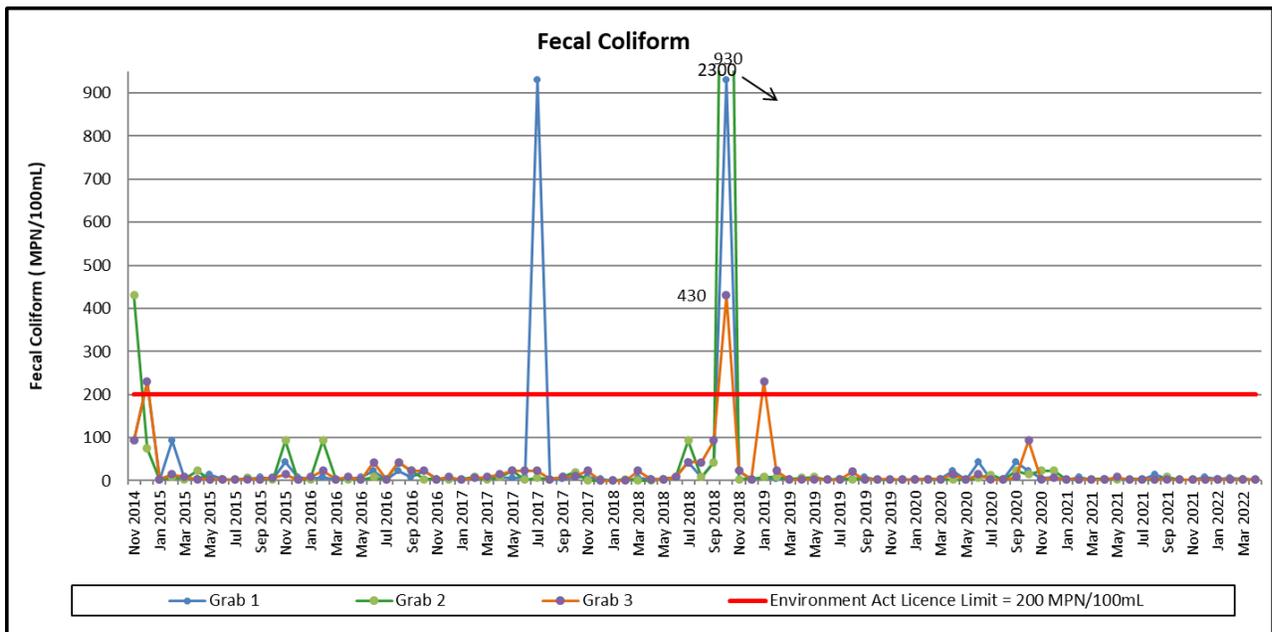
## Keyyask Wastewater Treatment Plant

### Effluent Composite Samples





**Keyyask Wastewater Treatment Plant**  
Effluent Grab Samples



**APPENDIX 6:  
REFUELING EQUIPMENT WITHIN 100 METRES OF A  
WATERCOURSE**

 <p><b>BBE Hydro Constructors LP</b></p> <p><b>Safe Work Procedure</b></p>	<p align="center"><b>Refueling Non-Mobile &amp; Mobile Equipment within 100 Metres of a Watercourse/Body</b></p>	
<p align="center"><b>SWP - 11007</b></p>	<p align="center"><b>Issue Date: August 5, 2014</b></p>	<p align="center"><b>Revised Date: Mar 2020</b></p>

POTENTIAL HAZARDS PRESENT		PERSONAL PROTECTIVE EQUIPMENT, DEVICES AND TOOLS	
<ul style="list-style-type: none"> <li>• Slips and Trips</li> <li>• Weather</li> <li>• Wildlife</li> <li>• Proximity to Water</li> <li>• Spills and sprays</li> <li>• Static energy</li> <li>• Equipment Failure</li> </ul>	<ul style="list-style-type: none"> <li>• Strains and sprains</li> <li>• Ergonomics</li> <li>• Distractions</li> <li>• Fire &amp; Explosion</li> <li>• Traffic, Vehicles</li> <li>• Manual Handling, pinch points</li> </ul>	<ul style="list-style-type: none"> <li>• Safety Footwear</li> <li>• Hard Hat</li> <li>• Safety Glasses</li> <li>• Clothing, High Visibility</li> <li>• Two-Way Radio</li> <li>• 20lb Fire Extinguisher</li> <li>• Life Jacket (if required)</li> </ul>	<ul style="list-style-type: none"> <li>• Spill tray</li> <li>• 95 US Gallon Spill Kit Drum</li> <li>-100 Universal Absorbent pads</li> <li>-10 Absorbent Pillows</li> <li>-4 Large Absorbent Booms or 10 Small Absorbent booms</li> <li>• Funnel</li> <li>• Containment/Spill Tray</li> </ul>
<p>NOTE: Other Safe Work Procedures may need to be referenced to address hazards associated with this task.</p>			

**Prerequisite:**

- Ensure a STARRT Card has been completed, as required.
- This task may only be performed by trained and qualified personnel or by any person being trained under the direct supervision of a qualified and authorized person.
- All workers conducting this job shall be required to wear safety PPE while in the field. A personal flotation device must be worn if working with 3 metres (10ft) of the shoreline. No worker shall put themselves at risk of falling into the water while refueling equipment.
- Use proper body mechanics. Symptoms of a musculoskeletal injury can include pain, burning, swelling, numbness/tingling, colour changes, and loss of movement or strength in a body part. Inform your supervisor if you are experiencing any of these symptoms so steps can be taken to avoid making the conditions worse.
- Ensure fully stocked 95-gallon spill drums are placed at all entrances to cofferdams. Additional spill drums may be placed if required. Drums may need to be relocated during fueling operations to ensure that they are easily accessible (i.e. within reach) in the event of a spill.
- Fully stocked equipment spill kits should be present on both the equipment being fuelled and the fuel truck. If a fuel truck is being used, ensure it is equipped with a spill tray.
- A spill tray will be placed under the fuel spout during fill operations.
- Be aware of congestion in the fueling area and the need for good housekeeping. Use a spotter where required.
- Ignition sources shall not be used or be moved to the area.
- This task requires your undivided attention. It is important to remain focused on the task at hand.
- Fueling areas **must be approved by BBE Environmental Team** before becoming operational.

**If an emergency situation occurs while conducting this task, then the area must be secured; this includes shutting down the machine to prevent further injury/damage. Call for emergency assistance as identified in your JHA/STARRT Card.**

- 1. Call Keeyask Security 204-778-4900 OR Radio Channel 1**
- 2. Contact your supervisor to report the incident.**

## Refueling Non-Mobile Equipment within 100 Metres of a Watercourse/Body

### **Purpose**

This procedure shall apply when refueling non-mobile and mobile equipment such as water pumps, light plants, generators, heaters, excavators, dozers etc. which are within 100 metres of a watercourse/body.

### **Procedure**

All fueling within 100 metres of a watercourse/body must be completed in an approved fueling area, in a contained manner, as approved by the Site Environmental Lead (or delegate).

Fueling requires your undivided attention and must be controlled at all times; an operator must be able to immediately shut off or stop the flow of the petroleum product during transfer. Fueling foreman must be readily available to support with any issues during fueling operations in these high-risk areas.

Where a fuel truck is used, two operators must be present when fueling: one to control the nozzle, one to remain at the switch (tank) to quickly shut it off should something happen. A single operator will not be acceptable when fueling within 100 metres of water unless prior authorization is obtained by the Site Environmental Lead (or delegate).

If equipment needs to be fueled continuously, a 1,000L fuel cube may be used to minimize the frequency of refueling hazards (See SWP 11008-Use of a Fuel Cube within 100 Metres of a Watercourse/Body).

### **Fueling by Hand**

1. The portable container will be refueled in a designated area.
2. The refueling of the machine will take place over a spill pad, spill tray, or inside a bermed containment area.
3. Shut down the machine that is to be refueled.
4. Remove all ignition sources from the area (NO cell phone/NO Smoking).
5. Remove fuel cap on equipment and insert funnel into equipment's fuel tank.
6. Make sure that gauges are in working order, over-fueling has occurred due to broken gauges.
7. Attach fuel nozzle to portable container. Nozzle must not contain a filling lock flap.
8. Slowly pour fuel from container through nozzle and funnel into equipment fuel tank. Avoid distractions and pay attention to ensure that no overflow, spray back, or spillage occurs. Make sure to allow room for fuel expansion and DO NOT fill over 85% of the tank capacity.
9. Once fueling is complete, remove nozzle and wipe with an absorbent pad. Insert nozzle back into fuel container and seal cap tightly.
10. Replace fuel cap on equipment. Seal tightly.
11. Exit fuel area slowly and be aware of surrounding traffic and/or personnel.

## Refueling Non-Mobile Equipment within 100 Metres of a Watercourse/Body

### Fueling with Fuel Truck

1. The refueling of the machine will take place on a spill tray, or inside a bermed containment area. **Two operators must be present: one in control of the nozzle, one at the tank.**
2. Park vehicle an appropriate distance from fueling area. Apply emergency brake. If truck is on uneven ground then place wheel chocks or extend outriggers, if available.
3. Shut down the machine that is to be refueled.
4. Remove all ignition sources from the area (NO cell phone/NO smoking).
5. Place spill tray underneath fuel port.
6. Remove fuel cap on equipment.
7. Make sure that gauges are in working order, over fueling has occurred due to broken gauges.
8. Turn on fuel pump and remove nozzle from the fuel tank. Set volume to "0".
9. Insert nozzle into equipment's fuel tank and begin fueling. Keep hands on nozzle at all times. **DO NOT** leave nozzle unattended or with fill lock flap engaged. No items can be used to 'jam' the nozzle in the open position, it must be 'manned' at all times. **Fill locks must be disabled.**
10. Avoid distractions and pay attention to ensure that no overflow, spray back, or spillage occurs.
11. When the nozzle shuts off, fueling is completed. Do not attempt to add more fuel. Make sure to allow room for expansion and DO NOT fill over 85% of tank capacity.
12. Once fueling is complete, remove nozzle and wipe with an absorbent pad. Return nozzle to fuel truck; keep spill pad wrapped around nozzle until it's returned to truck.
13. Shut off both the fuel pump and fuel tank on truck.
14. Replace fuel cap on equipment. Seal tightly.
15. Return spill tray to its place on the fuel truck.
16. Record fuel volume transferred in the logbook.
17. Remove wheel chocks, return outriggers if applicable and disengage emergency brake.
18. Exit fuel area slowly and be aware of surrounding traffic and/or personnel.

In the event of a release within the spill tray, on the spill pad or inside the bermed containment area – ensure the impacted material (i.e. spill tray, spill pad, etc.) are removed and properly disposed as hazardous material. Replace the contaminated spill tray with a clean one. Replace any used spill kit materials. Report the incident to your Supervisor and the Environmental Department on Radio Channel 3.

In the event of a release to ground – if it is safe to do so, stop the source of the release and ensure the release is contained using spill pads, spill booms, earthen dyke, or other available means. Immediately report the spill to your Supervisor and the Environmental Team who will arrive on scene and begin remediation.

In the event of a release to water – if it is safe to do so, stop the source of the release and ensure the release is contained using white spill pads, white spill booms, or other available means. If a boat is available and it is safe to do so, it is recommended that booms be placed to further contain the release. Immediately report the spill to your Supervisor and the Environmental Team who will arrive on scene and begin remediation.

### Regulations, Standards and References

- The Manitoba Workplace Safety and Health Act and Regulation, M.R. 217/2006, Part 19 Fire and Explosive Hazards
- BBE Construction Environmental Control Plan (CECP)
- Keeyask Generating Station "Environmental Protection Plan" (KGS Env. PP)

## **Refueling Non-Mobile Equipment within 100 Metres of a Watercourse/Body**

- SWP – 11004 – Petroleum Handling – Diesel, Gas, Oil
- SWP – 11005 – Vehicle & Equipment Fueling
- SWP – 11006 – Hydrocarbon Spill Cleanup
- SWP – 11008 – Use of a Fuel Cube Within 100 Metres of a Watercourse Body

## **APPENDIX 7: CONTRACTOR WASTE MANGEMENT PLAN**



BBE Hydro Constructors LP

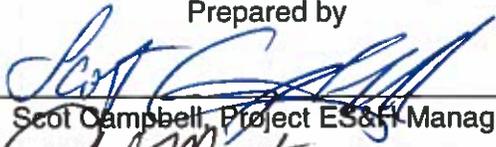
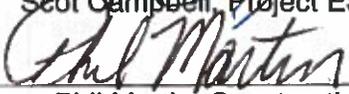
**Project Procedure**

for

**Environment, Safety & Health**

**HAZARDOUS WASTES AND MATERIALS MANAGEMENT**

**KEYYASK GENERATING STATION**

Revision:	<u>01</u>	<u>Gwen Bechtel</u>	<u>05/07/2015</u>
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Approved by:		<u>Scot Campbell, Project ES&amp;H Manager</u>	<u>05/12/2015</u>
			Date
Approved by:		<u>Phil Martin, Construction Manager</u>	<u>5/14/2015</u>
			Date
Reviewed by:		<u>Denis Garrity, Project Manager</u>	<u>5/14/15</u>
			Date

PROCEDURE N°

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## TABLE OF CONTENTS

<b>1.0</b>	<b>PURPOSE &amp; SCOPE</b>	<b>4</b>
<b>2.0</b>	<b>DEFINITIONS</b>	<b>4</b>
<b>3.0</b>	<b>RESPONSIBILITIES</b>	<b>5</b>
<b>4.0</b>	<b>LEGISLATION CONTROLLING MANAGEMENT OF HAZARDOUS MATERIALS</b>	<b>7</b>
4.1	Classification of Hazardous Materials	7
4.2	Hazardous Wastes and Hazardous and Non-Hazardous By-Products	8
4.3	Materials Approvals	8
4.4	Material Safety Data Sheets	9
4.5	Workplace Hazardous Material Information System Labels (WHMIS)	9
4.6	WHMIS Classification	9
4.7	Inventory Control	10
4.8	Hazardous Materials and Hazardous Waste Storage Areas	11
4.9	Generator Number	12
4.10	Hazardous Materials Management	12
4.11	Classification of Hazardous Waste & Manifests	13
4.12	Off Site Transportation and Disposal	13
4.13	Chain of Custody and Record Keeping	13
4.14	Inspections and Monitoring	14
<b>5.0</b>	<b>GENERAL WASTE MINIMIZATION AND MANAGEMENT MEASURES</b>	<b>14</b>
5.1	Work Requirements	14
5.2	Engineering Specification	14
5.3	Minimization of Waste through Procurement Management	15
5.4	Handling and Storage	15
<b>6.0</b>	<b>CONSTRUCTION WASTE MANAGEMENT</b>	<b>15</b>
6.1	Non-Hazardous Waste	15
6.2	Hazardous Waste	16
6.3	Recycling and On-Site Collection Areas	17
6.4	Non-Recyclable Wood Products	18
6.5	Used Oil Management	18
<b>7.0</b>	<b>TRAINING</b>	<b>18</b>
<b>8.0</b>	<b>INSPECTION REQUIREMENTS</b>	<b>18</b>
<b>9.0</b>	<b>WASTE MANAGEMENT MONITORING, RECORDING &amp; REPORTING</b>	<b>19</b>

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9.1 Waste Management Monitoring ..... 19  
9.2 Environmental Incidents..... 19  
10.0 ATTACHMENTS .....19

## 1.0 PURPOSE & SCOPE

This Hazardous Waste and Materials Management Procedure is to provide guidance for managing the use, storage, handling and disposal of hazardous materials during construction on Site to protect the Keeyask Generating Station (KGS) staff, workers, the local public, and prevent releases to the environment.

This procedure is applicable to all KGS staff and Works Contractors, including sub-tiers and suppliers, and any other entity conducting work on the KGS, during mobilization, site development, and construction.

## 2.0 DEFINITIONS

**ES&H** Environmental Safety and Health

**CHWSA:** Central Hazardous Waste Storage Area **Domestic Waste:** Also known as household waste, non-recyclable waste, and garbage including non-hazardous, non-recyclable materials originating from the Works Camp, offices, canteen or BBE construction site

**Non-Hazardous Waste:** Waste which is neither inert nor classified as hazardous waste according to the Manitoba Hazardous Waste Program, which is pursuant to The Dangerous Goods Handling and Transportation Act (TDG) or other applicable rules or regulations

**Hazardous Waste:** Hazardous wastes are defined according to the Classification Criteria for Products, Substances and Organisms Regulation, Manitoba Regulation 282/87

Hazardous characteristics (e.g., flammability, toxicity)

Toxic components (e.g., PCBs, arsenic)

Types of materials (e.g., organic solvents, explosives)

Processes which generate hazardous wastes

**EIR:** Environmental Inspection Report

**PEL:** BBE Project **Environmental Lead**

**Inert Wastes:** Non-degradable, non-leaching, and non-reactive materials such as rock, rubble, soil, and cured concrete and cement

**Waste Log:** Record documenting movements of waste loads removed or exported for recycling, reuse, treatment, or disposal

**Re-Use:** Wastes are used again, on-site or off-site, in a manner similar to the original use of the material

**Recycle:** Wastes are reprocessed, generally by a third-party processing company, to use the wastes as feedstock to create new raw materials for manufacturing new products

**Manitoba Hydro:** The Owner/Operator and Client

**Construction Waste-Water:** Construction waste-water refers to waters that have been generated and/or used by construction activities such as drilling, dewatering, concrete wash out,

sediment laden waters, etc. It does not refer to sewage and grey water generated from Site and Camp ablution, laundry and kitchen facilities

### **3.0 RESPONSIBILITIES**

#### **3.1 BBE Project Manager (PM):**

The PM has overall responsibility for construction on the BBE Site. Specific responsibilities with respect to this procedure include:

Supporting the implementation of this instruction through provision of adequate management support and resources;

Coordinating and raising issues of waste management in the Zero Accident Program, Joint Health & Safety Committee;

Championing waste management initiatives and strategies to improve compliance in the field; and assigning duties to qualified staff members.

#### **3.2 BBE Construction Manager (CM)**

The CM is the site coordinator for all construction actions and activities with the PEL and Works Contractor Management.

#### **3.3 BBE Project Environmental Lead) (PEL):**

The PEL is responsible for:

- Site inspections and compliance evaluations, reporting to the PM, CM, and ES&HM;
- Providing oversight & implementation of Works Contractors mobilization, planning, & waste management programs;
- Day-to-day environmental compliance activities for construction, development, and planning of new waste management strategies, as well as modifications and upgrades to this Waste Management Procedure;
- Day to Day oversight for auditing & tracking of waste sorting, collection, classification, transport and final disposition (recycle or disposal);
- Coordinate site activities for waste management including ensuring that waste containers are properly managed and materials (receptacles/signage etc.) are procured to support the BBE Waste Management Program;
- Identifying and contracting acceptable licensed waste handling sub-contractors for the disposal of waste;
- Ensuring the Waste Log (Attachment E) accurately records the movements of wastes leaving the Project and provides to the Project PEL upon completion;
- Provide a summary of the all waste generated on Site on a monthly basis;
- Raising issues of non-compliance and opportunities for improvement and assuring timely and effective follow up;

- Providing necessary training, awareness and signage to encourage Work Contractors to follow reduce philosophy as described in this procedure;
- Coordinate the sanitary waste hauler's daily activities including daily pumping of portable toilets and sewage holding tanks;
- Coordinate Works Contractor submittal of Waste Disposal and Declaration Plan;
- Review and evaluate Works Contractor compliance plans and provide recommendations for improvements;
- Collecting information from Works Contractors on total quantities of waste produced; and
- Amendments to this procedure as required.

### **3.4 Waste Management Service Contractor:**

The waste management service contractor is responsible for the proper transport under The Dangerous Goods and Transportation Act (TDG) and disposal of all waste generated during onsite activities.

The waste contractor will be responsible for:

- Compliance with Manitoba and Canadian legislative requirements and regulations;
- Ensuring that all operators are qualified for dealing with waste as required;
- Ensuring that disposal facilities are compliant;
- Provision of suitable and sufficient waste receptacles to support waste segregation and recycling initiatives;
- Work closely with the PEL (or designee) to identify a preferred disposal option if any waste not listed in disposal Waste Stream document; and
- Dispose of waste in appropriate manner in approved waste disposal locations.

### **3.5 BBE:**

BBE is responsible for all waste generated as part of BBE construction activities at the project site. This includes both non-hazardous and hazardous waste, as well as special waste destined for recycling (e.g., used oil, drained used oil filters, scrap metal, lead core batteries) and for implementation of this instruction in the field. Responsibilities include:

Implementation of this instruction, including, where practicable, in all procurement and vendor activities;

Conducting inspections and reporting waste management compliance and opportunities for improvement to the BBE PEL;

Housekeeping in construction and waste storage and handling areas;

### **3.6 Project Engineering Manager (PEM):**

The PEM shall develop and review engineering and design specifications to eliminate or reduce the overall generation of waste as part of the design, supply and transportation process.

### **3.7 Project Field Engineer (PFE):**

The PFE provides engineering support, design and construction of waste storage areas, buildings and other facilities in support of the plan.

### **3.8 Field Procurement Manager:**

The Field Procurement Manager shall:

Provide BBE Safety Department with Material Safety Data Sheet (MSDS) for all classified chemicals purchased.

Provide logistics and packing recommendations and specifications which reduce or eliminate wasteful packaging products; and

Evaluate vendors on their compliance with packaging and transport waste minimization requirements as part of the procurement selection process.

## **4.0 LEGISLATION CONTROLLING MANAGEMENT OF HAZARDOUS MATERIALS**

The management of hazardous materials in Manitoba is regulated under a number of bodies of legislation, associated regulations and by-laws, including the following:

- The Environmental Management Act;
- Hazardous Waste Regulations;
- Workplace Hazardous Materials Information System (WHMIS) under the Provincial Occupational Health and Safety Regulations;
- Hazardous Products Act;
- Hazardous Materials Information Review Act;
- Controlled Products Regulations;
- Safe Work Manitoba; and
- Dangerous Goods Handling and Transportation Act.

These regulations define the types of waste that are classified as hazardous wastes, how they are to be stored, transported and how they are to be treated and/or disposed of. BBE and Subcontractors are required to plan their works to assure minimization of hazardous waste usage and generation, separation, storage, handling, packaging, transportation, disposal, document retention and handling, in accordance with these regulations.

It should be noted that the rules and regulations listed above are complicated. To ensure compliance with the regulations, BBE should closely examine this procedure and the rule and regulations in force governing this issue to determine what measures will be required to ensure compliance during the execution of the contract scope of work.

### **4.1 Classification of Hazardous Materials**

Hazardous materials may broadly be defined as any substance or article (solid, liquid, mist, vapour or gas) that poses a threat to human health and/or the environment. Typically, hazardous materials are toxic, corrosive, flammable, explosive or radioactive. Included are a wide variety of man-made (i.e. synthetic) and naturally occurring substances. When misused or mismanaged, they can adversely affect the environment and our health and safety.

Typical hazardous materials that may be used or generated onsite during the course of construction include, but are not limited to the following.

- Gasoline/diesel fuel and oils;
- Oil/lubricants;
- Antifreeze;
- Solvents and thinners;
- Acid;
- Paints/coatings;
- Glues/adhesives;
- Concentrated detergents, disinfectants, and cleaners;
- Additives (such as cold weather stabilizers);
- Compressed gases, fuels, welding gases;
- Sandblasting materials (such as silica abrasives, aluminium oxides);
- Filters from welding vacuums that may contain heavy metals (including hexavalent chromium);
- Batteries (dry cell and car batteries);
- Light bulbs containing mercury (fluorescent) and ballasts;
- Coolants in air conditioners, water coolers, or refrigerators;
- Medical waste;
- Welding rods;
- Ramming paste;
- Wall insulation;
- Oil contaminated soil and used oil; and
- Any materials classified in terms of their MSDS or WHMIS.

#### **4.2 Hazardous Wastes and Hazardous and Non-Hazardous By-Products**

Hazardous by-products may be generated by the use of hazardous materials during construction operations which require special treatment and handling prior to disposal. Typical hazardous wastes generated from construction activities include, but are not limited to:

- Residual paints, coatings, adhesives;
- Spent solvents;
- Contaminated material or soil from spills of hazardous substances; and
- Infectious wastes (bio hazard contaminated).

BBE shall consider the potential for generating or encountering potentially hazardous materials during the course of their Works in advance of commencing construction to ensure that resources are available to manage hazardous materials in accordance with this procedure.

#### **4.3 Materials Approvals**

Prior to bringing any material which contains hazardous or potentially hazardous materials onto site, BBE ES&H Department must ensure that such material is approved for use onsite by reviewing its component materials and ensuring that none of these materials are banned for use as described in Section 4.4 below. A 'Hazardous Material Evaluation Form' included in Appendix B must complete and submit for approval by the ES&H Representative and/or the project Environmental Lead. If, after reviewing the material, BBE ES&H Representative believes that the material properties constitute an acceptable and manageable risk, the BBE ES&H Representative

and/or the Project Environmental Lead shall provide return an electronic copy of the approved form to requestor for information and retain in ES&H records.

Materials or chemicals that have not been agreed to, through the methodology described above, may not be brought or used onsite.

All 'Hazardous Material Evaluation Forms' must be accompanied by the correct manufacturers Material Safety Data Sheet as described in Section 4.5 below.

#### **4.4 Material Safety Data Sheets**

A Material Safety Data Sheet is a technical bulletin that provides specific hazard information, safe handling information, and emergency procedures for a controlled product. Since an MSDS contains detailed health and safety information specific to a controlled product, it should be used as a key source of information for developing training programs and safe work procedures.

BBE ES&H Department shall:

- Ensure copies of MSDSs for hazardous substances brought to site are available to all employees and contractors in hard copy form and maintained in a register and recorded in a hazardous materials inventory as further detailed in Section 4.8;
- Ensure that such MSDSs are within three years of issue date unless otherwise specified by manufacturer;
- Retain MSDS sheets for all materials brought onsite, and provide copies of MSDS sheets for inspection or information as requested by Manitoba Hydro;
- Provide training in the location and use of MSDS sheets;
- Ensure that when hazardous materials are required as part of the scope of work the following information is discussed during pre-task briefings or STARRT meetings:
  - Locations of MSDS sheets;
  - Specific acute risks associated with hazardous materials to be used;
  - Locations of first aid facilities and the identity and contact details of the first aid provider
  - The safe use of hazardous materials;
  - Any restrictions or limitations associated with the hazardous material i.e. no smoking nearby; and
  - The safe storage, handling & disposal of hazardous waste materials and containers.

#### **4.5 Workplace Hazardous Material Information System Labels (WHMIS)**

Where hazardous materials are labelled with a WHMIS label (supplier label or workplace label), BBE ES&H Department shall ensure that this information is recorded and retained and is available for use by workers in the same way as MSDS information.

#### **4.6 WHMIS Classification**

A controlled product is a product that falls into one or more of the hazard classes described below. Manufacturers and suppliers classify these products and assign one or more of the appropriate hazard symbols. There are eight WHMIS hazard symbols. Works Contractors must train workers to recognize these symbols and to know what they mean.



#### **CLASS A: COMPRESSED GAS**

This class includes compressed gases, dissolved gases, and gases liquefied by compression or refrigeration.



#### **CLASS B: FLAMMABLE AND COMBUSTIBLE MATERIAL**

This class includes solids, liquids, and gases capable of catching fire in the presence of a spark or open flame under normal working conditions.



#### **CLASS C: OXIDIZING MATERIAL**

These materials increase the risk of fire if they come in contact with flammable or combustible materials.



#### **CLASS D: POISONOUS AND INFECTIOUS MATERIAL Division 1: Materials Causing Immediate and Serious Toxic Effects**

These materials can cause death or immediate injury when a person is exposed to small amounts. Examples: sodium cyanide, hydrogen sulfide



#### **CLASS D: POISONOUS AND INFECTIOUS MATERIAL Division 2: Materials Causing Other Toxic EFFECTS**

These materials can cause life-threatening and serious long-term health problems as well as less severe but immediate reactions in a person who is repeatedly exposed to small amounts.



#### **CLASS D: POISONOUS AND INFECTIOUS MATERIAL Division 3: Bio-hazardous Infectious MATERIAL**

These materials contain harmful micro-organisms that have been classified into Risk Groups 2, 3, and 4 as determined by the World Health Organization (WHO) or the Medical Research Council of Canada.



#### **CLASS E: CORROSIVE MATERIAL**

This class includes caustic and acidic materials that can destroy the skin or eat through metals. Examples: sodium hydroxide, hydrochloric acid, nitric acid

## **4.7 Inventory Control**

BBE ES&H Department shall be responsible for establishing and maintaining appropriate controls and protocols for dispensing and tracking the use of hazardous materials and maintain a strict and recorded inventory and quantity tracking of all hazardous materials, which are used and stored on site.

#### **4.8 Hazardous Materials and Hazardous Waste Storage Areas**

BBE PEL shall ensure hazardous waste storage areas are designed to meet the requirements of applicable regulations in force.

Notwithstanding the above, the following requirements shall apply to hazardous material and hazardous waste storage areas on the KGS:

- All hazardous material and hazardous waste storage tanks and containers, including those for used oil, will be compatible with the materials to be stored within them.
- Storage tanks and containers located onsite may not be reused or refilled with hazardous materials different from those originally held in the tank or container.
- To minimize the possibility of inadvertent mixing of incompatible materials during handling, incompatible materials will be segregated (e.g., by using distance or physical barrier) in storage areas. Hazardous materials shall be stored separately from hazardous wastes.
- As necessary Satellite Accumulation Areas (SAAs) will be provided in location near the work activities generating the wastes and will be maintained in accordance with the relevant environmental requirements.
- BBE shall designate trained persons as being responsible for managing hazardous waste SAA prior to its removal from site.
- Waste accumulated in SAA shall be managed in accordance with this procedure until it can be removed to a Central Hazardous Waste Storage Area (CHWSA) and/or made ready for removal by a licensed hazardous waste handling company.
- Materials shall only be used in accordance with the manufactures' directions, the product Material Safety Data Sheet (MSDS) recommendations and the approved Hazardous Material Evaluation Form.
- Hazardous materials (not including petroleum products which are addressed below) shall be located in designated areas to optimize control. Storage areas will be constructed, or purchased, prior to bringing any hazardous material or fuel onsite.

The storage areas shall:

- Be located away from existing drainage paths to offsite areas and 15 m or more from wells, open streams, or storm water management structures;
- Be sized appropriately to store anticipated containers with sufficient space between drums to permit visual inspection and allow access for emergency response;
- Be secured to keep unauthorized personnel or animals out and protect the area from vehicles or equipment damage.

All hazardous materials storage locations shall be installed with secondary containment [e.g., impervious concrete pad, soil berm with a high density polyethylene (HDPE) liner, or manufactured secondary containment system designed to provide and maintain an impervious containment system sufficient to hold the larger of 110% of the largest volume of free liquid hazardous waste in any given container or tank or 25% of the total volume of free liquid hazardous waste in storage. Hazardous materials storage locations should additionally:

- Be equipped with fire extinguisher(s) and spill kits appropriate for the types and quantities of materials present;

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- Be managed so that only leak-proof containers are used to store liquids and containers are kept upright and closed at all times unless adding or removing contents;
- Provide protection from rain and wind (roof and sides for chemicals stored in secondary containment on site) to prevent the ingress and accumulation of precipitation to reduce the requirement for testing and analysis prior to discharge.
- Display appropriate signage to identify the hazard (e.g., Flammable - No Smoking or Open Flame within 15m, Hazardous Material). Signs will be written in English.

Containers shall be labelled with the following information as a minimum:

- Hazardous Waste or Hazardous Material;
- Name of the Waste/Material (e.g., waste oil, solvents);
- Hazard Identification (health, flammability and physical hazard);
- Type of Hazard (e.g., toxic, ignitable);
- Date container was filled/placed into storage;
- Be inspected to ensure that MSDSs, inspection records, transportation documents and Waste Logs are up to date and maintained in the project files; and
- Be inspected to ensure all materials that have been moved out of the original container are labelled, with name, hazard conditions, PPE requirements.

#### **4.9 Generator Number**

BBE shall obtain a generator number under M.R. 175/87 Manitoba Conservation and Water Stewardship when construction activities generate volumes subject to The Dangerous Goods Handling and Transportation Act (TDG) guidelines. The BBE PEL shall complete and submit application for a waste generator number and provide Manitoba Hydro Environmental Coordinator copy for file and records.

#### **4.10 Hazardous Materials Management**

- BEE shall establish a formal Hazardous Materials Management Procedure which must address the following management elements: On site storage area for hazardous material will be designed and maintained to prevent and/or minimize and contact with storm water, drainage waterways.
- Designated storage areas will be designed with an underlying impermeable surface (e.g., concrete, plastic lining) surrounded by curbing, dikes or other means to contain small spills and prevent their release into the environment.
- The specific requirements of the Hazardous Waste Regulations as they pertain to the works contractor's scope of work; and
- Roles and responsibilities – These must clearly define responsibilities for staff to ensure the requirements of this procedure are complied with and are communicated to Works contractor staff, new hires and subcontractors.

Training requirements include:

- Introduction;
- Ongoing task-specific training;
- Revised roles and new initiatives;
- The employed person's duties and responsibilities;

- Use of personnel protective equipment;
- Fire and explosion response procedures;
- Spill response procedures;
- Communications and alarm systems (where applicable);
- Use of abatement and cleanup equipment;
- Shut down operations (where applicable); and
- Hazards of all hazardous waste managed at the facility.

Management controls including:

- Descriptions of inventories;
- Supervision of SAA;
- Management of waste disposal inspections;
- Storage & security management;
- Emergency response measures; and
- Description of a systematic auditing procedure for significant aspects of hazardous materials management at site in order to verify its adequacy and performance.

#### 4.11 Classification of Hazardous Waste & Manifests

BBE PEL shall ensure that prior to the offsite shipment and disposal of hazardous waste that the waste has been classified and labelled strictly in accordance with [Section 45.1\(7\) of the HWR](#) and that a manifest has been correctly completed for each consignment of hazardous waste to be transported in accordance with [Section 46\(7\) of the HWR](#) utilizing a manifest form that includes, at a minimum the same information as included on the form listed in [Form 5 of Schedule 5 of the HWR](#).

#### 4.12 Off Site Transportation and Disposal

BBE PEL (or designee) shall ensure that hazardous wastes in quantities greater than the quantity set out in [Column II of Schedule 6 of the HWR](#) are only transported provided the following conditions are met:

- The person receiving the hazardous waste is an authorized consignee;

The person transporting the waste, if so required under section 45, has a licence to transport hazardous waste BBE shall ensure hazardous waste is transported in containers according to [Section 50\(8\) of the HWR](#) prior to shipment.

#### 4.13 Chain of Custody and Record Keeping

BBE PEL (or designee) shall ensure that organizations selected for the off-site removal and disposal of hazardous waste materials are selected on the basis of their ability to comply with applicable rules and regulations controlling the handling and disposal of hazardous waste including, but not limited to, the Hazardous Waste Regulations under the Manitoba Environmental Management Act (See reference 5.3 below) and the Transportation of Dangerous Goods Regulations (reference 5.4 below). The disposal method shall be approved by BBE prior to any disposal being conducted.

BBE PEL (or designee) will track all waste removal and handling subcontractors which defines clearly the fate of waste streams collected, including stabilization, treatment and disposal. This

information shall must be submitted by Works Contractors to BBE for retention in the KGS document management system.

#### **4.14 Inspections and Monitoring**

BBE PEL or (or designee) shall conduct routine inspections and monitoring of all hazardous materials and waste storage areas and satellite accumulation areas for leaks from, or deterioration of storage tanks, in accordance with the timetables specified in this procedure.

BBE PEL (or designee) shall regularly inspect and record the condition of all spill response and leakage detection equipment to ensure that it is adequate for the risk posed by the stored hazardous materials.

### **5.0 GENERAL WASTE MINIMIZATION AND MANAGEMENT MEASURES**

#### **5.1 Works Contractor Requirements**

BBE PEL (or designee) shall review and complete the Waste Disposal Declaration and Disposal Plan (which is included as Attachment A) to this procedure prior to commencing work on Site. The intent of this document is to define waste streams that shall be produced during the course of the works and be used, as the basis of planning for waste management activities for the duration of the contract, in accordance with this procedure.

All waste-streams for which land-filling will be the disposal choice. The BBE PEL (or designee) shall review Waste Disposal. Only waste materials for which no other economic or practicable disposal route can be identified may be land filled.

#### **5.2 Engineering Specification**

The potential for waste generation will be evaluated during process design and technology development, detailed design review, risk assessments and operating reviews and vendor package reviews. Where design evaluations have indicated the potential for significant waste generation, or where waste generation may be avoided or minimized, alternatives will be considered or evaluated further. Such alternatives may include:

- Variations in process technology or operating parameters;
- Variation of equipment or suppliers;
- Consideration of specific designs to capture, contain, or minimize environmental impacts from releases;
- Consideration of more environmentally friendly chemicals (e.g. lubricants and additives); and
- Identified mitigation factors or design requirements and specifications will be included in the appropriate design documents, drawings, equipment specifications or material requisitions for management review and approval.

### 5.3 Minimization of Waste through Procurement Management

One of the largest sources of waste for construction of new facilities is packing materials which accompany any construction equipment and materials shipped to the site..

Shipping and packing specifications will include language requiring the use of environmentally responsible materials and the expectation for using only as much packing material as is required to protect the shipped items. Additionally, the choice of returnable containers, reusable packing material and biodegradable materials is preferred over synthetic, non-recyclable packing material.

Where significant potential for waste generation exists, the PEL shall work with the Procurement Department to develop strategies to minimize packing materials required and ensure appropriate verbiage is included in requisitions to support these efforts.

The Procurement Manager, with assistance from the PEL, will work with major equipment suppliers or the supplier's shipping agents, to help the supplier assess and minimize the impact of packing material.

### 5.4 Handling and Storage

High standards of housekeeping shall be maintained on a daily basis in all areas of the BBE work locations.

BBE and BBE Subcontractors shall ensure:

- Work areas are maintained in a clean and tidy fashion with emphasis placed on proactive waste management in accordance with this procedure;
- Wastes are stored in appropriate receptacles in appropriate storage locations;
- All equipment and materials, required to remain on-site, are adequately secured and protected;
- Where waste is required to be handled and stored prior to offsite transport the following general measures will apply:
  - Spoil, topsoil, and mulch are to be stockpiled in designated areas, where appropriate, and mitigation measure for dust control and water management are to be implemented; and
  - Liquid wastes are to be stored in appropriate containers in secondary containment areas until transport offsite. Containment should have a capacity to hold 110% stored.

## 6.0 CONSTRUCTION WASTE MANAGEMENT

Appendix C gives a breakdown of expected waste-streams and the final disposal options expected.

### 6.1 Non-Hazardous Waste

Non-hazardous waste materials shall be collected and handled in work and laydown areas in accordance with the following general requirements:

- The waste management contractor shall provide sufficient numbers of adequately sized, fit for purpose, sealable waste receptacles for different waste-streams in all work areas; and

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- Appropriate PPE shall be worn at all times when handling hazardous or non-hazardous wastes.

All containers shall be provided with lids that are securely attached when not in use and distributed in locations where they can easily be seen and accessed. Containers shall be emptied on a regular basis to the disposal locations as described in Attachment C.

For any unanticipated wastes that have not been addressed in Attachment C the Waste Management Contractor is responsible for informing the BBE PEL to identify the most appropriate disposal option.

Receptacles for the following waste-streams shall be provided in works areas:

- Plastic containers for recycling
- Ferrous and non-ferrous metals
- Non-recyclable and non-re-usable waste

Liquid wastes such as used oil and hydraulic fluids shall be stored in dedicated areas in accordance with the Fuel & Oil Storage Handling Safe Work Procedure (Ref: SWP - 11004 - Petroleum Handling - Diesel, Gas, Oil and SWP – 1005 – Fueling ) ).

BBE Superintendents are responsible for managing housekeeping and waste segregation within their work areas; they will also designate personnel responsible for picking up litter and collecting non-recyclable waste in suitable waste containers.

The following materials may be neatly stockpiled onsite in an orderly manner, provided it is clear of any access ways and does not present a trip hazard, prior to removal from work areas by the Waste Management Contractor:

- Non Ferrous Metals;
- Ferrous Metals; and
- Wood materials (pallets, dunnage, wood packaging).

## 6.2 Hazardous Waste

Hazardous waste collection will comply with The Dangerous Goods Handling and Transporting Act, regulation 175/87. Hazardous waste materials shall be collected and handled in work and laydown areas in accordance with the following general requirements:

Designated storage areas for hazardous waste and materials will be designed with an impermeable secondary containment with volume in excess of 110% of the largest tank volume. The storage area will be located in a location that provides convenient loading and unloading, with a level and graded driveway adjacent to the storage area

Storage areas will also be covered to protect them from the elements and to minimize collection of storm water or snow in the secondary containment areas. Small amounts of storm water that might collect within these secondary containment areas will be visually examined by the PEL (or designee) and if found to be clean, discharged to the ground.

If snow has accumulated in the secondary containment areas, the snowmelt will be visually examined and, if found to be clean, discharged to the ground.

Alternatively, small containers of hazardous substances may be stored in metal flammable cabinets and/or con-x storage vessel provided the flammable cabinets/con-x storage vessel meet ventilation and fire protection requirements of the materials being stored. Appropriate PPE shall be worn at all times when handling hazardous wastes.

Proper labeling of the receptacles and the area in general will be required, as per MB Guideline 97-03E Used Oil Collection Depot Guideline.

All containers shall be provided with lids that are securely attached when not in use and distributed in locations where they can easily be seen and accessed. Containers shall be emptied on a regular basis to the disposal locations as described in Attachment C.

For any unanticipated wastes that have not been addressed in Attachment C the Waste Management Contractor is responsible for informing the BBE PEL to identify the most appropriate disposal option.

Receptacles for the following waste-streams shall be provided in the hazardous waste collection area.

- Used oil
- Used oil filters ( drained)
- Contaminated soils from spills or leaks
- Used Spent coolant
- Aerosol cans
- Paints and solvents

The CHWSA / Used Oil Collection Depot area will be kept enclosed to discourage unauthorized entry, unless attendant is present.

Legible, weather-proof signs will be posted at the entrance to the storage area identifying the area as a hazardous water collection site. The sign will indicate hours of operation, a contact number and a warning to not leave products at the site without an operator present.

### **6.3 Recycling and On-Site Collection Areas:**

Non-Hazardous waste collection areas shall comply with the following requirements:

- Located away from accommodation areas, wetlands, streams, and drainages;
- Marked to ensure and promote proper waste segregation;
- Marked to show wastes that are not allowed to be stored in the area (e.g., batteries);
- Enclosed to prevent rainwater from entering the area (when applicable);
- Secured (e.g. barricaded or fenced and locked) when Project personnel are not working in the area to prevent unauthorized personnel from entering, mis-use, or theft prior to disposal;
- Kept free of any wind-blown garbage;
- Managed to ensure waste containers are kept covered at all times when not in use;
- An adequate number of labeled or color-coded receptacles will be used to facilitate proper waste sorting and collection;
- Waste receptacles in outdoor areas shall be provided with lids or means to prevent wind from blowing by-products from the receptacle; and
- Wastes will only be stored in containers and areas that have been specially designed for waste storage.

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## 6.4 Non-Recyclable Wood Products

Limited amounts of wood by-products that are unsuitable for re-use or recycling

## 6.5 Used Oil (uncontaminated) Management

Used oil from motor vehicles and construction equipment maintenance will be managed as hazardous waste while temporarily stored in the CHWSA. All used oil shall be stored and handled in accordance with BBE Fuel & Oil Storage Handling Procedure.

Contractors generating used oil shall comply with the following requirements:

- Used oil shall not be mixed with flammable fuels, any liquids containing halogen components, or any other materials as may be specified by applicable Provincial and/or Canadian Federal requirements and regulations ;
- A record of quantities of used oil transported off-site using the BBE Waste Declaration & Disposal Plan, included in Attachment A to this procedure; and
- No used oil shall be disposed of in the sewer systems, storm water system, stream, wetlands, channel, or on the ground.
- Used oil shall only be transported by carriers with the appropriate Provincial and Federal Licenses, namely the Transportation of Dangerous Goods Act. All waste hauler are required to inform BBE of any plans to change for used oil disposal in advance of any off-site transportation other than a designated processing facility located Manitoba Province.
- Used Oil may only be disposed of in licensed facilities located in Manitoba Province. BBE shall retain records of all used oil transported off site under The Dangerous Goods Handling and Transporting Act, regulation 175/87. .

## 7.0 TRAINING

An overview of BBE Waste Management requirements shall be included in the BBE New Employee Orientation. The PEL is responsible for developing training material and assuring that it is maintained with latest Project requirements.

Waste Management training shall also be issued to employees in the form of Toolbox Talks given prior to the commencement of a shift by the PEL or designee.

## 8.0 INSPECTION REQUIREMENTS

BBE PEL (or designee) will inspect all waste handling areas, and general site conditions regularly and weekly inspection reports noting the condition on site which have the potential to result in non-compliance and discuss the results of these inspections with the BBE Superintendents who will oversee the performance of any necessary corrective actions will provide ensure the following aspects are managed in accordance with this procedure:

- Housekeeping and maintenance of waste storage and handling areas;
- Provision and maintenance of waste receptacles;
- Compliance with waste segregation and recycling requirements; and
- BBE Superintendents are also required to undertake surveillance of waste management activities.

Where any deficiencies in waste management standards are noted, these shall be recorded and reported to the responsible BBE supervisor for action and shall be recorded on the BBE Job-

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Site Inspection Report and reported by the PEL or ES&H designee. Any close-out actions agreed shall be recorded for follow-up action by the ES&H department and required to promptly correct any deficiency observed during inspections and confirm close-out to the BBE supervisor.

In order to ensure implementation of this procedure, the BBE PEL shall complete a review of environmental compliance during Site environmental tours. Any opportunities for improvement or examples of non-compliance discovered shall be recorded using the EIR and communicated for action and follow-up.

## **9.0 WASTE MANAGEMENT MONITORING, RECORDING & REPORTING**

### **9.1 Waste Management Monitoring**

The BBE Environmental Monitoring & Reporting Plan defines how shall self-assess their own compliance with BBE Environmental Standards, including waste management.

### **9.2 Environmental Incidents**

All environmental incidents associated with waste management (for example a spill or improper handling of hazardous waste materials) shall be reported by BBE in accordance with the BBE Incident Reporting, Recording and Investigating Procedure (Ref: 25731-101-PR-GHS-00XXX).

## **10.0 ATTACHMENTS**

Attachment A – BBE Waste Declaration & Disposal Plan

Attachment B – BBE Hazardous Material Evaluation Form

Attachment C – BBE Hazardous Waste Disposal Record/ Log

Attachment D – BBE Waste Streams

Attachment E – BBE By-Product Log

Attachment F – BBE Hazardous Material Inspection Form

Attachment G – BBE Facility Hazardous Waste and Material Layout

Waste Item	Disposal Method
Aerosol cans	Drain and recycle metal
Aluminum cans	Recycle bin for aluminum cans
Antifreeze	Used antifreeze drums / recycle / Non Reg. Haz Waste Manifest
Batteries – all types	Hazardous Waste Area / Haz Waste Manifest
Bricks, blocks, porcelain, hardened concrete	Reused on-site
Cardboard	Recycle bin for paper
Fluorescent light bulbs	Hazardous Waste Area / Haz Waste Manifest
Fuel containers & fuel filters	Hazardous Waste Area / Haz Waste Manifest
Oil filters	Used oil area or Maintenance Shop / Non Reg. Haz Waste Manifest
Lumber (treated) & plywood	General waste bin
Lumber (untreated)/pallets/forms	Recycle wood bin
Metal: aluminum, copper, steel	Recycle steel bins
Office/lunch items (food, paper, plastic)	Normal trash cans bin
Oily rags and used absorbents	Hazardous Waste Area if free product is present / Non Reg Haz Waste Manifest
Paints/finishes/caulk/joint compound containers	Hazardous Waste Area / Haz Waste /Manifest
Paper – office waste white or colored	Recycle bin for paper
Pesticides & their containers	Hazardous Waste Area / Haz Waste /Manifest
Plaster/sheetrock	General Waste bin
Plastic bottles (must be empty) for oil/brake fluid/transmission fluid/windshield wash	Hazardous Waste Area / Haz Waste /Manifest
Plastic pipe (HDPE, PVC)	Recycle bin for plastic pipe if applicable
Plastic/rubber pads-tarps-bags-wrap	General waste bin
Propane tanks	Hazardous Waste Area / Haz Waste /Manifest
Refrigeration units including water coolers	Hazardous Waste Area / Haz Waste /Manifest
Soil contaminated with petroleum/oil	Dumpster for oily soil / Shop / Non Reg. Haz Waste Manifest
Solvents & degreasing agents	Hazardous Waste Area/ Haz Waste /Manifest
Spill cleanup materials	Hazardous Waste Area if free product present
Tires	Taken by tire subcontractor / recycled
Used oil/lubricants	Used oil area / recycle / Non Reg. Haz Waste Manifest
Volatiles empty boxes	Burn / under MN issued burn permit
Welding rods	Metal recycle bin

**ATTACHMENT B – BBE Hazardous Material Evaluation Form**

**Attachment A – Hazardous Material Evaluation Form**

- 1) Verify the material has been approved by ES&H? Y  N   
*(If on the approval has been granted go to question 7, one time purchase not included)*
- 2) Does the product contain material on the restricted list? Yes  No
- 3) If yes, is the justification acceptable? Yes  No
- 4) Is the substance/agent
- |  |                          |                          |
|--|--------------------------|--------------------------|
|  | Yes                      | No                       |
| Physical (e.g. flammable, explosives, peroxides)   | <input type="checkbox"/> | <input type="checkbox"/> |
| Chemical (e.g., particulate, gases, acids, vapors) | <input type="checkbox"/> | <input type="checkbox"/> |
| Subject to Hazardous Waste Disposal                | <input type="checkbox"/> | <input type="checkbox"/> |
| Carcinogen/Teratogen                               | <input type="checkbox"/> | <input type="checkbox"/> |

- 5) Possible Exposure Routes/Risk      Possible Controls (Standard PPE Included)
- |              |       |       |
|--------------|-------|-------|
| Inhalation   | _____ | _____ |
| Eye Contact  | _____ | _____ |
| Ingestion    | _____ | _____ |
| Absorption   | _____ | _____ |
| Injection    | _____ | _____ |
| Skin Contact | _____ | _____ |

- 6) Occupational exposure standard to use (OES):
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

7) Recommended Activity Oversight/Monitoring:					Comment
Environmental	Per Use _____	Periodic _____	Random _____	None _____	_____
Hazardous Waste	Per Use _____	Periodic _____	Random _____	None _____	_____
Safety and Health	Per Use _____	Periodic _____	Random _____	None _____	_____

ES&H Representative: \_\_\_\_\_ Date: \_\_\_\_\_

**Attachment C – BBE Hazardous Waste Log**

**Keyask Generating Station Project  
Hazardous Waste Receipt Log  
Hazardous Wastes Received in the CHWSA**

CHWSA Attendant

Date

---

Waste Stream	Origin (BBE or Subcontractor)	Container Type*	Quantity
Waste Oil (Used Oil)			
Spill Cleanup Materials			
Grease			
Contaminated Soil			
Aerosol Cans			
Fluorescent Light Bulbs			
Solvents and Paints			
Alkaline and Rechargeable Batteries			
Lead Acid Batteries			
Used Engine Coolant			
Contaminated Diesel Fuel			

\*Container type examples are 55-gallon drum, 5-gallon container, etc.

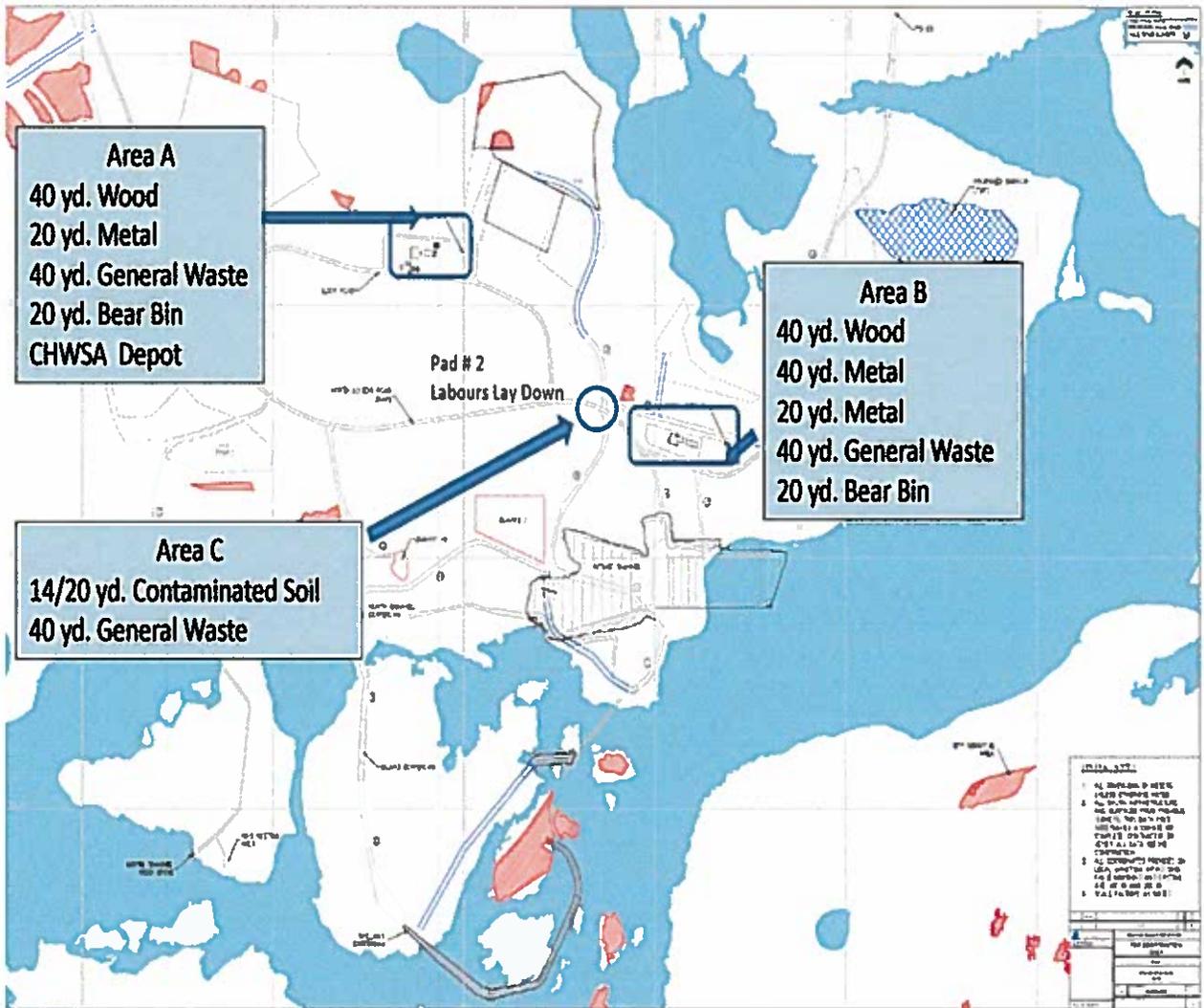
## ATTACHMENT D – BBE WASTE STREAMS

### Waste Streams for Keeyask Generating Station Project

All wastes removed from the work site shall be quantified and documented on the KGS Waste Receipt Log, to be submitted to the BBE Environmental Monitor.

<b>Waste</b>	<b>Storage Location</b>
Undamaged Pallets	Stack near BBE warehouse ( Area B)
Untreated Wood	Recycle Wood Bin in Area A and B
Steel/Iron	Recycle Metal Bin in Area A and B
Food Waste/Domestic Garbage	Bear-proof bin area A and B
Office Wastes (plastics, paper)	General Waste Bin in Area A, B and C
Explosives Boxes	Burn Receptacle in Area G1
Dry Cardboard	General Waste Bin in Area A and B
Spoiled, uncured concrete	Concrete Washout Containment Area A
Cured Concrete	With Waste Rock
Used Spill Pads	Central Hazardous Waste Storage Area ( Area A)
Contaminated Soils	Area C
Used Oil/Lubricants	Central Hazardous Waste Storage Area ( Area A)
Contaminated Fuels	Central Hazardous Waste Storage Area ( Area A)
Used Antifreeze	Central Hazardous Waste Storage Area ( Area A)
Used Oil Filters (drained)	Central Hazardous Waste Storage Area ( Area A)
Electronics, Batteries, or pending profile hazardous wastes	Central Hazardous Waste Storage Area ( Area A)
Glass	General Bin in Area A and B
Tires	Area A (Recycle Tire Distributor)
Painted or Treated Wood	Central Hazardous Waste Storage Area ( Area A)

# BBE Hydro Constructors – Waste Management Bins Location



**BBE Hydro Constructors LP**  
 5/11/2015



**ATTACHMENT F- BBE INSPECTION FORM**

**INSERT ATTACHEMENT F (PDF)**



**BBE Hydro Constructors LP**

**Hazardous Waste & Material Management - Inspection Forms**  
**Keeyask Generation Station Waste Management Program**

<b>TEA ID#:</b>	3107
<b>Site Name:</b>	Keeyask Power Generation Const. Site
<b>Site Location:</b>	SW 7-85-15 EPM
<b>Owner/Operator:</b>	Manitoba Hydro LP / BBE Construction LP
<b>Inspectors Signature:</b>	_____ <b>Date:</b> _____
<b>Type of Inspection:</b>	_____

**LOCATION: Central Hazardous Waste Storage Area (CHWSA)**

**Hazardous Waste**

Is the accumulation start date clearly marked and visible for inspection on each drums/ container?

Yes  No  N/A

Are all containers clearly marked with the words "Hazardous Waste" or Non Hazardous" and content?

Yes  No  N/A

If a container is leaking or in poor condition, are the contents transferred to another container in good condition?

Yes  No  N/A

Are containers made of or lined with materials that are compatible with the waste?

Yes  No  N/A

Are containers kept closed, except when it is necessary to add or remove waste?

Yes  No  N/A

Are containers opened, handled, or stored to prevent leaks or ruptures?

Yes  No  N/A

Are container storage areas inspected daily for leaks and deterioration?

Yes  No  N/A

Are containers of incompatible wastes separated or protected from each other by a physical barrier (dike, berm, wall or other device)?

Yes  No  N/A

**GENERAL WORK LOCATION REVIEW Areas A and B**

Are all containers clearly marked with content?

Yes  No  N/A

Are containers kept closed, except when it is necessary to add or remove waste?

Yes  No  N/A

Are containers kept in secured area (flammable cabinet, or designated con-x)?

Yes  No  N/A

Are container storage outside in secondary containment as required?

Yes  No  N/A

**Labour Laydown Yard /Pad #2 Blasting Area (Contaminated Soil Receptacles)**

Are all containers clearly marked with content?

Yes  No  N/A

Are containers kept in secured area (flammable cabinet, or designated con-x)?

Yes  No  N/A

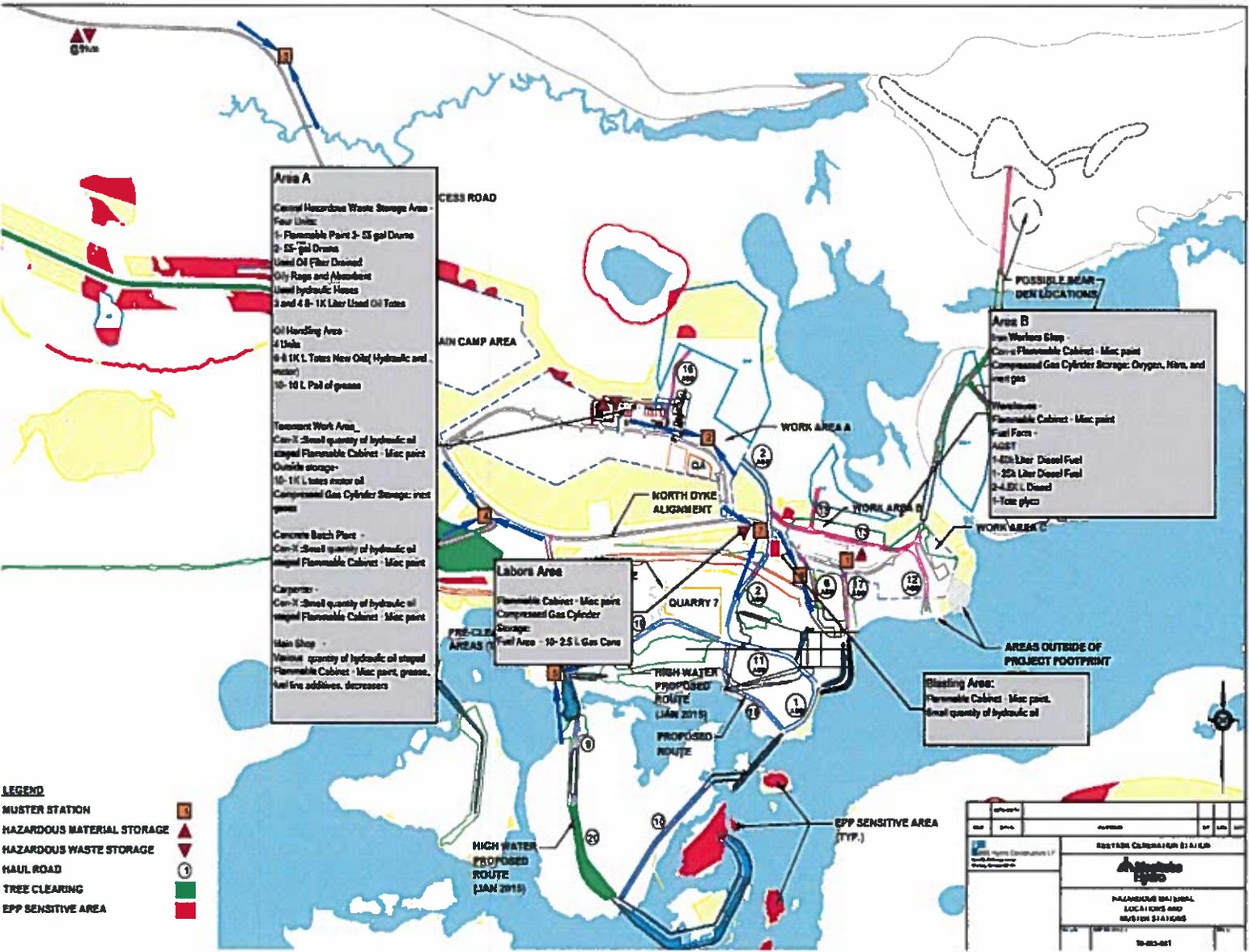
Are containers kept covered, except when it is necessary to add or remove waste?

Yes  No  N/A

Are container storage outside in secondary containment as required?

Yes  No  N/A

**Comments, Observations:**

REV	DATE	DESCRIPTION	BY	CHKD

BBE Hydro Constructors LP  
 10-000-001



**BBE Hydro Constructors LP**  
**Hazardous Waste & Material Management - Inspection Forms**  
**Keeyask Generation Station Hazardous Waste Management Program**

**Daily Inspection:**

*Waste containers, all waste handling areas, and general site conditions will be inspected daily by Keeyask Hydro Project assigned labor supervisor or labors Daily check list will be maintained in CHWSA.*

*Containers used to store hazardous wastes in the CHWSA will meet the following criteria:*

- Containers will remain **closed** during storage, except to add or remove waste.
- Containers will be in "good" condition with no visible defects that could result in leaking or spilling of wastes.
- Liquid wastes must be stored in leak-proof sealed containers (e.g., steel drums with fixed lids).
- Non-liquid wastes may be stored in containers with removable tops (e.g., steel drums with removable heads secured with a steel-band and gasket).
- Properly labeled with content and date.

**Intital Date of Inspection Calandar:**



**BBE Hydro Constructors LP**

*Hazardous Waste & Material Management - Inspection Forms*  
*Keeyask Generation Station Waste Management Program*

May 2015

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

ATTACHMENT- G

BBE FACILITY HAZARDOUS WASTE AND MATERIAL LAYOUT

APRIL - 2015

