Indigenous and Northern Affairs Canada | Affaires autochtones et du Nord Canada

WATER LICENCE INSPECTION FORM

☒ Original
☐ Follow-Up Report

Licensee	Licensee Representative
Major Creighton North Warning System Office 455 Boulevard de la Carriere, Gatineau, Quebec, J8Y 6W6	Scott Charland – NWS A/Environmental officer - NWS Don Beattie – Raytheon Manager, Environmental, Health and Safety- Raytheon Canada
Licence No. / Expiry	**Representative's Title**
3BC-BAF0919	**Acting Environmental Officer**
Land / Other Authorizations	**Land / Other Authorizations**
NIL	Nil
Date of Inspection	**Inspector**
July 19, 2016	A.Keim

Activities Inspected

☒ Camp ☐ Drilling ☐ Mining ☐ Construction ☐ Reclamation ☐ Fuel Storage
☐ Roads/Hauling ☐ Other: Water Discharge ☐ Other: Municipal

Conditions: **A - Acceptable** **C - Concern** **U - Unacceptable** **NA – Not Applicable** **NI – Not Inspected**

Water Use	Condition	Comment	Site Conditions	Condition	Comment	Haz/Mat Management	Condition	Comment
Intake/Screen	A		Water Management Structures	NA		Storage	C	
Flow Measure. Device	A		Culverts / Bridges	NA		Spills	U	
Source: Water Supply Lk.	A		Drainage	NA		Spill Plan	C	
Water Use:	A		Erosion / Sediment	NA				
Recirculation (y /n)	NA		Mitigation Measures	A		**Administrative**		
			Reclamation Activities	C		Records	A	
			Materials Storage	A		Reports	A	
Waste Disposal			Signage	C		Plans	A	
Waste Water	C					Notifications	A	
Solid Waste	C		**Monitoring**			**Other**		
Hazardous Waste	NA		Sample Collection / Analysis	A				

**The number in the comments field will correspond with specific comments provided below.*

Samples taken by Inspector:	Location(s): Samples were collected during the period of Inspection
☒ Yes ☐ No	

SECTION 1 ☒ **Comments** (s.__) ☐ **Non-Compliance with Act or Licence** (s.__) ☐ **Action Required** (s.__)

Administration

The Water Resources Officer (WRO) appreciates the assistance and cooperation provided by Mr. Scott Charland, Mr. Beattie who accompanied the Inspector during the inspection of the site.

The following report is based on observations made at the time of the inspections at the Brevoort Island Long Range Radar Station. A review of the terms and conditions of the water license was conducted during the site inspection. The specific focus of this inspection was to monitor the on-going remediation efforts to address open spill files at the site between 2007 and 2016.

Specifically the Inspector was interested in the following spills;

- 07-011 – 150,000 L of Jet A1,
- 15-104 - 50,000L of Jet A1,
- 15-321- 856 L of Jet A1,
- 15-334 - 250 L of Jet A1 impacted soils.

A review of the Nunavut Water Board FTP – Public Registry was conducted during the writing of this report. An annual report for the 2015 annum, completed by Raytheon Canada was located. This report is a requirement under the terms and conditions of the Water License. The annual report was found to include those items listed in Section 1 (a) through (g) of Part B General Conditions.

Additionally, it was noted that the report detailed that there had been 11 uncontrolled releases of Waste (spills) at the site in the 2015 annum. The report contained the information required to meet the spirit of section 6 (C) of Part H –

Conditions applying to Spill Contingency Planning – Submission of a report on each occurrence, submit to the Inspector, no later than thirty (30) days after initially reporting the event, a detailed report that will include the amount and type of spilled product, the GPS location of the spill, and the measures taken to contain and clean up the spill site. While not strictly in accordance with the License the Inspector notes that all required information was submitted for review. It is also noted that a report on the Reclamation work undertaken on site was included in the 2015 annual report. This information assisted the Inspector in the review of on-going activities on site.

It is noted that the Licensee has shipped hazardous wastes off site and that the Manifests were also included in the annual report.

Finally, clarification was sought during the Inspection with respect to the open burning of wood and card board on site. The Inspector referred the licensee to sections 4 and 5 of Part D: Conditions Applying To Waste Disposal.

Section 4 references the Incineration of acceptable food wastes, paper waste and untreated wood products. Section 5 contains specific prohibitions with respect to Open burning of wastes including: plastics, wood treated with preservative, electric wire, asbestos or painted wood. Given the Incinerator remains off line and the immediate need to burn Paper products and untreated wood remains the Inspector has agreed that this will be allowed subject to the installation of a containment or burn box where these items may be burned and the removal from site of the ash generated by this activity. This is a modification of previous decisions by the Inspector, which were based on site observations made during previous inspections. The current decision is subject to review and continuation of this activity will be based on site conditions and observations made during the next inspection of the site.

SECTION 2 ☒ **Comments** (s.__) ☐ **Non-Compliance with Act or License** (s.__) ☐ **Action Required** (s.__)

Site Inspection:

The Inspector acknowledges and would like to thank Ms. Amanda Winegardner, Water Management Specialist, Indigenous and Northern Affairs Canada. Ms. Winegardner provided insight, technical advice and support to the Inspector leading up to and during the Inspection of the site. This advice and support was critical to the review of the on-going reclamation activities and processes employed by the Licensee in response to the complex composition of the contact water collected during the cleanup effort.

Once on site the Inspection centered on the on-going reclamation activities and site works undertaken by the licensee since the last inspection.

With respect to the 07-011 spill; ruminants of that spill remain on site in the form of waste liner, plastics, portable containment berms, bags of activated carbon, hoses and contaminated soils stored beside the airstrip. The inspector noted that the wastes from the clean up associated with 07-011 remain on site behind the ATB. These waste items should be containerized and hauled off site or stored properly. The contaminated soils piles were documents and one sample was collected from the ponded water. That sample did not return any results in exceedance of the water license. The Licensee also was scheduled to have a contractor attend the site to examine the piles to ensure the impacted soils were now free of contamination and could be used for fill on site. The results of this testing are still outstanding.

With respect to the 2015 spill 15-104;

- The spill was initially discovered during maintenance activities at the site on March 19th, 2015
- The spill originated in the last (eastern most tank) installed at the summit in 2013.
- Final estimate of fuel released from the tank is approximately 50,000 L
- Spill was caused by faulty wiring on the installation of an unapproved sump pump installed within the tank resulting in the back up of fuel into the tank and eventual overtopping. Additionally, as the recommended remote sensing system initially required by the inspector following the 2007 spill has not yet been installed there remains no way to immediately identify a fuel system malfunction on site.
- Following the initial discovery the spill extent was delineated and an action plan was initiated by the licensee
- Impacted snow was collected and approximately 5,000L of free product was salvaged in the first few days following the discovery of the spill.
- Over the course of the summer of 2015 approximately 2 million liters of contaminated contact water was collected, treated and released back to the environment and resulted in an additional 5,000 L of fuel being collected.
- During the 2015 season however, following the excavation of a down gradient interceptor collection trench (ditch) the ground water collected was found, during testing, to have Phenol concentrations that exceeded the License limits. (up to 448 µg/l)
- In response to this finding the 2016 treatment process was reviewed and modifications to the initial process were adopted. These modifications were documents and submitted to the Nunavut Water Board and the Inspector for review.

- Up to 7 monitoring wells (some left from the 2007 and 2011 spills were being monitored for both free product and the movement of ground water.
- The diversion trench had been filled in at the time of the Inspection and a vapor extraction system (forced air) is in place to promote the additional use of Ozone in this treatment system.
- There were obvious signs of staining throughout the site and free product was found in 5 of seven wells. It was also noted that some free product was identified moving south of the spill site into the boulder field and an ad hoc oil/water separator was installed to catch this material.
- Ground water (contact water) collected via the treatment system and monitoring wells is pumped into an oil/water separator and then into a large holding tank. This water is allowed to settle and then is retreated through another separator and particulate filter system.
- This water is then heated to between 32° and 38°C and passes through a forced air (Air stripper) system where the higher fractions are mostly volatilized. The addition of a highly concentrated (40%) Hydrogen Peroxide mixture is then added to the treated contact water. The addition of the Hydrogen peroxide at this stage assists in the breakdown of remaining phenols. The water is then cooled and run through activated carbon filters.
- This mixture is then transferred to a tank outside the treatment facility where it is discharged.
- During the period of the Inspection several up-grades and modifications to the system were still underway including the process for inputting the Hydrogen Peroxide as well as the addition of a UV light system in order to increase the effectiveness of the treatment system and reduce the amount of activated carbon required.

This treatment system was in use during the period of Inspection and one up-date since the Inspection has been provided to the Inspector. It is unclear how the system worked during the highest period of ground water flow. The Licensee will be required to provide a report on their progress and test results outlining any exceedances of the license criteria identified during the cleanup.
Following the Inspection and during the development of this report, research indicates that there have been 21uncontrolled releases (spills) associated with this site since 2007. It is highly recommended that the Licensee revisit the lessons learned from the 2007 spill incident and again determine the availability and opportunities that may be available with the incorporation of a remote sensing technology to more quickly identify potential spills and thus reduce the impact associated clean up.
Finally, On-going monitoring of the site and ground water movement will now be required going forward. As it is no longer possible to distinguish between the PHC from the 2007 or 2015 spills, the relatively small footprint at the summit and the identified of Phenols in the groundwater. On-going monitoring is highly recommended by the Inspector. If necessary this may be made into an order as required.

Water usage:
Water usage was within the limits as set by the license and records were available for review during the period of Inspection.

Waste Management:
As identified earlier the licensee is to develop and submit a plan to the inspector and the board to facilitate the open burning of clean wood and paper products on site prior to undertaking this activity.

The inclusion of records in the annual report with respect to the shipment of hazardous wastes off site I excellent however the licensee is reminded that these records are to be available on site so they may be reviewed by an inspector.

On-going and continued maintenance of the sewage treatment/Lagoon systems are to be maintained. Wash outs and overtopping of these facilities can be avoided through regular inspections. It is recommended that the Licensee and the contactor on site develop some schedule for regular inspections of these facilities.

Waste materials that are no longer in use and are left over from previous activities should be consolidated and if no longer required either stored or shipped off site. Materials left open to the elements are subject to deterioration and to be windblown / ejected off site. This can be avoided and is to be addressed prior to the period of the next Inspection.

SECTION 3	☐ Comments (s.__)	☒ Non-Compliance with Act or License (s.__)	☐ Action Required (s.__)

Non-compliance

Without Prejudice.

The Nunavut Waters and Nunavut Surface Rights Tribunal Act;

12. (1) Subject to subsection (2) and except in accordance with the conditions of a license, no person shall deposit or permit the deposit of waste

(*a*) in waters in Nunavut; or

(*b*) in any other place in Nunavut under conditions in which the waste, or any other waste that results from the deposit of that waste, may enter waters in Nunavut.

(2) Subsection (1) does not apply in respect of

(*a*) any unlicensed deposit of waste that is authorized by the regulations; or

(*b*) the deposit of waste in a national park.

Based on observations and photos collected during the period of the Inspection, the Inspector believes that the Licensee has failed to adhere to section 12 as above and is in contravention of the Act.

No further enforcement actions are recommended at this time given the remedial actions undertaken by the licensee. However, on-going compliance and inspection activities will be required to ensure continuing efforts are maintained to achieve and maintain compliance with the Act and the License.

Photo Log			
Date	**Authorization**	**Camera**	**Inspector**
July 19, 2016	**3BC-BAF0919**	**Sony Cyber shot**	**A. Keim**

Figure 1 Beach tank farm. New tanks (5) Five in-service and two awaiting installation

Figure 2 Pump station at Beach

Figure 3 Legacy- Beach tank removal project

Figure 4 Legacy Beach tank removal project - Berm wall breach to remove water (2015)

Figure 5 Beach pump house July 19,2016

Figure 6 Baf -3 Air terminal building / Storage

Figure 7- Behind ATB Building - Absorbant material bags to be cleaned up

Figure 8 Behind Baf-3 ATB waste plastics liner to be consolidated and shipped off site

Figure 9 Behind ATB - Waste Plastic and liner - To be consolidated and waste shipped off site

Figure 10 ATB Storage - Activated charcoal for filters

Figure 11 Land farmed contaminated soils from a spill in 2007, (07-011)

Figure 12Land farmed soils/ contact water collected from a spill in 2007, (07-011)

Figure 13 Raw water source

Figure 14 Raw water Pumping station

Figure 15 BAF-3 upper site- fuel clean up and containment of contact water

Figure 16 Effluent lagoon site at Baf-3

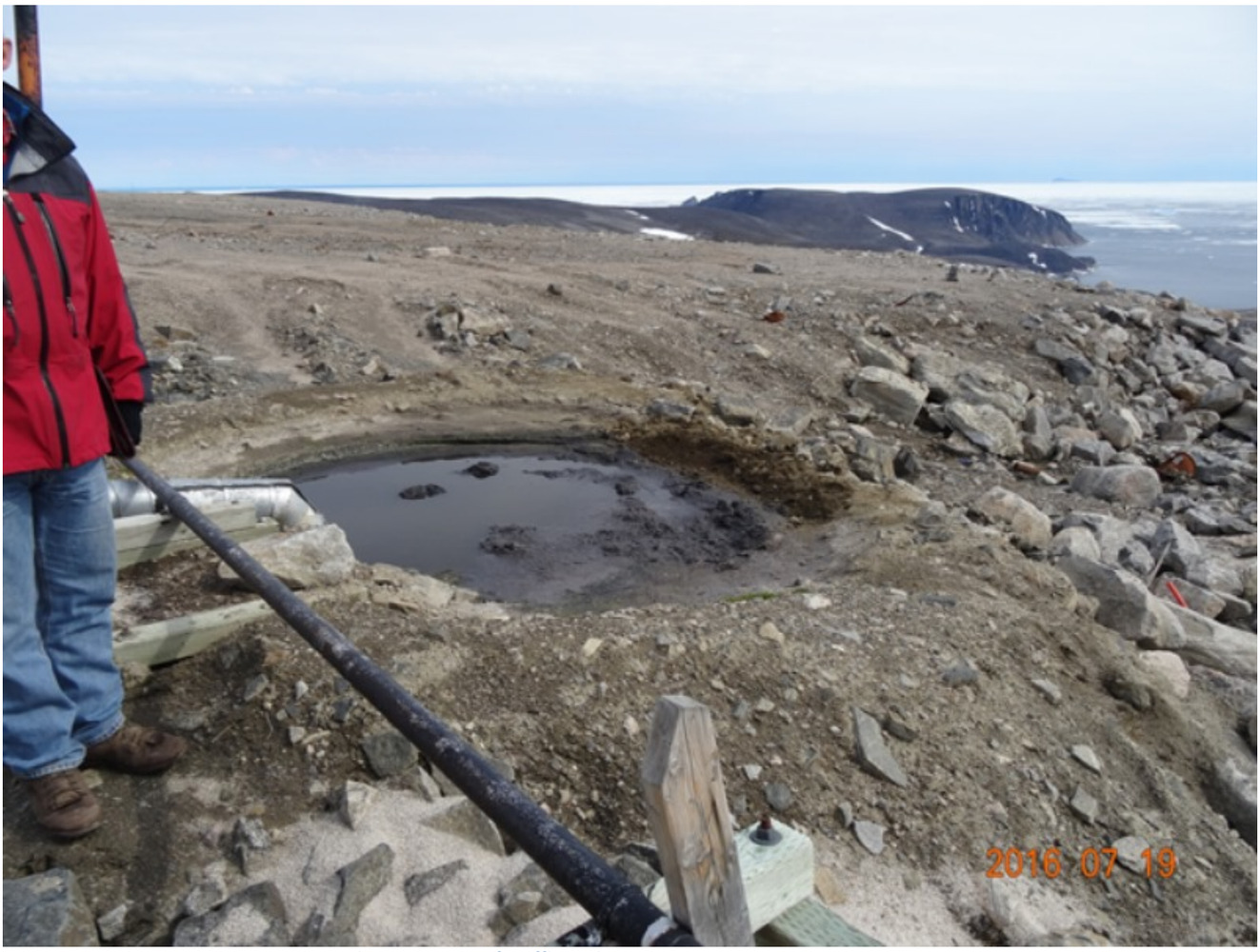

Figure 17 On going maintenance required to maintain Baf-3 Effluent lagoon

Figure 18 Cofferdams -North side - A.Winegardener

Figure 19 Direct discharge of treated hydrocarbon impacted water

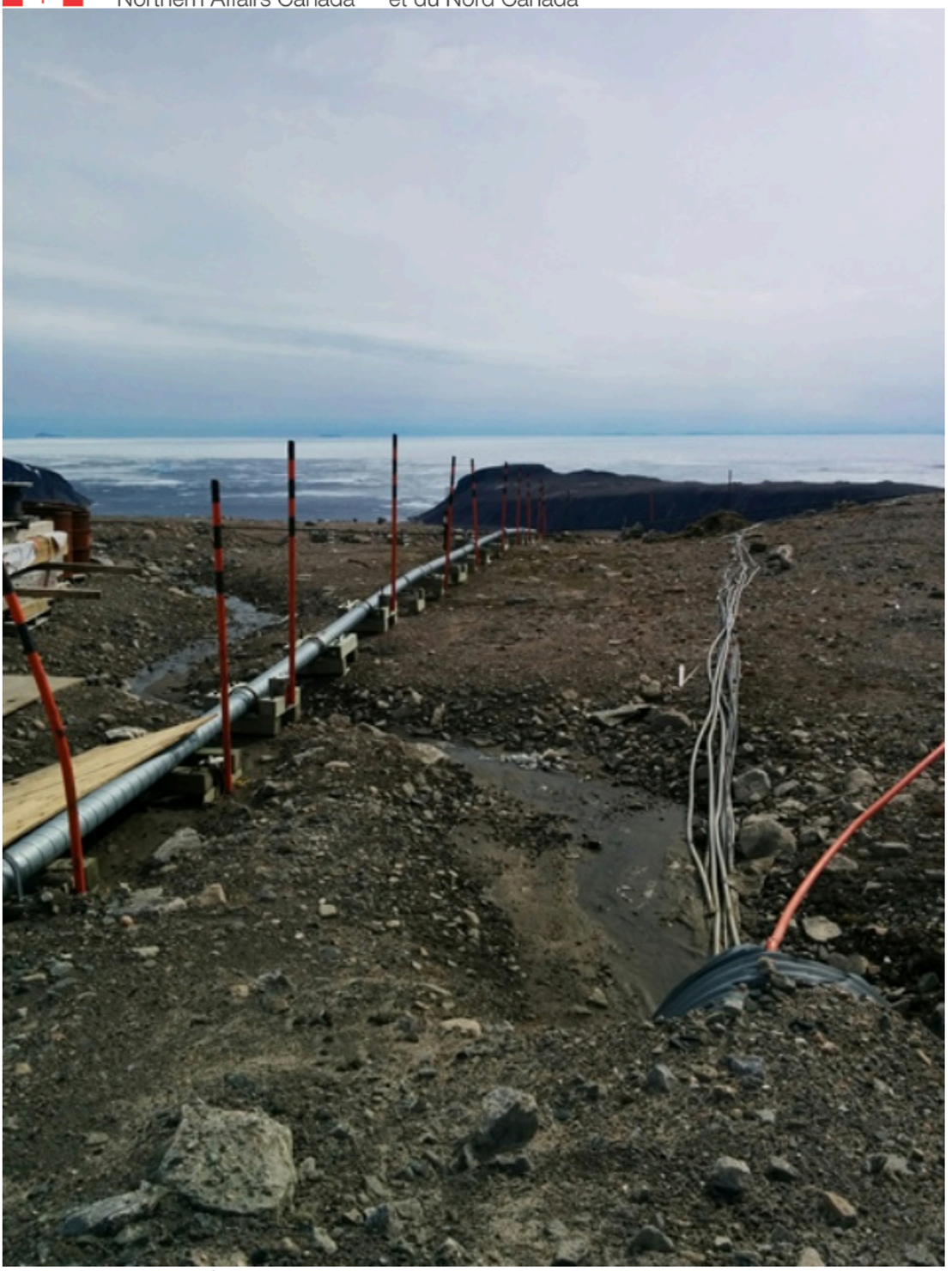

Figure 20 Direct discharge flow pathway - A.Winegardener

Figure 21 Effluent containment Berm for impacted water A.Winegardener

Figure 22 Hydrogen peroxide testing area A. Winegardener

Figure 23 Hydrogen Peroxide infusion and carbon filtration systems in place on site A.Wingardener

Figure 24 Influent containment A. Winegardener

Figure 25 Site of L Trench where Ozone infusion treatment is underway A.Winegardener

Figure 26 Oil Trap installed on south side to catch surface flow A.Winegardener

Figure 27 Tank installation at summit of baf-3

Figure 28 Influent berm

Figure 29 Sampling discharge

Licensee or Representative	Inspector's Name
	A. Keim
Signature	**Signature**
	On original document
Date	**Date**
	02/8/2016

Office Use Only: Follow-up report to be issued by Inspector	☐ Yes ☐ No