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18 October 2017

ECCC File: 6600 000 025/006
NWB File: 1BR-FRA1016

Via email to: richard.dwyer@nwb-oen.ca

Richard Dwyer
License Administrator
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0

Re: Response to ECCC's Letter Dated September 12, 2017, Titled "1BR-FRA1016 – Defence Construction Canada – PIN-3 Lady Franklin [Point] Project – Long Term Monitoring Program"

Dear Mr. Dwyer,

DND has reviewed the above-mentioned letter and is submitting this letter in response to the recommendations provided therein.

DEW Line Clean-Up Historical and Legal Context

Preliminary environmental investigations of the 21 DEW Line sites under DND's jurisdiction were initiated in 1989-1990. In the absence of an applicable federal or territorial approach to addressing multiple contaminated sites of this magnitude in the arctic at that time, the DEW Line Clean-Up (DLCU) Protocol was developed in 1991 to provide a comprehensive strategy for assessing and remediating DND's DEW Line sites. The DLCU Protocol was endorsed by multiple government agencies, including Environment Canada, Indian and Northern Affairs, the Department of Fisheries and Oceans and the Government of the Northwest Territories. The DLCU Protocol was updated in 1994 as a result of community consultations, further scientific studies, development of engineering designs for landfills situated in permafrost and ongoing consultations with regulatory agencies. When Nunavut became a territory in 1999, the DLCU Protocol continued to be applied to those sites within its borders. Refer to Attachment 1 for an excerpt of the protocol.

Subsequent to the development of the DLCU Protocol, three legal agreements were signed between DND and Nunavut Tunngavik Incorporated (NTI), which is the legal representative of the Inuit of Nunavut for the purposes of treaty rights and negotiations. These agreements govern the remediation and long term monitoring of all former DEW Line sites in Nunavut, including PIN-3:

1. *Agreement Between Nunavut Tunngavik Incorporated and Her Majesty in the Right of Canada as Represented by the Minister of National Defence for the Clean-up and Restoration of Distant Early Warning Sites Within the Nunavut Settlement Area* (NTI-DND Environmental Provisions, September 1998).

Canada

2. *Agreement Between Nunavut Tunngavik Incorporated and Her Majesty in the Right of Canada, Represented by the Minister of National Defence With Respect to Economic Benefits for Inuit in the Clean-Up and Restoration of Distant Early Warning Sites Within the Nunavut Settlement Area* (NTI-DND Economic Agreement, August 2001).
3. *Agreement Between Nunavut Tunngavik Incorporated and Her Majesty in the Right of Canada, Represented by the Minister of National Defence With Respect to the Phase II Post-Clean-up Monitoring of Distant Early Warning Sites Within the Nunavut Settlement Area* (NTI-DND Monitoring Agreement, May 2005).

All of these agreements can be found on the Nunavut Water Board (NWB) Public Registry (refer to Attachment 2 of this letter for the relevant hyperlinks).

Response to ECCC Recommendations Re: Groundwater Monitoring Program Contaminants

In Section 1 (page 2) of the above-mentioned letter, ECCC made the following recommendation:

- a) *ECCC recommends that the Proponent consider analyzing additional parameters [over and above total concentrations of arsenic, cadmium, chromium, cobalt, copper, lead, nickel and zinc] by using a full ICP metal scan when monitoring groundwater.*

As per the NTI-DND agreements, the objective of the DEW Line long term monitoring program is to evaluate landfill stability using a multidisciplinary approach including geotechnical visual inspections, thermal monitoring of permafrost, and chemical monitoring of soil and groundwater. These monitoring results (visual, thermal and chemical) are interpreted in concert with one another. Consequently, the monitored soil and groundwater parameters are targeted to include only the DEW Line-specific contaminants of concern that were identified in the DLCU Protocol (arsenic, cadmium, chromium, cobalt, copper, lead, mercury, nickel, zinc and PCBs), as well as total petroleum hydrocarbons (TPH), which were later added as an additional contaminant of concern.

This specific parameter list for groundwater monitoring is reflected in Section 3.2 (page 50) of the NTI-DND Environmental Provisions (September 1998). Water samples are to be tested for additional parameters, including “inorganic elements by ICP scan”, only if the site is located close to a drinking water source. PIN-3 is not located near any known drinking water sources; the nearest community is Kugluktuk, approximately 105 km to the southwest.

After more than a decade of chemical monitoring at DND’s DEW Line sites, a comprehensive evaluation of the groundwater analytical results was conducted in 2013. It was concluded that mercury and PCBs in groundwater are not useful indicators of potential landfill failure; the other more mobile contaminants in the groundwater monitoring suite are more effective indicators. The DEW Line Environmental Working Group (EWG) concurred with this assessment, and the DEW Line Steering Committee endorsed the decision to remove the analysis of mercury and PCBs from the Nunavut DEW Line groundwater monitoring program in 2016. Please refer to this notification and supporting documentation published in 2017 on the NWB Public Registry:

[http://www.nwb-oen.ca/public/registry/1%20INDUSTRIAL/1B/1BR%20-%20Remediation/1BR-SHE1016%20CAM%203/3%20TECH/10%20MONITORING%20\(J\)/170324%201BR-SHE1016%20Letter%20to%20NWB-Discontinue%20Hg%20and%20PCB%20Analyses%20with%20annexes-ILAE.pdf](http://www.nwb-oen.ca/public/registry/1%20INDUSTRIAL/1B/1BR%20-%20Remediation/1BR-SHE1016%20CAM%203/3%20TECH/10%20MONITORING%20(J)/170324%201BR-SHE1016%20Letter%20to%20NWB-Discontinue%20Hg%20and%20PCB%20Analyses%20with%20annexes-ILAE.pdf)

In summary, the current list of approved groundwater monitoring parameters at all DEW Line sites in Nunavut includes arsenic, cadmium, chromium, cobalt, copper, lead, nickel, zinc and TPH (or petroleum hydrocarbon fractions F1 to F4).

In Section 1, (page 2) of the above-mentioned letter, ECCC made the following recommendation:

- b) *ECCC recommends that the EWG (Environmental Working Group) consider using the federal interim groundwater quality guidelines as comparison when reviewing the monitoring reports.*

As per the NTI-DND Environmental Provisions (September 1998), results of analysis from groundwater monitoring samples are compared to post-remediation baseline analytical results for each landfill, as this provides a landfill-specific indication of changing localized environmental conditions which could indicate potential landfill instability.

Response to ECCC Recommendations Re: Quality Assurance and Quality Control

In Section 2, (page 2) of the above-mentioned letter, ECCC made the following recommendation:

ECCC recommends that Proponent describe their QA/QC procedures and that these procedures include field duplicates and field blanks.

DND's requirements for QA/QC procedures are specified in the Terms of Reference for every DEW Line monitoring contract. Please refer to the PIN-3 monitoring reports on the NWB's Public Registry for specific details of QA/QC procedures undertaken each monitoring year, including the use of field duplicates and/or field blanks:

[http://www.nwb-oen.ca/public/registry/1%20INDUSTRIAL/1B/1BR%20-%20Remediation/1BR-FRA1016%20PIN%203%20DCC/3%20TECH/10%20MONITORING%20\(J\)/](http://www.nwb-oen.ca/public/registry/1%20INDUSTRIAL/1B/1BR%20-%20Remediation/1BR-FRA1016%20PIN%203%20DCC/3%20TECH/10%20MONITORING%20(J)/)

If further clarification is required, please do not hesitate to contact me at (613) 995-8603 or Alison.Street@forces.gc.ca or the DND DEW Line Senior Project Manager Laura D'Costa at (613) 943-7852 or Laura.D'Costa@forces.gc.ca.

Regards,



Alison Street, P.Eng.
Environmental Specialist, DEW Line Clean-Up and Long Term Monitoring, DND

cc: Gabriel Bernard-Lacaille, Environmental Assessment Coordinator, ECCC
Melissa Pinto, Senior Environmental Assessment Coordinator, ECCC
Laura D'Costa, Senior Project Manager, DEW Line, DND

Attachment 1: Excerpt from DLCU Protocol (1991, Revised 1994)

DEW LINE CLEAN UP PROTOCOL

The DEW Line Clean Up (DLCU) Protocol was originally endorsed by various government agencies including Environment Canada, Indian and Northern Affairs, Government of the Northwest Territories and Fisheries and Oceans at a meeting in Victoria, B.C. in October 1991. This revised version (April 1994) has been slightly modified as a result of:

- Presentations (1992, 1993, 1994) to the Legislative Assembly of the Northwest Territories;
- Community consultations at ten northern communities in 1992 and twelve in 1993;
- Further scientific studies including analytical field testing, leachate testing and barrel sampling;
- Engineering designs for a landfill leachate control system and a contaminated soil containment facility in permafrost;
- Continuing discussions with regulatory agencies, including a second major workshop held in March 1993; and
- Changes in staffing requirements at the North Warning System sites.

The DLCU Protocol, which is divided into three main areas, provides a strategy for dealing with chemical contamination and physical debris at the DEW Line sites.

Contaminated Soils

Remediation is to be applied to soils and sediments where inorganic elements and/or PCBs have been found to be present at concentrations in excess of the DEW Line Cleanup Criteria (DCC); this includes soils contaminated by sewage in outfall areas and lagoons. The

DCC (Table 1) are a combination of the CCME R/P¹ and Quebec B² criteria and were determined, on the basis of site specific investigations, to be protective of the Arctic ecosystem.

Table 1: DEW Line Cleanup Criteria

Substance	Units	DCC Tier I	DCC Tier II
Arsenic	ppm	-	30
Cadmium	ppm	-	5.0
Chromium	ppm	-	250
Cobalt	ppm	-	50
Copper	ppm	-	100
Lead	ppm	200	500
Mercury	ppm	-	2.0
Nickel	ppm	-	100
Zinc	ppm	-	500
PCBs	ppm	1.0	5.0

- Soils containing contaminants above the DCC Tier II level should be excavated.
- Soils containing PCBs and lead at concentrations between the DCC Tier I and Tier II levels may be placed in an on-site engineered landfill.

¹ Interim Canadian Environmental Quality Criteria for Contaminated Sites as of 1991 produced for the Canadian Council of Ministers for the Environment (CCME).

² Quebec Soil Contamination Guidelines as of 1991.

Attachment 2: Links to DND-NTI Agreements on NWB Public Registry

1. *Agreement Between Nunavut Tunngavik Incorporated and Her Majesty in the Right of Canada as Represented by the Minister of National Defence for the Clean-up and Restoration of Distant Early Warning Sites Within the Nunavut Settlement Area* (NTI-DND Environmental Provisions, September 1998).

Cover to page 17:

<http://www.nwb-oen.ca/public/registry/1%20INDUSTRIAL/1B/1BR%20-%20Remediation/1BR-SHE1016%20CAM%203/1%20APPLICATION/2004%20New/040824%20NWB5SHE----Appendix%20III%20DND%20NTI%20Cooperation%20Agreement-IACE%20Part%201.pdf>

Pages 18 to 39:

<http://www.nwb-oen.ca/public/registry/1%20INDUSTRIAL/1B/1BR%20-%20Remediation/1BR-SHE1016%20CAM%203/1%20APPLICATION/2004%20New/040824%20NWB5SHE----Appendix%20III%20DND%20NTI%20Cooperation%20Agreement-IACE%20Part%202.pdf>

Pages 40 to 63:

<http://www.nwb-oen.ca/public/registry/1%20INDUSTRIAL/1B/1BR%20-%20Remediation/1BR-SHE1016%20CAM%203/1%20APPLICATION/2004%20New/040824%20NWB5SHE----Appendix%20III%20DND%20NTI%20Cooperation%20Agreement-IACE%20Part%203.pdf>

Pages 64 to 71:

<http://www.nwb-oen.ca/public/registry/1%20INDUSTRIAL/1B/1BR%20-%20Remediation/1BR-SHE1016%20CAM%203/1%20APPLICATION/2004%20New/040824%20NWB5SHE----Appendix%20III%20DND%20NTI%20Cooperation%20Agreement-IACE-Part%204.pdf>

2. *Agreement Between Nunavut Tunngavik Incorporated and Her Majesty in the Right of Canada, Represented by the Minister of National Defence With Respect to Economic Benefits for Inuit in the Clean-Up and Restoration of Distant Early Warning Sites Within the Nunavut Settlement Area* (NTI-DND Economic Agreement, August 2001).

Cover to page 14:

<http://www.nwb-oen.ca/public/registry/1%20INDUSTRIAL/1B/1BR%20-%20Remediation/1BR-SHE1016%20CAM%203/1%20APPLICATION/2004%20New/040824%20NWB5SHE----Appendix%20III%20DND%20NTI%20Cooperation%20Agreement-IACE-Part%204.pdf>

Pages 15 to 37:

<http://www.nwb-oen.ca/public/registry/1%20INDUSTRIAL/1B/1BR%20-%20Remediation/1BR-SHE1016%20CAM%203/1%20APPLICATION/2004%20New/040824%20NWB5SHE----Appendix%20III%20DND%20NTI%20Cooperation%20Agreement-IACE-Part%205.pdf>

3. *Agreement Between Nunavut Tunngavik Incorporated and Her Majesty in the Right of Canada, Represented by the Minister of National Defence With Respect to the Phase II Post-Clean-up Monitoring of Distant Early Warning Sites Within the Nunavut Settlement Area* (NTI-DND Monitoring Agreement, May 2005).

See Appendix B of the PIN-3 monitoring program summary:

<http://www.nwb-oen.ca/public/registry/1%20INDUSTRIAL/1B/1BR%20-%20Remediation/1BR-FRA1016%20PIN%203%20DCC/1%20APPLICATION/2017%20Renewal/170713%201BR-FRA1016%20Monitoring%20Program%20PIN%203-IAAE.pdf>