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Bâtir le Nunavut ensemble

Petroleum Products Division,
Department of Community & Government Services,
Government of Nunavut

Rankin Inlet Landfarm Operation and Maintenance Plan - 1BR-RAN0914

Date of Application – August 23, 2021

Name and mailing address of Applicant - Petroleum Products Division,
Department of Community and Government Services,
Government of Nunavut, PO Box 590, Rankin Inlet, NU X0C 0G0

Contact Information including phone number(s) and email address –

Sulaimon Ayilara,
Environmental Services Specialist,
Petroleum Products Division
Phone – 18676458444
Email – sayilara@gov.nu.ca

or

Ayo Ogunkoya,
Manager, Technical & Environmental Services,
Petroleum Products Division
Phone – 18676458433
Email – aogunkoya@gov.nu.ca

Name of Facility operator – PPD Rankin, NU

Number of years requesting for water license – Five (5) years

Location GPS - (Lat/Long) 62º 49' 49.66" N, 92º 10' 28.15" W, (UTM) Easting 542,055.88, Northing 6,966,969.53.

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1. INTRODUCTION

The community of Rankin Inlet is located within the Kivalliq Region, Nunavut, on the west coast of Hudson Bay. The community is in a zone of continuous permafrost, which has an active layer of approximately one metre. The Rankin Inlet Fuel Facility is being upgraded. As part of the upgrade, approximately 5,000 cubic metres of hydrocarbon-contaminated soils must be removed from the site and remediated.

Contaminated soils are remediated in a lined engineered landfarm.

The landfarm is located adjacent to the new Rankin Inlet Municipal Solid Waste Site. It will be accessed from the same road. The Government of Nunavut in consultation with the Hamlet of Rankin Inlet selected the site.

1.1 DETAILED DESCRIPTION OF FACILITY

The site for the landfarm is in (Lat/Long) 62º 49' 49.66" N, 92º 10' 28.15" W, (UTM), Easting 542,055.88, Northing 6,966,969.53. (Map sheet number 55K16) near the Hamlet of Rankin Inlet's municipal solid waste site. The landfarm is designed to hold 6450 CU.M. of contaminated soil.

1.2 OPERATION AND MAINTENANCE PLAN

- ✓ Soil is always deposited no deeper than 1 meter.
- ✓ When depositing contaminated soil trucks do not drive over existing contaminated soil as to not track contaminates out of the berm.
- ✓ When equipment leaves the landfarm care should be taken not to track excess material out of the berm.
- ✓ Contaminated soils are turned once a month during snow free seasons. Care is always taken not to rip the liner as this could cause contaminate leakage.
- ✓ No effluent discharge of contaminated material is permitted. Contaminated liquid collected within the treatment area will be dispersed within the containment area over the contaminated soil.
- ✓ Only Type B contaminates shall are stored within the landfarm. No Heavy Metals, glycols and or heavy oils is be placed in the landfarm.

1.3 RUNOFF MANAGEMENT

Our landfarm was designed to manage runoff and eliminate surface and subsurface contamination.

Surface water that appears outside the containment area are being routed around the berms and will have no chance to penetrate the contaminated soils. Water outside the landfarm is not in contact with contaminated soils thus will have no chance to effect Iqalugaarjuup Nunanga or the two small located southwest of the landfarm.

Water that collects inside the containment area have no chance to contaminate local groundwater sources because of the berm and the 60 mil HDPE textured impervious membrane installed.

The landfarm is built in an area where evaporation exceeds precipitation. Any water that does collect in

the sump is not discharged but rather pumped back over the contaminated soil to maximize remediation and evaporation.

Water monitoring wells have been designed into landfarm plan. These wells monitored to ensure no contamination of the local groundwater.

1.4 SPILL CONTIGENCY PLAN/MITIGATION MEASURES TO PREVENT SEEPAGE

Our landform was designed to prevent seepage. The berm was 2 to 1 slope and is lined with an impervious HDPE 60 mil textured membrane. On either side of the liner will be 80mm lift of sand.

This will accomplish two objectives.

- Protect the liner from contacting the native ground that could have sharp edges, which in turn could cause wear and tearing of the liner.
- Protect the equipment from contacting the liner. Over the lift of sand will be a geo-textile membrane with further gravel on top of that. This layer system will ensure containment of the contaminates.

Water monitoring wells have been designed into landfarm plan. These wells will be monitored to ensure no contamination of the local groundwater.

Spill Contingency Plan identifies lines of authority and responsibility, established proper reporting and communication procedures and described an action plan to be implemented in the event of a spill. All the information necessary to effectively control and clean up a spill.

Action Plan

- Potential spill sizes and sources for each hazardous material on site.
- Potential environmental impacts of spill (include worst case scenario)
- Procedures (include alternative action in case of impeding environmental conditions):

  A. Procedures for initial actions

  B. Spill reporting procedures

  C. Procedures for containing and controlling the spill e.g., on land, water, snow, ice using Spill kits, Spill absorbent, booms and earth moving equipment to contain spill.

  D. Procedures for transferring, storing, and managing spill-related wastes.

  E. Procedures for restoring affected areas.

1.5 SOIL QUALITY REMEDIATION OBJECTIVES

The objective of our sample procedure is to obtain commercial levels of petroleum hydrocarbons in soil as a minimum. Based on the GN and CCME Guidelines.

GNWT Commercial Standards for Petroleum Hydrocarbons (PHCs) in Soils (mg/kg soil)									
	Particle Size	Benzene	Toluene	Ethyl-benzene	Xylene	F1 (C_6-C_{10})	F2 (C_{10}-C_{16})	F3 (C_{16}-C_{34})	F4 (>C_{34})
Under building <1.5m	Coarse	5.0	20	0.8	17	310	1700	NA	NA
	Fine	5.0	20	0.8	17	4600	25000	NA	NA
Under building >1.5m	Coarse	5.0	20	0.8	17	340	1800	NA	NA
	Fine	5.0	20	0.8	17	4900	26000	NA	NA
Eco-soil <1.5m	Coarse	5.0	20	0.8	17	330	760	1700	3300
	Fine	5.0	20	0.8	17	660	1500	2500	6600
Eco-soil >1.5m	Coarse	5.0	20	0.8	17	700	2000	3500	10000
	Fine	5.0	20	0.8	17	1000	3000	5000	10000

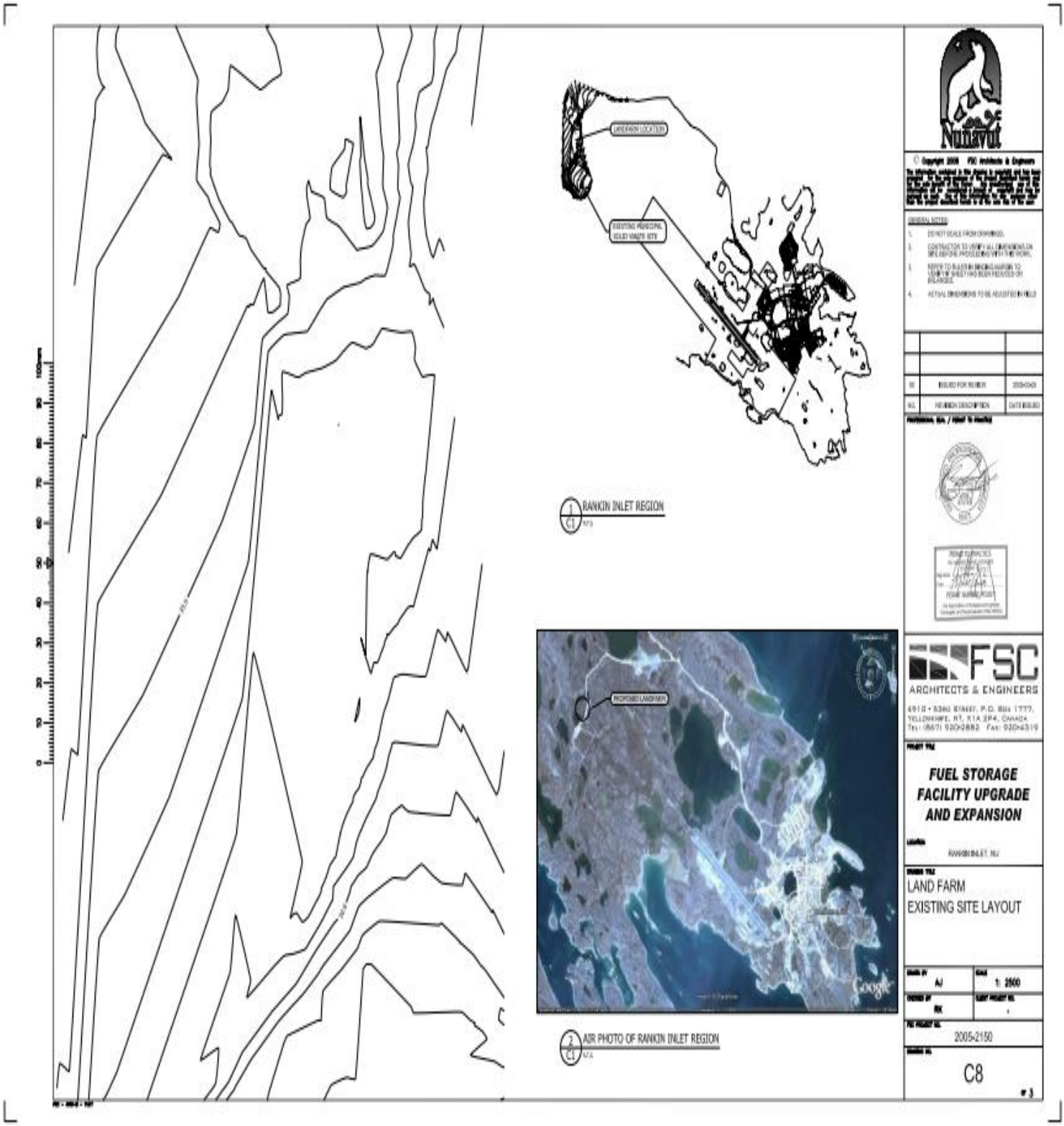
1.6 SITE MONITORING PROGRAM

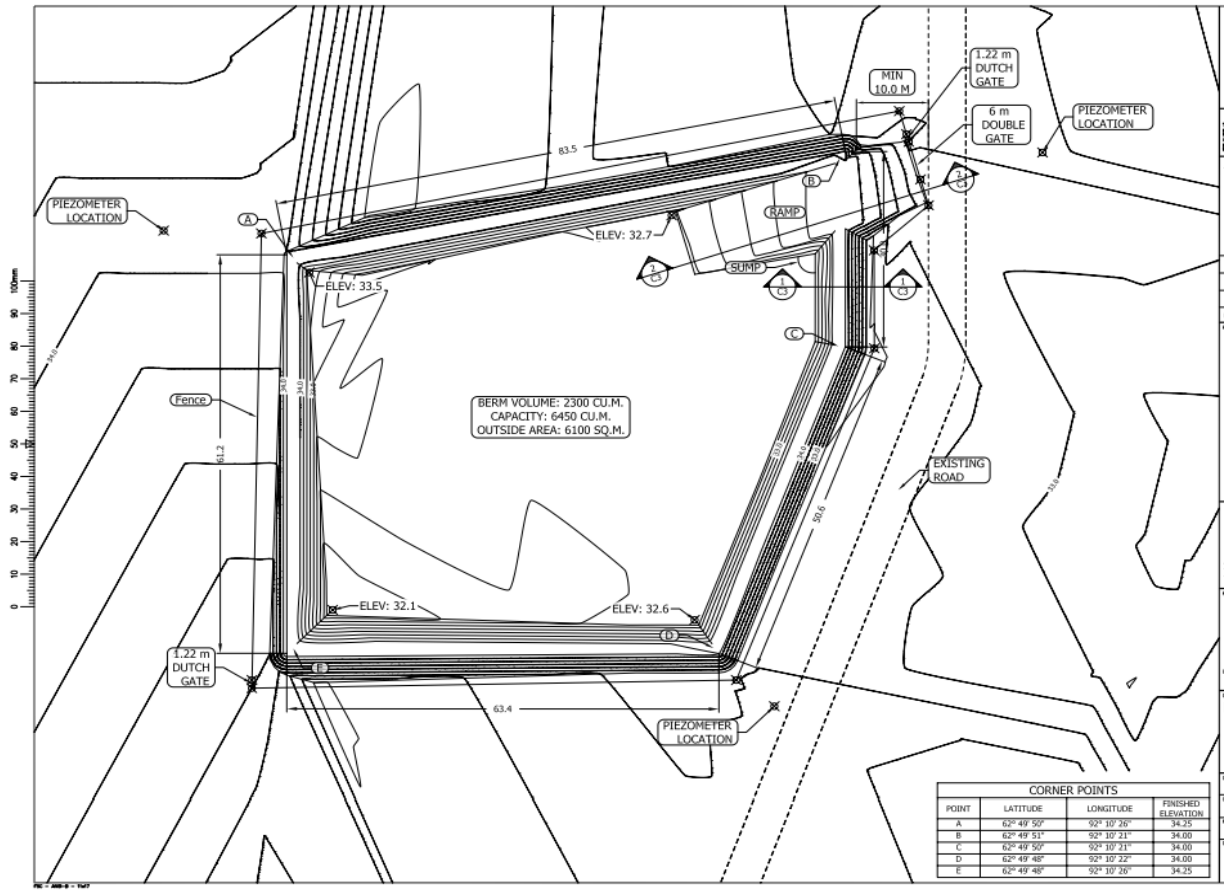
Soil and Water samples are taken once a month, during the snow free season, immediately after the contaminated soil is turned. This is a good indicator of the progress of the remediation. All samples are taken on a 10 by 10-meter grid. Piezometers will be checked monthly until freeze up. Any water collected in any piezometer are tested for:

- PHC
- BTEX, F1 to F4
- Total Metals

During construction of the landfarm, background groundwater parameters were collected and tested for reference. QA/QC programs will be implemented soon as part of our monitoring program.

1.7 MAPS


RANKIN INLET REGION
AIR PHOTO OF RANKIN INLET REGION
PROPOSED LANDFARM
Nunavut
FSC
ARCHITECTS & ENGINEERS
FUEL STORAGE FACILITY UPGRADE AND EXPANSION
RANKIN INLET, NU
LAND FARM
EXISTING SITE LAYOUT
AJ
1: 2500
2005-2150
C8



CORNER POINTS			
POINT	LATITUDE	LONGITUDE	FINISHED ELEVATION
A	62° 49' 50"	92° 10' 26"	34.25
B	62° 49' 51"	92° 10' 21"	34.00
C	62° 49' 50"	92° 10' 21"	34.00
D	62° 49' 48"	92° 10' 22"	34.00
E	62° 49' 48"	92° 10' 26"	34.25

Nunavut

GENERAL NOTES:
1. DO NOT SCALE FROM DRAWINGS.
2. CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE BEFORE PROCEEDING WITH THIS WORK.
3. REFER TO RULER IN BINDING MARGIN TO CONFIRM SHEET HAS BEEN REDUCED OR ENLARGED.
4. ACTUAL DIMENSIONS TO BE ADJUSTED IN FIELD

NO.	REVISION DESCRIPTION	DATE ISSUED
00	ISSUED FOR REVIEW	2008-03-25

PROFESSIONAL SEAL / PERMIT TO PRACTICE

PERMIT TO PRACTICE
PERMIT NUMBER: P 0451
Signature
Date 27/MAY/08

FSC
ARCHITECTS & ENGINEERS
4910 - 53RD STREET, P.O. BOX 1777,
YELLOWKNIFE, NT, X1A 2P4, CANADA
TEL: (867) 920-2882 FAX: 920-4319

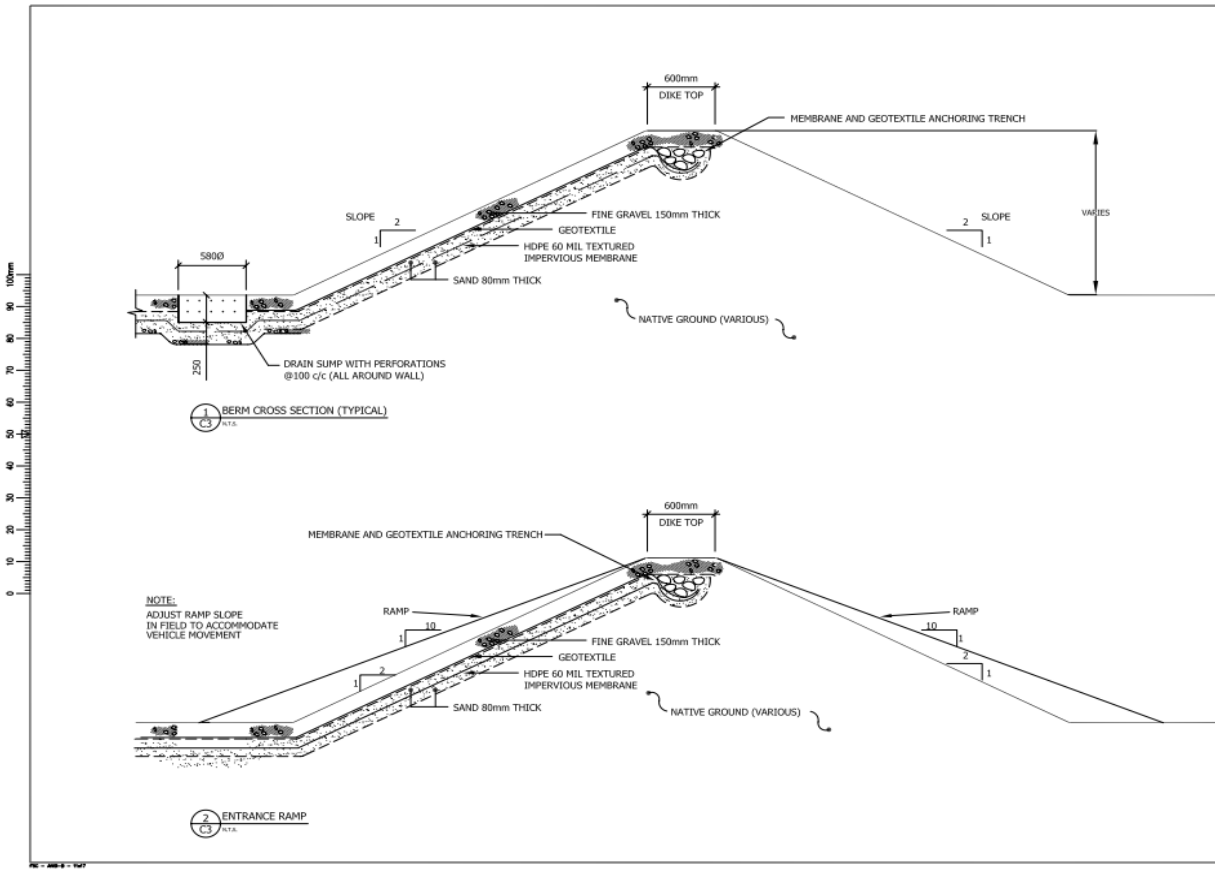
PROJECT TITLE
FUEL STORAGE FACILITY UPGRADE AND EXPANSION

LOCATION
RANKIN INLET, NU

DRAWING TITLE
LAND FARM DESIGN

DRAWN BY: AJ/CP	SCALE: 1: 500
CHECKED BY: RK	CLIENT PROJECT NO.: -
FSC PROJECT NO.: 2005-2150	
DRAWING NO.: C9	

of 3



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PROJECT TITLE
FUEL STORAGE FACILITY UPGRADE AND EXPANSION

LOCATION
RANKIN INLET, NU

DRAWING TITLE
LAND FARM
TYPICAL CROSS SECTION DETAILS

DRAWN BY: AJ	SCALE: NTS
CHECKED BY: RK	CLIENT PROJECT NO.: -
FSC PROJECT NO.: 2005-2150	
DRAWING NO.: C10	

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1.8 HEALTH AND SAFETY CONSIDERATIONS

Landfarming requires the appropriate safeguards for the protection of human health. The potential for uncontrolled emissions, such as volatile organic compounds (VOCs), leachates and odours and any other adverse effects from treatment, needs to be considered on a site-specific basis according to the nature of the contamination and the conditions of the site.

The landfarm is already located 4km from the Hamlet of Rankin Inlet, therefore the chances of emissions reaching the general population are extremely slim. All operational procedures including Personal Protective Equipment (PPE) and methodology are outlined within the Operation and Maintenance Plan associated with this landfarm. If properly operated every year, the risk of emissions affecting the general population or landfarm personnel is significantly decreased (EPA 2014).

PPD will not allow contaminated materials into the landfarm that pose an extreme health risk to the personnel at the landfarm. Unfortunately, those materials will need to be shipped south to an approved facility. The contamination levels can be determined by effective soil sampling.

ENVIRONMENTAL CONSIDERATIONS

Leachate and run-off pose a risk to the area around the landfarm, and appropriate water management systems is in place to control stormwater and spring thaw flow onto and off landfarm.

Materials are in place to appropriately contain all contaminated water from leaching the landfarm which include the diversion of water and leachate to a suitable lined retention pond where it can be recycled over the landfarm materials to maintain moisture content. It should be noted that PPD initiated this control system during summer operations.

Prepared by:

Sulaimon Ayilara,
Environmental Services Specialist,
Petroleum Products Division
Department of Community and Government Services
Government of Nunavut
Rankin Inlet, NU