Report to:

NUNAVUT GOVERNMENT
DEPARTMENT OF COMMUNITY AND
GOVERNMENT SERVICES

Soil Remediation Landfarm
Hamlet of Kugaaruk Annual Report
2006-2008

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WARDROP

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NUNAVUT GOVERNMENT DEPARTMENT OF COMMUNITY AND GOVERNMENT SERVICES

SOIL REMEDIATION LANDFARM HAMLET OF KUGAARUK ANNUAL REPORT 2006-2008

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REVISION HISTORY

REV. NO	ISSUE DATE	PREPARED BY AND DATE	REVIEWED BY AND DATE	APPROVED BY AND DATE	DESCRIPTION OF REVISION

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1.0 INTRODUCTION

The soil remediation landfarm was constructed adjacent to the Hamlet of Kugaaruk during the fall of 2004. Additional work was completed in 2005 to bring the cover material on the cell berms up to specification. A licence application was submitted to the Nunavut Water Board on May 25, 2005, and Licence No. 8BR-KRK0609 was issued on October 13, 2006. Part B of the Licence requires that the Licensee submit an annual report to the Board outlining specified water use and waste disposal activities for each year of operation. The following report provides the required information for the operating years 2006 to 2008.

2.0 REPORTING REQUIREMENTS

Part B of Nunavut Water Board Licence Number 8BR-KRK0609 specifies the information to be included in the annual reports on the operation of the Kugaaruk landfarm facility. Compliance methods for these information requirements for the reporting period from 2006 to 2008 are described in this section.

2.1 WATER USE ACTIVITIES

Section 1(i)a; Quantity of water collected:

Surface water from outside of the landfarm berms is not collected. A ditch alongside the landfarm directs upstream drainage around the facility and back into the natural drainage pattern. The quantity of water collected was not recorded in 2006 and 2007. In the 2008 the volume of water collected was estimated based on the elevation of water within the retention cell prior to pump-out. The water elevation was compared to the design dimensions of the cell in order to estimate the total volume in storage.

Section 1(i)b: Daily water discharge to treatment cells:

No water was intentionally discharged into the treatment cells during the report period. Water accumulation was due solely to precipitation and snow melt.

Section 1(i)c: Quantity of water discharged:

Since the placement of impacted soil into the treatment cell, water was only discharged during the report period in 2008. The volume of the discharge was estimated based on the height of the water in the retention cell.

Section 1(i): Data and rationale for determining quantification:

The only data for determining the quantity of the water collected and discharged is described in the preceding sections

Section 1(i)e: All data

The only data produced for quantity of water discharged in the reporting period is included in Section 5.0 of this report.

2.2 WASTE DISPOSAL ACTIVITIES

Section1(ii)a: Characteristics of Soil Present:

Soil was placed in the landfarm in July 2007. Details on in situ characterization prior to excavation and baseline soil quality data immediately following placement in the treatment cell are included in Section 4 and the appendices of this report. No soil analysis was conducted in 2008.

Section 1(ii)b:Site Delineation

It is not clear whether this section relates to site delineation at the source where the soil originated or delineation within the landfarm. In terms of the landfarm, all of the soil is from the remediation project described in Section 4.1 of this report. If the protocol for delineation of the source site is being requested this information is presented in Section 3.0 and the appended report.

Section 1(ii)c: Historical Total Tonnage

The data on quantity of material placed in the landfarm is included in Section 4.1 and in Appendix B.

Section 1(ii)d: Rate of Degradation

During the reporting period, baseline soil quality samples were analyzed, however no additional sampling was conducted. Therefore, the rate of degradation is not calculated in this report.

Section 1(ii) e: Treatment Efficiency and Amendments

As indicated in the previous section, only baseline soil quality data was produced during the reporting period , therefore treatment efficiency has not been determined. No amendments were added to the soil during the reporting period.

Section 1(ii)f: Quantities of Waste Rock

No waste rock was received at the landfarm, therefore, no waste rock has been treated, stored or removed.

Section 1(ii)g: Effluent from Water Treatment Facility

Water treatment equipment was not used during the reporting period, therefore there is no data to report.

Section 1(ii)h: Soil Profiles, pH, etc.

During the reporting period, the only activity employed to promote biodegradation was the turning of the soil layer to aerate the soil. Measurement of soil temperature, pH and moisture content would typically be done for a more aggressive soil treatment process involving the introduction of amendments to the soil mass. Since amendments were not used during the reporting period, these parameters were not measured.

Section 1(ii)g: Data and Rationale

In all cases where data has been reported, the methodology has been presented In the following sections of this report and in the appended documents.

3.0 ACTIVITIES FOR 2006

In September 2006, Wardrop conducted an environmental site assessment of the former bulk fuel storage facility in the Hamlet of Kugaaruk. The assessment identified four areas where petroleum contaminant levels in the soil exceeded applicable guideline levels for the surrounding land use. It was recommended that excavation of the impacted areas be conducted. A copy of the assessment report entitled, Soil Sampling – Former Tank Farm Site, Kugaaruk (Wardrop, July 2007), is included as Appendix A.

No activity was recorded at the landfarm site in 2006. Wardrop received anecdotal information that the Hamlet of Kugaaruk pumped standing water out of the bermed area of the landfarm. Since no impacted soil had been placed in the cell at this point, there was no reason to suspect that the water contained any chemical contaminants.

4.0 ACTIVITIES FOR 2007

4.1 LOADING OF SOIL TREATMENT CELL

The Nunavut Department of Community and Government Services decommissioned a bulk fuel storage facility in the Hamlet of Kugaaruk in 2005. After the tanks were removed, the department engaged Wardrop to delineate areas of soil contamination related to the former tank site. Wardrop conducted the site investigation in October 2006, and identified five areas that required remediation. The remediation plan consisted of excavating the delineated areas and transporting the impacted soil to the landfarm that had been constructed in 2005 for placement in the treatment cell.

The soil excavation project was conducted in July 2007, by Kudlik Construction under supervision of Wardrop personnel. The excavated material was transported directly to the landfarm. .Approximately 2172 m^3 of soil were placed in the treatment cell. An excavator spread the soils evenly, and ensured that a one-meter perimeter buffer strip was maintained between the toe of the soil and the interior berm. The resulting soil pile was approximately 0.9 m in height. Care was taken to prevent compaction of the soils and damage of the underlying HPDE liner membrane during soil placement.

4.2 BASELINE SOIL SAMPLING AT LANDFARM

Initial soil sampling at the Landfarm Facility took place immediately following the placement of the impacted soil into the treatment area. A total of six composite samples (LF1-2, LF2-2, LF3-2, LF4-2, LF5-2, and LF6-2), were taken to confirm the soil quality for the volume of material. To ensure that samples were representative of the material, the Landfarm was divided into six longitudinal segments by dividing the northwest exterior berm into six equal lengths, and then extending a perpendicular line to the opposite side of the cell. For segment lengths of 50 m or less, four discrete samples were collected from equidistant points along the centre line of the segment. For segments over 50 m in length, an additional discrete sample was taken for every 10 m or less. Samples were collected from approximately 0.3 m below grade.

The Wardrop report entitled, Former Tank Farm Site Remediation, Kugaaruk, Nunavut (Wardrop, August 2008), on the site remediation project and baseline sampling is included as Appendix B.

5.0 ACTIVITIES FOR 2008

The soil in the treatment cell was aerated once in 2008. Kudlik Construction turned the soil on August 26 using a track mounted excavator. Numerous test pits were dug by hand to ascertain the depth to the cell liner. The excavator turned the soil to a depth approximately 45 to 60 cm. This ensured that 15 cm depth of granular cover over the liner was not disturbed.

The water in the retention cell was pumped out on August 26. Kudlik Construction used a 2-inch pump and discharged the water directly onto the ground approximately 10 m south west of the landfarm. No water depth measurements were recorded in the retention cell prior to discharge, but it is estimated that 700 to 800 m^3 of water may have been pumped out. No water treatment process was used for the 2008 discharge.

No analyses of soil or water quality were conducted during 2008.