Appendix B

Landfill Monitoring - Main Landfill South

B.1 Main Landfill South

~~3.2.1~~B.1.1 Landfill Summary

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The Main Landfill-South is located to the east of the main station buildings. The area of the landfill is approximately 15,000 m^2. The depth of the landfill is approximately 1.5 to 2.0 m below surface. The landfill configuration is provided on Figure B-1. Prior to the remedial work in 1999, DCC had classified the landfill as a moderate potential environmental risk. Remediation of the landfill included the installation of a double synthetic liner system anchored into the permafrost along the toe of the landfill and re-grading with the placement of additional granular fill sufficient for permafrost aggradation through the landfill contents.

~~3.2.2~~B.1.2 Visual Monitoring

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Based on the visual inspection, the Main Landfill South area appears to be in good condition with no visible signs of settlement or recent frost action. As shown in photograph MLFS 6, the frost boils observed in previous years are unchanged. There are erosion rills on the slopes along the margins of the landfill, which also appear unchanged. Vegetation cover is sparse and scattered with minimal grass and herb ground cover. Slight colour change on east and south slopes, as noted in 2004, was virtually undetectable. It is noted that 2004 photograph 2-12 appears to have been incorrectly located, and was in fact located at position MLFS 9, as shown on Figure B-1. The site inspection record is appended at the end of this section. Overall, no major evidence of instability or settlement were observed, and overall performance is considered acceptable.

~~3.2.3~~B.1.3 Soil Sampling

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Soil samples were collected at the designated locations of MW 1, MW 2, MW 3, MW 9 and MW 14. The sampling locations are shown on Figure B-1. At each location wherever possible, samples were collected at a depth of approximately 0.10 m below ground and between 0.40-0.50 m below ground. The photograph of each test pit sampled is shown in Appendix B2.

During the sampling there were no odours noted, no visible staining in the soil and no free product observed. The vegetation around the landfill did not appear to be under any stress.

Low concentrations of Total Petroleum Hydrocarbons (TPH) (C10-32) were detected in the shallow sample from soil sample location MW 3. The concentrations noted are not considered to be of significant, however these should be evaluated in the context of the Landfill Monitoring Plan.

APPENDIX B Main Landfill South

The analytical results are tabulated in Table B-1 and the laboratory certificates are provided in Appendix G.

APPENDIX B Main Landfill South

Figure B-1 Main Landfill South

APPENDIX B Main Landfill South

Table B-1 CAM-M Cambridge Bay, Summary of 2004 Soil Analysis – Main Landfill South

Table B-2 CAM-M Cambridge Bay, Summary of 2004 Groundwater Analysis – Main Landfill South

B.1.4 Groundwater

Groundwater elevations and monitor conditions records were documented for observation wells MW 1, MW 2, MW3, MW 9 and MW 14. The records are appended to the end of this section. Generally the observation wells were in good condition. As per the recommendation, J-plugs were installed on the observation monitor wells in 2003. There was insufficient clearance between the top of the pipe and the protective casing lid to permit the installation of the cap on well MW1. In each well, the bentonite grout seal had heaved up inside of the protective casing to an elevation parallel or just below the top of the monitor pipe. Some of the heaved grout around the pipe was removed to permit monitoring of the well and the re-installation of the cap. Ponded water was observed inside of the casing and there appears to be potential for some of the ponded water to overflow into the pipe during the year.

Samples were collected from observation wells MW1, MW2, MW3 MW 9 and MW14 and submitted to the laboratory for analysis. Water samples from MW 9 and MW 2 returned moderate concentrations of Zinc. These concentrations are elevated in comparison to other wells in the area and should be evaluated in the context of the Landfill Monitoring Plan. The analytical results for the observation monitors are tabulated in Table B-2 and the laboratory certificate are provided in Appendix G.

~~3.2.5~~B.1.5 Thermal Monitoring

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The manual readings taken from each thermistor from the Main Landfill – South are provided in Tables B-3 through B-6. The tabulated summary data from the thermistors is appended to this section. The graphs for the 2005 data for these thermistors are provided in Graphs 6 through 9. The graphs for the previous years are also appended to this section.

All thermistors were downloaded, reset and had their batteries replaced. Data loggers with one string attached have an anticipated memory capacity to January 2011. Data loggers with two strings attached have an anticipated memory capacity to January 2008. A full download of the thermistor data loggers should be completed the summer of 2007.

Table B-3 Thermistor String VT4 CAM-M

Thermistor No.	Ohms	°C
1	10060	9.8
2	11880	6.5
3	12880	4.8
4	13960	3.2
5	15210	1.5
6	16600	-0.3
7	17530	-1.4

Note: 1.05 m stick-up.

Table B-4 Thermistor String VT5 CAM-M

Thermistor No.	Ohms	°C
1	9470	11.0
2	11600	6.9
3	12600	5.3
4	13560	3.8
5	14700	2.2
6	15870	0.6
7	16860	-0.6

Note: 0.89 m stick-up.

Table B-5 Thermistor String ITS1 CAM-M

Thermistor No.	Ohms		°C	
	A	**B**	**A**	**B**
1	7514	17130	15.7	-0.9
2	11970	16960	6.3	-0.7
3	16690	15750	-0.4	0.8
4	17570	15470	-1.4	1.2
5	17760	14920	-1.6	1.9
6	18230		-2.1	
7	18730		-2.7	
8	18880		-2.8	
9	18620		-2.6	

Note: 0.58 m stick-up.

Table B-6 Thermistor String ITS2 CAM-M

Thermistor No.	Ohms		°C	
	A	**B**	**A**	**B**
1	7134	17160	16.7	-0.9
2	7842	16660	14.8	-0.3
3	15400	14950	1.3	1.8
4	17230	14160	-1.0	2.9
5	17740	14430	-1.6	2.6
6	18200		-2.1	
7	18720		-2.7	
8	18930		-2.9	
9	18450		-2.4	

Note: 0.84 m stick-up.

Appendix B Attachments

B1 Site Condition/Visual Inspection Records

B2 Geotechnical Inspection Photographic Records

B3 Soil Testpit Photographic Records

B4 Monitoring Well Development Records

B5 Thermistor Data Tables 2005

B6 Thermistor Graphs 2005

B7 Thermistor Graphs 2004

B8 Thermistor Graphs 2003

B9 Thermistor Graphs 2002

B10 Thermistor Graphs 2001

B11 Field Notes

Appendix B1

Site Condition/Visual Inspection Records

Appendix B2

Geotechnical Inspection Photographic Records

Appendix B3

Soil Testpit Photographic Records

Appendix B4

Monitoring Well Development Records

Appendix B5

Thermistor Data Tables 2005

Appendix B6

Thermistor Graphs 2005

Appendix B7

Thermistor Graphs 2004

Appendix B8

Thermistor Graphs 2003

Appendix B9

Thermistor Graphs 2002

Appendix B10

Thermistor Graphs 2001

Appendix B11

Field Notes