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AGRA
Earth & Environmental

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October 18, 1996
Project No. WX-03866

Manitoba Environment
Building 2
139 Tuxedo Avenue
Winnipeg, Manitoba
R2W 5J5

Attention: **Mr. Rick Lemoine, P.Geol.**

Dear Sir:

RE: DISPOSAL OF PAH CONTAMINATED SOIL
CENTRA GAS SUTHERLAND AVENUE ELEVATOR PROJECT
WINNIPEG, MANITOBA

Enclosed please find a letter report to Centra Gas Manitoba Inc. documenting AGRA Earth & Environmental Limited's (AEE) testing of the PAH contaminated soil from the above project, currently being landfarmed at the Mid Canada Soil Treatment Facility in Sanford, Manitoba.

The results of the laboratory analysis indicate that the soil has been remediated to below the CCME Commercial/Industrial criteria. In addition, all of the PAH contaminated water has been incorporated into the soil stockpile, in accordance with AEE's July 5, 1996 letter to Manitoba Environment.

Based on the test results, it is proposed that the soil should be transferred to the adjacent Sanford landfill for final disposal as landfill cover material. Please review the enclosed report and advise AEE on the suitability of the proposed actions. As we would like to move the soil prior to winter, your timely response would be most appreciated.

Sincerely,
AGRA Earth & Environmental Limited

Harley Pankratz, P. Eng.
Manager; Winnipeg Operations

Reviewed By:

Rob Matthews, P. Geol.
Senior Hydrogeologist

cc: Andy Galarnyk, Centra Gas

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October 18, 1996
Project: WX-03866

Centra Gas Manitoba Inc.
444 St. Mary Avenue
Winnipeg, MB
R3C 3T2

Attention: **Mr. Andrew Galarnyk**

Dear Sir:

RE: SOIL REMEDIATION MONITORING
SUTHERLAND AVENUE ELEVATOR PROJECT
WINNIPEG, MANITOBA

1.0 INTRODUCTION

This report summarizes testing undertaken on the PAH impacted soil currently being landfarmed at the Mid Canada Soil Treatment Facility in Sanford, Manitoba. The purpose of the testing was to verify that the PAH Concentrations of the soil were below the CCME Commercial/Industrial remediation criteria and therefore could be used as cover material at the adjacent landfill.

2.0 BACKGROUND

In July 1996, AGRA Earth & Environmental Limited (AEE) obtained approval to undertake a landfarming project for the PAH impacted soil generated during construction of the elevator project at the Sutherland Avenue Operations Building. The soil had been stockpiled at the Mid Canada site pending the implementation of a bioremediation program. However, testing of the soil in June 1996 indicated that implementation of the bioremediation program was not required to reduce the PAH concentrations below the required levels and a modified bio-remediation program (i.e. landfarming) operation was subsequently proposed and approved by Manitoba Environment.

Since July 1996, the soil has been turned and aerated on a regular basis to promote reduction of the PAH concentrations. In addition, contaminated water which was also to be used in the bio-remediation program was sprayed on and incorporated into the soil.

3.0 SOIL SAMPLING

On September 12, 1996, AEE obtained 6 soil samples from the stockpile. The stockpile was divided into 6 roughly equal sections and a soil sample obtained from the centre of each section. The samples were obtained from throughout the entire soil depth, which was about 600 mm thick at the time of sampling. The soil samples were placed in clean glass jars, put in ice packed coolers and taken to AEE's Winnipeg lab. The samples were then transported to AEE's Edmonton laboratory for analytical testing.

4.0 TEST RESULTS

The results of the laboratory analysis for PAH's are appended to this report. In summary, the test results indicate that the PAH concentrations are substantially lower than previous test had indicated and were below the CCME criteria for commercial/industrial sites.

5.0 RECOMMENDATIONS

Based on the results of the lab testing, it is AEE's opinion that the soil is suitable for disposal at the Sandford landfill, as cover material. Further testing or assessment of the soil is not considered necessary.

This letter has been forwarded to Manitoba Environment for their review. Soil disposal at the landfill will be completed once the appropriate approvals have been received from Manitoba Environment.

Yours truly,

AGRA Earth & Environmental Limited

Harley Pankratz, P. Eng.
Manager; Winnipeg Operations

Reviewed By:

Rob Matthews, P. Geol.
Senior Hydrogeologist

Dist: (1) Addressee
(1) Manitoba Environment

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AGRA Earth & Enviromental Limited
Winnipeg, Manitoba

ANALYTICAL REPORT

Date Received: Sept 13/96
Date Sampled: Sept 12/96
Date of Report: Oct 15/96

SOIL ANALYSIS-POLY AROMATIC HYDROCARBONS

Attention: Harley Pankratz

Project No.: WX03866.6000

File No.: EC22275.553

Analyst	Date of Analysis	Parameters	Units	EPA Method	MDL	Sample I.D. No. 97-2268 Sample 4	97-2269 Sample 5	97-2270 Sample 6
ST	10/10/96	Napthalene	µg/g (ppm)	8270	0.005	<0.005	0.028	<0.005
ST	10/10/96	Acenapthylene	µg/g (ppm)	8270	0.005	0.012	0.160	0.064
ST	10/10/96	Acenaphthene	µg/g (ppm)	8270	0.005	<0.005	0.012	<0.005
ST	10/10/96	Fluorene	µg/g (ppm)	8270	0.005	<0.005	0.043	0.010
ST	10/10/96	Phenanthrene	µg/g (ppm)	8270	0.005	0.010	0.150	<0.005
ST	10/10/96	Anthracene	µg/g (ppm)	8270	0.005	<0.005	0.057	<0.005
ST	10/10/96	Fluoranthene	µg/g (ppm)	8270	0.005	0.019	0.340	0.047
ST	10/10/96	Pyrene	µg/g (ppm)	8270	0.005	0.021	0.390	0.048
ST	10/10/96	Benzo (a) anthracene	µg/g (ppm)	8270	0.005	<0.005	0.085	<0.005
ST	10/10/96	Chrysene	µg/g (ppm)	8270	0.005	<0.005	0.220	0.010
ST	10/10/96	Benzo(b)fluoranthene	µg/g (ppm)	8270	0.005	<0.05	0.470	0.140
ST	10/10/96	Benzo(k)fluoranthene	µg/g (ppm)	8270	0.005	<0.05	<0.05	<0.05
ST	10/10/96	Benzo(a)pyrene	µg/g (ppm)	8270	0.005	0.090	0.690	0.200
ST	10/10/96	Indeno(1,2,3cd)anthracene	µg/g (ppm)	8270	0.01	<0.01	<0.01	0.33
ST	10/10/96	Dibenzo(ah)anthracene	µg/g (ppm)	8270	0.01	<0.01	<0.01	0.05
ST	10/10/96	Benzo(g,h,i)Perylene	µg/g (ppm)	8270	0.01	0.05	<0.01	0.26
			Surrogate Recovery					
ST	10/10/96	d4-Dichlorobenzene	%	8270	–	83	65	83
ST	10/10/96	d8-Naphthalene	%	8270	–	68	49	72
ST	10/10/96	d10-Acenaphthene	%	8270	–	88	59	80
ST	10/10/96	D10-Phenanthrene	%	8270	–	86	66	80
ST	10/10/96	d12-Chrysene	%	8270	–	82	95	85
ST	10/10/96	D12-Perylene	%	8270	–	96	–	–

MDL - Method Detection Limit
EPA - U.S. Environmental Protection Agency. 1986. Test Methods of Evaluation of Solid Waste 3rd Ed. Office Solid Waste Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

Report reviewed by:

Marie England
QA/QC Compliance
Laboratory Services

Brenda Chomin, C.E.T.
Manager
Laboratory Services

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ANALYTICAL REPORT

Date Received: Sept 13/96
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SOIL ANALYSIS-POLY AROMATIC HYDROCARBONS

Attention: Harley Pankratz

Project No.: WX03866.6000

File No.: EC22275.553

Analyst	Date of Analysis	Parameters	Units	EPA Method	MDL	Sample I.D. No. 97-2265 Sample 1	97-2266 Sample 2	97-2267 Sample 3
ST	10/10/96	Napthalene	µg/g (ppm)	8270	0.005	<0.005	<0.005	<0.005
ST	10/10/96	Acenapthylene	µg/g (ppm)	8270	0.005	0.038	0.010	<0.005
ST	10/10/96	Acenaphthene	µg/g (ppm)	8270	0.005	<0.005	0.010	<0.005
ST	10/10/96	Fluorene	µg/g (ppm)	8270	0.005	<0.005	<0.005	<0.005
ST	10/10/96	Phenanthrene	µg/g (ppm)	8270	0.005	0.130	0.013	0.011
ST	10/10/96	Anthracene	µg/g (ppm)	8270	0.005	0.015	<0.005	<0.005
ST	10/10/96	Fluoranthene	µg/g (ppm)	8270	0.005	0.170	0.024	0.021
ST	10/10/96	Pyrene	µg/g (ppm)	8270	0.005	0.200	0.032	0.023
ST	10/10/96	Benzo (a) anthracene	µg/g (ppm)	8270	0.005	0.051	<0.005	0.023
ST	10/10/96	Chrysene	µg/g (ppm)	8270	0.005	0.054	<0.005	<0.005
ST	10/10/96	Benzo(b)fluoranthene	µg/g (ppm)	8270	0.005	0.064	<0.05	<0.05
ST	10/10/96	Benzo(k)fluoranthene	µg/g (ppm)	8270	0.005	<0.05	<0.05	<0.05
ST	10/10/96	Benzo(a)pyrene	µg/g (ppm)	8270	0.005	0.078	<0.05	0.069
ST	10/10/96	Indeno(1,2,3cd)anthracene	µg/g (ppm)	8270	0.01	<0.01	<0.01	<0.01
ST	10/10/96	Dibenzo(ah)anthracene	µg/g (ppm)	8270	0.01	<0.01	<0.01	<0.01
ST	10/10/96	Benzo(g,h,i)Perylene	µg/g (ppm)	8270	0.01	0.04	<0.01	0.06
		Surrogate Recovery						
ST	10/10/96	d4-Dichlorobenzene	%	8270	--	75	98	62
ST	10/10/96	d8-Naphthalene	%	8270	--	69	86	57
ST	10/10/96	d10-Acenaphthene	%	8270	--	69	87	62
ST	10/10/96	D10-Phenanthrene	%	8270	--	62	91	57
ST	10/10/96	d12-Chrysene	%	8270	--	--	100	72
ST	10/10/96	D12-Perylene	%	8270	--	--	86	61

MDL - Method Detection Limit
EPA - U.S. Environmental Protection Agency. 1986. Test Methods of Evaluation of Solid Waste 3rd Ed. Office Solid Waste Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.