

185976



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Engineering Solutions for Business and Environment

October 21, 2004

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Dear Ms. Clarke:

Re: Revised Proposed Remedial Plan for Site # 5720 located at the Junction of Highway 20 and Highway 39, Alsike, Alberta

I would like to inform Safety Codes Council (SCC) that site #5720 is no longer required to be risk managed as stated on the previous letter dated September 2, 2004. The site has been remediated to the applicable criteria, as detailed on this submitted closure report.

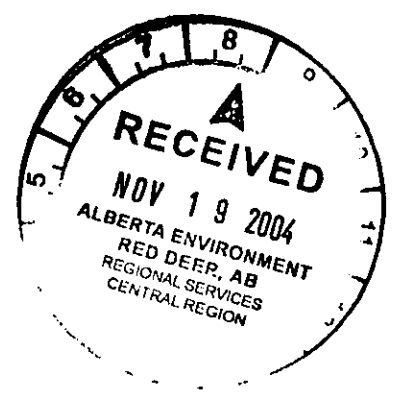
If you have any questions or need clarification on any of the points presented herein please contact the undersigned at your earliest convenience.

Sincerely Yours,

KC Environmental Group Ltd.

Bryan Armstrong, MEng, PEng
Senior Environmental Engineer

cc. Harold Blize and Barbara Blize, (owners)
Karen Gervais, (AENV) ✓



Site #5720



185976

Prepared for
Harold Blize
Race Trac Gas
Highway 20 and Highway 39 (Junction)
Alsike, Alberta

Legal Description: NW- 36 -48-4 W5

Site Remediation for Petroleum Storage
Tank Site in Alberta

Site: # 5720

SUBMITTED BY

KC Environmental Group Ltd.
October 25, 2004

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October 25, 2004

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Dear Mr. Blize:

Re: Closure Report on Remediation for Underground Petroleum Storage Tank Sites in Alberta (Site # 5720) located at the Junction of Highway 20 and Highway 39, Alsike, Alberta.

KC Environmental Group Ltd. (KC) was retained by Mr. Harold Blize to provide environmental consulting services for Safety Codes Council Site # 5720 located at Junction of Hwy 39 and Hwy 20, (NW- 36- 48- 4 W5) Alsike, Alberta. The contractor providing the on-site remediation work was Hazco Environmental Services Ltd., Edmonton, Alberta, (contact person: Rod Ward at 780-456-1444). The remedial plan proposed by KC and approved by Alberta Environment (AENV) and Safety Codes Council (SCC), was excavation with on-site aeration treatment.

Excavated hydrocarbon impacted soil was aerated on site and remediated to applicable criteria. The excavated area was backfilled with imported clean soil and the remediated soil was spread in an area to the north of the subject site, on the client's property. The remediated soil was not used to backfill the excavated basin because of high moisture content, caused by heavy rainfall during remediation that prevented the soil from being compacted to the required compaction standard.

With the exception of one small area, the contaminated area on the subject site has been remediated to the applicable Alberta Environment (AENV) approved standards. These standards are the Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use) for the petroleum hydrocarbon fractions (F1, F2, F3 and F4), and the Generic Hydrocarbon Criteria for the Groundwater Ingestion Pathway (Coarse -Grained Soil) for the BTEX levels. The small area of exception (approximately 40 m³) is the north portion of the excavation wall which is directly south and southeast of the corner of the general store. This area was inaccessible due to its close proximity to the general store and the instability of the store foundation. This area has contamination levels that exceed the Generic

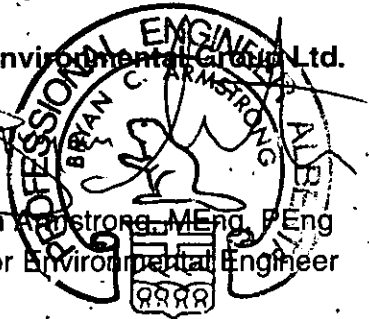
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Hydrocarbon Criteria for Groundwater Ingestion Pathway (Coarse-Grained Soil); however, levels are within the Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use). The site sensitivity assessment completed for the site indicated that the Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use) is appropriate for the small area and **no further remedial action is necessary for site #5720.**

Should you wish to discuss this information or have any questions, please contact me at (780) 488-7926.

Sincerely yours,

KC Environmental Group Ltd.

Bryan Armstrong, M.Eng., P.Eng.
Senior Environmental Engineer

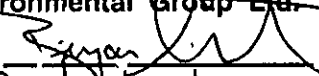
PERMIT TO PRACTICE KC Environmental Group Ltd. Signature  Date <u>Oct 25/2004</u> PERMIT NUMBER: P 6080 The Association of Professional Engineers, Geologists and Geophysicists of Alberta
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APPENDIX

- Appendix A: Site Sketches (Figures F1 and F1 (Zoom), Cross Section of the Excavation Limits with Hydrocarbon Vapor Readings (Figure A2)
- Appendix B: Summary of Laboratory Results and Hydrocarbon Vapor Readings for Soil Samples (Tables B1, B2 and B3)
- Appendix C: Laboratory Results
- Appendix D: Compaction Tests and Water Well Drilling Report
- Appendix E: Photographs

EXECUTIVE SUMMARY

KC Environmental Group Ltd. (KC) was retained by Mr. Harold Blize to provide environmental consulting services for Safety Codes Council Site # 5720 located at Junction of Hwy 39 and Hwy 20, (NW- 36- 48- 4 W5) Alsike, Alberta. The contractor providing the on-site remediation work was Hazco Environmental Services Ltd., Edmonton, Alberta, (contact person: Rod Ward at 780-456-1444).

The purpose of this work is to completely remediate on-site petroleum hydrocarbon contaminated soil and associated groundwater to the applicable criteria required by Alberta Environment (AENV). KC is a fully qualified and insured environmental engineering firm. The legal description of SCC Site #5720 is NW- 36- 48- 4 W5. The owners for this site are Mr. Harold Blize and Mrs. Barbara Blize.

Based on the results of the remedial work conducted at site # 5720, the following conclusions were drawn:

- With one exception, on-site investigations and laboratory analysis indicate that the contaminated area on the subject site has been remediated to the applicable Alberta Environment (AENV) Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use) for the petroleum hydrocarbon fractions (F1, F2, F3 and F4), and the Generic Hydrocarbon Criteria for the Groundwater Ingestion Pathway (Coarse -Grained Soil) for the BTEX levels.
- The exception is a small area north of the excavation wall (directly south and southeast of the corner of the general store) which was inaccessible due to its close proximity to the general store (approximately 40 m³). This area has contamination levels that exceed the Generic Hydrocarbon Criteria for Groundwater Ingestion Pathway (Coarse-Grained Soil), however, the levels are within the Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use).
- The site sensitivity assessment indicates that the Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use) is appropriate for the small area of exception. **No further remedial action is necessary for SCC Site #5720.**

1.0 INTRODUCTION

KC Environmental Group Ltd. (KC) was retained by Mr. Harold Blize to provide environmental consulting services for Safety Codes Council Site # 5720 located at Junction of Hwy 39 and Hwy 20, Alsike, Alberta. The contractor providing the on-site remediation work was Hazco Environmental Services Ltd., Edmonton, Alberta, (contact person: Rod Ward at 780-456-1444).

The purpose of this remedial work is to completely remediate any petroleum hydrocarbon contaminated soil and associated groundwater to the applicable criteria required by Alberta Environment (AENV). KC is a fully qualified and insured environmental engineering firm. The legal description of site #5720 is NW- 36- 48- 4 W5. The owners for this site are Mr. Harold Blize and Mrs. Barbara Blize.

2.0 SCOPE OF WORK

The following tasks were completed by KC as part of the remedial work for SCC Site #5720:

- Observe and direct the excavation and aeration of on-site petroleum hydrocarbon impacted soil.
- Collect representative soil samples of the impacted soil, clean backfill, and the soil at the final limits of the excavation. Samples were collected for field screening and potential laboratory analyses.
- Sample collection of water that accumulated in the excavation basin for chemical analysis.
- Submission of thirty-nine soil samples and one groundwater sample for detailed laboratory analysis.
- Selection of soil samples for laboratory analysis based on hydrocarbon vapor reading, the degree of hydrocarbon odor and the locations where the soil samples were collected.
- Submission of soil samples for BTEX (Benzene, Toluene, Ethylbenzene, and Xylenes), Petroleum Hydrocarbon Fractions F1, F2, F3 and F4, and lead analysis. Submission of two samples for grain size analysis.
- Submission of a groundwater sample for BTEX (Benzene, Toluene, Ethylbenzene, and Xylenes) and Petroleum Hydrocarbon Fractions F1 and F2 analysis.



- Reporting of the analytical results conforming to relevant sections of the Risk Management Guidelines for Petroleum Storage Tank Sites (October, 2001).

3.0 BACKGROUND

The subject site, owned by Mr. Harold Blize and Mrs. Barbara Blize, is currently under lease and being operated as a gasoline service station. According to Mr. Blize the site has been operated as a gasoline service station since 1947. The site has a general store which also serves as the local post office, a restaurant and several other businesses.

The general store and the two underground gasoline storage tanks with the dispenser island are located on the west half of the property. An underground diesel storage tank with a dispenser island is located on the east half of the property. A leak test conducted on the underground petroleum storage tanks in May 1998 showed there was no leakage from any of the three underground petroleum storage tanks.

3.1 Three Underground and One Aboveground Petroleum Storage Tanks

Prior to remediation the subject site contained three underground petroleum storage tanks (two 27,300 Litre and one 36,400 Litre) and one aboveground propane storage tank (1000 Imperial Gallons, 4500 Litre). The four storage tanks are approximately 13 years old. The relative positions of the four petroleum storage tanks are shown on the site sketch in Appendix A, Figure F1.

Table 1. Summary of Information for the Petroleum Storage Tanks

	Volume (litres)	Contents	Status
1 underground steel storage tank	27,300	gasoline	Removed on August 17, 2004
1 underground steel storage tank	36,400	gasoline	Removed on August 17, 2004
1 underground steel storage tank	27,300	diesel	Currently in use
1 aboveground storage tank	4,500	propane	Currently in use

3.2 Results of the Phase III Delineation Report

The results of the Phase III Delineation Report prepared by KC in October 15, 2002 for SCC Site #5720 showed petroleum contamination above the applicable Generic Hydrocarbon and Lead Criteria for Fine-Grained Soil (Commercial Land Use) and the Generic Hydrocarbon Criteria for Groundwater Ingestion Pathway defined in Alberta



Environment's Risk Management Guidelines for Petroleum Storage Tank Sites
(October, 2001).

It was estimated in the KC report that the depth of petroleum hydrocarbon contamination was approximately 4.50 m. The contaminated area on-site is estimated to be about 250 m². Based on a maximum contamination depth of 4.5 m, the total volume of on-site impacted soil is approximately 1,100 m³.

3.3 Accepted Remediation Plan

The remedial plan proposed by KC was excavation with on-site aeration of contaminated soil. The plan was approved by Alberta Environment (AENV) and Safety Codes Council (SCC). The on-site treatment method involves aeration of the impacted soil by the turning and grinding action of an Allu, Twister or similar type bucket. Given that the major contaminants on the subject site are volatile organic compounds known as BTEX (Benzene, toluene, ethyl-benzene and xylene) the contaminated site can be effectively remediated through aeration of the contaminated soil.

4.0 SITE SENSITIVITY ASSESSMENT

SCC Site #5720 is located in a rural area, at the junction of Highway 20 and Highway 39, and is zoned as highway commercial use.

4.1 Site Conditions

The soil profile in the excavation basin included: an initial layer of approximately 0.08 m asphalt; a layer of 0.20 m imported gravel fill; and, at least a 5.0 m thick silty clay horizon with occasional inclusion of sandy clay. The water table was encountered at a depth between 3 and 4 m. This finding is consistent with the soil profile and groundwater table encountered during Phase II and III borehole drilling.

Table 2. General Soil Lithology

Depth (m)	General soil lithology
0.0 - 0.2	Generally covered by asphalt/gravel
0.2 -3.0	Brown silty clay
3.0 - 5.0	Sandy clay
*5.25 - 7.50	Clay with iron oxides

- The soil lithology for this depth interval was observed during the phase II and III ESA reports.



4.2 Land Use Assessment - Surrounding Land Use and Receptors

Commercial land use on site:

The site has a general store which also serves as the local post office. Approximately 70 m east of the general store are a denture clinic, Teddy Bear's Restaurant and a trailer, followed by a service centre located about 150 m from the general store. Further east, about 200 m, from the general store is an oilfield and industrial supplier (Monarch Supply Apex Distribution).

The general store located on site is most affected by the contamination due to its proximity to the underground gasoline storage tanks.

Adjacent land uses

North: Immediately north of the subject site is wooded area, followed by a farm field.

South: Immediately south of the subject site is a ditch located within a 30 m distance, followed by Highway 39 and then a cultivated farm field.

East: Immediately east of the subject site is a wooded area, followed by a farmhouse located approximately 200 m from the subject site.

West: Immediately west of the subject site is a wooded area.

Since the subject site is situated in a rural area and is zoned as highway commercial, the land use is considered to be commercial land use.

4.3 Exposure Pathways

4.3.1 Human Pathway

Soil Ingestion and Soil Dermal Contact

This pathway is considered low, as incidental soil ingestion and soil dermal contact is unlikely for a paved commercial area.

Inhalation of Indoor Air

The inhalation exposure pathway is considered high as volatile contaminants can enter via the basement of the general store. This can be via general seepage or through underground potable water and sewage disposal/collection piping pathways. The general store on the subject site would be most affected by the contamination.



Groundwater Ingestion Pathway

There are two potable groundwater wells on site. One is located underneath the general store (west end of the property) and the other is on the east end of the property. The potential contaminant migration plume from the underground storage tanks was originally predicated to be primarily in the north-east direction due to the influence of the groundwater flow. However, the contamination migration plume was determined to be in the direction of south-east based on the results of delineation and field observations. To provide a higher safety factor, the groundwater ingestion pathway is considered in selecting the remediation criteria.

4.3.2 Ecological Pathway

Plant/Invertebrate Soil Contact

As the gas station dispensing area is paved and contaminants are mainly found below ground surface at a depth between 3 m and 4m, the exposure of terrestrial organisms (plant and invertebrate) to contaminants is considered low.

Aquatic Life

There is a river located more than 3 km to the east. As this is the only surface water body and is located more than 300 m from the subject site, the potential risk to freshwater aquatic life, from contaminants originating from the subject site, is not considered.

The potential pathways are therefore primarily through inhalation of vapor from soil and groundwater, and groundwater ingestion.

4.3.3 Applicable Remediation Criteria as Approved by Alberta Environment

Based on the above land use assessment, the potential exposure pathways assessment and the particle size analysis of the two soil samples (section 6 below), the remediation criteria for the subject site are:

For remediation of soil

- Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use) for the petroleum hydrocarbon fractions (F1, F2, F3 and F4), and the Generic Hydrocarbon Criteria for the Groundwater Ingestion Pathway (Coarse -Grained Soil)



for the BTEX levels, as per Alberta Environment's Risk Management Guidelines for Petroleum Storage Tank Sites (October, 2001).

For remediation of groundwater

- The remediation criteria for groundwater are the Generic Hydrocarbon Criteria for Groundwater Ingestion Pathway.

Note that the more stringent criteria for coarse-grained soil (Commercial Land Use) is selected for remediation purposes, instead of the less stringent criteria for fine-grained soil (Commercial Land Use) previously used for the delineation purposes. The more stringent criteria is used because of the high concentrations of contaminants found at a depth between 3m and 4m. The soil at this depth then becomes the governing soil type that controls contaminant migration. It is considered to be coarse-grained soil based on particle size analysis and field observation.

With the exception of the small area underneath the sidewalk next to the general store, the Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use) for the petroleum hydrocarbon fractions (F1, F2, F3 and F4), and the Generic Hydrocarbon Criteria for the Groundwater Ingestion Pathway (Coarse -Grained Soil) for the BTEX levels, defined in Alberta Environment's Risk Management Guidelines for Petroleum Storage Tank Sites (October, 2001) are chosen for a **majority of the subject site** (approximate volume of soil -1000 m³). Excavation of the contaminated soil underneath the sidewalk would risk damage to the on-site building (the general store).

The Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use) is considered appropriate for the **relatively small area of soil to the south and southeast corner of the general store**. The groundwater Ingestion Pathway for this small area can be excluded based on the following reasoning:

- The contamination plume appears to follow the topography of the on-site area which slopes south towards Highway 39, not the groundwater flow direction (northeasterly).
- The on-site potable groundwater well underneath the general store is located northwest of the residual contaminated area. This will receive the least impact from the residual contaminated area since the well is situated up-gradient of the contamination plume which appears to be moving in the southeast direction away from the well.
- According to water well drilling information (Appendix D), the underlying aquifer appears to be at a depth between 60 ft (15m) and 80 ft (25 m) below ground.



- Based on the water well drilling report for the on-site potable groundwater well, it appears that there is a subsoil horizon consisting mainly of clay (a minimum depth of 11 m) above the aquifer.

5.0 SUMMARY OF FIELD ACTIVITIES FOR SITE REMEDIATION

During the period from August 17, 2004 to September 11, 2004, KC personnel were present on-site during the excavation, removal of Pump Island and the remaining associated underground fuel lines, as well as on-site aeration of the contaminated soil. Throughout the excavation process, soil samples were collected from the excavated area and analyzed for the presence of hydrocarbon vapors.

The two USTs did not appear to be the source of contamination as there was no obvious petroleum staining around the tank nest. However, staining and petroleum odor were detected around the associated piping running from the two USTs to the pump islands located to the south of the general store. It appeared that the associated piping was one of the contamination sources.

5.1 Finding of an Unexpected UST

One relatively small and empty, approximately 300 litre, UST with associated piping underneath the sidewalk was unexpectedly discovered at a depth between 2 m and 4 m at the southeast corner of the general store during the excavation, as shown in Figure A1 (Appendix A). The UST could have been left behind by the previous owners as Mr. Blize was not aware of the presence of the small UST.

Heavy staining and strong hydrocarbon odors were noted when the UST was exposed. Staining was also observed beneath and around the associated piping underneath the sidewalk. It appeared that the unexpected tank and its associated piping were the major source of contamination.

5.2 Excavation of Petroleum Hydrocarbon Impacted Soil

The excavation to remove impacted soil covered an area of approximately 240 m² and the excavation reached final depths ranging between 4m and 5m. The actual impacted soil and the depth confirmed during the excavation is consistent with findings in the Phase III report (October, 2002). The contamination plume appeared to be stable based on the findings.

In general, the final limits of the excavation were determined by: the hydrocarbon vapor readings (generally below 100 ppm), odor detection of the samples up to the predetermined limits of excavation or where continued excavation would risk damage to the on-site building (the general store). The approximate extent of the



excavation is presented in Figure A1 (Appendix A). Excavation details and cross-sections are provided in Figure A2 (Appendix A).

Confirmatory soil samples from the final walls and floor of the excavation were submitted to the laboratory for chemical analysis of BTEX and petroleum hydrocarbon fractions F1 to F4. Samples were selected based on field vapor screening results and locations within the excavation.

5.3 Installation of a Geo-Membrane Liner

Laboratory analysis indicated that the soil along the northern limits of the excavation (directly south and southeast of the corner of the general store) has a contamination level exceeding the Generic Hydrocarbon Criteria for Groundwater Ingestion Pathway (Coarse-Grained Soil) for BTEX. However, the level is within the Generic Hydrocarbon Criteria for Coarse-Grained Soil (Commercial Land Use) for BTEX.

It was determined that excavation in this area was restricted by the risk of collapsing the sidewalk (1.2 m wide) and endangering the on-site building (the general store).

It was decided to leave the residual contaminated soil in place and to install a 30 mil HDPE liner. The liner would extend approximately 200 m² along the north wall of the excavation from the ground surface to the bottom of the excavation and separate the residual contaminated soil from the clean backfilled material. Installation activities were completed by Hazco Personnel. The location of the liner is identified on Figure A1, (Appendix A).

5.4 Contaminated Soil Under the Side-Walk

Angle borehole drilling under the general store for further delineating the extent of the contamination was not considered as the structural integrity of the store might be compromised. The contaminated soil underneath the sidewalk was excavated as much as possible and it was estimated that about 40 m³ of contaminated soil was left in place.

One excavated soil sample with the highest PID reading, collected from the location where the unexpected UST was found, was sent for laboratory analysis. The results showed that the soil sample had a petroleum hydrocarbon composition consistent with that of gasoline. The unexpected UST appeared to be the major contamination source based on the obvious staining, strong hydrocarbon odor and the high levels of contaminants. High contamination was confirmed by the laboratory results shown in Table 5 (section 6).

5.5 On-Site Aeration

Clean gravel that was removed from the top of the excavation was stockpiled on the property for back-filling. Contaminated soil was stockpiled on the property for on-site



aeration. Approximately 1000 m³ of contaminated soil was aerated three times and laboratory analysis of eleven confirmatory soil samples show the soil meets the more stringent criteria. It should be noted that the 1000 m³ of the contaminated soil was also aerated during the loading and unloading process conducted by the loader and the hauling truck during backfilling.

5.6 Back-Filling with Imported Clean Fill and Disposal of Remediated Aerated Soil

Approximately 80 m³ of clean fill was imported for backfilling the UST nest. The clean fill was mixed in with some of the remediated soil (approximately 100 m³) during the process of backfilling. A technician from J.R. Paine & Associates Ltd. was on site to ensure the backfilled soil was compacted to the minimum required density (95% of the Standard Proctor Density).

The compaction tests (Appendix D) on the first lift of one foot backfill soil showed a compaction density ranging from 84% to 91%. Because the high moisture content of the soil (caused by heavy rainfall during the remediation) prevented the soil from being compacted to the minimum required density (95% of the Standard Proctor Density), the remaining remediated aerated soil of approximately 900 m³ was not used for backfilling the excavated basin. Imported clean dry soil was therefore required for backfilling the excavation basin so that compaction to the minimum required density of 95% could be achieved.

A series of final compaction tests show that the imported clean soil was compacted to 98% or more of the Standard Proctor Density. The surface of the backfilled excavation was finished with approximately 20 cm of gravel. The remaining remediated soil, approximately 900 m³, would be spread on the area to the north of the subject site on the client's property.

5.7 Disposal of Debris

On-site waste debris such as asphalt and concrete generated during the remedial activities was hauled by Mel Ruff Trucking to the County of Leduc Concrete Recycling Facility. The three USTs and associated steel piping were taken to "General Scrap", located in Edmonton.

Rainwater and groundwater pooled in the excavation basin (approximately 50 m³) was removed by vacuum truck and hauled by Hazco to New Alta in Drayton Valley for disposal. One groundwater sample was sent for laboratory analysis and the results show that the water is below the Criteria for Human Drinking Water (Generic Hydrocarbon Criteria for the Groundwater Ingestion Pathway).



6.0 SOIL ANALYSIS

Throughout the excavation process, soil samples were collected from the excavated area and analyzed for the presence of hydrocarbon vapors.

6.1 Excavation Limits of the Impacted Area

6.1.1 Field Hydrocarbon Vapor Screening

The samples were screened for hydrocarbon vapor in the field by a photo-ionization detector (PID). Approximately 140 soil samples were collected as part of the remedial excavation activities. The field hydrocarbon vapor readings are summarized in Table B1 (Appendix B).

6.1.2 Particle Size and Texture

Two soil samples were collected on August 17th, 2004 and sent for laboratory analysis. Two samples were sent as one soil sample appeared to be coarser than the other.

Sample "N-3W-3m" - the soil sample collected at a depth of 3m from the north wall of the tank nest had 80% of particles greater than 75 microns. The reported soil composition is 7% clay, 82% sand and 11% silt. The soil texture was that of loamy sand. The soil sample is classified as a coarse grained soil.

Sample "W-5S-1m" - the soil sample collected at a depth of 1m from the west excavation limit has 11% of particles greater than 75 microns. The reported soil composition is 45% clay, 16% sand and 39% silt. This sample had a soil texture of clay. The soil sample is classified as a fine grained soil.

Field observations and laboratory analysis indicate that contaminants are found between 3m and 4m, thus the governing soil type that controls contaminant migration is considered to be coarse-grained soil.

6.1.3 Laboratory Results

Approximately 100 soil samples were collected for hydrocarbon vapor screening from the excavation basin along the walls and the floor.

Approximately 20 soil samples of the 100 collected were sent to the laboratory for analysis for BTEX (benzene, toluene, ethyl-benzene, and xylenes), Petroleum Hydrocarbons Fractions: F1 (C6-C10), F2 (C10-C16), F 3 (C16-C34) and F4 (C34-C50) and lead. However, due to budgetary constraints, not all the soil samples were analyzed for lead. This decision is supported by historical data and current laboratory results that indicate



that lead is not a concern on this site. A summary of the laboratory results is presented in the Table 3 and Table B2 (Appendix B).

Table 3. Comparison of Soil Analysis to the Applicable Criteria for the Excavation Limits

Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use) for fractions (F1, F2, F3 and F4) and the Generic Hydrocarbon Criteria for the Groundwater Ingestion Pathway (Coarse-Grained Soil) for BTEX												
Sample No.	Depth	PID	Odour	Benzene	Toluene	Ethylbenzene	Xylene	F1	F2	F3	F4	Lead
Criteria				0.13	1.6	0.36	49	310	760	1700	3300	260
East Wall												
E-10S-3m	3	17.1	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	---
Random East	3	6	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	7.1
Nest E-5S-3m	3	11.5	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	10.1
South Wall												
S-6E-2m	2	144	Slight/no	<0.005	<0.005	<0.005	<0.005	4	<90	<90	<90	10.6
S2-10E-3m	3	25.9	no	<0.005	<0.005	<0.005	<0.005	5.1	<90	<90	<90	9.6
S-15E-3m	3	29.4	no	0.013	<0.005	0.023	0.055	9	<90	<90	<90	---
S-20E-2m	2	83.3	no	0.021	<0.005	0.194	0.776	6	<90	<90	<90	---
S-25E-3m	3	25.5	no	0.008	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	---
West Wall												
W-0-1m	1	1	no	<0.005	<0.005	<0.005	0.058	<1.4	<90	<90	<90	11.1
W-5S-1m	1	1.5	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	110	13.7
W2-5S-1m	1	75.8	no	<0.005	0.038	0.011	0.161	<1.4	<90	<90	<90	11.2
Nest W-3S-4m	4	45.7	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	7.4
Bottom												
Nest W-3S-4m	4	45.7	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	7.4
N-6W-5m	5	30.4	no	0.006	0.113	0.033	0.24	1.61	<90	<90	<90	6.8
N2-5E-5m	5	14.1	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	---
F4	28	5.1	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	5.1
Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use)												
Excluding Groundwater Ingestion Pathway				0.55	71	1200	130	310	760	1700	3300	260
North Wall												
(north of the tank nest)												
N-3W-3m	3	16	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	5.4
N-6W-3m	4	1151	strong	0.039	1.75	0.205	19.3	87	<90	<90	<90	5.4
N-6W-5m	5	30.4	no	0.006	0.113	0.033	0.24	1.61	<90	<90	<90	6.8
Nest N2-4W-3m	3	8.7	no	<0.005	<0.005	<0.005	0.02	<1.4	<90	<90	<90	10.3
Nest N2-8W-3m	3	926	strong	0.039	<0.005	0.825	1.48	86.9	100	<90	<90	12
North Wall												
(south of the general store)												
N2-5E-5m	5	14.1	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	---
N2-15E-5m (west of the tank nest)	5	920	strong	0.532	3.83	3.52	21.7	132	<90	<90	<90	9.2

All values in mg/kg or µg/g, unless otherwise noted.

Bolded values exceeded the Generic Hydrocarbon Criteria for Groundwater Ingestion Pathway (Coarse-Grained Soil) for BTEX but within the Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use) for BTEX.



6.1.4 Discussion and Conclusion

A total of twenty final soil samples from the walls and floor of the excavation confirmed the excavation limits. This was with the exception of the small area (approximately 40 m³) along the north portion of the excavation wall (directly south and southeast of the general store) which was inaccessible. This area was too close to the general store.

The locations of the soil samples collected are shown in Figure A2 (Appendix A). Discussion of the laboratory results follow:

East Boundary - A total of 9 soil samples were collected from the east excavation limit for hydrocarbon vapour screening. The 9 soil samples had PID readings ranging from 6 ppm to 17.1 ppm and no detectable petroleum hydrocarbon odour. Laboratory results of the 3 confirmatory soil samples show that the east excavation limit has petroleum hydrocarbon levels below the applicable criteria.

South Boundary - A total of 24 soil samples were collected from the south excavation limit for hydrocarbon vapour screening. With the exception of one reading of 144 ppm, the 23 soil samples had PID readings below 100 ppm. Some of the soil samples had a low petroleum hydrocarbon odour. Laboratory results of 5 confirmatory samples show that the south excavation limit has petroleum hydrocarbon levels below the applicable criteria.

West Boundary - A total of 18 soil samples were collected from the west excavation limit, south of the store. None of the soil samples had a detectable petroleum hydrocarbon odour and PID readings were below 100 ppm. Laboratory results of the 4 confirmatory samples show that the west excavation limit has petroleum hydrocarbon levels below the applicable criteria.

Bottom of the Excavation - A total of 25 soil samples were collected from the bottom for hydrocarbon vapour screening. Soil samples had PID readings ranging from 0.5 ppm to 45.7 ppm and only a few had any detectable petroleum hydrocarbon odour. Laboratory results of the 4 confirmatory samples show that the bottom of the excavation has petroleum hydrocarbon levels below the applicable criteria.

North Boundary - A total of 36 soil samples were collected from the north excavation limit. With one area exception, a majority of the soil samples had no detectable petroleum hydrocarbon odour and PID readings below 100 ppm. The area of exception was for the soil samples collected from the small area located directly south and southeast of the corner of the general store where the small unexpected UST was found. The soil samples from that particular area had PID readings close to 1,000 ppm.



The laboratory results of the 7 confirmatory soil samples show that 3 out of the 7 soil samples have petroleum hydrocarbon levels exceeding the Generic Hydrocarbon Criteria for Groundwater Ingestion Pathway (Coarse-Grained Soil) for BTEX, but are within the Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use) for BTEX.

Excavated Soil Samples from the Location of the Unexpected UST

One soil sample from the location of the small unexpected UST was sent for laboratory analysis to determine the extent of contamination and whether or not the small UST is the main source of the contamination.

Based on laboratory analysis of the soil sample (Table 4), the hydrocarbon vapour readings as well as visual observations of fuel staining around the small area, it is concluded that the small unexpected UST and associated piping is the main source of contamination. The soil sample had contamination levels exceeding both the applicable criterias. The chemical composition of the contaminant is consistent with that of gasoline.

Table 4. Comparison of Analysis of the Excavated Soil Sample from the Area of the Unexpected UST to the Applicable Criteria

Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use)												
	Depth	PID	Odor	Benzene	Toluene	Ethyl benzene	Xylene	F1	F2	F3	F4	Lead
Criteria				0.55	71	200	130	310	760	1700	3300	260
N2-15E-4m (southeast corner of the general store/west of the tank nest)	4	1036	strong	2.33	59.1	36.7	213	1090	180	<90	<90	7.4

All values in mg/kg or µg/g, unless otherwise noted.

Bolded values exceeded the Generic Hydrocarbon Criteria for Groundwater Ingestion Pathway (Coarse-Grained Soil) and the Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use).

6.2 Direction and Maximum Depth of the Contaminant Migration Plume

The petroleum contaminant migration plume appears to be southeasterly, based on soil sample laboratory results and visual staining in the excavation area. The contamination levels appear to peak at a depth of 3 m for a majority of the contamination area but extend to a depth of 4.50 m. These findings are consistent with those reported in the previous Phase II and III ESA reports conducted by KC.



6.3 Aerated Remediated Soil

All excavated soil was aerated at least 3 times prior to backfilling the excavated basin. Table 5 and Table B3 (Appendix B) show the efficiency of Allu-Bucket aeration compared to the PID readings of the contaminated soil and aerated soil.

Table 5. Comparison of Laboratory Results of the Aerated Soil Samples to the Applicable Criteria.

Sample ID	PID	Odour	Benzene	Toluene	Ethylbenzene	Xylene	F1	F2	F3	F4
Criteria			0.13	0.16	0.36	49	310	760	1700	3300
1st time aeration										
Aug 24#1	359	moderate	0.013	0.06	0.096	5.14	67	<90	<90	<90
Aug 24#5	852	strong	0.014	0.071	0.05	9.91	137	150	120	<90
Aug 24#9	67.9	slight	0.016	0.15	0.058	4.32	40.3	<90	180	130
2nd time aeration										
Aug 25 #2	396	moderate	0.012	0.074	0.048	6.09	75.8	130	120	<90
Aug 25#4	552	strong	0.012	0.41	0.38	15.9	169	90	110	<90
Aug 25#5	477	moderate	0.011	0.168	0.086	9.32	87.5	<90	<90	<90
Aug25#9	401	moderate	0.02	0.478	1.01	14.8	119	120	<90	<90
Aug25#10	592	strong	0.009	0.104	0.071	12.3	113	110	<90	<90
3rd time aeration										
A30#2	235	moderate	0.043	0.361	0.169	7.75	78.5	160	120	110
A30#6	83	slight	<0.005	0.009	0.014	0.308	48	80	250	140
A30#9	294	slight	<0.005	0.013	0.013	0.203	17.9	60	210	130
A-Spt.1#1	166	slight/no	0.015	0.219	0.351	4.98	58.5	130	150	170
A-Spt.1#3	145	slight	0.005	0.025	0.022	0.32	38.2	90	100	110
A-Spt.1#5	209	no	0.008	0.039	0.027	1.94	61.5	100	100	<90
A-Spt.1#7	38.2	slight	0.007	0.031	0.023	1.4	49.7	100	90	100
A-Sept#2	120	slight	<0.005	0.014	0.025	0.366	16.8	110	<90	<90
A-Sept#3	225	moderate	<0.005	<0.005	<0.005	<0.005	13.7	120	110	<90
A-Sept#7	50	slight	<0.005	0.007	<0.005	0.055	20.4	120	<90	<90
A-Sept#8	91	moderate	<0.005	<0.005	<0.005	0.669	23.5	100	<90	<90

All values in mg/kg or µg/g, unless otherwise noted.

Bolded values exceeded the Generic Hydrocarbon Criteria for Groundwater Ingestion Pathway (Coarse-Grained Soil) for BTEX and the Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use) for F1-F4.

A total of 46 aerated soil samples were collected for hydrocarbon vapour screening and 19 samples were submitted for laboratory analysis. The laboratory results of the final aerated soil samples show that the contaminated soil has been effectively remediated to the Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use) for the petroleum hydrocarbon fractions (F1, F2, F3 and F4), and the Generic Hydrocarbon Criteria for the Groundwater Ingestion Pathway (Coarse -Grained Soil) for



the BTEX levels. This soil could have been used for backfilling; however, it was extremely wet and could not achieve the required compaction density. An item of note is that the presence of higher concentrations of ethyl-benzene and the petroleum hydrocarbon fractions F1 and F2 appear to influence PID readings and the detectable odour of some of the aerated soil samples.

7.0 GROUNDWATER ANALYSIS

One groundwater sample was collected from the bottom of the excavation area for laboratory analysis. The test results were compared to the Generic Hydrocarbon Criteria for Groundwater Ingestion Pathway for groundwater, defined in Alberta Environment's Risk Management Guidelines for Petroleum Storage Tank Sites (October, 2001). This criteria is also the criteria for Human Drinking Water.

Table 6. Comparison of Groundwater Analysis to the Generic Hydrocarbon Criteria for Groundwater Ingestion Pathway

Sample name	Benzene	Toluene	Ethyl-Benzene	Xylene	F1	F2
The applicable criteria	0.005	0.024	0.0024	0.3	5	2
Groundwater sample	<0.005	<0.001	<0.001	0.003	0.26	1.1

All values in (mg/L) ppm unless otherwise noted.
< - below laboratory detection limits.

Based upon laboratory results, the groundwater sample has concentrations of petroleum hydrocarbons below the Generic Hydrocarbon Criteria for Groundwater Ingestion Pathway. The groundwater has non detectable BTEX and the petroleum fractions were well below the Criteria for Human Drinking Water.

8.0 CONCLUSIONS OF THE REMEDIAL PROGRAM

Based on the results of the remedial work conducted at site # 5720, the following conclusions were drawn:

- With one exception, on-site investigations and laboratory analysis indicate that the contaminated area on the subject site has been remediated to the applicable Alberta Environment (AENV) Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use) and the Generic Hydrocarbon Criteria for Groundwater Ingestion Pathway (Coarse-Grained Soil).
- The exception is a small area north of the excavation wall (directly south and southeast of the corner of the general store) which was inaccessible due to its close proximity to the general store (approximately 40 m³). This area had contamination



levels that exceed the Generic Hydrocarbon Criteria for Groundwater Ingestion Pathway (Coarse-Grained Soil), however, the levels are within the Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use).

- The site sensitivity assessment indicates that the less stringent Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use) **excluding** the Groundwater Ingestion Pathway is appropriate for the small exception area. **No further remedial action is necessary for SCC Site #5720.**

9.0 METHODOLOGY

The following is a summary of the general methodology followed for the remedial work conducted for Alberta Government's Underground Petroleum Storage Tank Site Remediation Program.

9.1 Consultation with Client

Work is on a "grant recipient" approved basis. KC analyzes and provides the client with information and data for progressive decision making. Grant recipients are, however, to provide as much information as they are aware on the location, size and depth of underground storage tanks and piping as well as any unique conditions on the site that might assist in fully defining project work and the methodology. Following is the methodology that is used and modified by KC to fit particular site circumstances.

9.2 Soil Sampling

1. Samples were collected using sterile hand tools which were washed between each sample taken and rinsed with distilled water. Surgical gloves were worn during the procedure and changed between samples.
2. Soil samples were grab samples collected off the bucket of the excavator. At each sampling depth, two samples were taken and placed in separate Ziploc bags. One sample was kept at room temperature until it reached approximately 20°C, at which time it was tested with a Photoionization Detector (PID) to determine the presence or absence of hydrocarbon contamination. As is standard practice, the instrument was calibrated with 99.6 ppm of isobutylene to record the maximum level of contamination detected. PID analysis was used to conduct the field vapour screening as specified in the Terms of Reference.
3. Soil samples selected were transferred from the duplicate unopened Ziploc bags to EPA certified glass jars and kept at or below 4°C until taken to the laboratory for analysis, or the decision was made to discard the sample.



4. Samples were submitted to a CAEAL (Canadian Association for Environmental Analytical Laboratories) and SCC (Standards Council of Canada) accredited laboratory and will be received in accordance with the chain of custody documentation. The samples will not exceed the recommended holding times thus preserving sample integrity. One of the quality control procedures performed by the laboratory with each batch of samples involves the "spiking" of a sample replicate with a known concentration of analyte. The percent recovery of the spike is then determined by subtracting the analyte concentration of an unspiked sample replicate from that of the spiked replicate. If the spike recovery is within acceptable limits, matrix interference is deemed to be negligible and analytical results are accepted. This is standard laboratory practice.
5. The laboratory disposes of the water samples down the drain and of the soil samples at an approved landfill. This is standard laboratory practice and is acceptable according to the City of Edmonton Sewers Use By-Law as well as solid waste disposal guidelines.
6. Soil samples were disposed of at the sampling location. This is standard laboratory practice, and is acceptable according to the sewer bylaw as well as solid waste disposal guidelines.

9.3 Water Sampling

One groundwater sample was collected directly from the pooled area into the containers provided by the laboratory for each analysis. The sample was held at or below 4 °C until it was taken to the laboratory for analysis.

9.4 Analysis of Collected Soil and Groundwater Samples

Soil samples and groundwater samples were submitted to a CAEAL approved laboratory for testing.

The tests requested for the soil samples are:

- a) BTEX (Benzene, Toluene, Ethylbenzene, Xylenes),
- b) Petroleum Hydrocarbon Fractions F1(C6 -C10), F2 (C10-C16), F3(C16-C34) and F4(C34-C50),
- c) Lead,
- d) Grain size analysis on one soil sample.

The tests requested for the water samples are:

- a) BTEX (Benzene, Toluene, Ethylbenzene, Xylenes),



- b) Petroleum Hydrocarbon Fractions F1(C6 -C10), F2 (C10-C16),
- c) Document the presence of free product on the water table.



10.0 PROJECT LIMITATIONS

10.1 Sampling Limitations

A limited number of samples were submitted for laboratory testing and only for components as determined by the Alberta Remediation program. Laboratory analysis is limited in that it only provides quantifiable data about specific samples tested and compounds tested for, and may not necessarily reflect the entire site. Interpretations are based on a limited number of laboratory results and the error in this must be recognized. Laboratory results were used to validate field data and to obtain a more accurate reading of hydrocarbon contamination levels.

10.2 Project Limitations

This project has been completed to the best of the consultant's abilities and in accordance to the APEGGA Code of Ethics. However, the report is based on the information reviewed to the extent that the information was available and to the extent considered reasonable within the allocated project time frame and project budget. KC Environmental Group Ltd. and the environmental consultants who prepared this report do not accept any liability for contamination that may be found later on the subject site and is not identified in this environmental report.

The purpose of the report is to provide the client with information with respect to the remediation of environmental contamination due to the past or the present site uses. One copy of the report is maintained in the consultant's files as required by APEGGA.



APPENDIX A

**SITE SKETCH, CROSS-SECTIONS FOR THE
EXCAVATION LIMITS WITH HYDROCARBON
VAPOR READINGS**





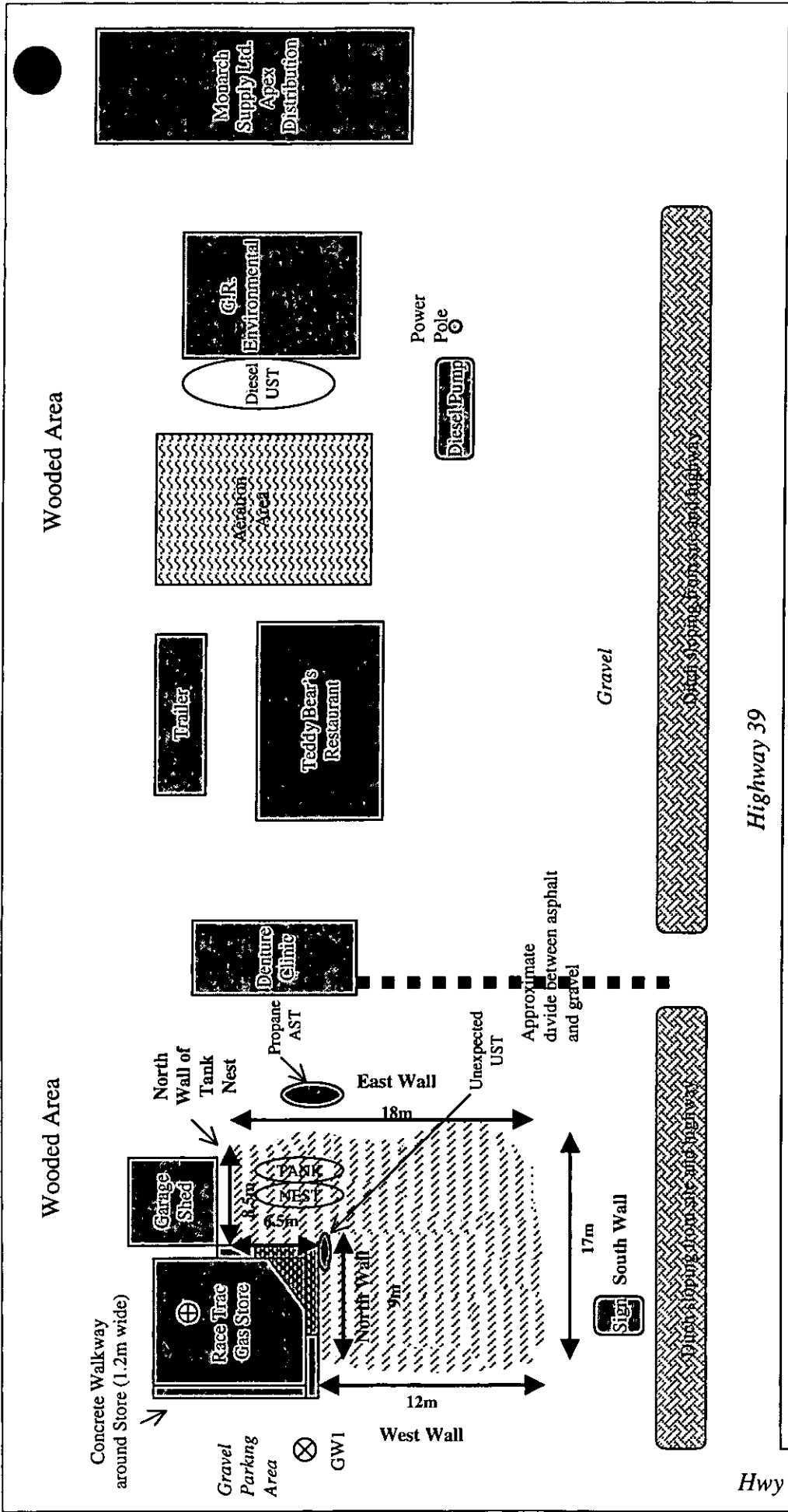


Figure A1: Remediation of Race Trac Gas Site #5720 located at the Junction of Hwy 39 and Hwy 20, Alsike, AB.

- ⊗ GW1 3m West of SW corner of Store Building
- ⊕ Potable Water Well

~ 40m³ of Contaminated Soil at a depth of 2m to 5m that meets the Gener Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use).
 Excavation area that was backfilled with clean imported soil.
 ~ 1000m³ of Contaminated Soil was remediated to meet the Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use) and the Generic Hydrocarbon Criteria for Groundwater Ingestion Pathway (Coarse-Grained Soil).

Note. Sketch is approximate and Not to scale



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Wooded Area

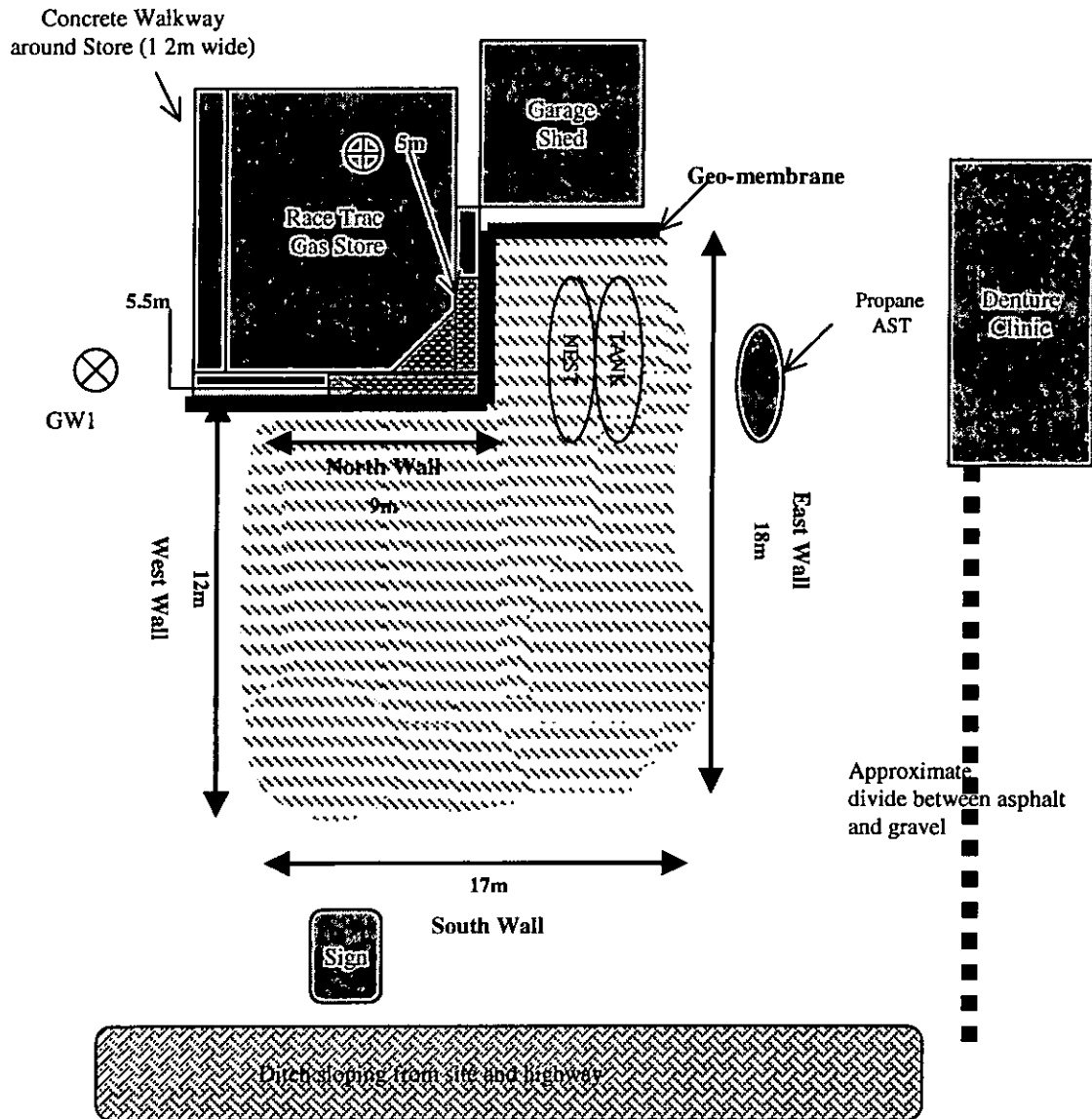





Figure A1 (Zoom): Remediation of Race Trac Gas Site #5720 located at the Junction of Hwy 39 and Hwy 20, Alsike, AB.

-  ~ 40m³ of Contaminated Soil at a depth of 2m to 5m that meets the Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use).
-  Excavation area that was backfilled with clean imported soil.
~ 1000m³ of Contaminated Soil was remediated to meet the Generic Hydrocarbon and Lead Criteria for Coarse-Grained Soil (Commercial Land Use) and the Generic Hydrocarbon Criteria for Groundwater Ingestion Pathway (Coarse-Grained Soil).
-  Geo-membrane



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Note: Sketch is approximate and Not to scale

Figure A2. Hydrocarbon Vapor Screening Readings (PID) for the Excavation Limits

Shed

General Store		North of tank nest (from west to east)		West of tank nest (from north to south)	
Depth	0m	4m	8m	Depth	3m
1	6.9	8	0.4	1	6.5m
2	38.1	5.1	0.4	2	293
3	926	8.7	3	3	800
4	6.8	7.8/30.4	7.2	4	748
5		30.4		5	920*

NI Wall (S. of the store) from W to E		Length from west to East	
Depth	0m	5m	10m
1	4.9	673	293
2	32.5	322	800
3	63.3	785	748
4	34.0	725	920*
5	14.1	F1=2	920

West Wall		Length from north to south	
Depth	0m	5m	10m
1	1	75.8	0
2	0.9	35.7	144
3	0.6	58.5	7.7
4	0.6	2	39.9
5	0.5	---	---

Bottom		Length from west to East	
length	0m	5m	10m
0m	14.1	F1=2	---
5m	2	---	F4=28
10m	39.9	---	F3=23.5
12m	---	4.5	8.9

East Wall		Length from north to south	
Depth	0m	5m	10m
1	0.4	8.9	15.3
2	0.4	10.1/6	12.6
3	3	11.5	17.1
4	7.2	7.9	9.9

South Wall		Length from west to East	
Depth	0m	5m	10m
1	0	5.1	27.9
2	144	10.8	19.5
3	7.7	25.9	29.4
4	39.9	4.5	8.9

Note:
 * the soil collapsed after the contaminated soil sample was taken, so the wall should have levels of contaminants lower than that of the analysis
 * the PID reading for the 4m sample was collected from the floor after it collapsed from the wall
 Bolded Values are the locations where the confirmatory soil samples were taken
 all values are in ppm

APPENDIX B

**SUMMARY OF LABORATORY RESULTS AND
HYDROCARBON VAPOR READINGS FOR
SOIL SAMPLES**



Table B1. Hydrocarbon Vapor Screening (PID) Readings for All the Soil Samples Collected.

Sample No.	Sample I.D.	PID	Odour	Benzene	Toluene	Ethyl-benzene	Xylene	F1	F2	F3	F4	Lead	M.C.
Criteria				0.13	1.6	0.36	49	310	760	1,700	3,300	260	
17-Aug-04													
1	N-0-1m	0.7	no	---	---	---	---	---	---	---	---	---	---
2	N-0-2m	0.5	no	---	---	---	---	---	---	---	---	---	---
3	N-0-3m	0.4	no	---	---	---	---	---	---	---	---	---	---
4	N-0-4m	0.7	no	---	---	---	---	---	---	---	---	---	---
5	N-3W-1m	0.8	no	---	---	---	---	---	---	---	---	---	---
6	N-3W-2m	0.9	no	---	---	---	---	---	---	---	---	---	---
7	N-3W-3M	16	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	5.4	13
8	N-3W-4m	2.5	no	---	---	---	---	---	---	---	---	---	---
9	N-3W-5m	1.6	no	---	---	---	---	---	---	---	---	---	---
10	N-6W-1m	2.4	no	---	---	---	---	---	---	---	---	---	---
11	N-6W-2m	4.7	no	---	---	---	---	---	---	---	---	---	---
12	N-6W-3M	1312	strong	0.039	1.75	0.205	19.9	87	<90	<90	<90	9	14
13	N-6W-4m	1151	strong	---	---	---	---	---	---	---	---	---	---
14	N-6W-5M	30.4	no	0.006	0.113	0.033	0.24	1.61	<90	<90	<90	6.8	15
15	W-O-1M	1	no	<0.005	<0.005	<0.005	0.058	<1.4	<90	<90	<90	11.1	19
16	W-O-2M	0.9	no	---	---	---	---	---	---	---	---	---	---
17	W-O-3M	0.6	no	---	---	---	---	---	---	---	---	---	---
18	W-O-4M	0.6	no	---	---	---	---	---	---	---	---	---	---
19	W-O-5M	0.5	no	---	---	---	---	---	---	---	---	---	---
20	W-5S-1m	1.5	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	110	13.7	23
21	W-5S-2m	0.9	no	---	---	---	---	---	---	---	---	---	---
22	W-5S-3m	0.5	no	---	---	---	---	---	---	---	---	---	---
23	W-5S-4m	0.6	no	---	---	---	---	---	---	---	---	---	---
24	W-5S-5m	1.5	no	---	---	---	---	---	---	---	---	---	---
18-Aug-04													
1	W2-5S-1m	75.8	slight/no	<0.005	0.038	0.011	0.161	<1.4	<90	<90	<90	11.2	20
2	W2-5S-2m	35.7	slight/no	---	---	---	---	---	---	---	---	---	---
3	W2-5S-3m	58.5	slight/no	---	---	---	---	---	---	---	---	---	---
4	W2-5S-4m	2	no	---	---	---	---	---	---	---	---	---	---
5	S-6E-1m	4.7	no	---	---	---	---	---	---	---	---	---	---
6	S-6E-2m	144	slight/no	<0.005	<0.005	<0.005	<0.005	4	<90	<90	<90	10.6	23
7	S-6E-3m	7.7	no	---	---	---	---	---	---	---	---	---	---
8	S-6E-4m	39.9	no	---	---	---	---	---	---	---	---	---	---
9	S-10E-1m	50.1	no	---	---	---	---	---	---	---	---	---	---
10	S-10E-2m	740	strong/moderate	---	---	---	---	---	---	---	---	---	---
11	S-10E-3m	137	moderate	---	---	---	---	---	---	---	---	---	---
12	S-10E-4m	31.3	slight/none	---	---	---	---	---	---	---	---	---	---
13	S2-10E-1m	5.1	no	---	---	---	---	---	---	---	---	---	---
14	S2-10E-2m	10.8	no	---	---	---	---	---	---	---	---	---	---
15	S2-10E-3m	25.9	no	<0.005	<0.005	<0.005	<0.005	5.1	<90	<90	<90	9.6	15
16	S2-10E-4m	4.5	no	---	---	---	---	---	---	---	---	---	---
17	F1	2	no	---	---	---	---	---	---	---	---	---	---
19-Aug-04													
1	Nest N2-0-1m	0.4	no	---	---	---	---	---	---	---	---	---	---
2	Nest N2-0-2m	0.4	no	---	---	---	---	---	---	---	---	---	---
3	Nest N2-0-3m	3	no	---	---	---	---	---	---	---	---	---	---
4	Nest N2-0-4m	7.2	no	---	---	---	---	---	---	---	---	---	---
5	Nest N2-4W-1m	8	no	---	---	---	---	---	---	---	---	---	---
6	Nest N2-4W-2m	5.1	no	---	---	---	---	---	---	---	---	---	---
7	Nest N2-4W-3m	8.7	no	<0.005	<0.005	<0.005	0.02	<1.4	<90	<90	<90	10.3	16
8	Nest N2-4W-4m	7.8	no	---	---	---	---	---	---	---	---	---	---
9	Nest N2-8W-1m	6.9	no	---	---	---	---	---	---	---	---	---	---
10	Nest N2-8W-2m	38.1	no	---	---	---	---	---	---	---	---	---	---
11	Nest N2-8W-3m	926	strong	0.039	<0.005	0.825	1.48	86.9	100	<90	<90	12	15
12	Nest N2-8W-4m	6.8	no	---	---	---	---	---	---	---	---	---	---
13	Nest W-3S-1m	13.5	no	---	---	---	---	---	---	---	---	---	---
14	Nest W-3S-2m	41.3	no	---	---	---	---	---	---	---	---	---	---
15	Nest W-3S-3m	55.9	no	---	---	---	---	---	---	---	---	---	---
16	Nest W-3S-4m	45.7	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	7.4	15

Table B1. Hydrocarbon Vapor Screening (PID) Readings for All the Soil Samples Collected (cont'd).

Sample No.	Sample I.D.	PID	Odour	Benzene	Toluene	Ethyl-benzene	Xylene	F1	F2	F3	F4	Lead	M.C.
Criteria				0.13	1.6	0.36	49	310	760	1700	3300	260	
17	N2-10E-1m	673	strong	---	---	---	---	---	---	---	---	---	---
18	N2-10E-2m	322	strong	---	---	---	---	---	---	---	---	---	---
19	N2-10E-3m	785	strong	---	---	---	---	---	---	---	---	---	---
20	N2-10E-4m	725	strong	---	---	---	---	---	---	---	---	---	---
21	N2-15E-1m	293	strong	---	---	---	---	---	---	---	---	---	---
22	N2-15E-2m	800	strong	---	---	---	---	---	---	---	---	---	---
23	N2-15E-3m	748	strong	---	---	---	---	---	---	---	---	---	---
24	N2-15E-4m	1038	strong	2.33	5.91	3.67	213	1090	180	<90	<90	10.1	15
25	N2-15E-5m	920	strong	0.532	3.83	3.52	237	132	<90	<90	<90	9.2	16
26	Nest E-5S-1m	8.9	no	---	---	---	---	---	---	---	---	---	---
27	Nest E-5S-2m	10.1	no	---	---	---	---	---	---	---	---	---	---
28	Nest E-5S-3m	11.5	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	10.1	16
29	Nest E-5S-4m	7.9	no	---	---	---	---	---	---	---	---	---	---
30	F2	23	no	---	---	---	---	---	---	---	---	---	---
31	F3	23.5	no	---	---	---	---	---	---	---	---	---	---
32	F4	28	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	5.1	17
33	F5	21.1	no	---	---	---	---	---	---	---	---	---	---
20-Aug-04													
1	random east	6	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	7.1	16
2	E-10S-1m	15.3	no	---	---	---	---	---	---	---	---	---	---
3	E-10S-2m	12.6	no	---	---	---	---	---	---	---	---	---	---
4	E-10S-3m	17.1	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	10.2	15
5	E-10S-4m	9.9	no	---	---	---	---	---	---	---	---	---	---
6	S-15E-1m	27.9	no	---	---	---	---	---	---	---	---	---	---
7	S-15E-2m	19.5	no	---	---	---	---	---	---	---	---	---	---
8	S-15E-3m	29.4	no	0.013	<0.005	0.023	0.055	9	<90	<90	<90	11.1	15
9	S-15E-4m	8.9	no	---	---	---	---	---	---	---	---	---	---
10	S-20E-1m	32	no	---	---	---	---	---	---	---	---	---	---
11	S-20E-2m	83.3	no	0.021	<0.005	0.194	0.776	6	<90	<90	<90	7.2	14
12	S-20E-3m	32.8	no	---	---	---	---	---	---	---	---	---	---
13	S-20E-4m	12.6	no	---	---	---	---	---	---	---	---	---	---
14	S-25E-1m	16.1	no	---	---	---	---	---	---	---	---	---	---
15	S-25E-2m	17	no	---	---	---	---	---	---	---	---	---	---
16	S-25E-3m	25.5	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	6.6	12
17	S-25E-4m	12.9	no	---	---	---	---	---	---	---	---	---	---
18	N2-5E-1m	4.9	no	---	---	---	---	---	---	---	---	---	---
19	N2-5E-2m	32.5	slight	---	---	---	---	---	---	---	---	---	---
20	N2-5E-3m	63.3	slight	---	---	---	---	---	---	---	---	---	---
21	N2-5E-4m	340	strong	---	---	---	---	---	---	---	---	---	---
22	N2-5E-5m	14.1	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	---	16
24-Aug-04 (1st time aeration)													
1	Aug 24#1	359	moderate/strong	0.013	0.06	0.096	5.14	67	<90	<90	<90	---	15
2	Aug 24#2	248	strong	---	---	---	---	---	---	---	---	---	---
3	Aug 24#3	200	moderate	---	---	---	---	---	---	---	---	---	---
4	Aug 24#4	245	moderate	---	---	---	---	---	---	---	---	---	---
5	Aug 24#5	852	strong	0.014	0.071	0.05	9.91	137	150	120	<90	---	14
6	Aug 24#6	342	moderate/strong	---	---	---	---	---	---	---	---	---	---
7	Aug 24#7	66.9	slight	---	---	---	---	---	---	---	---	---	---
8	Aug 24#8	345	moderate/strong	---	---	---	---	---	---	---	---	---	---
9	Aug 24#9	67.9	slight	0.016	0.15	0.058	4.32	40.3	<90	180	130	---	17
random#1		15.8	no	---	---	---	---	---	---	---	---	---	---
random#2		428	strong	---	---	---	---	---	---	---	---	---	---
25-Aug-04 (2nd time aeration)													
1	Aug 25 #1	253	moderate	---	---	---	---	---	---	---	---	---	---
2	Aug 25 #2	396	moderate	0.012	0.074	0.048	6.09	75.8	130	120	<90	---	16
3	Aug 25 #3	306	moderate	---	---	---	---	---	---	---	---	---	---
4	Aug 25#4	552	strong	0.012	0.41	0.38	15.9	169	90	110	<90	---	14
5	Aug 25#5	477	moderate	0.011	0.168	0.086	9.32	87.5	<90	<90	<90	---	15
6	Aug 25#6	295	light	---	---	---	---	---	---	---	---	---	---
7	Aug 25#7	236	light	---	---	---	---	---	---	---	---	---	---
8	Aug 25#8	366	light	---	---	---	---	---	---	---	---	---	---
9	Aug25#9	401	moderate	0.02	0.478	1.01	14.8	119	120	<90	<90	---	14
10	Aug25#10	592	strong	0.009	0.104	0.071	12.3	113	110	<90	<90	---	14

Table B2. Laboratory Analysis for All the Confirmatory Soil Samples

Sample No.	Sample I.D.	PID	Odour	Benzene	Toluene	Ethyl-benzene	Xylene	F1	F2	F3	F4	Lead	M.C.
Criteria				0.13	1.6	0.36	49	310	760	1700	3300	260	
17-Aug-04													
1	N-3W-3M	16	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	5.4	13
2	N-6W-5M	30.4	no	0.006	0.113	0.033	0.24	1.61	<90	<90	<90	6.8	15
3	W-5S-1m	1.5	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	110	13.7	23
4	N-6W-3M	115.1	strong	0.039	1.75	0.205	19.3	87	<90	<90	<90	9	14
5	W-O-1M	1	no	<0.005	<0.005	<0.005	0.058	<1.4	<90	<90	<90	11.1	19
18-Aug-04													
6	W2-5S-1m	75.8	slight/no	<0.005	0.038	0.011	0.161	<1.4	<90	<90	<90	11.2	20
7	S-6E-2m	144	slight/no	<0.005	<0.005	<0.005	<0.005	4	<90	<90	<90	10.6	23
8	S2-10E-3m	25.9	no	<0.005	<0.005	<0.005	<0.005	5.1	<90	<90	<90	9.6	15
19-Aug-04													
9	Nest N2-4W-3m	8.7	no	<0.005	<0.005	<0.005	0.02	<1.4	<90	<90	<90	10.3	16
10	Nest N2-6W-3m	926	strong	0.039	<0.005	0.825	1.48	86.9	100	<90	<90	12	15
11	Nest W-3S-4m	45.7	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	7.4	15
12	N2-15E-4m	1036	strong	2.33	59.1	36.7	213	1090	180	<90	<90	7.4	15
13	N2-15E-5m	920	strong	0.532	3.83	9.52	21.7	132	<90	<90	<90	9.2	16
14	Nest E-5S-3m	11.5	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	10.1	16
15	F4	28	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	5.1	17
20-Aug-04													
16	E-10S-3m	17.1	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	10.2	15
17	S-15E-3m	29.4	no	0.013	<0.005	0.023	0.055	9	<90	<90	<90	11.1	15
18	S-20E-2m	83.3	no	0.021	<0.005	0.194	0.776	6	<90	<90	<90	7.2	14
19	S-25E-3m	25.5	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	6.6	12
20	random East	6	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	7.1	16
21	N2-5E-5m	14.1	no	<0.005	<0.005	<0.005	<0.005	<1.4	<90	<90	<90	---	16
24-Aug-04 (1st time aeration)													
22	Aug 24#1	359	moderate/strong	0.013	0.06	0.096	5.14	67	<90	<90	<90	---	15
23	Aug 24#5	852	strong	0.014	0.071	0.05	9.91	137	150	120	<90	---	14
24	Aug 24#9	67.9	slight	0.016	0.15	0.058	4.32	40.3	<90	180	130	---	17
25-Aug-04 (2nd time aeration)													
25	Aug 25 #2	396	moderate	0.012	0.074	0.048	6.09	75.8	130	120	<90	---	16
26	Aug 25#4	552	strong	0.012	0.41	0.38	15.9	169	90	110	<90	---	15
27	Aug 25#5	477	moderate	0.011	0.168	0.086	9.32	87.5	<90	<90	<90	---	15
28	Aug 25#9	401	moderate	0.02	0.478	1.03	14.9	119	120	<90	<90	---	14
29	Aug 25#10	592	strong	0.009	0.104	0.071	12.3	113	110	<90	<90	---	14
30-Aug-04 (3rd time aeration)													
29	A30#2	235	moderate	0.043	0.361	0.169	7.75	78.5	160	120	110	---	16
30	A30#6	83	slight	<0.005	0.009	0.014	0.308	48	80	250	140	---	16
31	A30#9	294	slight	<0.005	0.013	0.013	0.203	17.9	60	210	130	---	16
1-Sep-04 (3rd time aeration)													
32	A-Spt.1#1	166	slight/no	0.015	0.219	0.351	4.98	58.5	130	150	170	---	15
33	A-Spt.1#3	145	slight/sweet	0.005	0.025	0.022	0.32	38.2	90	100	110	---	14
34	A-Spt.1#5	209	no	0.008	0.039	0.027	1.94	61.5	100	100	<90	---	14
35	A-Spt.1#7	38.2	slight	0.007	0.031	0.023	1.4	49.7	100	90	100	---	15
7-Sep-04 (4th time aeration)													
36	A-Sept#2	120	slight	<0.005	0.014	0.025	0.366	16.8	110	<90	<90	---	17
37	A-Sept#3	225	moderate/strong	<0.005	<0.005	<0.005	<0.005	13.7	120	110	<90	---	15
38	A-Sept#7	50	slight/moderate	<0.005	0.007	<0.005	0.055	20.4	120	<90	<90	---	15
39	A-Sept#8	91	moderate	<0.005	<0.005	<0.005	0.669	23.5	100	<90	<90	---	17

M.C. = Moisture Content

Table B3. Laboratory Analysis for All the Aerated Soil Samples

Sample No.	Sample I.D.	PID	Odour	Benzene	Toluene	Ethyl-benzene	Xylene	F1	F2	F3	F4	Lead	M.C.
Criteria				0.13	1.6	0.36	49	310	760	11700	3300	260	
24-Aug-04	(1st time aeration)												
1	Aug 24#1	359	moderate/strong	0.013	0.06	0.096	5.14	67	<90	<90	<90	---	15
2	Aug 24#5	852	strong	0.014	0.071	0.05	9.91	137	150	120	<90	---	14
3	Aug 24#9	67.9	slight	0.016	0.15	0.058	4.32	40.3	<90	180	130	---	17
25-Aug-04	(2nd time aeration)												
4	Aug 25 #2	396	moderate	0.012	0.074	0.048	6.09	75.8	130	120	<90	---	16
5	Aug 25#4	552	strong	0.012	0.41	0.38	15.9	169	90	110	<90	---	15
6	Aug 25#5	477	moderate	0.011	0.168	0.086	9.32	87.5	<90	<90	<90	---	15
7	Aug25#9	401	moderate	0.02	0.478	1.01	34.8	119	120	<90	<90	---	14
8	Aug25#10	592	strong	0.009	0.104	0.071	12.3	113	110	<90	<90	---	14
30-Aug-04	(3rd time aeration)												
9	A30#2	235	moderate	0.043	0.361	0.169	7.75	78.5	160	120	110	---	16
10	A30#6	83	slight	<0.005	0.009	0.014	0.308	48	80	250	140	---	16
11	A30#9	294	slight	<0.005	0.013	0.013	0.203	17.9	60	210	130	---	16
1-Sep-04	(3rd time aeration)												
12	A-Spt.1#1	166	slight/no	0.015	0.219	0.351	4.98	58.5	130	150	170	---	15
13	A-Spt.1#3	145	slight/sweet	0.005	0.025	0.022	0.32	38.2	90	100	110	---	14
14	A-Spt.1#5	209	no	0.008	0.039	0.027	1.94	61.5	100	100	<90	---	14
15	A-Spt.1#7	38.2	slight	0.007	0.031	0.023	1.4	49.7	100	90	100	---	15
7-Sept-04	(4th time aeration)												
16	A-Sept#2	120	slight	<0.005	0.014	0.025	0.366	16.8	110	<90	<90	---	17
17	A-Sept#3	225	moderate/strong	<0.005	<0.005	<0.005	<0.005	13.7	120	110	<90	---	15
18	A-Sept#7	50	slight/moderate	<0.005	0.007	<0.005	0.055	20.4	120	<90	<90	---	15
19	A-Sept#8	91	moderate	<0.005	<0.005	<0.005	0.669	23.5	100	<90	<90	---	17

M.C. = Moisture Content

APPENDIX C
LABORATORY RESULTS





Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04C093134

ATTENTION: VANESSA CASTRO

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 17, 2004
SAMPLE ID:	410513	DATE RECEIVED:	Aug 18, 2004
SAMPLE DESCRIPTION:	N-8W-8M	DATE REPORTED:	Aug 20, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.005	mg/kg	0.005	Aug 20, 2004	MS	Aug 19, 2004
Toluene	<0.005	mg/kg	0.005	Aug 20, 2004	MS	Aug 19, 2004
Ethylbenzene	<0.005	mg/kg	0.005	Aug 20, 2004	MS	Aug 19, 2004
Xylenes	<0.005	mg/kg	0.005	Aug 20, 2004	MS	Aug 19, 2004
C6 - C10 (F1)	<1.4	mg/kg	1.4	Aug 20, 2004	MS	Aug 19, 2004
Moisture Content	13	%	1	Aug 20, 2004	MS	Aug 19, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Results are based on sample dry weight.

The C6-C10 fraction is calculated using toluene response factor.

Total C6 - C50 results are not corrected for BTEX contributions.

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC6 and nC10 response factors are within 30% of Toluene response factor

Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04C093134

ATTENTION: VANESSA CASTRO

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE: Soil	DATE SAMPLED: Aug 17, 2004
SAMPLE ID: 410514	DATE RECEIVED: Aug 18, 2004
SAMPLE DESCRIPTION: N-6W-5M	DATE REPORTED: Aug 20, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	0.006	mg/kg	0.005	Aug 20, 2004	MS	Aug 19, 2004
Toluene	0.113	mg/kg	0.005	Aug 20, 2004	MS	Aug 19, 2004
Ethylbenzene	0.033	mg/kg	0.005	Aug 20, 2004	MS	Aug 19, 2004
Xylenes	0.240	mg/kg	0.005	Aug 20, 2004	MS	Aug 19, 2004
C6 - C10 (F1)	2.0	mg/kg	1.4	Aug 20, 2004	MS	Aug 19, 2004
Moisture Content	15	%	1	Aug 20, 2004	MS	Aug 19, 2004

COMMENTS:

M.D.L. - Method Detection Limit
Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
Total C6 - C50 results are not corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
Extraction and holding times were met for this sample

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04C093134

ATTENTION: VANESSA CASTRO

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 17, 2004
SAMPLE ID:	410515	DATE RECEIVED:	Aug 18, 2004
SAMPLE DESCRIPTION:	W-5S-1M	DATE REPORTED:	Aug 20, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.005	mg/kg	0.005	Aug 20, 2004	MS	Aug 19, 2004
Toluene	<0.005	mg/kg	0.005	Aug 20, 2004	MS	Aug 19, 2004
Ethylbenzene	<0.005	mg/kg	0.005	Aug 20, 2004	MS	Aug 19, 2004
Xylenes	<0.005	mg/kg	0.005	Aug 20, 2004	MS	Aug 19, 2004
C6 - C10 (F1)	<1.4	mg/kg	1.4	Aug 20, 2004	MS	Aug 19, 2004
Moisture Content	23	%	1	Aug 20, 2004	MS	Aug 19, 2004

COMMENTS:

M.D.L. - Method Detection Limit
Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
Total C6 - C50 results are not corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04C093145

ATTENTION: VANESSA CASTRO

Soil Analysis - Lead

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 17, 2004
SAMPLE ID:	410517	DATE RECEIVED:	Aug 18, 2004
SAMPLE DESCRIPTION:	N-3W-3M	DATE REPORTED:	Aug 24, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	5.4	µg/g	0.5	Aug 24, 2004	MG	Aug 24, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Renette Garbutt

Certified By:

Renette Garbutt, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04C093145

ATTENTION: VANESSA CASTRO

Soil Texture

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 17, 2004
SAMPLE ID:	410517	DATE RECEIVED:	Aug 18, 2004
SAMPLE DESCRIPTION:	N-3W-3M	DATE REPORTED:	Aug 24, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Particle Size Distribution (Sand)	82	%	1	Aug 23, 2004	VC	Aug 23, 2004
Particle Size Distribution (Silt)	11	%	1	Aug 23, 2004	VC	Aug 23, 2004
Particle Size Distribution (Clay)	7	%	1	Aug 23, 2004	VC	Aug 23, 2004

Soil Texture	Loamy Sand
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COMMENTS:

M.D.L. - Method Detection Limit
Results are based on the dry weight of the sample.

Renette Garbutt

Certified By:

Renette Garbutt, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04C093145

ATTENTION: VANESSA CASTRO

Particle Size by Sieve

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 17, 2004
SAMPLE ID:	410517	DATE RECEIVED:	Aug 18, 2004
SAMPLE DESCRIPTION:	N-3W-3M	DATE REPORTED:	Aug 24, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Sieve Analysis - 75 microns	80	%	N/A	Aug 24, 2004	VC	Aug 24, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Value reported is amount of sample retained on sieve after wash with water and represents proportion by weight particles larger than indicated sieve size.

Renette Garbutt

Certified By:

Renette Garbutt, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04C093145

Soil Analysis - Lead

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 17, 2004
SAMPLE ID:	410519	DATE RECEIVED:	Aug 18, 2004
SAMPLE DESCRIPTION:	N-6W-5M	DATE REPORTED:	Aug 24, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	6.8	µg/g	0.5	Aug 24, 2004	MG	Aug 24, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Certified By:

Renette Garbutt, Analyst



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CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04C093145

ATTENTION: VANESSA CASTRO

Soil Analysis - Lead

SAMPLE TYPE: Soil	DATE SAMPLED: Aug 17, 2004
SAMPLE ID: 410520	DATE RECEIVED: Aug 18, 2004
SAMPLE DESCRIPTION: W-5S-1M	DATE REPORTED: Aug 24, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	13.7	µg/g	0.5	Aug 24, 2004	MG	Aug 24, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Certified By:

Renette Garbutt, Analyst



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CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04C093145

ATTENTION: VANESSA CASTRO

Soil Texture

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 17, 2004
SAMPLE ID:	410520	DATE RECEIVED:	Aug 18, 2004
SAMPLE DESCRIPTION:	W5S-1M	DATE REPORTED:	Aug 24, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Particle Size Distribution (Sand)	16	%	1	Aug 23, 2004	VC	Aug 23, 2004
Particle Size Distribution (Silt)	39	%	1	Aug 23, 2004	VC	Aug 23, 2004
Particle Size Distribution (Clay)	45	%	1	Aug 23, 2004	VC	Aug 23, 2004

Soil Texture	Clay
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COMMENTS:

M.D.L. - Method Detection Limit
Results are based on the dry weight of the sample.

Certified By:

Renette Garbutt, Analyst



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CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04C093145

ATTENTION: VANESSA CASTRO

Particle Size by Sieve

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 17, 2004
SAMPLE ID:	410520	DATE RECEIVED:	Aug 18, 2004
SAMPLE DESCRIPTION:	W-5S-1M	DATE REPORTED:	Aug 24, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Sieve Analysis - 75 microns	11	%	N/A	Aug 24, 2004	VC	Aug 24, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Value reported is amount of sample retained on sieve after wash with water and represents proportion by weight particles larger than indicated sieve size.

Certified By:

Renette Garbutt, Analyst



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CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04C093145

Soil Analysis - Lead

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 17, 2004
SAMPLE ID:	410521	DATE RECEIVED:	Aug 18, 2004
SAMPLE DESCRIPTION:	N-6W-3M	DATE REPORTED:	Aug 24, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	9.0	µg/g	0.5	Aug 24, 2004	MG	Aug 24, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Certified By:

Renette Garbutt, Analyst



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CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04C093145

ATTENTION: VANESSA CASTRO

Soil Analysis - Lead

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 17, 2004
SAMPLE ID:	410523	DATE RECEIVED:	Aug 18, 2004
SAMPLE DESCRIPTION:	WO-1M	DATE REPORTED:	Aug 24, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	11.1	µg/g	0.5	Aug 24, 2004	MG	Aug 24, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Renette Garbutt

Certified By:

Renette Garbutt, Analyst



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CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04C093145

ATTENTION: VANESSA CASTRO

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 17, 2004
SAMPLE ID:	410517	DATE RECEIVED:	Aug 18, 2004
SAMPLE DESCRIPTION:	N-3W-3M	DATE REPORTED:	Aug 24, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
C>10 - C16	<90	mg/kg	90	Aug 23, 2004	MM	Aug 20, 2004
C>16 - C34	<90	mg/kg	90	Aug 23, 2004	MM	Aug 20, 2004
C>34 - C50	<90	mg/kg	90	Aug 23, 2004	MM	Aug 20, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	13	%	1	Aug 20, 2004	JA	Aug 23, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Results are based on sample dry weight.

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average.

Linearity is within 15%.

Extraction and holding times were met for this sample

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04C093145

ATTENTION: VANESSA CASTRO

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 17, 2004
SAMPLE ID:	410519	DATE RECEIVED:	Aug 18, 2004
SAMPLE DESCRIPTION:	N-6W-5M	DATE REPORTED:	Aug 24, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
C>10 - C16	<90	mg/kg	90	Aug 23, 2004	MM	Aug 20, 2004
C>16 - C34	<90	mg/kg	90	Aug 23, 2004	MM	Aug 20, 2004
C>34 - C50	<90	mg/kg	90	Aug 23, 2004	MM	Aug 20, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	15	%	1	Aug 20, 2004	JA	Aug 23, 2004

COMMENTS:

M.D.L. - Method Detection Limit
Results are based on sample dry weight.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
n-C10, n-C16 and n-C34 response factors are within 10% of their average.
C50 response factor is within 70% of n-C10 + n-C16 + n-C34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04C093145

ATTENTION: VANESSA CASTRO

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 17, 2004
SAMPLE ID:	410520	DATE RECEIVED:	Aug 18, 2004
SAMPLE DESCRIPTION:	W-5S-1M	DATE REPORTED:	Aug 24, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
C>10 - C16	<90	mg/kg	90	Aug 23, 2004	MM	Aug 20, 2004
C>16 - C34	<90	mg/kg	90	Aug 23, 2004	MM	Aug 20, 2004
C>34 - C50	110	mg/kg	90	Aug 23, 2004	MM	Aug 20, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	23	%	1	Aug 20, 2004	JA	Aug 23, 2004

COMMENTS:

M.D.L. - Method Detection Limit
Results are based on sample dry weight.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average
Linearity is within 15%.
Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04C093145

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 17, 2004
SAMPLE ID:	410521	DATE RECEIVED:	Aug 18, 2004
SAMPLE DESCRIPTION:	N-8W-3M	DATE REPORTED:	Aug 24, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	0.039	mg/kg	0.005	Aug 24, 2004	JA	Aug 20, 2004
Toluene	1.75	mg/kg	0.005	Aug 24, 2004	JA	Aug 20, 2004
Ethylbenzene	0.205	mg/kg	0.005	Aug 24, 2004	JA	Aug 20, 2004
Xylenes	19.3	mg/kg	0.05	Aug 24, 2004	JA	Aug 20, 2004
C6 - C10 (F1)	108	mg/kg	14	Aug 24, 2004	JA	Aug 20, 2004
C6 - C10 (F1 minus BTEX)	87	mg/kg	14			
C>10 - C16	<90	mg/kg	90	Aug 23, 2004	MM	Aug 20, 2004
C>16 - C34	<90	mg/kg	90	Aug 23, 2004	MM	Aug 20, 2004
C>34 - C50	<90	mg/kg	90	Aug 23, 2004	MM	Aug 20, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	14	%	1	Aug 20, 2004	JA	Aug 23, 2004

COMMENTS:

M.D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC6 and nC10 response factors are within 30% of Toluene response factor
 nC10, nC16 and nC34 response factors are within 10% of their average.
 C50 response factor is within 70% of nC10 + nC16 + nC34 average.
 Linearity is within 15%.
 Extraction and holding times were met for this sample

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04C093145

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 17, 2004
SAMPLE ID:	410523	DATE RECEIVED:	Aug 18, 2004
SAMPLE DESCRIPTION:	W-01M	DATE REPORTED:	Aug 24, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.005	mg/kg	0.005	Aug 24, 2004	JA	Aug 20, 2004
Toluene	<0.005	mg/kg	0.005	Aug 24, 2004	JA	Aug 20, 2004
Ethylbenzene	<0.005	mg/kg	0.005	Aug 24, 2004	JA	Aug 20, 2004
Xylenes	0.058	mg/kg	0.005	Aug 24, 2004	JA	Aug 20, 2004
C6 - C10 (F1)	<1.4	mg/kg	1.4	Aug 24, 2004	JA	Aug 20, 2004
C6 - C10 (F1 minus BTEX)	<1.4	mg/kg	1.4			
C>10 - C16	<90	mg/kg	90	Aug 23, 2004	MM	Aug 20, 2004
C>16 - C34	<90	mg/kg	90	Aug 23, 2004	MM	Aug 20, 2004
C>34 - C50	<90	mg/kg	90	Aug 23, 2004	MM	Aug 20, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	19	%	1	Aug 20, 2004	JA	Aug 23, 2004

COMMENTS:

M.D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor.
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC6 and nC10 response factors are within 30% of Toluene response factor.
 nC10, nC16 and nC34 response factors are within 10% of their average.
 C50 response factor is within 70% of nC10 + nC16 + nC34 average
 Linearity is within 15%.
 Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E093285

ATTENTION: VANESSA CASTRO

Soil Analysis - Lead

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 18, 2004
SAMPLE ID:	410774	DATE RECEIVED:	Aug 20, 2004
SAMPLE DESCRIPTION:	W2-6S-1m	DATE REPORTED:	Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	11.2	µg/g	0.5	Aug 26, 2004	MG	Aug 26, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Renette Garbutt

Certified By:

Renette Garbutt, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E093285

ATTENTION: VANESSA CASTRO

Soil Analysis - Lead

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 18, 2004
SAMPLE ID:	410776	DATE RECEIVED:	Aug 20, 2004
SAMPLE DESCRIPTION:	S-6E-2m	DATE REPORTED:	Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	10.6	µg/g	0.5	Aug 26, 2004	MG	Aug 26, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Renette Garbutt

Certified By:

Renette Garbutt, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E093285

ATTENTION: VANESSA CASTRO

Soil Analysis - Lead

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 18, 2004
SAMPLE ID:	410778	DATE RECEIVED:	Aug 20, 2004
SAMPLE DESCRIPTION:	S2-10E-3m	DATE REPORTED:	Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	9.6	µg/g	0.5	Aug 26, 2004	MG	Aug 26, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Renette Garbutt

Certified By:

Renette Garbutt, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E093285

ATTENTION: VANESSA CASTRO

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 18, 2004
SAMPLE ID:	410774	DATE RECEIVED:	Aug 20, 2004
SAMPLE DESCRIPTION:	W2-6S-1m	DATE REPORTED:	Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 23, 2004
Toluene	0.038	mg/kg	0.005	Aug 26, 2004	JA	Aug 23, 2004
Ethylbenzene	0.011	mg/kg	0.005	Aug 26, 2004	JA	Aug 23, 2004
Xylenes	0.161	mg/kg	0.005	Aug 26, 2004	JA	Aug 23, 2004
C6 - C10 (F1)	1.5	mg/kg	1.4	Aug 26, 2004	JA	Aug 23, 2004
C6 - C10 (F1 minus BTEX)	<1.4	mg/kg	1.4			
C>10 - C16	<90	mg/kg	90	Aug 25, 2004	MM	Aug 23, 2004
C>16 - C34	<90	mg/kg	90	Aug 25, 2004	MM	Aug 23, 2004
C>34 - C50	<90	mg/kg	90	Aug 25, 2004	MM	Aug 23, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	20	%	1	Aug 24, 2004	MM	Aug 23, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Results are based on sample dry weight.

The C6-C10 fraction is calculated using toluene response factor

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34

Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.

Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC6 and nC10 response factors are within 30% of Toluene response factor.

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average.

Linearity is within 15%

Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E093285

ATTENTION: VANESSA CASTRO

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 18, 2004
SAMPLE ID:	410776	DATE RECEIVED:	Aug 20, 2004
SAMPLE DESCRIPTION:	S-6E-2m	DATE REPORTED:	Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 23, 2004
Toluene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 23, 2004
Ethylbenzene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 23, 2004
Xylenes	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 23, 2004
C6 - C10 (F1)	4.0	mg/kg	1.4	Aug 26, 2004	JA	Aug 23, 2004
C6 - C10 (F1 minus BTEX)	4.0	mg/kg	1.4			
C>10 - C16	<90	mg/kg	90	Aug 25, 2004	MM	Aug 23, 2004
C>16 - C34	<90	mg/kg	90	Aug 25, 2004	MM	Aug 23, 2004
C>34 - C50	<90	mg/kg	90	Aug 25, 2004	MM	Aug 23, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	23	%	1	Aug 24, 2004	MM	Aug 23, 2004

COMMENTS:

M.D.L. - Method Detection Limit
Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04E093285

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 18, 2004
SAMPLE ID:	410778	DATE RECEIVED:	Aug 20, 2004
SAMPLE DESCRIPTION:	S2-10E-3m	DATE REPORTED:	Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 23, 2004
Toluene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 23, 2004
Ethylbenzene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 23, 2004
Xylenes	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 23, 2004
C6 - C10 (F1)	5.1	mg/kg	1.4	Aug 26, 2004	JA	Aug 23, 2004
C6 - C10 (F1 minus BTEX)	5.1	mg/kg	1.4			
C>10 - C16	<90	mg/kg	90	Aug 25, 2004	MM	Aug 23, 2004
C>16 - C34	<90	mg/kg	90	Aug 25, 2004	MM	Aug 23, 2004
C>34 - C50	<90	mg/kg	90	Aug 25, 2004	MM	Aug 23, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	15	%	1	Aug 24, 2004	MM	Aug 23, 2004

COMMENTS:

M.D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC6 and nC10 response factors are within 30% of Toluene response factor.
 nC10, nC16 and nC34 response factors are within 10% of their average.
 C50 response factor is within 70% of nC10 + nC16 + nC34 average.
 Linearity is within 15%.
 Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E093427

ATTENTION: VANESSA CASTRO

Soil Analysis - Lead

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 19, 2004
SAMPLE ID:	411005	DATE RECEIVED:	Aug 23, 2004
SAMPLE DESCRIPTION:	Nest N2-4W-3m	DATE REPORTED:	Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	10.3	µg/g	0.5	Aug 26, 2004	MG	Aug 26, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Certified By:

Renette Garbutt, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04E093427

Soil Analysis - Lead

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 19, 2004
SAMPLE ID:	411006	DATE RECEIVED:	Aug 23, 2004
SAMPLE DESCRIPTION:	Nest N2-8W-3m	DATE REPORTED:	Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	12.0	µg/g	0.5	Aug 26, 2004	MG	Aug 26, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Renette Garbutt

Certified By:

Renette Garbutt, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04E093427

Soil Analysis - Lead

SAMPLE TYPE: soil	DATE SAMPLED: Aug 19, 2004
SAMPLE ID: 411007	DATE RECEIVED: Aug 23, 2004
SAMPLE DESCRIPTION: Nest W-3S-4m	DATE REPORTED: Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	7.4	µg/g	0.5	Aug 26, 2004	MG	Aug 26, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Certified By:

Renette Garbutt, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04E093427

Soil Analysis - Lead

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 19, 2004
SAMPLE ID:	411008	DATE RECEIVED:	Aug 23, 2004
SAMPLE DESCRIPTION:	N2-15E-4m	DATE REPORTED:	Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	11.1	µg/g	0.5	Aug 26, 2004	MG	Aug 26, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Renette Garbutt

Certified By:

Renette Garbutt, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E093427

ATTENTION: VANESSA CASTRO

Soil Analysis - Lead

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 19, 2004
SAMPLE ID:	411009	DATE RECEIVED:	Aug 23, 2004
SAMPLE DESCRIPTION:	N2-15E-5m	DATE REPORTED:	Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	9.2	µg/g	0.5	Aug 26, 2004	MG	Aug 26, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Certified By:

Renette Garbutt, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E093427

ATTENTION: VANESSA CASTRO

Soil Analysis - Lead

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 19, 2004
SAMPLE ID:	411010	DATE RECEIVED:	Aug 23, 2004
SAMPLE DESCRIPTION:	Nest E-5S-3m	DATE REPORTED:	Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	10.1	µg/g	0.5	Aug 26, 2004	MG	Aug 26, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Renette Garbutt

Certified By:

Renette Garbutt, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E093427

ATTENTION: VANESSA CASTRO

Soil Analysis - Lead

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 19, 2004
SAMPLE ID:	411011	DATE RECEIVED:	Aug 23, 2004
SAMPLE DESCRIPTION:	F4	DATE REPORTED:	Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	5.1	µg/g	0.5	Aug 26, 2004	MG	Aug 26, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Certified By:

Renette Garbutt, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E093427

ATTENTION: VANESSA CASTRO

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 19, 2004
SAMPLE ID:	411005	DATE RECEIVED:	Aug 23, 2004
SAMPLE DESCRIPTION:	Nest N2-4W-3m	DATE REPORTED:	Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
Toluene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
Ethylbenzene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
Xylenes	0.020	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
C6 - C10 (F1)	<1.4	mg/kg	1.4	Aug 26, 2004	JA	Aug 24, 2004
C6 - C10 (F1 minus BTEX)	<1.4	mg/kg	1.4			
C>10 - C16	<90	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
C>16 - C34	<90	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
C>34 - C50	<90	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	16	%	1	Aug 25, 2004	MM	Aug 24, 2004

COMMENTS:

M.D.L. - Method Detection Limit
Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E093427

ATTENTION: VANESSA CASTRO

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 19, 2004
SAMPLE ID:	411006	DATE RECEIVED:	Aug 23, 2004
SAMPLE DESCRIPTION:	Nest N2-3W-3m	DATE REPORTED:	Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	0.039	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
Toluene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
Ethylbenzene	0.825	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
Xylenes	1.48	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
C6 - C10 (F1)	89.2	mg/kg	1.4	Aug 26, 2004	JA	Aug 24, 2004
C6 - C10 (F1 minus BTEX)	86.9	mg/kg	1.4			
C>10 - C16	100	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
C>16 - C34	<90	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
C>34 - C50	<90	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	15	%	1	Aug 25, 2004	MM	Aug 24, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Results are based on sample dry weight.

The C6-C10 fraction is calculated using toluene response factor.

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present

Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC6 and nC10 response factors are within 30% of Toluene response factor.

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average

Linearity is within 15%.

Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04E093427

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 19, 2004
SAMPLE ID:	411007	DATE RECEIVED:	Aug 23, 2004
SAMPLE DESCRIPTION:	Nest W-3S-4m	DATE REPORTED:	Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
Toluene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
Ethylbenzene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
Xylenes	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
C6 - C10 (F1)	<1.4	mg/kg	1.4	Aug 26, 2004	JA	Aug 24, 2004
C6 - C10 (F1 minus BTEX)	<1.4	mg/kg	1.4			
C>10 - C16	<90	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
C>16 - C34	<90	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
C>34 - C50	<90	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	15	%	1	Aug 25, 2004	MM	Aug 24, 2004

COMMENTS:

M.D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor.
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC8 and nC10 response factors are within 30% of Toluene response factor.
 nC10, nC16 and nC34 response factors are within 10% of their average.
 C50 response factor is within 70% of nC10 + nC16 + nC34 average
 Linearity is within 15%.
 Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E093427

ATTENTION: VANESSA CASTRO

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 19, 2004
SAMPLE ID:	411008	DATE RECEIVED:	Aug 23, 2004
SAMPLE DESCRIPTION:	N2-15E-4m	DATE REPORTED:	Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	2.33	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
Toluene	59.1	mg/kg	0.2	Aug 26, 2004	JA	Aug 24, 2004
Ethylbenzene	36.7	mg/kg	0.1	Aug 26, 2004	JA	Aug 24, 2004
Xylenes	213	mg/kg	0.2	Aug 26, 2004	JA	Aug 24, 2004
C6 - C10 (F1)	1400	mg/kg	28	Aug 26, 2004	JA	Aug 24, 2004
C6 - C10 (F1 minus BTEX)	1090	mg/kg	28			
C>10 - C16	180	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
C>16 - C34	<90	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
C>34 - C50	<90	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	15	%	1	Aug 25, 2004	MM	Aug 24, 2004

COMMENTS:

M.D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor.
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC6 and nC10 response factors are within 30% of Toluene response factor.
 nC10, nC16 and nC34 response factors are within 10% of their average.
 C50 response factor is within 70% of nC10 + nC16 + nC34 average.
 Linearity is within 15%
 Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E093427

ATTENTION: VANESSA CASTRO

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 19, 2004
SAMPLE ID:	411009	DATE RECEIVED:	Aug 23, 2004
SAMPLE DESCRIPTION:	N2-16E-5m	DATE REPORTED:	Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	0.532	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
Toluene	3.83	mg/kg	0.05	Aug 26, 2004	JA	Aug 24, 2004
Ethylbenzene	3.52	mg/kg	0.05	Aug 26, 2004	JA	Aug 24, 2004
Xylenes	21.7	mg/kg	0.05	Aug 26, 2004	JA	Aug 24, 2004
C6 - C10 (F1)	162	mg/kg	1.4	Aug 26, 2004	JA	Aug 24, 2004
C6 - C10 (F1 minus BTEX)	132	mg/kg	1.4			
C>10 - C16	<90	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
C>16 - C34	<90	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
C>34 - C50	<90	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	16	%	1	Aug 25, 2004	MM	Aug 24, 2004

COMMENTS:

M.D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor.
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC6 and nC10 response factors are within 30% of Toluene response factor.
 nC10, nC16 and nC34 response factors are within 10% of their average.
 C50 response factor is within 70% of nC10 + nC16 + nC34 average.
 Linearity is within 15%.
 Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E093427

ATTENTION: VANESSA CASTRO

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 19, 2004
SAMPLE ID:	411010	DATE RECEIVED:	Aug 23, 2004
SAMPLE DESCRIPTION:	Nest E-5S-3m	DATE REPORTED:	Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
Toluene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
Ethylbenzene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
Xylenes	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
C6 - C10 (F1)	<1.4	mg/kg	1.4	Aug 26, 2004	JA	Aug 24, 2004
C6 - C10 (F1 minus BTEX)	<1.4	mg/kg	1.4			
C>10 - C16	<90	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
C>16 - C34	<90	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
C>34 - C50	<90	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	16	%	1	Aug 25, 2004	MM	Aug 24, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Results are based on sample dry weight.

The C6-C10 fraction is calculated using toluene response factor

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.

Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC6 and nC10 response factors are within 30% of Toluene response factor

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average.

Linearity is within 15%.

Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04E093427

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 19, 2004
SAMPLE ID:	411011	DATE RECEIVED:	Aug 23, 2004
SAMPLE DESCRIPTION:	F4	DATE REPORTED:	Aug 26, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
Toluene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
Ethylbenzene	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
Xylenes	<0.005	mg/kg	0.005	Aug 26, 2004	JA	Aug 24, 2004
C6 - C10 (F1)	<1.4	mg/kg	1.4	Aug 26, 2004	JA	Aug 24, 2004
C6 - C10 (F1 minus BTEX)	<1.4	mg/kg	1.4			
C>10 - C16	<90	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
C>16 - C34	<90	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
C>34 - C50	<90	mg/kg	90	Aug 25, 2004	MM	Aug 24, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	17	%	1	Aug 25, 2004	MM	Aug 24, 2004

COMMENTS:

M.D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor.
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC6 and nC10 response factors are within 30% of Toluene response factor
 nC10, nC16 and nC34 response factors are within 10% of their average
 C50 response factor is within 70% of nC10 + nC16 + nC34 average
 Linearity is within 15%.
 Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04E093638

Soil Analysis - Lead

SAMPLE TYPE: soil	DATE SAMPLED: Aug 20, 2004
SAMPLE ID: 411232	DATE RECEIVED: Aug 24, 2004
SAMPLE DESCRIPTION: E-10S-3m	DATE REPORTED: Aug 30, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	10.2	µg/g	0.5	Aug 28, 2004	MG	Aug 28, 2004

COMMENTS:

M.D.L. - Method Detection Limit -

Certified By:

Renette Garbutt, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04E093638

Soil Analysis - Lead

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 20, 2004
SAMPLE ID:	411235	DATE RECEIVED:	Aug 24, 2004
SAMPLE DESCRIPTION:	S-15E-3m	DATE REPORTED:	Aug 30, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	11.1	µg/g	0.5	Aug 28, 2004	MG	Aug 28, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Certified By:

Renette Garbutt, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04E093638

Soil Analysis - Lead

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 20, 2004
SAMPLE ID:	411236	DATE RECEIVED:	Aug 24, 2004
SAMPLE DESCRIPTION:	S-20E-2m	DATE REPORTED:	Aug 30, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	7.2	µg/g	0.5	Aug 28, 2004	MG	Aug 28, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Renette Garbutt

Certified By:

Renette Garbutt, Analyst



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CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04E093638

Soil Analysis - Lead

SAMPLE TYPE: soil	DATE SAMPLED: Aug 20, 2004
SAMPLE ID: 411237	DATE RECEIVED: Aug 24, 2004
SAMPLE DESCRIPTION: S-25E-3m	DATE REPORTED: Aug 30, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	6.6	µg/g	0.5	Aug 28, 2004	MG	Aug 28, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Certified By:

Renette Garbutt, Analyst



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CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04E093638

Soil Analysis - Lead

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 20, 2004
SAMPLE ID:	411239	DATE RECEIVED:	Aug 24, 2004
SAMPLE DESCRIPTION:	Random East	DATE REPORTED:	Aug 30, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	71	µg/g	0.5	Aug 28, 2004	MG	Aug 28, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Certified By:

Renette Garbutt, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E093638

ATTENTION: VANESSA CASTRO

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 20, 2004
SAMPLE ID:	411232	DATE RECEIVED:	Aug 24, 2004
SAMPLE DESCRIPTION:	E-10S-3m	DATE REPORTED:	Aug 30, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.005	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
Toluene	<0.005	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
Ethylbenzene	<0.005	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
Xylenes	<0.005	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
C6 - C10 (F1)	<1.4	mg/kg	1.4	Aug 30, 2004	JA	Aug 26, 2004
C6 - C10 (F1 minus BTEX)	<1.4	mg/kg	1.4			
C>10 - C16	<90	mg/kg	90	Aug 26, 2004	LW	Aug 01, 2004
C>16 - C34	<90	mg/kg	90	Aug 26, 2004	LW	Aug 01, 2004
C>34 - C50	<90	mg/kg	90	Aug 26, 2004	LW	Aug 01, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	15	%	1	Aug 30, 2004	PG	Aug 27, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Results are based on sample dry weight.

The C6-C10 fraction is calculated using toluene response factor.

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34

Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.

Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC6 and nC10 response factors are within 30% of Toluene response factor.

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average

Linearity is within 15%.

Extraction and holding times were met for this sample

Certified By:

Amber Alderman, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E093638

ATTENTION: VANESSA CASTRO

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 20, 2004
SAMPLE ID:	411235	DATE RECEIVED:	Aug 24, 2004
SAMPLE DESCRIPTION:	S-15E3m	DATE REPORTED:	Aug 30, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	0.013	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
Toluene	<0.005	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
Ethylbenzene	0.023	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
Xylenes	0.055	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
C6 - C10 (F1)	9.1	mg/kg	1.4	Aug 30, 2004	JA	Aug 26, 2004
C6 - C10 (F1 minus BTEX)	9.0	mg/kg	1.4			
C>10 - C16	<90	mg/kg	90	Aug 26, 2004	LW	Aug 01, 2004
C>16 - C34	<90	mg/kg	90	Aug 26, 2004	LW	Aug 01, 2004
C>34 - C50	<90	mg/kg	90	Aug 26, 2004	LW	Aug 01, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	15	%	1	Aug 30, 2004	PG	Aug 27, 2004

COMMENTS:

M.D.L. - Method Detection Limit
Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Certified By:

Amber Alderman, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04E093638

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 20, 2004
SAMPLE ID:	411236	DATE RECEIVED:	Aug 24, 2004
SAMPLE DESCRIPTION:	G-20E-2m	DATE REPORTED:	Aug 30, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	0.021	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
Toluene	<0.005	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
Ethylbenzene	0.194	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
Xylenes	0.776	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
C6 - C10 (F1)	7.0	mg/kg	1.4	Aug 30, 2004	JA	Aug 26, 2004
C6 - C10 (F1 minus BTEX)	6.0	mg/kg	1.4			
C>10 - C16	<90	mg/kg	90	Aug 26, 2004	LW	Aug 01, 2004
C>16 - C34	<90	mg/kg	90	Aug 26, 2004	LW	Aug 01, 2004
C>34 - C50	<90	mg/kg	90	Aug 26, 2004	LW	Aug 01, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	14	%	1	Aug 30, 2004	PG	Aug 27, 2004

COMMENTS:

M.D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor.
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC6 and nC10 response factors are within 30% of Toluene response factor.
 nC10, nC16 and nC34 response factors are within 10% of their average.
 C50 response factor is within 70% of nC10 + nC16 + nC34 average.
 Linearity is within 15%.
 Extraction and holding times were met for this sample.

Certified By: Amber Alderman, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E093638

ATTENTION: VANESSA CASTRO

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 20, 2004
SAMPLE ID:	411237	DATE RECEIVED:	Aug 24, 2004
SAMPLE DESCRIPTION:	G25E-3m	DATE REPORTED:	Aug 30, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.005	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
Toluene	<0.005	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
Ethylbenzene	<0.005	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
Xylenes	<0.005	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
C6 - C10 (F1)	<1.4	mg/kg	1.4	Aug 30, 2004	JA	Aug 26, 2004
C6 - C10 (F1 minus BTEX)	<1.4	mg/kg	1.4			
C>10 - C16	<90	mg/kg	90	Aug 26, 2004	LW	Aug 01, 2004
C>16 - C34	<90	mg/kg	90	Aug 26, 2004	LW	Aug 01, 2004
C>34 - C50	<90	mg/kg	90	Aug 26, 2004	LW	Aug 01, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	12	%	1	Aug 30, 2004	PG	Aug 27, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Results are based on sample dry weight.

The C6-C10 fraction is calculated using toluene response factor.

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.

Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC6 and nC10 response factors are within 30% of Toluene response factor.

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average.

Linearity is within 15%.

Extraction and holding times were met for this sample.

Certified By:

Amber Alderman, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04E093638

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 20, 2004
SAMPLE ID:	411239	DATE RECEIVED:	Aug 24, 2004
SAMPLE DESCRIPTION:	Random East	DATE REPORTED:	Aug 30, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.005	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
Toluene	<0.005	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
Ethylbenzene	<0.005	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
Xylenes	<0.005	mg/kg	0.005	Aug 30, 2004	JA	Aug 26, 2004
C6 - C10 (F1)	<1.4	mg/kg	1.4	Aug 30, 2004	JA	Aug 26, 2004
C6 - C10 (F1 minus BTEX)	<1.4	mg/kg	1.4			
C>10 - C16	<90	mg/kg	90	Aug 26, 2004	LW	Aug 01, 2004
C>16 - C34	<90	mg/kg	90	Aug 26, 2004	LW	Aug 01, 2004
C>34 - C50	<90	mg/kg	90	Aug 26, 2004	LW	Aug 01, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	16	%	1	Aug 30, 2004	PG	Aug 27, 2004

COMMENTS:

M.D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor.
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC6 and nC10 response factors are within 30% of Toluene response factor.
 nC10, nC16 and nC34 response factors are within 10% of their average.
 C50 response factor is within 70% of nC10 + nC16 + nC34 average.
 Linearity is within 15%.
 Extraction and holding times were met for this sample.

Amber Alderman

Certified By:

Amber Alderman, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04C093953

Soil Analysis - Lead

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 24, 2004
SAMPLE ID:	411509	DATE RECEIVED:	Aug 26, 2004
SAMPLE DESCRIPTION:	A24#5	DATE REPORTED:	Aug 27, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead		µg/g	0.5			

COMMENTS:

M.D.L. - Method Detection Limit

Certified By: _____



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04C093953

Soil Analysis - Lead

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 24, 2004
SAMPLE ID:	411510	DATE RECEIVED:	Aug 26, 2004
SAMPLE DESCRIPTION:	A24#9	DATE REPORTED:	Aug 27, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead		µg/g	0.5			

COMMENTS:

M.D.L. - Method Detection Limit

Certified By: _____



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04C093953

ATTENTION: VANESSA CASTRO

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 24, 2004
SAMPLE ID:	411508	DATE RECEIVED:	Aug 26, 2004
SAMPLE DESCRIPTION:	A24#1	DATE REPORTED:	Aug 27, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	0.013	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Toluene	0.060	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Ethylbenzene	0.096	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Xylenes	5.14	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
C6 - C10 (F1)	72.3	mg/kg	1.4	Aug 27, 2004	JA	Aug 26, 2004
C6 - C10 (F1 minus BTEX)	67.0	mg/kg	1.4			
C>10 - C16	<90	mg/kg	90	Aug 27, 2004	MM	Aug 26, 2004
C>16 - C34	<90	mg/kg	90	Aug 27, 2004	MM	Aug 26, 2004
C>34 - C50	<90	mg/kg	90	Aug 27, 2004	MM	Aug 26, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	15	%	1	Aug 27, 2004	MM	Aug 26, 2004

COMMENTS:

M.D.L. - Method Detection Limit
Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04C093953

ATTENTION: VANESSA CASTRO

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE: Soil	DATE SAMPLED: Aug 24, 2004
SAMPLE ID: 411509	DATE RECEIVED: Aug 26, 2004
SAMPLE DESCRIPTION: A24#5	DATE REPORTED: Aug 27, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	0.014	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Toluene	0.071	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Ethylbenzene	0.050	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Xylenes	9.91	mg/kg	0.05	Aug 27, 2004	JA	Aug 26, 2004
C6 - C10 (F1)	147	mg/kg	1.4	Aug 27, 2004	JA	Aug 26, 2004
C6 - C10 (F1 minus BTEX)	137	mg/kg	1.4			
C>10 - C16	150	mg/kg	90	Aug 27, 2004	MM	Aug 26, 2004
C>16 - C34	120	mg/kg	90	Aug 27, 2004	MM	Aug 26, 2004
C>34 - C50	<90	mg/kg	90	Aug 27, 2004	MM	Aug 26, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	14	%	1	Aug 27, 2004	MM	Aug 26, 2004

COMMENTS:

M.D.L. - Method Detection Limit
Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04C093953

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 24, 2004
SAMPLE ID:	411510	DATE RECEIVED:	Aug 26, 2004
SAMPLE DESCRIPTION:	A24#9	DATE REPORTED:	Aug 27, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	0.016	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Toluene	0.150	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Ethylbenzene	0.058	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Xylenes	4.32	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
C6 - C10 (F1)	44.8	mg/kg	1.4	Aug 27, 2004	JA	Aug 26, 2004
C6 - C10 (F1 minus BTEX)	40.3	mg/kg	1.4			
C>10 - C16	<90	mg/kg	90	Aug 27, 2004	MM	Aug 26, 2004
C>16 - C34	180	mg/kg	90	Aug 27, 2004	MM	Aug 26, 2004
C>34 - C50	130	mg/kg	90	Aug 27, 2004	MM	Aug 26, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	17	%	1	Aug 27, 2004	MM	Aug 26, 2004

COMMENTS:

M.D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor.
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC6 and nC10 response factors are within 30% of Toluene response factor.
 nC10, nC16 and nC34 response factors are within 10% of their average.
 C50 response factor is within 70% of nC10 + nC16 + nC34 average
 Linearity is within 15%.
 Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04C093988

ATTENTION: VANESSA CASTRO

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 25, 2004
SAMPLE ID:	411521	DATE RECEIVED:	Aug 26, 2004
SAMPLE DESCRIPTION:	A25#2	DATE REPORTED:	Aug 27, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	0.012	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Toluene	0.074	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Ethylbenzene	0.048	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Xylenes	6.09	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
C6 - C10 (F1)	82	mg/kg	1.4	Aug 27, 2004	JA	Aug 26, 2004
C6 - C10 (F1 minus BTEX)	75.8	mg/kg	1.4			
C>10 - C16	130	mg/kg	90	Aug 26, 2004	MM	Aug 26, 2004
C>16 - C34	120	mg/kg	90	Aug 26, 2004	MM	Aug 26, 2004
C>34 - C50	<90	mg/kg	90	Aug 26, 2004	MM	Aug 26, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	16	%	1	Aug 27, 2004	MM	Aug 26, 2004

COMMENTS:

M.D.L. - Method Detection Limit
Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



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CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04C093988

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 25, 2004
SAMPLE ID:	411522	DATE RECEIVED:	Aug 26, 2004
SAMPLE DESCRIPTION:	A25#3	DATE REPORTED:	Aug 27, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	0.012	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Toluene	0.410	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Ethylbenzene	0.380	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Xylenes	15.9	mg/kg	0.05	Aug 27, 2004	JA	Aug 26, 2004
C6 - C10 (F1)	186	mg/kg	1.4	Aug 27, 2004	JA	Aug 26, 2004
C6 - C10 (F1 minus BTEX)	169	mg/kg	1.4			
C>10 - C16	90	mg/kg	90	Aug 26, 2004	MM	Aug 26, 2004
C>16 - C34	110	mg/kg	90	Aug 26, 2004	MM	Aug 26, 2004
C>34 - C50	<90	mg/kg	90	Aug 26, 2004	MM	Aug 26, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	14	%	1	Aug 27, 2004	MM	Aug 26, 2004

COMMENTS:

M D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor.
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC6 and nC10 response factors are within 30% of Toluene response factor.
 nC10, nC16 and nC34 response factors are within 10% of their average.
 C50 response factor is within 70% of nC10 + nC16 + nC34 average.
 Linearity is within 15%
 Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



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CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04C093988

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 25, 2004
SAMPLE ID:	411523	DATE RECEIVED:	Aug 26, 2004
SAMPLE DESCRIPTION:	A25#5	DATE REPORTED:	Aug 27, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	0.011	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Toluene	0.168	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Ethylbenzene	0.086	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Xylenes	9.32	mg/kg	0.05	Aug 27, 2004	JA	Aug 26, 2004
C6 - C10 (F1)	97.1	mg/kg	1.4	Aug 27, 2004	JA	Aug 26, 2004
C6 - C10 (F1 minus BTEX)	87.5	mg/kg	1.4			
C>10 - C16	<90	mg/kg	90	Aug 26, 2004	MM	Aug 26, 2004
C>16 - C34	<90	mg/kg	90	Aug 26, 2004	MM	Aug 26, 2004
C>34 - C50	<90	mg/kg	90	Aug 26, 2004	MM	Aug 26, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	15	%	1	Aug 27, 2004	MM	Aug 26, 2004

COMMENTS:

M.D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor.
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC6 and nC10 response factors are within 30% of Toluene response factor
 nC10, nC16 and nC34 response factors are within 10% of their average.
 C50 response factor is within 70% of nC10 + nC16 + nC34 average.
 Linearity is within 15%.
 Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04C093988

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 25, 2004
SAMPLE ID:	411525	DATE RECEIVED:	Aug 26, 2004
SAMPLE DESCRIPTION:	A25#9	DATE REPORTED:	Aug 27, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	0.020	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Toluene	0.478	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Ethylbenzene	1.01	mg/kg	0.005	Aug 27, 2004	JA	Aug 26, 2004
Xylenes	14.8	mg/kg	0.05	Aug 27, 2004	JA	Aug 26, 2004
C6 - C10 (F1)	135	mg/kg	1.4	Aug 27, 2004	JA	Aug 26, 2004
C6 - C10 (F1 minus BTEX)	119	mg/kg	1.4			
C>10 - C16	120	mg/kg	90	Aug 26, 2004	MM	Aug 26, 2004
C>16 - C34	<90	mg/kg	90	Aug 26, 2004	MM	Aug 26, 2004
C>34 - C50	<90	mg/kg	90	Aug 26, 2004	MM	Aug 26, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	15	%	1	Aug 27, 2004	MM	Aug 26, 2004

COMMENTS:

M.D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor.
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC6 and nC10 response factors are within 30% of Toluene response factor.
 nC10, nC16 and nC34 response factors are within 10% of their average
 C50 response factor is within 70% of nC10 + nC16 + nC34 average.
 Linearity is within 15%.
 Extraction and holding times were met for this sample.

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04C093988

CCME Petroleum Hydrocarbons in Soil (CWS)

Table with sample information: SAMPLE TYPE: Soil, SAMPLE ID: 411528, SAMPLE DESCRIPTION: A25#10, DATE SAMPLED: Aug 25, 2004, DATE RECEIVED: Aug 26, 2004, DATE REPORTED: Aug 27, 2004

Main results table with columns: PARAMETER, RESULTS, UNITS, M.D.L., DATE ANALYZED, INITIALS, DATE PREPARED. Rows include Benzene, Toluene, Ethylbenzene, Xylenes, C6-C10 (F1), C6-C10 (F1 minus BTEX), C>10-C16, C>16-C34, C>34-C50, Gravimetric Heavy Hydrocarbons, and Moisture Content.

COMMENTS:

M.D.L. - Method Detection Limit
Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Handwritten signature of Joe Cartwright

Certified By: Joe Cartwright, Manager - Trace Organics



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04E094419

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 30, 2004
SAMPLE ID:	412047	DATE RECEIVED:	Sep 01, 2004
SAMPLE DESCRIPTION:	A30 #2	DATE REPORTED:	Sep 07, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	0.043	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
Toluene	0.361	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
Ethylbenzene	0.169	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
Xylenes	7.75	mg/kg	0.05	Sep 01, 2004	MS	Sep 01, 2004
C6 - C10 (F1)	86.8	mg/kg	1.4	Sep 01, 2004	MS	Sep 01, 2004
C6 - C10 (F1 minus BTEX)	78.5	mg/kg	1.4			
C>10 - C16	160	mg/kg	90	Sep 03, 2004	MM	Sep 01, 2004
C>16 - C34	120	mg/kg	90	Sep 03, 2004	MM	Sep 01, 2004
C>34 - C50	110	mg/kg	90	Sep 03, 2004	MM	Sep 01, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	16	%	1	Sep 01, 2004		Sep 01, 2004

COMMENTS:

M.D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor.
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC6 and nC10 response factors are within 30% of Toluene response factor.
 nC10, nC16 and nC34 response factors are within 10% of their average.
 C50 response factor is within 70% of nC10 + nC16 + nC34 average.
 Linearity is within 15%.
 Extraction and holding times were met for this sample.
 Detection limits elevated due to matrix interferences.

Amber Alderman

Certified By:

Amber Alderman, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04E094419

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 30, 2004
SAMPLE ID:	412050	DATE RECEIVED:	Sep 01, 2004
SAMPLE DESCRIPTION:	A30 #6	DATE REPORTED:	Sep 07, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.005	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
Toluene	0.008	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
Ethylbenzene	<0.005	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
Xylenes	0.687	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
C6 - C10 (F1)	56.2	mg/kg	1.4	Sep 01, 2004	MS	Sep 01, 2004
C6 - C10 (F1 minus BTEX)	55.5	mg/kg	1.4			
C>10 - C16	100	mg/kg	90	Sep 03, 2004	MM	Sep 01, 2004
C>16 - C34	<90	mg/kg	90	Sep 03, 2004	MM	Sep 01, 2004
C>34 - C50	<90	mg/kg	90	Sep 03, 2004	MM	Sep 01, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	16	%	1	Sep 01, 2004		Sep 01, 2004

COMMENTS:

M.D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC6 and nC10 response factors are within 30% of Toluene response factor.
 nC10, nC16 and nC34 response factors are within 10% of their average.
 C50 response factor is within 70% of nC10 + nC16 + nC34 average.
 Linearity is within 15%.
 Extraction and holding times were met for this sample.

Amber Alderman

Certified By: Amber Alderman, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04E094419

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 30, 2004
SAMPLE ID:	412052	DATE RECEIVED:	Sep 01, 2004
SAMPLE DESCRIPTION:	A30 #9	DATE REPORTED:	Sep 07, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	0.006	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
Toluene	0.015	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
Ethylbenzene	<0.005	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
Xylenes	2.64	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
C6 - C10 (F1)	64.6	mg/kg	1.4	Sep 01, 2004	MS	Sep 01, 2004
C6 - C10 (F1 minus BTEX)	61.9	mg/kg	1.4			
C>10 - C16	150	mg/kg	90	Sep 03, 2004	MM	Sep 01, 2004
C>16 - C34	<90	mg/kg	90	Sep 03, 2004	MM	Sep 01, 2004
C>34 - C50	<90	mg/kg	90	Sep 03, 2004	MM	Sep 01, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	15	%	1	Sep 01, 2004		Sep 01, 2004

COMMENTS:

M.D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor.
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC6 and nC10 response factors are within 30% of Toluene response factor.
 nC10, nC16 and nC34 response factors are within 10% of their average
 C50 response factor is within 70% of nC10 + nC16 + nC34 average.
 Linearity is within 15%.
 Extraction and holding times were met for this sample.

Amber Alderman

Certified By: Amber Alderman, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04E094419

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 30, 2004
SAMPLE ID:	412047	DATE RECEIVED:	Sep 01, 2004
SAMPLE DESCRIPTION:	A30 #2	DATE REPORTED:	Sep 07, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	0.043	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
Toluene	0.361	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
Ethylbenzene	0.169	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
Xylenes	7.75	mg/kg	0.05	Sep 01, 2004	MS	Sep 01, 2004
C6 - C10 (F1)	86.8	mg/kg	1.4	Sep 01, 2004	MS	Sep 01, 2004
C6 - C10 (F1 minus BTEX)	78.5	mg/kg	1.4			
C>10 - C16	160	mg/kg	90	Sep 03, 2004	MM	Sep 01, 2004
C>16 - C34	120	mg/kg	90	Sep 03, 2004	MM	Sep 01, 2004
C>34 - C50	110	mg/kg	90	Sep 03, 2004	MM	Sep 01, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	16	%	1	Sep 01, 2004		Sep 01, 2004

COMMENTS:

M.D.L. - Method Detection Limit
Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Detection limits elevated due to matrix interferences.

Certified By:

Amber Alderman, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04E094419

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	soil	DATE SAMPLED:	Aug 30, 2004
SAMPLE ID:	412050	DATE RECEIVED:	Sep 01, 2004
SAMPLE DESCRIPTION:	A30 #6	DATE REPORTED:	Sep 07, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.005	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
Toluene	0.008	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
Ethylbenzene	<0.005	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
Xylenes	0.687	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
C6 - C10 (F1)	56.2	mg/kg	1.4	Sep 01, 2004	MS	Sep 01, 2004
C6 - C10 (F1 minus BTEX)	55.5	mg/kg	1.4			
C>10 - C16	100	mg/kg	90	Sep 03, 2004	MM	Sep 01, 2004
C>16 - C34	<90	mg/kg	90	Sep 03, 2004	MM	Sep 01, 2004
C>34 - C50	<90	mg/kg	90	Sep 03, 2004	MM	Sep 01, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sill	NA	mg/kg	1000			
Moisture Content	16	%	1	Sep 01, 2004		Sep 01, 2004

COMMENTS:

M.D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor.
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC6 and nC10 response factors are within 30% of Toluene response factor.
 nC10, nC16 and nC34 response factors are within 10% of their average.
 C50 response factor is within 70% of nC10 + nC16 + nC34 average.
 Linearity is within 15%.
 Extraction and holding times were met for this sample.

Amber Alderman

Certified By: Amber Alderman, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL
ATTENTION: VANESSA CASTRO

AGAT WORK ORDER 04E094419

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Aug 30, 2004
SAMPLE ID:	412052	DATE RECEIVED:	Sep 01, 2004
SAMPLE DESCRIPTION:	A30 #9	DATE REPORTED:	Sep 07, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	0.006	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
Toluene	0.015	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
Ethylbenzene	<0.005	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
Xylenes	2.64	mg/kg	0.005	Sep 01, 2004	MS	Sep 01, 2004
C6 - C10 (F1)	64.6	mg/kg	1.4	Sep 01, 2004	MS	Sep 01, 2004
C6 - C10 (F1 minus BTEX)	61.9	mg/kg	1.4			
C>10 - C16	150	mg/kg	90	Sep 03, 2004	MM	Sep 01, 2004
C>16 - C34	<90	mg/kg	90	Sep 03, 2004	MM	Sep 01, 2004
C>34 - C50	<90	mg/kg	90	Sep 03, 2004	MM	Sep 01, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	15	%	1	Sep 01, 2004		Sep 01, 2004

COMMENTS:

M.D.L. - Method Detection Limit
Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.

Certified By:

Amber Alderman, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E095255

ATTENTION: Aaron Hills

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	soil	DATE SAMPLED:	Sep 07, 2004
SAMPLE ID:	412930	DATE RECEIVED:	Sep 09, 2004
SAMPLE DESCRIPTION:	A-Sept#2	DATE REPORTED:	Sep 13, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.005	mg/kg	0.005	Sep 10, 2004	MS	Sep 10, 2004
Toluene	0.014	mg/kg	0.005	Sep 10, 2004	MS	Sep 10, 2004
Ethylbenzene	0.025	mg/kg	0.005	Sep 10, 2004	MS	Sep 10, 2004
Xylenes	0.366	mg/kg	0.005	Sep 10, 2004	MS	Sep 10, 2004
C6 - C10 (F1)	17.2	mg/kg	1.4	Sep 10, 2004	MS	Sep 10, 2004
C6 - C10 (F1 minus BTEX)	16.8	mg/kg	1.4			
C>10 - C16	110	mg/kg	90	Sep 11, 2004	MM	Sep 10, 2004
C>16 - C34	<90	mg/kg	90	Sep 11, 2004	MM	Sep 10, 2004
C>34 - C50	<90	mg/kg	90	Sep 11, 2004	MM	Sep 10, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	17	%	1	Sep 13, 2004	JA	Sep 13, 2004

COMMENTS:

M.D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor.
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC6 and nC10 response factors are within 30% of Toluene response factor.
 nC10, nC16 and nC34 response factors are within 10% of their average.
 C50 response factor is within 70% of nC10 + nC16 + nC34 average.
 Linearity is within 15%.
 Extraction and holding times were met for this sample.

Amber Alderman

Certified By:

Amber Alderman, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E095255

ATTENTION: Aaron Hills

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Sep 07, 2004
SAMPLE ID:	412932	DATE RECEIVED:	Sep 09, 2004
SAMPLE DESCRIPTION:	A-Sept#3	DATE REPORTED:	Sep 13, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.005	mg/kg	0.005	Sep 10, 2004	MS	Sep 10, 2004
Toluene	<0.005	mg/kg	0.005	Sep 10, 2004	MS	Sep 10, 2004
Ethylbenzene	<0.005	mg/kg	0.005	Sep 10, 2004	MS	Sep 10, 2004
Xylenes	<0.005	mg/kg	0.005	Sep 10, 2004	MS	Sep 10, 2004
C6 - C10 (F1)	13.7	mg/kg	1.4	Sep 10, 2004	MS	Sep 10, 2004
C6 - C10 (F1 minus BTEX)	13.7	mg/kg	1.4			
C>10 - C16	120	mg/kg	90	Sep 11, 2004	MM	Sep 10, 2004
C>16 - C34	110	mg/kg	90	Sep 11, 2004	MM	Sep 10, 2004
C>34 - C50	<90	mg/kg	90	Sep 11, 2004	MM	Sep 10, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	17	%	1	Sep 13, 2004	JA	Sep 13, 2004

COMMENTS:

M.D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor.
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory
 nC6 and nC10 response factors are within 30% of Toluene response factor.
 nC10, nC16 and nC34 response factors are within 10% of their average.
 C50 response factor is within 70% of nC10 + nC16 + nC34 average.
 Linearity is within 15%.
 Extraction and holding times were met for this sample

Amber Alderman

Certified By:

Amber Alderman, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E095255

ATTENTION: Aaron Hills

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	soil	DATE SAMPLED:	Sep 07, 2004
SAMPLE ID:	412933	DATE RECEIVED:	Sep 09, 2004
SAMPLE DESCRIPTION:	A-Sept#7	DATE REPORTED:	Sep 13, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.005	mg/kg	0.005	Sep 10, 2004	MS	Sep 10, 2004
Toluene	0.007	mg/kg	0.005	Sep 10, 2004	MS	Sep 10, 2004
Ethylbenzene	<0.005	mg/kg	0.005	Sep 10, 2004	MS	Sep 10, 2004
Xylenes	0.055	mg/kg	0.005	Sep 10, 2004	MS	Sep 10, 2004
C6 - C10 (F1)	20.5	mg/kg	1.4	Sep 10, 2004	MS	Sep 10, 2004
C6 - C10 (F1 minus BTEX)	20.4	mg/kg	1.4			
C>10 - C16	120	mg/kg	90	Sep 11, 2004	MM	Sep 10, 2004
C>16 - C34	<90	mg/kg	90	Sep 11, 2004	MM	Sep 10, 2004
C>34 - C50	<90	mg/kg	90	Sep 11, 2004	MM	Sep 10, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Siii	NA	mg/kg	1000			
Moisture Content	15	%	1	Sep 13, 2004	JA	Sep 13, 2004

COMMENTS:

M.D.L. - Method Detection Limit
 Results are based on sample dry weight.
 The C6-C10 fraction is calculated using toluene response factor.
 The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
 Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
 Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.
 This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
 nC6 and nC10 response factors are within 30% of Toluene response factor.
 nC10, nC16 and nC34 response factors are within 10% of their average.
 C50 response factor is within 70% of nC10 + nC16 + nC34 average.
 Linearity is within 15%.
 Extraction and holding times were met for this sample.

Amber Alderman

Certified By:

Amber Alderman, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E095255

ATTENTION: Aaron Hills

CCME Petroleum Hydrocarbons in Soil (CWS)

SAMPLE TYPE:	Soil	DATE SAMPLED:	Sep 07, 2004
SAMPLE ID:	412935	DATE RECEIVED:	Sep 09, 2004
SAMPLE DESCRIPTION:	A-Sept#3	DATE REPORTED:	Sep 13, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.005	mg/kg	0.005	Sep 10, 2004	MS	Sep 10, 2004
Toluene	<0.005	mg/kg	0.005	Sep 10, 2004	MS	Sep 10, 2004
Ethylbenzene	<0.005	mg/kg	0.005	Sep 10, 2004	MS	Sep 10, 2004
Xylenes	0.669	mg/kg	0.005	Sep 10, 2004	MS	Sep 10, 2004
C6 - C10 (F1)	24.2	mg/kg	1.4	Sep 10, 2004	MS	Sep 10, 2004
C6 - C10 (F1 minus BTEX)	23.5	mg/kg	1.4			
C>10 - C16	100	mg/kg	90	Sep 11, 2004	MM	Sep 10, 2004
C>16 - C34	<90	mg/kg	90	Sep 11, 2004	MM	Sep 10, 2004
C>34 - C50	<90	mg/kg	90	Sep 11, 2004	MM	Sep 10, 2004
Gravimetric Heavy Hydrocarbons	NA	mg/kg	1000			
Gravimetric Heavy Hydrocarbons - Sili	NA	mg/kg	1000			
Moisture Content	17	%	1	Sep 13, 2004	JA	Sep 13, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Results are based on sample dry weight.

The C6-C10 fraction is calculated using toluene response factor

The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.

Gravimetric Heavy Hydrocarbons are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.

Total C6 - C50 results are corrected for BTEX and PAH (if requested) contributions.

This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.

nC6 and nC10 response factors are within 30% of Toluene response factor

nC10, nC16 and nC34 response factors are within 10% of their average.

C50 response factor is within 70% of nC10 + nC16 + nC34 average.

Linearity is within 15%.

Extraction and holding times were met for this sample.

Certified By:

Amber Alderman, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E095416

ATTENTION: Aaron Hills

CCME Fractions 1-2 & BTEX in Water

SAMPLE TYPE:	water	DATE SAMPLED:	Sep 09, 2004
SAMPLE ID:	413104	DATE RECEIVED:	Sep 10, 2004
SAMPLE DESCRIPTION:	SEPT9-GW	DATE REPORTED:	Sep 10, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Benzene	<0.001	mg/L	0.001	Sep 10, 2004	JA	Sep 10, 2004
Toluene	<0.001	mg/L	0.001	Sep 10, 2004	JA	Sep 10, 2004
Ethylbenzene	<0.001	mg/L	0.001	Sep 10, 2004	JA	Sep 10, 2004
Xylenes	0.002	mg/L	0.001	Sep 10, 2004	JA	Sep 10, 2004
C6 - C10 (F1)	0.04	mg/L	0.01	Sep 10, 2004	JA	Sep 10, 2004
C>10 - C16 (F2)	0.7	mg/L	0.5	Sep 10, 2004	LW	Sep 10, 2004

COMMENTS:

M.D.L. - Method Detection Limit
Hydrocarbon fractions are determined by integrating all area counts from the end of the first n-alkane peak in the fraction, to the end of the last n-alkane peak in the fraction.
The C>6 - C10 fraction is calculated using the o-xylene response factor
The C>10 - C16 fraction is calculated using the average response factor for n-C10.
BTEX has NOT been subtracted from Fraction 1.

Certified By:

Amber Alderman, Analyst



Certificate of Analysis

CLIENT NAME KC ENVIRONMENTAL

AGAT WORK ORDER 04E095416

ATTENTION: Aaron Hills

Water Analysis

SAMPLE TYPE:	water	DATE SAMPLED:	Sep 09, 2004
SAMPLE ID:	413104	DATE RECEIVED:	Sep 10, 2004
SAMPLE DESCRIPTION:	SEPT9-GW	DATE REPORTED:	Sep 10, 2004

PARAMETER	RESULTS	UNITS	M.D.L.	DATE ANALYZED	INITIALS	DATE PREPARED
Lead	<0.01	mg/L	0.01	Sep 10, 2004	MG	Sep 10, 2004

COMMENTS:

M.D.L. - Method Detection Limit

Certified By:

Krystyna Krauze, Analyst

APPENDIX D

**COMPACTION TESTS AND WATER WELL
DRILLING REPORT**

Ph: (780) 488-7926
Fax: (780) 452-8284

Closure Report on Remedial Work
Site (5720)





J.R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS
EDMONTON - GRANDE PRAIRIE - WHITEHORSE - PEACE RIVER

SUMMARY OF FIELD DENSITY TESTS

CLIENT KC Environmental

JOB NO Edmonton General

DATE TESTED Sept 12,04

PROJECT Alsike Reclaim Project

DATE REPORTED _____

TEST NO.	LOCATION	DEPTH (m)	DRY UNIT WT kg/m ³	FIELD MOIST.%	PROCTOR DENSITY	OPTIMUM MOISTURE	PROCTOR DENSITY %
16	From front door entrance	1.5	1815	15.9	1814	16.0	100.1
	5m south and 0.5m west						
17	From front door entrance	1.5	1821	18.1	1814	16.0	100.4
	5m south and 6m east						
18	From front door entrance	1.5	1819	18.5	1814	16.0	100.3
	1m south and 9m east						
19	From front door entrance	1.1	1814	16.6	1814	16.0	100.0
	4.5m south and 11m east						
20	From front door entrance	1.1	1830	16.3	1814	16.0	100.9
	1m south and 10m east						
21	From front door entrance	1.1	1816	16.9	1814	16.0	100.1
	3m south and 4m east						
22	From front door entrance	0.7	1823	15.8	1814	16.0	100.5
	2m south and 5m east						
23	From front door entrance	0.7	1815	16.9	1814	16.0	100.1
	5.5m south and 5.5m east						

CONTROL PROCTOR

- ONE POINT
- STANDARD
- MODIFIED

REQUIRED COMPACTION (%)

- 95 STANDARD
- 98 STANDARD
- 100 STANDARD
- 97 ONE-MOULD
- 100 ONE-MOULD
- OTHER _____

REMARKS All depth and linear measurements are approximate only.
Field copy given to Hazco site superintendent
On Site @ 8:30 am

TESTED BY M. Andrychuk

APPROVED BY _____



J.R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS
EDMONTON - GRANDE PRAIRIE - WHITEHORSE - PEACE RIVER

SUMMARY OF FIELD DENSITY TESTS

CLIENT KC Environmental

JOB NO Edmonton General

DATE TESTED Sept 11, 2004

PROJECT Alsike Reclaim Project

DATE REPORTED _____

TEST NO	LOCATION	DEPTH (m)	DRY UNIT WT kg/m ³	FIELD MOIST.%	PROCTOR DENSITY	OPTIMUM MOISTURE	PROCTOR DENSITY %
4	Retest of test #1 of Sept 11/04	3.0	1725	16.5	1814	16.0	95.1
5	Retest of test #2 of Sept 11/04	3.0	1731	17.1	1814	16.0	95.4
6	Retest of test #3 of Sept 11/04	3.0	1761	15.9	1814	16.0	97.1
7	From front door entrance 3.5m south and 0.5m east	2.0	1797	16.1	1814	16.0	99.1
8	From front door entrance 4m south and 4m east	2.0	1799	15.3	1814	16.0	99.2
9	From front door entrance 2m north & 9m east	2.0	1778	16.9	1814	16.0	98.0
10	From front door entrance 3.5m south and 3m east	1.8	1798	16.0	1814	16.0	99.1
11	From front door entrance 4m south and 7m east	1.8	1778	17.1	1814	16.0	98.0
12	From front door entrance 4m south and 9m east	1.8	1791	16.4	1814	16.0	98.7
13	From front door entrance 2m north and 10m east	1.8	1771	18.0	1814	16.0	97.6
14	From front door entrance 5m south and 8m east	1.6	1791	16.9	1814	16.0	98.7
15	From front door entrance 4m south and 0.5m east	1.6	1789	17.0	1814	16.0	98.6

CONTROL PROCTOR

- ONE POINT
 STANDARD
 MODIFIED

REQUIRED COMPACTION (%)

- 95 STANDARD 97 ONE-MOULD
 98 STANDARD 100 ONE-MOULD
 100 STANDARD OTHER _____

REMARKS All depth and linear measurements are approximate only
Field copy given to Hazco site superintendent
On Site at 3:30 pm

TESTED BY M. Andrychuk

APPROVED BY _____



Water Well Drilling Report

The data contained in this report is supplied by the Driller. The province disclaims responsibility for its accuracy.

Well I.D.:	0411435
Map Verified:	Not Verified
Date Report Received:	1980/12/05
Measurements:	Imperial

1. Contractor & Well Owner Information		2. Well Location	
Company Name: HOLLAND DRILLING LTD.		Drilling Company Approval No.:	
Mailing Address:	City or Town:	Postal Code:	1/4 or Sec Twp Rge West of LSD NW 36 048 04 M 5
Well Owner's Name: TEDDY BEARS CATERING	Well Location Identifier:		Location in Quarter: 0 FT from Boundary 0 FT from Boundary
P.O. Box Number:	Mailing Address:	Postal Code:	Lot Block Plan
City:	Province:	Country:	Well Elev: 2650 FT How Obtain: Survey-Tra
3. Drilling Information		6. Well Yield	
Type of Work: New Well	Proposed well use: Domestic	Test Date (yyyy/mm/dd): 1980/10/11	Start Time: 11:00 AM
Date Reclaimed (yyyy/mm/dd):	Materials Used:	Test Method: Air	
Method of Drilling: Rotary	Rate: Gallons	Non pumping static level:	8 FT
Flowing Well: No	Oil Present: No	Rate of water removal:	50 Gallons/Min
4. Formation Log		5. Well Completion	
Depth from ground level (feet)	Lithology Description	Date Started (yyyy/mm/dd): 1980/10/11	Date Completed (yyyy/mm/dd): 1980/10/11
20	Clay	Well Depth: 80 FT	Borehole Diameter: 0 Inches
38	Blue Clay	Casing Type: Steel	Liner Type: Plastic
46	Sand	Size OD: 5.56 Inches	Size OD: 4.5 Inches
72	Shale	Wall Thickness: 0 156 Inches	Wall Thickness: 0 Inches
74	Coal	Bottom at: 52 FT	Top: 0 FT Bottom: 80 FT
80	Sandstone	Perforations from: 60 FT to: 80 FT	Perforations Size: 0.062 Inches x 8 Inches
		from: 0 FT to: 0 FT	0 Inches x 0 Inches
		from: 0 FT to: 0 FT	0 Inches x 0 Inches
		Perforated by: Machine	
		Seal Driven from: 0 FT to: 52 FT	
		Seal from: 0 FT to: 0 FT	
		Seal from: 0 FT to: 0 FT	
		Screen Type: from 0 FT to: 0 FT	Screen ID: 0 Inches Slot Size: 0 Inches
		Screen Type: from 0 FT to: 0 FT	Screen ID: 0 Inches Slot Size: 0 Inches
		Screen Installation Method:	
		Fittings Top: Bottom:	
		Pack Grain Size Amount:	
		Geophysical Log Taken Retained on Files:	
		Additional Test and/or Pump Data	
		Chemistries taken By Driller: Yes	
		Held: 0 Documents Held: 1	
		Pitless Adapter Type	
		Drop Pipe Type: Length: FT Diameter: Inches	
		Comments: DRILLER STATES WATER IS MED HARD	
7. Contractor Certification			
Driller's Name: UNKNOWN DRILLER			
Certification No:			
This well was constructed in accordance with the Water Well regulation of the Alberta Environmental Protection & Enhancement Act All information in this report is true			
Signature		Yr Mo Day	

APPENDIX E
PHOTOGRAPHS

Ph: (780) 488-7926
Fax: (780) 452-8284

Closure Report on Remedial Work
Site (5720)





Photograph 1: Site # 5720 – View looking north at area where pump islands were located.



Photograph 2: Site # 5720 – View looking north at UST nest area (south of white shed).



Photograph 3: Site # 5720 – Two exposed and inerted underground storage tanks.



Photograph 4: Site # 5720 – Exposing unexpected UST.



Photograph 5: Site # 5720 – Exposed west, and north excavation walls, note water in the excavation.



Photograph 6: Site # 5720 – Contaminated soil being aerated with allu bucket at east end of site.



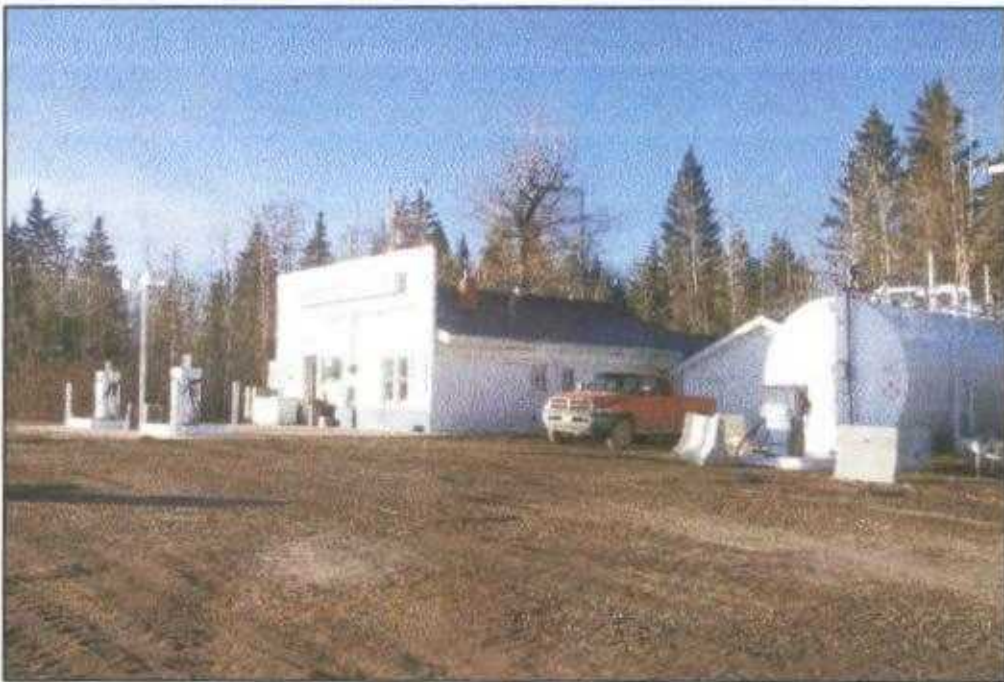
Photograph 7: Site # 5720 – Installation of Geo-membrane liner.



Photograph 8: Site # 5720 – View looking east after backfilling.



Photograph 9: Site # 5720 – View looking northeast after installation of concrete pad and pump islands.



Photograph 10: Site # 5720 – View looking northwest after installation of concrete pad and pump islands.