香港電燈有限公司
The Hongkong Electric Co., Ltd.

港燈
HK Electric

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) ORDINANCE, CAP. 499

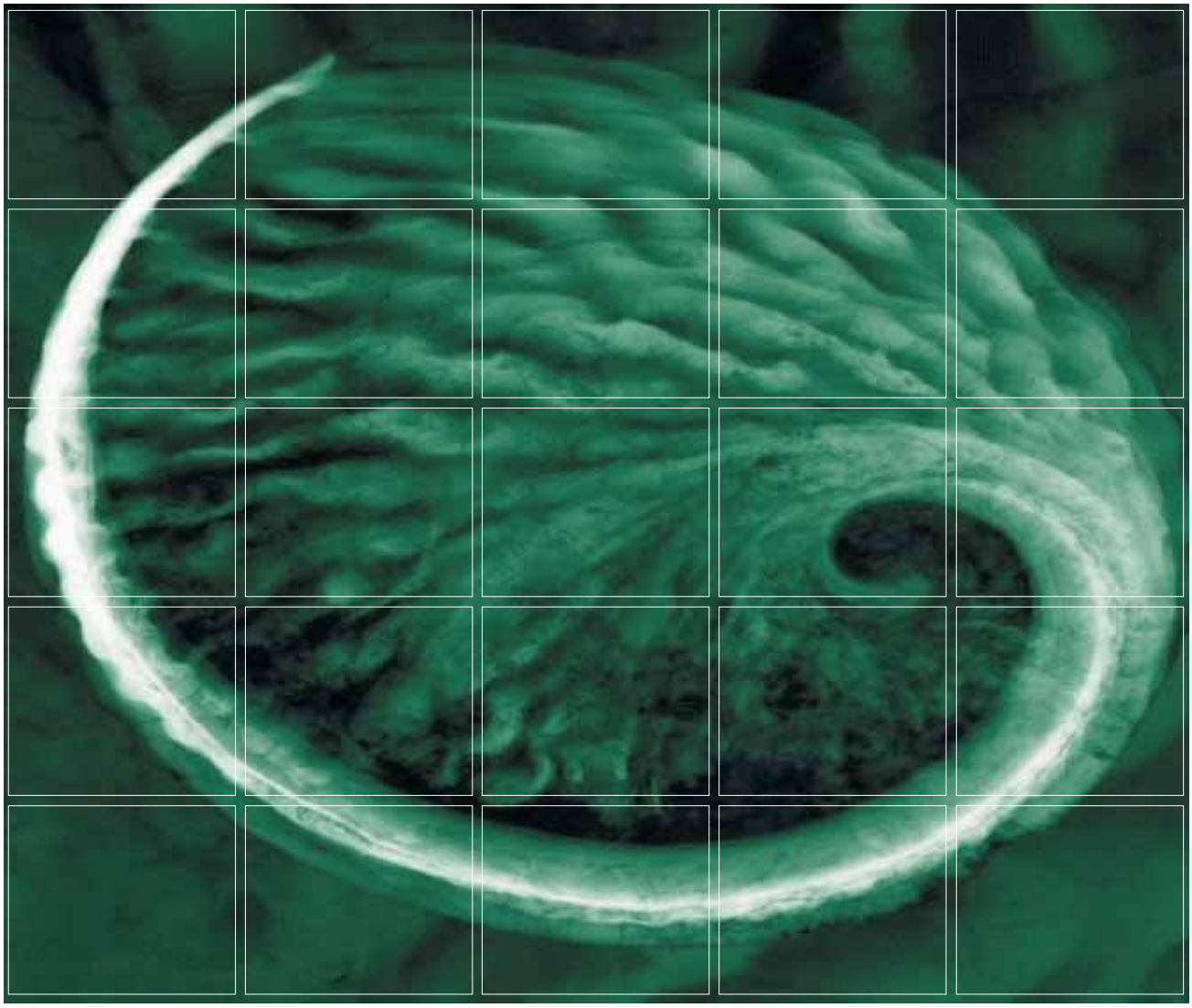
ENVIRONMENTAL PERMIT NO. EP-248/2006

LAMMA POWER STATION UNITS L4 & L5
FLUE GAS DESULPHURIZATION PLANT RETROFIT PROJECT

ENVIRONMENTAL MONITORING & AUDIT PROGRAMME

Report Title	Decontamination Verification Report
Date	30 May 2008
Certified by	(Mr. IP Tat-Yan, Environmental Team Leader)

REPORT



Kaden Construction Ltd

Verification Sampling and Treatment of Contaminated Materials for Foundation and Civil Works for Units 4 & 5 Retrofit of FGD Plant at Lamma Power Station: *Decontamination Verification Report*

May 2008

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REPORT

Kaden Construction Limited

Verification Sampling and Treatment of Contaminated Materials for Foundation and Civil Works for Units 4 & 5 Refrofit of FGD Plant at Lamma Power Station: *Decontamination Verification Report*

May 2008

Reference 0060350

For and on behalf of Environmental Resources Management	
Approved by:	Dr Andrew Jackson
Signed:	
Position:	Managing Director
Date:	20 May 2008

CONTENTS

1 INTRODUCTION

1.1 INTRODUCTION

The Hongkong Electric Company Ltd. (HEC) retained Kaden Construction Limited (Kaden) as their contractor to demolish two above ground oil storage tanks (No. 4 and No. 5 Light Oil Tanks) and an Oil Separation Sump at the HEC power plant at Lamma Island, Hong Kong. The soil excavated from these areas was found to be contaminated with total petroleum hydrocarbon (TPH), when compared to the Dutch values which were used for comparison purposes at the time of excavation.

ERM-Hong Kong, Limited (ERM) was commissioned by Kaden to carry out verification sampling of excavated contaminated soils, monitor the soil remediation process and verify the completion of decontamination of excavated soil.

1.2 BACKGROUND

HEC has initiated a project to retrofit its two existing 350MW coal-fired generating (Units L4 and L5) at the Lamma Power Station with a new Flue Gas Desulphurization (FGD) Plant. The FGD Plant will reduce sulphur dioxide emissions, thus supporting the Government's policy objective to improve the air quality in the Pearl River Delta.

In order to provide space for the installation of the FGD Plant, two above ground oil storage tanks (No. 4 and No. 5 Light Oil Tanks) and associated pipelines and Oil Separation Sump need to be demolished. In relation to this demolition a Contamination Assessment Plan (CAP) was submitted and approved by the Environmental Protection Department (EPD) in November 2005 and a site investigation (SI) was conducted in the area adjacent to the tanks and oil separation sump. The SI results indicated that TPH was present in soil and groundwater samples at levels exceeding Dutch B guidelines for mineral oil. These results and recommendations have been reported in a Contamination Assessment Report (CAR) and a Remedial Action Plan (RAP). Remedial measures and procedures for handling the TPH contamination were detailed in the RAP.

An Environmental Permit (EP) (No. EP-248/2006) dated 25 April 2006 for the project was issued by EPD which sets out the conditions and requirements for HEC to comply with during the decommissioning, construction and operation of the FGD installation project. In accordance with Condition 2.8 of the EP, a Decontamination Verification Report needs to be submitted to the EPD, indicating the level of TPH in the excavated contaminated material before and after the treatment, undertaken in accordance with the *Proposal of Controlling Land Contamination and Handling of Excavated Contaminated Materials* endorsed

by the EPD pursuant to Condition 2.7 of the EP, and detailing the total quantity of excavated contaminated materials arising from the demolition of the Light Oil Tanks.

1.3 *PURPOSE AND SCOPE*

The purpose of this study is to verify the completion of decontamination process.

The scope of the decontamination verification work comprised the following elements:

- Identify the excavated contaminated materials from the oil storage tanks (No.4 and No.5 Light Oil Tanks) and Oil Separation Sump areas.
- Conduct soil sampling at the excavated soil stockpiles and the biopile;
- Perform laboratory soil sample analysis for TPH; and
- Prepare this Decontamination Verification Report.

1.4 *LIMITATIONS AND EXCEPTIONS*

This report is the result of applying scientific principles and professional judgments to certain facts. Professional judgments expressed herein are based on factual information available within the limits of the existing data, scope of work, budget and schedule. To the extent that more definitive conclusions are desired by Kaden than are warranted by the currently available facts, it is specifically ERM's intent that the conclusions and recommendations stated herein will be intended as guidance and not necessarily as a firm course of action, except where explicitly stated as such. We make no warranties, expressed or implied, including, without limitation, warranties as to merchantability or fitness of the property for a particular purpose. In addition, the information provided to you in this report is not to be construed as legal advice.

The findings of this report are based on the Scope of Work agreed with Kaden. ERM performed the services in a manner consistent with the normal level of care and expertise exercised by members of the environmental auditing profession. No warranties, express or implied, are made. Subject to the Scope of Work, ERM's assessment is limited strictly to identifying soil contaminations associated with study areas and does not include evaluation of any other issues. The absence of any identified hazardous or toxic materials in the samples taken should not be interpreted as a guarantee that such materials do not exist on the site.

The results of this assessment are based on factual information available within the limits of the existing data, scope of work, budget and schedule.

All conclusions and recommendations regarding the property area are the professional opinions of the ERM personnel involved with the project, subject to the qualifications made above. While normal assessments of data reliability have been made, ERM assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of ERM, or developments resulting from situations outside the scope of this project. We make no warranties, expressed or implied, including, without limitation, warranties as to merchantability or fitness of the property for a particular purpose. In addition, the information provided to you in this report is not to be construed as legal advice.

ERM is not engaged in environmental investigation and reporting for the purposes of advertising, sales promotion, or endorsement of any Kaden interests, including raising investment capital, recommending investment decisions, or other publicity purposes. Kaden acknowledges that this report has been prepared for the exclusive use of Kaden and agrees that ERM reports or correspondence will not be used or reproduced, in full or in part, for such purposes, and may not be used or relied upon in any prospectus or offering circular. Kaden also agrees that none of its advertising, sales promotion, or other publicity matter containing information obtained from this audit and report will mention or imply the name of ERM.

1.5 STRUCTURE OF THE REPORT

The remainder of this report is structured as follows:

Section 2 Summarises the soil sampling activity;

Section 3 Presents the analytical results of soil samples;

Section 4 Outlines the conclusions of the verification sampling;

Annex A Laboratory Analysis Reports.

2 SOIL SAMPLING ACTIVITIES

2.1 EXCAVATION OF CONTAMINATED SOIL

Contaminated soil was excavated from the Unit 5 oil tank (U5) and the Oil Separation Sump on 14 - 26 February 2007 and from the Unit 4 oil tank (U4) on 7 - 10 May 2007 by Kaden. Based on the information provided by Kaden, the volumes of contaminated soil excavated from these areas were:

- U4: 189.7 m^3;
- U5: 165.05 m^3; and
- Oil Separation Sump: 60.80 m^3.

The total volume of contaminated soil excavated was 415.55 m^3.

The excavated soil was stockpiled in three piles. Soil excavated from U4 (Stockpile A), soil from U5 (Stockpile B) and soil from the Oil Separation Sump (Stockpile C). The excavated contaminated soil stockpiles were separately stored in the designated contaminated soil stockpile area (Area D1) within the HEC site (*Figure 2.1*). The area under the stockpile was lined with an impermeable HDPE base liner and each stockpile was covered with tarpaulin sheets to prevent dust emission and excessive water ingress.

2.2 SOIL SAMPLING AFTER EXCAVATION

Soil samples were taken from the stockpiles of excavated soil in March 2007 and May 2007.

In order to determine the extent of TPH contamination in the excavated soil stockpiles, 1 soil sample was collected from the soil stockpiles for every 100 m^3 of soil excavated. This sampling was undertaken in accordance with the "*Proposal of Controlling Land Contamination and Handling of Excavated Contaminated Materials, Revision 1*" (the Proposal) prepared by the HEC dated January 2007. The sampling details are summarised in *Table 2.1.*

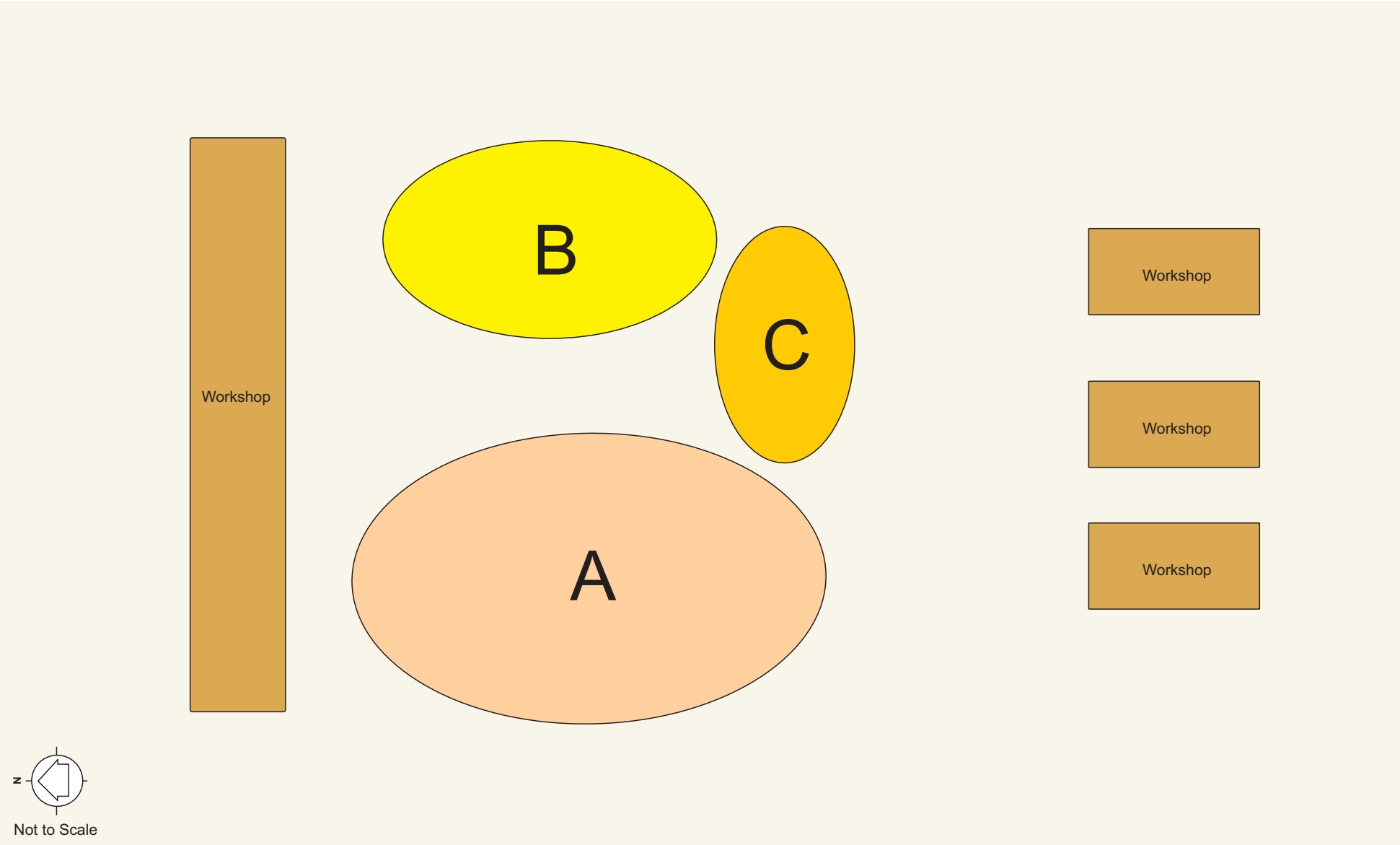

Figure 2.1

Excavated Soil Stockpile Area

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Table 2.1 Summary of Soil Sampling on 10 May 2007 and 21 March 2007

Sample ID	Excavated Soil Stockpile	Date of Sampling
SS1	A	10 May 2007
SS2	A	10 May 2007
SS3*	A	10 May 2007
UNIT5 #1	B	21 March 2007
UNIT5 #2	B	21 March 2007
OS#1	C	21 March 2007
OS#2*	C	21 March 2007

Notes:
A: excavated soil stockpile from Unit 4 Oil Tank,
B: excavated soil stockpile from Unit 5 Oil Tank,
C: excavated soil stockpile from Oil Separation Sump
* Duplicate samples

A total of seven soil samples (including two soil duplicate QA/QC samples) collected from the excavated soil stockpiles and two trip blank samples were delivered to the laboratory for chemical analysis. The soil samples were collected into the lab-supplied glass jars and stored in a refrigerator at 4 °C for sample delivery.

The results for the soil sampling are discussed in *Section 3.2*.

2.3 SOIL SAMPLING AFTER CONSTRUCTION OF BIOPILE

Stockpiles A, B and C were combined into a biopile at Area D1 in January 2008. The work was undertaken in accordance with the Proposal endorsed by the EPD pursuant to Condition 2.7 of the EP.

Two monitoring soil sampling visits were conducted on 23 January 2008 and 4 March 2008 in order to monitor bio-degradation within the biopile. In addition, in order to confirm bio-degradation was complete, an additional confirmation sampling visit to the biopile was conducted on 22 April 2008. On each visit, a total of five (5) soil samples, including one (1) duplicate sample, were taken at different locations and depths within the biopile. The sampling details are summarised in *Table 2.2* and *Table 2.3*.

Table 2.2 Summary of Monitoring Soil Sampling on 23 January 2008 and 4 March 2008

Sample ID	Location on Biopile	Date of Sampling
S1	Southern slope	23 January 2008
S2	Eastern slope	23 January 2008
S3	0.5m depth from top of pile	23 January 2008
S3 duplicate*	0.5m depth from top of pile	23 January 2008
S4	Northwest slope	23 January 2008
S5	1.0m depth from top of pile	21 March 2007
S5 duplicate*	1.0m depth from top of pile	21 March 2007
S6	0.5m depth from top of pile	21 March 2007
S7	0.7m depth from top of pile	21 March 2007
S8	Southwest slope	21 March 2007

Notes:
*Duplicate samples were taken at S3 and S5

Table 2.3 Summary of Confirmation Soil Sampling on 22 April 2008

Sample ID	Location on Biopile	Date of Sampling
S9	Western slope	22 April 2008
S9 duplicate*	Western slope	22 April 2008
S10	Southern slope	22 April 2008
S11	0.5m depth from top of pile	22 April 2008
S12	0.5m depth from top of pile	22 April 2008

Notes:
* Duplicate sample was taken at S9

2.4 FIELD QA/QC IMPLEMENTATION AND SAMPLE PRESERVATION AND DELIVERY

A QA/QC program was incorporated into the project. The program included collection/preparation and analysis of field QA/QC samples and laboratory internal QA/QC samples.

The field QA/QC samples included soil field duplicate samples. The field duplicate samples were collected from the soil stockpiles and biopile and were analysed for the same suite of parameters as for the main samples.

The laboratory QA/QC samples including method blanks, surrogates, matrix spikes, matrix spike duplicate, and laboratory duplicate sample were prepared and analysed by the contracted laboratory, ALS Technichem (HK) Pty Ltd (ALS), in accordance with the relevant USEPA's standard methods and procedures.

All soil samples (including QA/QC samples) were kept in a refrigerator (4 °C) or iced cooler for delivery. The soil samples were delivered on ice with Chain of Custody arrived at the laboratory within the sample holding time.

The Chain of Custody for the samples was maintained from the time of sample collection to sample arrival at the testing laboratory. The written

record of sample handling is intended to ensure prompt sample analysis and integrity.

2.5 *LABORATORY ANALYSIS*

The chemical analyses for the samples were conducted by ALS. ALS conducted all analyses in accordance with USEPA standard methods and procedures, including laboratory internal QA/QC samples and procedures. The laboratory analyses parameter for the soil samples was TPH (USEPA Method 8260 & 8015).

3 ANALYTICAL RESULTS

3.1 ASSESSMENT CRITERIA

In accordance with the RAP, the TPH results in soil have been compared against the Dutch B standards which were in force at the time the RAP was approved by the EPD.

The Dutch "B" value for TPH is 1,000 mg/kg (the Cleanup Target).

The laboratory results available indicate that the soils sampled are below the Cleanup Target.

3.2 SOIL ANALYTICAL RESULTS 10 MAY 2007 AND 21 MARCH 2007

The laboratory analytical results for the excavated soil samples are summarised in *Tables 3.1* and discussed in the following sections. The detailed laboratory analytical results along with the laboratory QA/QC information are presented in *Annex A*.

Table 3.1 Soil Analytical Results on 10 May 2007 and 21 March 2007 (all results in mg/kg)

Soil Sample ID	C6-C9 Fraction (gasoline)	C10-C14 Fraction (light diesel)	C15-C28 Fraction (heavy diesel)	C29-C36 Fraction (heavy oil)	TPH
Reporting Limit	2	50	100	100	--
Excavated Soil Stockpile A from Unit 4 Oil Tank					
SS1	ND	ND	ND	ND	ND
SS2	ND	ND	ND	ND	ND
SS3*	ND	ND	ND	ND	ND
Excavated Soil Stockpile B from Unit 5 Oil Tank					
UNIT5 #1	ND	ND	240	140	380
UNIT5 #2	ND	ND	240	140	380
Excavated Soil Stockpile C from Oil Separation Sump					
OS#1	ND	ND	190	110	300
OS#2*	ND	ND	250	140	390

Notes:
ND = Not detectable/ below reporting limit
TPH = the sum of gasoline, light diesel, heavy diesel and heavy oil
Dutch "B" level of TPH is 1,000 mg/kg
* = Field duplicate samples

3.2.1 *Soil Sample Results*

Excavated Soil Stockpile A from Unit 4 Oil Tank

TPH was not detected in the samples collected from the Stockpile A.

Excavated Soil Stockpile B from Unit 5 Oil Tank

The concentrations of TPH in both the samples taken from the Stockpile B were 380 mg/kg, which is below the Cleanup Target.

Excavated Soil Stockpile C from Oil Separation Sump

The concentrations of TPH in the two samples from the Stockpile C were 300 and 390 mg/kg, which are below the Cleanup Target.

3.3 *SOIL ANALYTICAL RESULTS FOR MONITORING SAMPLING*

Soil samples were collected on two occasions (23 January 2008 and 4 March 2008) in order to monitor the remedial process within the biopile. On each monitoring visit, a total of five (5) soil samples, including one (1) duplicate sample, were taken at different locations and depths within the biopile. The laboratory analytical results for the two monitoring soil sampling visits are summarised in *Tables 3.2 and 3.3* respectively and discussed in the following sections. The locations of soil sampling are presented in *Figure 3.1*. The detailed laboratory analytical results along with the laboratory QA/QC information are presented in *Annex A*.

3.3.1 *Soil Sample Results for Monitoring Sampling on 23 January 2008*

The soil samples (S1, S2, S3 and S4) were taken from random locations in the sides and the top of the biopile, as shown in *Figure 3.1*.

TPH was not detected in the sample S1.

The concentrations of TPH in the samples S2, S3 and S4 were 110 mg/kg, 220 mg/kg and 240 mg/kg, respectively. All concentrations were well below the Cleanup Target.

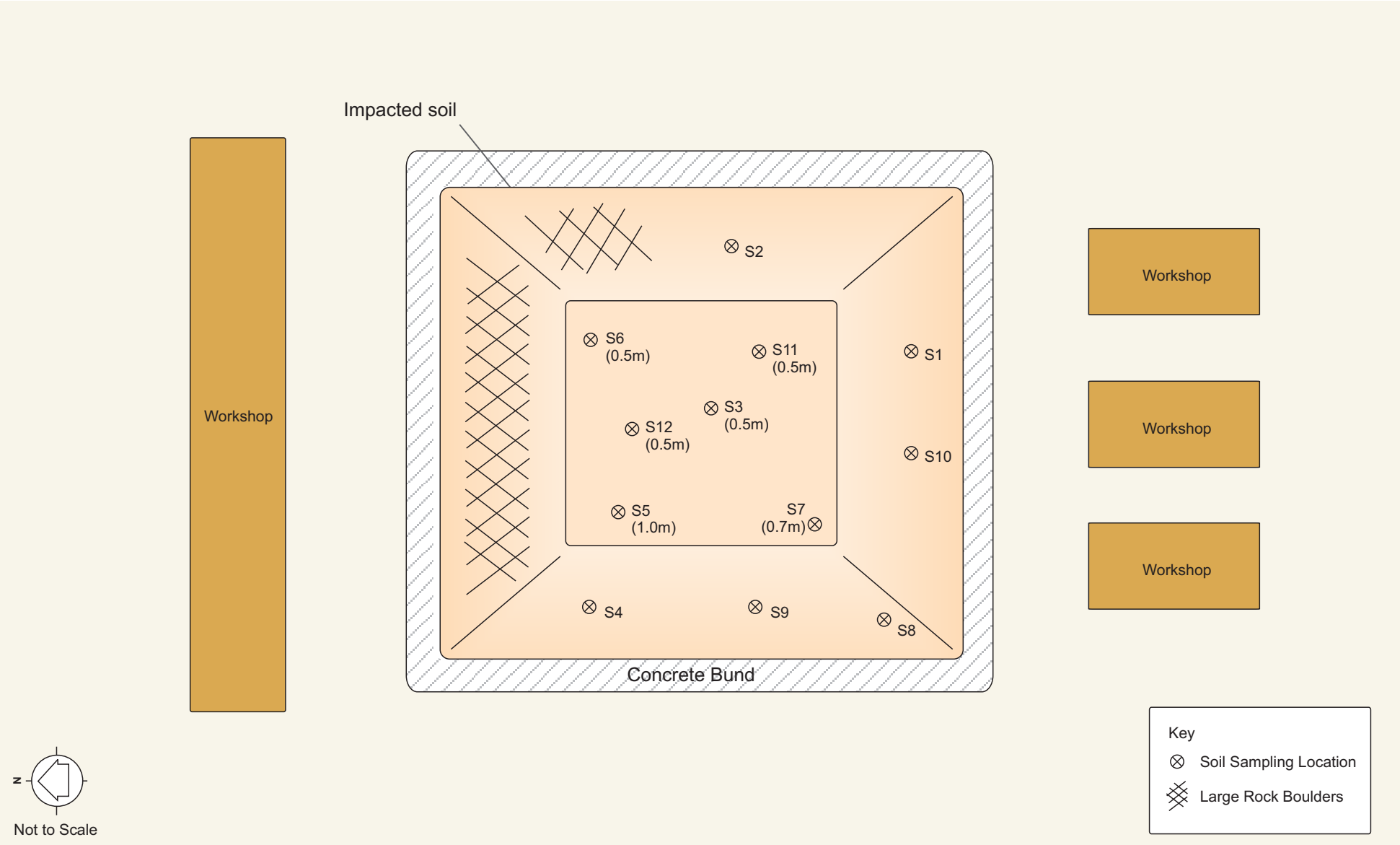

Figure 3.1

Locations of Soil Sampling on 23 January 2008, 4 March 2008 and 22 April 2008

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Table 3.2 *Soil Analytical Results on 23 January 2008 (all results in mg/kg)*

Soil Sample ID	C6-C9 Fraction (gasoline)	C10-C14 Fraction (light diesel)	C15-C28 Fraction (heavy diesel)	C29-C36 Fraction (heavy oil)	TPH
Reporting Limit	2	50	100	100	--
S1	ND	ND	ND	ND	ND
S2	ND	ND	110	ND	110
S3	ND	ND	ND	ND	ND
S3 duplicate*	ND	ND	120	100	220
S4	ND	ND	130	110	240

Notes:
ND = Not detectable/ below reporting limit
TPH = the sum of gasoline, light diesel, heavy diesel and heavy oil
Dutch "B" level of TPH is 1,000 mg/kg
* = Field duplicate samples

3.3.2 *Soil Sample Results for Monitoring Sampling on 4 March 2008*

Based on the results of the January 2008 sampling, it was decided that samples should be taken from several different locations (S5, S6, S7 and S8) within the main body of the biopile where the least bio-attenuation may be occurring.

TPH was not detected in samples S7 and S8.

The concentrations of TPH in the samples S5 and S6 were 130 mg/kg and 180 mg/kg, respectively, well below the Cleanup Target.

Table 3.3 *Soil Analytical Results on 4 March 2008 (all results in mg/kg)*

Soil Sample ID	C6-C9 Fraction (gasoline)	C10-C14 Fraction (light diesel)	C15-C28 Fraction (heavy diesel)	C29-C36 Fraction (heavy oil)	TPH
Reporting Limit	2	50	100	100	--
S5	ND	ND	ND	ND	ND
S5 duplicate*	ND	ND	130	ND	130
S6	ND	ND	180	ND	180
S7	ND	ND	ND	ND	ND
S8	ND	ND	ND	ND	ND

Notes:
ND = Not detectable/ below reporting limit
TPH = the sum of gasoline, light diesel, heavy diesel and heavy oil
Dutch "B" level of TPH is 1,000 mg/kg
* = Field duplicate samples

3.4 *SOIL ANALYTICAL RESULTS FOR CONFIRMATION SAMPLING*

It was concluded from the results of the two monitoring visits that the TPH levels were below the Cleanup Target. Therefore a final confirmation sampling visit was carried out on 22 April 2008. Samples were taken from 4 random locations (S9, S10, S11 and S12), based on the previous locations and accessibility.

The laboratory analytical results for the confirmation sampling are summarised in *Table 3.4* and discussed below.

TPH was not detected in samples S9 and S10.

The concentrations of TPH in samples S11 and S12 were 100 mg/kg and 120 mg/kg, respectively, well below the Cleanup Target.

Table 3.4 Soil Analytical Results on 22 April 2008 (all results in mg/kg)

Soil Sample ID	C6-C9 Fraction (gasoline)	C10-C14 Fraction (light diesel)	C15-C28 Fraction (heavy diesel)	C29-C36 Fraction (heavy oil)	TPH
Reporting Limit	2	50	100	100	--
S9	ND	ND	ND	ND	ND
S9 duplicate*	ND	ND	ND	ND	ND
S10	ND	ND	ND	ND	ND
S11	ND	ND	100	ND	100
S12	ND	ND	120	ND	120

Notes:
ND = Not detectable/ below reporting limit
TPH = the sum of gasoline, light diesel, heavy diesel and heavy oil
Dutch "B" level of TPH is 1,000 mg/kg
* = Field duplicate samples

3.5 FIELD QA/QC SAMPLE RESULTS

Throughout the project, field and laboratory QA/QC samples were taken.

Field Duplicate Samples

The relative percentage difference (RPD) was used to assess the sample collection and laboratory analysis reproducibility and precision. In accordance with the USEPA's guidance, RPDs were only calculated for the duplicate samples results that were higher than two times of the method detection limits. The USEPA acceptable limits for the RPDs are less than 50% for soil samples.

The TPH (heavy diesel, C15-C28 fraction) of the duplicate sample OS#2 was higher than two times of the method detection limits and hence the RPD was computed. The calculated RPD was 27%, which is within the USEPA acceptable limits.

The TPH (heavy diesel, C15-C28 fraction) of the duplicate samples S3 and S5 was slightly above the reporting limit of 100 mg/kg at 120 mg/kg and 130 mg/kg, respectively. The resulting RPD for these two samples calculated to be 20% and 30%, respectively, which is within the USEPA acceptable limits for the RPD (ie <50%).

The TPH of the sample S9 and its duplicate was detected below the reporting limit and thus, an RPD cannot be calculated. However, as both samples submitted yield replicable results, the QA/QC is considered to be acceptable.

Trip Blank

Two trip blanks were collected / prepared during the sampling visits on 21 March 2007 and 10 May 2007. No target pollutants were detected above the laboratory reporting limits in the trip blank samples collected/prepared for the project.

Laboratory QA/QC Data

The laboratory QA/QC sample results (eg surrogate recoveries, matrix spike recoveries, method blanks, sample holding time, and other internal laboratory QA/QC) met their respective requirements.

Sample Results Usability

Based on the review of the QA/QC sample results for this project, the laboratory results for the soil samples are considered useable to evaluate the levels of TPH in the soils after excavation and biopiling.

4 CONCLUSIONS

It is concluded from the available results that the levels of TPH within the excavated soils were already showing evidence that natural bio-attenuation was occurring and levels detected in the 2007 samples were below the target value.

After construction of the biopile in January 2008, two monitoring soil sampling visits were conducted on 23 January 2008 and 4 March 2008 and one confirmation soil sampling round was conducted on 22 April 2008. The testing results were compared against the Cleanup Target. It is concluded that concentrations of TPH were well below the Cleanup Target or not detected for all the soil samples collected from the biopile.

It is considered that the soils are representative of the soils within the biopile, having been collected from various locations and depths, and as such the excavated soils are considered suitable for re-use on the site.

Annex A

Laboratory Analysis Report

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: ERM HONG KONG	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 5
Contact	: MR KALVIN LAI	Contact	: Alice Wong	Work Order	: HK0703891
Address	: 21/F, LINCOLN HOUSE, 979 KING'S ROAD, TAIKOO PLACE, ISLAND EAST, HOG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: kalvin.lai@erm.com	E-mail	: Alice.Wong@alsenviro.com		
Telephone	: 22713000	Telephone	: +852 2610 1044		
Facsimile	: 27235660	Facsimile	: +852 2610 2021		
Project	: 0060350	Quote number	: ----	Date received	: 22 Mar 2007
Order number	: ----			Date of issue	: 30 Mar 2007
C-O-C number	: 127636			No. of samples	- Received : 5
Site	: LAMMA HEC POWER STATION				- Analysed : 5

Report Comments

This report for ALS Technichem (HK) Pty Ltd work order reference HK0703891 supersedes any previous reports with this reference. The completion date of analysis is 30 Mar 2007. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number. LOR = Limit of reporting.

Specific comments for Work Order HK0703891: **Samples were picked up from client by ALS Technichem (HK) staff in a chilled condition.**
Water sample(s) analysed and reported on an as received basis.
Soil sample(s) analysed on an as received basis. Result(s) reported on a dry weight basis.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the 'Electronic Transactions Ordinance' of Hong Kong, Chapter 553, Section 6.

Signatory	Position	Authorised results for:-
Anh Ngoc Huynh	Senior Chemist	Organics
Fung Lim Chee, Richard	General Manager	Inorganics

INVOICED
31 MAR 2007
INVOICE NO.: 28210
SUB. CON.:

Yvonne Tang

Analytical Results

Submatrix: SOIL

Client Sample ID :				OS#1	OS#2	UNIT5 #1	UNIT5 #2	
Laboratory Sample ID :				HK0703891-001	HK0703891-002	HK0703891-003	HK0703891-004	
Sample Date / Time :				[21 Mar 2007]	[21 Mar 2007]	[21 Mar 2007]	[21 Mar 2007]	
Method: Analysis Description	CAS number	LOR	Units					
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	7.9	8.5	7.8	7.1	
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BTEX								
C6 - C9 Fraction	----	2	mg/kg	<2	<2	<2	<2	
EP-071: Total Petroleum Hydrocarbons (TPH)								
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	mg/kg	190	250	240	240	
C29 - C36 Fraction	----	100	mg/kg	110	140	140	140	
EP-080S: TPH(Volatile)/BTEX Surrogate							Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%	81.4	80.3	87.6	86.7	
Toluene-D8	2037-26-5	0.1	%	96.7	97.9	95.3	94.1	
4-Bromofluorobenzene	460-00-4	0.1	%	99.5	100	103	103	

Analytical Results

Submatrix: WATER

Client Sample ID :	TRIP BLANK				
Laboratory Sample ID :	HK0703891-005				
Sample Date / Time :	[22 Mar 2007]				
Method: Analysis Description / **CAS number** / **LOR** / **Units**					
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BTEX					
C6 - C9 Fraction ---- 20 µg/L	<20				
EP-080S: TPH(Volatile)/BTEX Surrogate					Surrogate control limits listed at end of this report.
Dibromofluoromethane 1868-53-7 0.1 %	**90.1**				
Toluene-D8 2037-26-5 0.1 %	**92.8**				
4-Bromofluorobenzene 460-00-4 0.1 %	**96.3**				

Quality Control - Laboratory Duplicate (DUP) Results

Matrix Type: SOIL

Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	Duplicate (DUP) Results LOR	Units	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 378649)								
HK0703762-001	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	57.9	67.3	15.0
HK0703885-002	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	54.0	53.3	1.3
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QC Lot: 378478)								
HK0703891-001	OS#1	C6 - C9 Fraction	----	2	mg/kg	<2	<2	0.0
EP-071: Total Petroleum Hydrocarbons (TPH) (QC Lot: 378477)								
HK0703891-001	OS#1	C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0
		C15 - C28 Fraction	----	100	mg/kg	190	180	0.0
		C29 - C36 Fraction	----	100	mg/kg	110	100	0.0

Matrix Type: WATER

Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	Duplicate (DUP) Results LOR	Units	Original Result	Duplicate Result	RPD (%)
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QC Lot: 380987)								
HK0703891-005	TRIP BLANK	C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0

Quality Control - Method Blank (MB), Single Control Spike (SCS) and Duplicate Control Spike (DCS) Results

Matrix Type: SOIL

Method: Analysis Description	CAS number	Method Blank (MB) Results LOR	Units	Result	Single Control Spike (SCS) and Duplicate Control Spike (DCS) Results Spike Concentration	Spike Recovery (%) SCS	DCS	Recovery Limits (%) Low	High	RPDs (%) Value	Control Limit
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QCLot: 378478)											
C6 - C9 Fraction	----	2	mg/kg	<2	4 mg/kg	88.0	----	86	103	----	----
EP-071: Total Petroleum Hydrocarbons (TPH) (QCLot: 378477)											
C10 - C14 Fraction	----	50	mg/kg	<50	202 mg/kg	124	----	51	127	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	881 mg/kg	121	----	45	138	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	589 mg/kg	120	----	40	142	----	----

Matrix Type: WATER

Method: Analysis Description	CAS number	Method Blank (MB) Results LOR	Units	Result	Single Control Spike (SCS) and Duplicate Control Spike (DCS) Results Spike Concentration	Spike Recovery (%) SCS	DCS	Recovery Limits (%) Low	High	RPDs (%) Value	Control Limit
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QCLot: 380987)											
C6 - C9 Fraction	----	20	µg/L	<20	200 µg/L	83.4	----	72	117	----	----

Quality Control - Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Results

Matrix Type: SOIL

Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Results Spike Concentration	Spike Recovery (%) MS	MSD	Recovery Limits (%) Low	High	RPDs (%) Value	Control Limit
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QCLot: 378478)										
HK0703891-002	OS#2	C6 - C9 Fraction	----	4 mg/kg	92.7	----	50	130	----	----
EP-071: Total Petroleum Hydrocarbons (TPH) (QCLot: 378477)										

Matrix Type: SOIL

Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Results: Spike Concentration	Spike Recovery (%) MS	Spike Recovery (%) MSD	Recovery Limits (%) Low	Recovery Limits (%) High	RPDs (%) Value	RPDs (%) Control Limit
EP-071: Total Petroleum Hydrocarbons (TPH) (QCLot: 378477) - continued										
HK0703891-002	OS#2	C10 - C14 Fraction	----	202 mg/kg	118	----	50	130	----	----
		C15 - C28 Fraction	----	881 mg/kg	118	----	50	130	----	----
		C29 - C36 Fraction	----	589 mg/kg	119	----	50	130	----	----

Surrogate Control Limits

Submatrix Type: SOIL

Method: Analysis Description	Units	Lower Limit	Upper Limit
EP-080S: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	%	80	120
Toluene-D8	%	81	117
4-Bromofluorobenzene	%	74	121

Submatrix Type: WATER

Method: Analysis Description	Units	Lower Limit	Upper Limit
EP-080S: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	%	86	118
Toluene-D8	%	88	110
4-Bromofluorobenzene	%	86	115

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: ERM HONG KONG	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 5
Contact	: MR ANGUS CHOI	Contact	: Alice Wong	Work Order	: HK0706439
Address	: 21/F, LINCOLN HOUSE, 979 KING'S ROAD, TAIKOO PLACE, ISLAND EAST, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong HONG KONG		
E-mail	: angus.choi@erm.com	E-mail	: Alice.Wong@alsenviro.com		
Telephone	: 22713000	Telephone	: +852 2610 1044		
Facsimile	: 27235660	Facsimile	: +852 2610 2021		
Project	: ----	Quote number	: ----	Date received	: 10 May 2007
Order number	: ----			Date of issue	: 28 May 2007
C-O-C number	: 201166			No. of samples	- Received : 4
Site	: ----				- Analysed : 4

Report Comments

This report for ALS Technichem (HK) Pty Ltd work order reference HK0706439 supersedes any previous reports with this reference. The completion date of analysis is 16 May 2007. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number. LOR = Limit of reporting.

Specific comments for Work Order HK0706439 : **Samples were picked up from client by ALS Technichem (HK) staff in a chilled condition.**
Soil sample(s) analysed on an as received basis. Result(s) reported on a dry weight basis.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the 'Electronic Transactions Ordinance' of Hong Kong, Chapter 553, Section 6.

Signatory	Position	Authorised results for:-
Anh Ngoc Huynh	Senior Chemist	Organics
Fung Lim Chee, Richard	General Manager	Inorganics

INVOICED
12 JUN 2007
INVOICE NO.: 28843
SUB. CON.
Yvonne Tang

Analytical Results

Submatrix: SOIL

Client Sample ID :				SS1	SS2	SS3		
Laboratory Sample ID :				HK0706439-001	HK0706439-002	HK0706439-003		
Sample Date / Time :				[10 May 2007]	[10 May 2007]	[10 May 2007]		
Method: Analysis Description	CAS number	LOR	Units					
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	8.7	8.3	8.7		
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BTEX								
C6 - C9 Fraction	----	2	mg/kg	<2	<2	<2		
EP-071: Total Petroleum Hydrocarbons (TPH)								
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50		
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100		
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100		
EP-080S: TPH(Volatile)/BTEX Surrogate							Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%	97.7	95.8	93.4		
Toluene-D8	2037-26-5	0.1	%	98.4	95.8	103		
4-Bromofluorobenzene	460-00-4	0.1	%	93.9	92.5	91.1		

Analytical Results

Submatrix: WATER

Client Sample ID :	TRIP BLANK				
Laboratory Sample ID :	HK0706439-004				
Sample Date / Time :	[10 May 2007]				
Method: Analysis Description / **CAS number** / **LOR** / **Units**					
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BTEX					
C6 - C9 Fraction ---- 20 µg/L	<20				
EP-080S: TPH(Volatile)/BTEX Surrogate					Surrogate control limits listed at end of this report.
Dibromofluoromethane 1868-53-7 0.1 %	**104**				
Toluene-D8 2037-26-5 0.1 %	**92.8**				
4-Bromofluorobenzene 460-00-4 0.1 %	**91.8**				

Quality Control - Laboratory Duplicate (DUP) Results

Matrix Type: SOIL

Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	Duplicate (DUP) Results LOR	Units	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 408432)								
HK0706378-003	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	11.1	10.6	4.5
HK0706439-003	SS3	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	8.7	9.2	4.9
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QC Lot: 408481)								
HK0706439-001	SS1	C6 - C9 Fraction	----	2	mg/kg	<2	<2	0.0
EP-071: Total Petroleum Hydrocarbons (TPH) (QC Lot: 408475)								
HK0706439-001	SS1	C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0
		C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0
		C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0

Matrix Type: WATER

Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	Duplicate (DUP) Results LOR	Units	Original Result	Duplicate Result	RPD (%)
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QC Lot: 409792)								
HK0706354-001	Anonymous	C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0

Quality Control - Method Blank (MB), Single Control Spike (SCS) and Duplicate Control Spike (DCS) Results

Matrix Type: SOIL

Method: Analysis Description	CAS number	Method Blank (MB) Results LOR	Units	Result	Single Control Spike (SCS) and Duplicate Control Spike (DCS) Results: Spike Concentration	Spike Recovery (%) SCS	DCS	Recovery Limits (%) Low	High	RPDs (%) Value	Control Limit
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QCLot: 408481)											
C6 - C9 Fraction	----	2	mg/kg	<2	4 mg/kg	105	----	78	106	----	----
EP-071: Total Petroleum Hydrocarbons (TPH) (QCLot: 408475)											
C10 - C14 Fraction	----	50	mg/kg	<50	270 mg/kg	83.3	----	50	157	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	1142 mg/kg	75.2	----	46	150	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	788 mg/kg	75.0	----	45	155	----	----

Matrix Type: WATER

Method: Analysis Description	CAS number	Method Blank (MB) Results LOR	Units	Result	Single Control Spike (SCS) and Duplicate Control Spike (DCS) Results: Spike Concentration	Spike Recovery (%) SCS	DCS	Recovery Limits (%) Low	High	RPDs (%) Value	Control Limit
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QCLot: 409792)											
C6 - C9 Fraction	----	20	µg/L	<20	200 µg/L	91.5	----	78	124	----	----

Quality Control - Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Results

Matrix Type: SOIL

Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Results: Spike Concentration	Spike Recovery (%) MS	MSD	Recovery Limits (%) Low	High	RPDs (%) Value	Control Limit
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QCLot: 408481)										
HK0706439-002	SS2	C6 - C9 Fraction	----	4 mg/kg	115	----	50	130	----	----
EP-071: Total Petroleum Hydrocarbons (TPH) (QCLot: 408475)										

Matrix Type: SOIL

Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Results						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
					MS	MSD	Low	High	Value	Control Limit
EP-071: Total Petroleum Hydrocarbons (TPH) (QCLot: 408475) - continued										
HK0706439-002	SS2	C10 - C14 Fraction	----	202 mg/kg	96.0	----	50	130	----	----
		C15 - C28 Fraction	----	881 mg/kg	109	----	50	130	----	----
		C29 - C36 Fraction	----	589 mg/kg	130	----	50	130	----	----

Surrogate Control Limits

Submatrix Type: SOIL

Method: Analysis Description	Units	Lower Limit	Upper Limit
EP-080S: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	%	80	120
Toluene-D8	%	81	117
4-Bromofluorobenzene	%	74	121

Submatrix Type: WATER

Method: Analysis Description	Units	Lower Limit	Upper Limit
EP-080S: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	%	86	118
Toluene-D8	%	88	110
4-Bromofluorobenzene	%	86	115

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: ERM HONG KONG	*Laboratory*	: ALS Technichem (HK) Pty Ltd	*Page*	: 1 of 4
Contact	: MR JAMES POTTER	*Contact*	: Alice Wong	*Work Order*	: HK0801234
Address	: 21/F, LINCOLN HOUSE, 979 KING`S ROAD, TAIKOO PLACE, ISLAND EAST, QUARRY BAY HONG KONG	*Address*	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: james.potter@erm.com	*E-mail*	: Alice.Wong@alsenviro.com		
Telephone	: 2271 3000	*Telephone*	: +852 2610 1044		
Facsimile	: 2723 5660	*Facsimile*	: +852 2610 2021		
Project	: 0060350 LAMMA HEC PROJECT	*Quote number*	: ----	*Date received*	: 24 Jan 2008
Order number	: ----			*Date of issue*	: 12 Feb 2008
C-O-C number	: H002504			*No. of samples*	- *Received* : 5
Site	: LAMMA SOIL REMEDIATION				- *Analysed* : 5

Report Comments

This report for ALS Technichem (HK) Pty Ltd work order reference HK0801234 supersedes any previous reports with this reference. The completion date of analysis is 26 Jan 2008. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number. LOR = Limit of reporting.

Specific comments for Work Order HK0801234 : **Soil sample(s) analysed on an as received basis. Result(s) reported on a dry weight basis. Sample(s) were picked up from client by ALS Technichem (HK) staff in a chilled condition.**

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the 'Electronic Transactions Ordinance' of Hong Kong, Chapter 553, Section 6.

Signatory	*Position*	*Authorised results for:-*
Anh Ngoc Huynh	Senior Chemist	Organics
Fung Lim Chee, Richard	General Manager	Inorganics

INVOICED
20 FEB 2008
INVOICE NO. E441215
SUB. CON.

Analytical Results

Submatrix: SOIL

Client Sample ID :				S1	S2	S3	S3 (DUPLICATE)	S4
Laboratory Sample ID :				HK0801234-001	HK0801234-002	HK0801234-003	HK0801234-004	HK0801234-005
Sample Date / Time :				23 Jan 2008 10:00	23 Jan 2008 10:00	23 Jan 2008 10:00	23 Jan 2008 10:00	23 Jan 2008 10:00
Method: Analysis Description	*CAS number*	*LOR*	*Units*					
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	8.0	7.7	7.8	7.5	5.3
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BTEX								
C6 - C9 Fraction	----	2	mg/kg	<2	<2	<2	<2	<2
EP-071: Total Petroleum Hydrocarbons (TPH)								
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg	<100	110	<100	120	130
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	100	110
EP-080S: TPH(Volatile)/BTEX Surrogate							Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%	102	100	119	100	102
Toluene-D8	2037-26-5	0.1	%	97.8	98.8	101	96.9	98.0
4-Bromofluorobenzene	460-00-4	0.1	%	106	106	110	107	107

Quality Control - Laboratory Duplicate (DUP) Results

Matrix Type: SOIL

Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	Duplicate (DUP) Results LOR	Units	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 580953)								
HK0801188-008	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	47.6	47.6	0.0
HK0801212-005	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	18.4	17.2	6.4
EA/ED: Physical and Aggregate Properties (QC Lot: 580954)								
HK0801234-005	S4	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	5.3	5.6	4.6
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QC Lot: 580724)								
HK0801188-001	Anonymous	C6 - C9 Fraction	----	2	mg/kg	<2	<2	0.0
EP-071: Total Petroleum Hydrocarbons (TPH) (QC Lot: 580732)								
HK0801234-001	S1	C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0
		C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0
		C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0

Quality Control - Method Blank (MB), Single Control Spike (SCS) and Duplicate Control Spike (DCS) Results

Matrix Type: SOIL

Method: Analysis Description	CAS number	Method Blank (MB) Results LOR	Units	Result	Single Control Spike (SCS) and Duplicate Control Spike (DCS) Results: Spike Concentration	Spike Recovery (%) SCS	DCS	Recovery Limits (%) Low	High	RPDs (%) Value	Control Limit
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QCLot: 580724)											
C6 - C9 Fraction	----	2	mg/kg	<2	4 mg/kg	71.8	----	47	99	----	----
EP-071: Total Petroleum Hydrocarbons (TPH) (QCLot: 580732)											
C10 - C14 Fraction	----	50	mg/kg	<50	183 mg/kg	106	----	69	139	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	708 mg/kg	102	----	72	144	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	458 mg/kg	96.3	----	65	159	----	----

Quality Control - Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Results

Matrix Type: SOIL

Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Results: Spike Concentration	Spike Recovery (%) MS	MSD	Recovery Limits (%) Low	High	RPDs (%) Value	Control Limit
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QCLot: 580724)										
HK0801188-002	Anonymous	C6 - C9 Fraction	----	4 mg/kg	83.0	----	50	130	----	----
EP-071: Total Petroleum Hydrocarbons (TPH) (QCLot: 580732)										
HK0801234-002	S2	C10 - C14 Fraction	----	183 mg/kg	113	----	50	130	----	----
		C15 - C28 Fraction	----	708 mg/kg	130	----	50	130	----	----
		C29 - C36 Fraction	----	458 mg/kg	112	----	50	130	----	----

Surrogate Control Limits

Submatrix Type: SOIL

Method: Analysis Description	Units	Lower Limit	Upper Limit
EP-080S: TPH(Volatile)/BTEX Surrogate			

Submatrix Type: SOIL

Method: Analysis Description	Units	Lower Limit	Upper Limit
Dibromofluoromethane	%	80	120
Toluene-D8	%	81	117
4-Bromofluorobenzene	%	74	121

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: ERM HONG KONG	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 4
Contact	: MR JAMES POTTER	Contact	: Alice Wong	Work Order	: HK0803487
Address	: 21/F, LINCOLN HOUSE, 979 KING`S ROAD, TAIKOO PLACE, ISLAND EAST, QUARRY BAY HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: james.potter@erm.com	E-mail	: Alice.Wong@alsenviro.com		
Telephone	: 2271 3000	Telephone	: +852 2610 1044		
Facsimile	: 2723 5660	Facsimile	: +852 2610 2021		
Project	: HKC BIOPILE	Quote number	: ----	Date received	: 4 Mar 2008
Order number	: ----			Date of issue	: 25 Mar 2008
C-O-C number	: H002964			No. of samples	- Received : 5
Site	: LAMMA				- Analysed : 5

Report Comments

This report for ALS Technichem (HK) Pty Ltd work order reference HK0803487 supersedes any previous reports with this reference. The completion date of analysis is 8 Mar 2008. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number. LOR = Limit of reporting.

Specific comments for Work Order HK0803487 : **Sample(s) were picked up from client by ALS Technichem (HK) staff in an ambient condition.**
Soil sample(s) analysed on an as received basis. Result(s) reported on a dry weight basis.

INVOICED
31 MAR 2008
INVOICE NO. E452061
SUB. CON.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the 'Electronic Transactions Ordinance' of Hong Kong, Chapter 553, Section 6.

Signatory	Position	Authorised results for:-
Anh Ngoc Huynh	Senior Chemist	Organics
Fung Lim Chee, Richard	General Manager	Inorganics

Analytical Results

Submatrix: SOIL

Client Sample ID :				S5 1.0M	S5 1.0M DUPLICATE	S6 0.5M	S7 0.7M	S8 SW CORNER
Laboratory Sample ID :				HK0803487-001	HK0803487-002	HK0803487-003	HK0803487-004	HK0803487-005
Sample Date / Time :				4 Mar 2008 15:20	4 Mar 2008 15:20	4 Mar 2008 15:30	4 Mar 2008 15:50	4 Mar 2008 16:00
Method: Analysis Description	CAS number	LOR	Units					
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	11.1	10.0	9.0	9.3	8.0
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BTEX								
C6 - C9 Fraction	----	2	mg/kg	<2	<2	<2	<2	<2
EP-071: Total Petroleum Hydrocarbons (TPH)								
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg	<100	130	180	<100	<100
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
EP-080S: TPH(Volatile)/BTEX Surrogate							Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%	87.4	89.9	86.4	87.7	89.5
Toluene-D8	2037-26-5	0.1	%	96.8	97.6	98.2	98.2	98.0
4-Bromofluorobenzene	460-00-4	0.1	%	95.4	97.2	97.0	99.0	99.4

Quality Control - Laboratory Duplicate (DUP) Results

Matrix Type: SOIL

Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	Duplicate (DUP) Results LOR	Units	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 608443)								
HK0803427-013	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	56.1	56.8	1.3
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QC Lot: 607856)								
HK0803159-022	Anonymous	C6 - C9 Fraction	----	2	mg/kg	<2	<2	0.0
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QC Lot: 608633)								
HK0803487-005	S8 SW CORNER	C6 - C9 Fraction	----	2	mg/kg	<2	<2	0.0
EP-071: Total Petroleum Hydrocarbons (TPH) (QC Lot: 607850)								
HK0803159-018	Anonymous	C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0
		C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0
		C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0

Quality Control - Method Blank (MB), Single Control Spike (SCS) and Duplicate Control Spike (DCS) Results

Matrix Type: SOIL

Method: Analysis Description	CAS number	Method Blank (MB) Results LOR	Units	Result	Single Control Spike (SCS) and Duplicate Control Spike (DCS) Results: Spike Concentration	Spike Recovery (%) SCS	DCS	Recovery Limits (%) Low	High	RPDs (%) Value	Control Limit
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QCLot: 607856)											
C6 - C9 Fraction	----	2	mg/kg	<2	4 mg/kg	85.0	----	47	99	----	----
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QCLot: 608633)											
C6 - C9 Fraction	----	2	mg/kg	<2	4 mg/kg	82.5	----	47	99	----	----
EP-071: Total Petroleum Hydrocarbons (TPH) (QCLot: 607850)											
C10 - C14 Fraction	----	50	mg/kg	<50	183 mg/kg	107	----	65	129	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	708 mg/kg	108	----	78	130	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	458 mg/kg	121	----	65	157	----	----

Quality Control - Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Results

Matrix Type: SOIL

Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Results: Spike Concentration	Spike Recovery (%) MS	MSD	Recovery Limits (%) Low	High	RPDs (%) Value	Control Limit
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QCLot: 607856)										
HK0803427-001	Anonymous	C6 - C9 Fraction	----	4 mg/kg	53.9	----	50	130	----	----
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QCLot: 608633)										
HK0803794-001	Anonymous	C6 - C9 Fraction	----	4 mg/kg	53.2	----	50	130	----	----
EP-071: Total Petroleum Hydrocarbons (TPH) (QCLot: 607850)										
HK0803159-019	Anonymous	C10 - C14 Fraction	----	183 mg/kg	95.9	----	50	130	----	----
		C15 - C28 Fraction	----	708 mg/kg	112	----	50	130	----	----
		C29 - C36 Fraction	----	458 mg/kg	121	----	50	130	----	----

Surrogate Control Limits

Submatrix Type: SOIL

Method: Analysis Description	Units	Lower Limit	Upper Limit
EP-080S: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	%	80	120
Toluene-D8	%	81	117
4-Bromofluorobenzene	%	74	121

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: **ERM HONG KONG**	*Laboratory*	: **ALS Technichem (HK) Pty Ltd**	*Page*	: **1 of 4**
Contact	: **MR JAMES POTTER**	*Contact*	: **Alice Wong**	*Work Order*	: **HK0806245**
Address	: **21/F, LINCOLN HOUSE, 979 KING`S ROAD, TAIKOO PLACE, ISLAND EAST, QUARRY BAY, HONG KONG**	*Address*	: **11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong**		
E-mail	: **james.potter@erm.com**	*E-mail*	: **Alice.Wong@alsenviro.com**		
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Project	: **0060350**	*Quote number*	: **----**	*Date received*	: **22 Apr 2008**
Order number	: **----**			*Date of issue*	: **2 May 2008**
C-O-C number	: **H003959**			*No. of samples*	- *Received* : **5**
Site	: **LAMMA BIOPILE**				- *Analysed* : **5**

Report Comments

This report for ALS Technichem (HK) Pty Ltd work order reference HK0806245 supersedes any previous reports with this reference. The completion date of analysis is 24 Apr 2008. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number. LOR = Limit of reporting.

Specific comments for Work Order HK0806245 : **Sample(s) were received in a chilled condition.**
Soil sample(s) analysed on an as received basis. Result(s) reported on a dry weight basis.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the 'Electronic Transactions Ordinance' of Hong Kong, Chapter 553, Section 6.

Signatory	*Position*	*Authorised results for:-*
Anh Ngoc Huynh	**Senior Chemist**	**Organics**
Fung Lim Chee, Richard	**General Manager**	**Inorganics**

Analytical Results

Submatrix: SOIL

Client Sample ID :				S9 (0.3M)	S9 DUPLICATE	S10 (0.3M)	S11 (0.5M)	S12 (0.5M)
Laboratory Sample ID :				HK0806245-001	HK0806245-002	HK0806245-003	HK0806245-004	HK0806245-005
Sample Date / Time :				22 Apr 2008 10:00	22 Apr 2008 10:00	22 Apr 2008 10:00	22 Apr 2008 10:00	22 Apr 2008 10:00
Method: Analysis Description	CAS number	LOR	Units					
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	**10.7**	**11.3**	**12.3**	**9.1**	**7.7**
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BTEX								
C6 - C9 Fraction	----	2	mg/kg	<2	<2	<2	<2	<2
EP-071: Total Petroleum Hydrocarbons (TPH)								
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	**100**	**120**
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	<100
EP-080S: TPH(Volatile)/BTEX Surrogate							Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%	**90.4**	**90.4**	**90.6**	**90.2**	**90.4**
Toluene-D8	2037-26-5	0.1	%	**97.4**	**96.8**	**96.8**	**95.6**	**96.4**
4-Bromofluorobenzene	460-00-4	0.1	%	**97.8**	**98.0**	**96.1**	**97.8**	**97.4**

Quality Control - Laboratory Duplicate (DUP) Results

Matrix Type: SOIL

Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	Duplicate (DUP) Results LOR	Units	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 641819)								
HK0806242-035	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	64.4	65.0	0.9
HK0806279-006	Anonymous	EA055: Moisture Content (dried @ 103°C)	----	0.1	%	63.1	63.2	0.2
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QC Lot: 641779)								
HK0806245-001	S9 (0.3M)	C6 - C9 Fraction	----	2	mg/kg	<2	<2	0.0
EP-071: Total Petroleum Hydrocarbons (TPH) (QC Lot: 641784)								
HK0806245-001	S9 (0.3M)	C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0
		C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0
		C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0

Quality Control - Method Blank (MB), Single Control Spike (SCS) and Duplicate Control Spike (DCS) Results

Matrix Type: SOIL

Method: Analysis Description	CAS number	Method Blank (MB) Results LOR	Units	Result	Single Control Spike (SCS) and Duplicate Control Spike (DCS) Results: Spike Concentration	Spike Recovery (%) SCS	DCS	Recovery Limits (%) Low	High	RPDs (%) Value	Control Limit
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QCLot: 641779)											
C6 - C9 Fraction	----	2	mg/kg	<2	4 mg/kg	109	----	61	100	----	----
EP-071: Total Petroleum Hydrocarbons (TPH) (QCLot: 641784)											
C10 - C14 Fraction	----	50	mg/kg	<50	16 mg/kg	81.0	----	63	115	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	53 mg/kg	76.5	----	52	112	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	45 mg/kg	76.8	----	8	117	----	----

Quality Control - Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Results

Matrix Type: SOIL

Laboratory Sample ID	Client Sample ID	Method: Analysis Description	CAS number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Results: Spike Concentration	Spike Recovery (%) MS	MSD	Recovery Limits (%) Low	High	RPDs (%) Value	Control Limit
EP-071/080: Total Petroleum Hydrocarbons (TPH Volatile) / BT (QCLot: 641779)										
HK0806245-002	S9 DUPLICATE	C6 - C9 Fraction	----	4 mg/kg	82.7	----	50	130	----	----
EP-071: Total Petroleum Hydrocarbons (TPH) (QCLot: 641784)										
HK0806245-002	S9 DUPLICATE	C10 - C14 Fraction	----	16 mg/kg	50.7	----	50	130	----	----
		C15 - C28 Fraction	----	53 mg/kg	68.4	----	50	130	----	----
		C29 - C36 Fraction	----	45 mg/kg	76.1	----	50	130	----	----

Surrogate Control Limits

Submatrix Type: SOIL

Method: Analysis Description	Units	Lower Limit	Upper Limit
EP-080S: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	%	80	120
Toluene-D8	%	81	117

Submatrix Type: SOIL

Method: Analysis Description	Units	Lower Limit	Upper Limit
4-Bromofluorobenzene	%	74	121