

TEST REPORT

Work Order	: KW1800612	Page	: 1 of 9
Amendment	: 2		
Client	: AL AWAMA GENERAL TRADING AND CONTRACTING COMPANY	Laboratory	: ALS Arabia - Kuwait
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Project	: Contaminated Soil	QC Level	: ALS ARABIA Standard Quality Schedule (QCS3)
Order number	: 91431	Date Samples Received	: 18-Nov-2018 15:00
C-O-C number	: ----	Date Analysis Commenced	: 21-Nov-2018
Sampler	: Steve Miller	Issue Date	: 04-Dec-2018 15:51
Site	: KUWAIT	No. of samples received	: 7
Quote number	: KW2018KWDAWA0001 (KT/298/18)	No. of samples analysed	: 7

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

The analytical procedures used by the Life Sciences Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA AS, NEPM, FDA/BAM, AOAC, ISO etc. In house developed procedures are employed in the absence of documented standards or by client request.

Key : LOR = Limit of reporting

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Signatories



This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Badrodin Gayao	Laboratory Supervisor (A)	Inorganic Chemistry
Maniruddin Nizami	Technical Manager	Oil and Tribology
Syed Rahimuddin	Senior Organic Chemist	Organic Chemistry

Analytical Results

Crude Standard Specification

Sub-Matrix: OIL

				Client sample ID	7 KERP South Kuwait Dry Oil Lake Layer 2 Recovered Oil Naphtha	KOC Remediation Standard Specification				
				Laboratory sample ID		KW1800612007				
				Client sampling date / time			13-Nov-2018 15:00			
Parameter	CAS#	LOR	Unit		Result	Low	High	Unit	Evaluation	
OIL AND TRIBOLOGY PARAMETERS										
API Gravity	----	-	°API		49.73	----	>25	°API	Pass	

KOC Remediation Standard Specifications

Sub-Matrix: SOIL

				Client sample ID	1 KERP South Kuwait Dry Oil Lake Layer 2, Before Cleaning	Remediation Standard Specifications				
				Laboratory sample ID		KW1800612001				
				Client sampling date / time			13-Nov-2018 15:00			
Parameter	CAS#	LOR	Unit		Result	Low	High	Unit	Evaluation	
AGGREGATE ORGANIC PARAMETERS										
Total PHC	HEM	100	mg/kg		26900	----	5580	mg/kg	Fail High	
PHYSICAL PARAMETERS										
Electrical Conductivity @ 25°C	----	1	µS/cm		762	----	4500	µS/cm	Pass	
Sodium Absorption Ratio	----	0.01	-		9.41	----	12	-	Pass	
SEMIVOLATILE ORGANIC COMPOUNDS - POLYAROMATIC HYDROCARBONS (SIM)										
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	--	mg/kg	Pass	
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	1001	mg/kg	Pass	
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	5.8	mg/kg	Pass	
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	2.5	mg/kg	Pass	
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg		<0.5	----	20	mg/kg	Pass	
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg		<0.5	----	33	mg/kg	Pass	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	38	mg/kg	Pass	
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	35	mg/kg	Pass	
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	2	mg/kg	Pass	
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	--	mg/kg	Pass	
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	--	mg/kg	Pass	
Naphthalene	91-20-3	0.5	mg/kg		4.1	----	11	mg/kg	Pass	
Phenanthrene	85-01-8	0.5	mg/kg		1.3	----	20.5	mg/kg	Pass	
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	10	mg/kg	Pass	
TOTAL PETROLEUM HYDROCARBON (TPH)										
Total PHC >C35 (calculation method)	PHC_C90	100	mg/kg		17800	----	3300	mg/kg	Fail High	
TOTAL PETROLEUM HYDROCARBON (TPH) - SPECIATION										
Total PHC >C10-C16	PHC_C16	50	mg/kg		609	----	260	mg/kg	Pass	
Total PHC >C16-C35	PHC_C35	50	mg/kg		8280	----	1700	mg/kg	Pass	
Total PHC C6-C10	PHC_C10	5	mg/kg		169	----	320	mg/kg	Pass	

Analytical Results

PHYSICAL PARAMETERS								
Moisture Content (dried @ 103°C)	----	1.0	%	<1.0	----	----	----	----
SEMIVOLATILE ORGANIC COMPOUNDS - POLYAROMATIC HYDROCARBONS (SIM)								
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	----	----	----
Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	5.4	----	----	----	----
TOTAL PETROLEUM HYDROCARBON (TPH) - SPECIATION								
Extractable Aliphatics >C10-C16	ALIPH_C16	50	mg/kg	330	----	----	----	----
Extractable Aliphatics >C16-C35	ALIPH_C35	50	mg/kg	4720	----	----	----	----
Extractable Aromatics >C10-C16	AROM_C16	50	mg/kg	279	----	----	----	----
Extractable Aromatics >C16-C35	AROM_C35	50	mg/kg	3560	----	----	----	----
Volatile Aliphatics C6-C10	ALIPH_C10	5	mg/kg	38	----	----	----	----
Volatile Aromatics C6-C10	AROM_C10	0.5	mg/kg	132	----	----	----	----

KOC Remediation Standard Specifications

Sub-Matrix: SOIL

Client sample ID

2 KERF South
Kuwait Dry Oil Lake
Layer 2, Clean 95
Octane

Remediation Standard Specifications

Laboratory sample ID

KW1800612002

Client sampling date / time

13-Nov-2018 10:00

Parameter	CAS#	LOR	Unit	Result	Low	High	Unit	Evaluation
AGGREGATE ORGANIC PARAMETERS								
Total PHC	HEM	100	mg/kg	440	----	5580	mg/kg	Pass
PHYSICAL PARAMETERS								
Electrical Conductivity @ 25°C	----	1	µS/cm	172	----	4500	µS/cm	Pass
Sodium Absorption Ratio	----	0.01	-	2.86	----	12	-	Pass
SEMIVOLATILE ORGANIC COMPOUNDS - POLYAROMATIC HYDROCARBONS (SIM)								
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	--	mg/kg	Pass
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	1001	mg/kg	Pass
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	5.8	mg/kg	Pass
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	2.5	mg/kg	Pass
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	----	20	mg/kg	Pass
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	----	33	mg/kg	Pass
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	38	mg/kg	Pass
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	35	mg/kg	Pass
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	2	mg/kg	Pass
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	--	mg/kg	Pass
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	--	mg/kg	Pass
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	11	mg/kg	Pass
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	20.5	mg/kg	Pass
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	10	mg/kg	Pass
TOTAL PETROLEUM HYDROCARBON (TPH)								
Total PHC >C35 (calculation method)	PHC_C90	100	mg/kg	440	----	3300	mg/kg	Pass
TOTAL PETROLEUM HYDROCARBON (TPH) - SPECIATION								
Total PHC >C10-C16	PHC_C16	50	mg/kg	<50	----	260	mg/kg	Pass
Total PHC >C16-C35	PHC_C35	50	mg/kg	<50	----	1700	mg/kg	Pass
Total PHC C6-C10	PHC_C10	5	mg/kg	<5	----	320	mg/kg	Pass

Analytical Results

PHYSICAL PARAMETERS								
Moisture Content (dried @ 103°C)	----	1.0	%	<1.0	----	----	----	----
SEMIVOLATILE ORGANIC COMPOUNDS - POLYAROMATIC HYDROCARBONS (SIM)								
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	----	----	----
Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	----	----	----	----
TOTAL PETROLEUM HYDROCARBON (TPH) - SPECIATION								
Extractable Aliphatics >C10-C16	ALIPH_C16	50	mg/kg	<50	----	----	----	----
Extractable Aliphatics >C16-C35	ALIPH_C35	50	mg/kg	<50	----	----	----	----
Extractable Aromatics >C10-C16	AROM_C16	50	mg/kg	<50	----	----	----	----
Extractable Aromatics >C16-C35	AROM_C35	50	mg/kg	<50	----	----	----	----
Volatile Aliphatics C6-C10	ALIPH_C10	5	mg/kg	<5	----	----	----	----
Volatile Aromatics C6-C10	AROM_C10	0.5	mg/kg	0.6	----	----	----	----

KOC Remediation Standard Specifications

Sub-Matrix: SOIL

Client sample ID

3 KERF South
Kuwait Dry Oil Lake
Layer 2, Clean
Naphtha

Remediation Standard Specifications

Laboratory sample ID

KW1800612003

Client sampling date / time

13-Nov-2018 13:00

Parameter	CAS#	LOR	Unit	Result	Low	High	Unit	Evaluation
AGGREGATE ORGANIC PARAMETERS								
Total PHC	HEM	100	mg/kg	400	----	5580	mg/kg	Pass
PHYSICAL PARAMETERS								
Electrical Conductivity @ 25°C	----	1	µS/cm	193	----	4500	µS/cm	Pass
Sodium Absorption Ratio	----	0.01	-	7.37	----	12	-	Pass
SEMIVOLATILE ORGANIC COMPOUNDS - POLYAROMATIC HYDROCARBONS (SIM)								
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	--	mg/kg	Pass
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	1001	mg/kg	Pass
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	5.8	mg/kg	Pass
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	2.5	mg/kg	Pass
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	----	20	mg/kg	Pass
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	----	33	mg/kg	Pass
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	38	mg/kg	Pass
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	35	mg/kg	Pass
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	2	mg/kg	Pass
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	--	mg/kg	Pass
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	--	mg/kg	Pass
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	11	mg/kg	Pass
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	20.5	mg/kg	Pass
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	10	mg/kg	Pass
TOTAL PETROLEUM HYDROCARBON (TPH)								
Total PHC >C35 (calculation method)	PHC_C90	100	mg/kg	400	----	3300	mg/kg	Pass
TOTAL PETROLEUM HYDROCARBON (TPH) - SPECIATION								
Total PHC >C10-C16	PHC_C16	50	mg/kg	<50	----	260	mg/kg	Pass
Total PHC >C16-C35	PHC_C35	50	mg/kg	<50	----	1700	mg/kg	Pass
Total PHC C6-C10	PHC_C10	5	mg/kg	<5	----	320	mg/kg	Pass

Analytical Results

PHYSICAL PARAMETERS								
Moisture Content (dried @ 103°C)	----	1.0	%	<1.0	----	----	----	----
SEMIVOLATILE ORGANIC COMPOUNDS - POLYAROMATIC HYDROCARBONS (SIM)								
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	----	----	----
Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	----	----	----	----
TOTAL PETROLEUM HYDROCARBON (TPH) - SPECIATION								
Extractable Aliphatics >C10-C16	ALIPH_C16	50	mg/kg	<50	----	----	----	----
Extractable Aliphatics >C16-C35	ALIPH_C35	50	mg/kg	<50	----	----	----	----
Extractable Aromatics >C10-C16	AROM_C16	50	mg/kg	<50	----	----	----	----
Extractable Aromatics >C16-C35	AROM_C35	50	mg/kg	<50	----	----	----	----
Volatile Aliphatics C6-C10	ALIPH_C10	5	mg/kg	<5	----	----	----	----
Volatile Aromatics C6-C10	AROM_C10	0.5	mg/kg	<0.5	----	----	----	----

KOC Remediation Standard Specifications

Sub-Matrix: SOIL

Client sample ID

4 TERI Bucket One
Before Cleaning

Remediation Standard Specifications

Laboratory sample ID

KW1800612004

Client sampling date / time

13-Nov-2018 11:00

Parameter	CAS#	LOR	Unit	Result	Low	High	Unit	Evaluation
AGGREGATE ORGANIC PARAMETERS								
Total PHC	HEM	100	mg/kg	68100	----	5580	mg/kg	Fail High
PHYSICAL PARAMETERS								
Electrical Conductivity @ 25°C	----	1	µS/cm	11700	----	4500	µS/cm	Fail High
Sodium Absorption Ratio	----	0.01	-	79.2	----	12	-	Fail High
SEMIVOLATILE ORGANIC COMPOUNDS - POLYAROMATIC HYDROCARBONS (SIM)								
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	--	mg/kg	Pass
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	1001	mg/kg	Pass
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	5.8	mg/kg	Pass
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	2.5	mg/kg	Pass
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	----	20	mg/kg	Pass
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	----	33	mg/kg	Pass
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	38	mg/kg	Pass
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	35	mg/kg	Pass
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	2	mg/kg	Pass
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	--	mg/kg	Pass
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	--	mg/kg	Pass
Naphthalene	91-20-3	0.5	mg/kg	6.1	----	11	mg/kg	Pass
Phenanthrene	85-01-8	0.5	mg/kg	3.3	----	20.5	mg/kg	Pass
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	10	mg/kg	Pass
TOTAL PETROLEUM HYDROCARBON (TPH)								
Total PHC >C35 (calculation method)	PHC_C90	100	mg/kg	42400	----	3300	mg/kg	Fail High
TOTAL PETROLEUM HYDROCARBON (TPH) - SPECIATION								
Total PHC >C10-C16	PHC_C16	50	mg/kg	1290	----	260	mg/kg	Fail High
Total PHC >C16-C35	PHC_C35	50	mg/kg	24200	----	1700	mg/kg	Fail High
Total PHC C6-C10	PHC_C10	5	mg/kg	183	----	320	mg/kg	Pass

Analytical Results

PHYSICAL PARAMETERS								
Moisture Content (dried @ 103°C)	----	1.0	%	1.6	----	----	----	----
SEMIVOLATILE ORGANIC COMPOUNDS - POLYAROMATIC HYDROCARBONS (SIM)								
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	----	----	----
Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	9.4	----	----	----	----
TOTAL PETROLEUM HYDROCARBON (TPH) - SPECIATION								
Extractable Aliphatics >C10-C16	ALIPH_C16	50	mg/kg	669	----	----	----	----
Extractable Aliphatics >C16-C35	ALIPH_C35	50	mg/kg	12300	----	----	----	----
Extractable Aromatics >C10-C16	AROM_C16	50	mg/kg	619	----	----	----	----
Extractable Aromatics >C16-C35	AROM_C35	50	mg/kg	11900	----	----	----	----
Volatile Aliphatics C6-C10	ALIPH_C10	5	mg/kg	56	----	----	----	----
Volatile Aromatics C6-C10	AROM_C10	0.5	mg/kg	126	----	----	----	----

KOC Remediation Standard Specifications

Sub-Matrix: SOIL

Client sample ID

5 TERI Bucket One
Cleaning Naphtha

Remediation Standard Specifications

Laboratory sample ID

KW1800612005

Client sampling date / time

13-Nov-2018 15:00

Parameter	CAS#	LOR	Unit	Result	Low	High	Unit	Evaluation
AGGREGATE ORGANIC PARAMETERS								
Total PHC	HEM	100	mg/kg	190	----	5580	mg/kg	Pass
PHYSICAL PARAMETERS								
Electrical Conductivity @ 25°C	----	1	µS/cm	1770	----	4500	µS/cm	Pass
Sodium Absorption Ratio	----	0.01	-	12.5	----	12	-	Fail High
SEMIVOLATILE ORGANIC COMPOUNDS - POLYAROMATIC HYDROCARBONS (SIM)								
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	--	mg/kg	Pass
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	1001	mg/kg	Pass
Anthracene	120-12-7	0.5	mg/kg	1.2	----	5.8	mg/kg	Pass
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	2.5	mg/kg	Pass
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	----	20	mg/kg	Pass
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	----	33	mg/kg	Pass
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	38	mg/kg	Pass
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	35	mg/kg	Pass
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	2	mg/kg	Pass
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	--	mg/kg	Pass
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	--	mg/kg	Pass
Naphthalene	91-20-3	0.5	mg/kg	3.3	----	11	mg/kg	Pass
Phenanthrene	85-01-8	0.5	mg/kg	1.9	----	20.5	mg/kg	Pass
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	10	mg/kg	Pass
TOTAL PETROLEUM HYDROCARBON (TPH)								
Total PHC >C35 (calculation method)	PHC_C90	100	mg/kg	190	----	3300	mg/kg	Pass
TOTAL PETROLEUM HYDROCARBON (TPH) - SPECIATION								
Total PHC >C10-C16	PHC_C16	50	mg/kg	<50	----	260	mg/kg	Pass
Total PHC >C16-C35	PHC_C35	50	mg/kg	<50	----	1700	mg/kg	Pass
Total PHC C6-C10	PHC_C10	5	mg/kg	<5	----	320	mg/kg	Pass

Analytical Results

PHYSICAL PARAMETERS								
Moisture Content (dried @ 103°C)	----	1.0	%	<1.0	----	----	----	----
SEMIVOLATILE ORGANIC COMPOUNDS - POLYAROMATIC HYDROCARBONS (SIM)								
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	----	----	----
Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	6.3	----	----	----	----
TOTAL PETROLEUM HYDROCARBON (TPH) - SPECIATION								
Extractable Aliphatics >C10-C16	ALIPH_C16	50	mg/kg	<50	----	----	----	----
Extractable Aliphatics >C16-C35	ALIPH_C35	50	mg/kg	<50	----	----	----	----
Extractable Aromatics >C10-C16	AROM_C16	50	mg/kg	<50	----	----	----	----
Extractable Aromatics >C16-C35	AROM_C35	50	mg/kg	<50	----	----	----	----
Volatile Aliphatics C6-C10	ALIPH_C10	5	mg/kg	<5	----	----	----	----
Volatile Aromatics C6-C10	AROM_C10	0.5	mg/kg	1.0	----	----	----	----

KOC Remediation Standard Specifications

Sub-Matrix: SOIL

Client sample ID

6 Six TERI Bucket
One Clean 95
Octane

Remediation Standard Specifications

Laboratory sample ID

KW1800612006

Client sampling date / time

13-Nov-2018 14:00

Parameter	CAS#	LOR	Unit	Result	Low	High	Unit	Evaluation
AGGREGATE ORGANIC PARAMETERS								
Total PHC	HEM	100	mg/kg	1160	----	5580	mg/kg	Pass
PHYSICAL PARAMETERS								
Electrical Conductivity @ 25°C	----	1	µS/cm	1790	----	4500	µS/cm	Pass
Sodium Absorption Ratio	----	0.01	-	13.8	----	12	-	Fail High
SEMIVOLATILE ORGANIC COMPOUNDS - POLYAROMATIC HYDROCARBONS (SIM)								
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	--	mg/kg	Pass
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	1001	mg/kg	Pass
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	5.8	mg/kg	Pass
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	2.5	mg/kg	Pass
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5	----	20	mg/kg	Pass
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	----	33	mg/kg	Pass
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	38	mg/kg	Pass
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	35	mg/kg	Pass
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	2	mg/kg	Pass
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	--	mg/kg	Pass
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	--	mg/kg	Pass
Naphthalene	91-20-3	0.5	mg/kg	0.7	----	11	mg/kg	Pass
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	20.5	mg/kg	Pass
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	10	mg/kg	Pass
TOTAL PETROLEUM HYDROCARBON (TPH)								
Total PHC >C35 (calculation method)	PHC_C90	100	mg/kg	700	----	3300	mg/kg	Pass
TOTAL PETROLEUM HYDROCARBON (TPH) - SPECIATION								
Total PHC >C10-C16	PHC_C16	50	mg/kg	261	----	260	mg/kg	Fail High
Total PHC >C16-C35	PHC_C35	50	mg/kg	188	----	1700	mg/kg	Pass
Total PHC C6-C10	PHC_C10	5	mg/kg	8	----	320	mg/kg	Pass

Analytical Results

PHYSICAL PARAMETERS								
Moisture Content (dried @ 103°C)	----	1.0	%	<1.0	----	----	----	----
SEMIVOLATILE ORGANIC COMPOUNDS - POLYAROMATIC HYDROCARBONS (SIM)								
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	----	----	----
Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	0.7	----	----	----	----
TOTAL PETROLEUM HYDROCARBON (TPH) - SPECIATION								
Extractable Aliphatics >C10-C16	ALIPH_C16	50	mg/kg	<50	----	----	----	----
Extractable Aliphatics >C16-C35	ALIPH_C35	50	mg/kg	<50	----	----	----	----
Extractable Aromatics >C10-C16	AROM_C16	50	mg/kg	261	----	----	----	----
Extractable Aromatics >C16-C35	AROM_C35	50	mg/kg	189	----	----	----	----
Volatile Aliphatics C6-C10	ALIPH_C10	5	mg/kg	<5	----	----	----	----
Volatile Aromatics C6-C10	AROM_C10	0.5	mg/kg	3.5	----	----	----	----

Brief Method Summaries

Analytical Methods	Method	Method Descriptions
Sodium Absorption Ratio (SAR)	EA006	SM 3120 (Ca, Mg, Na-A), APHA 22nd ed. The concentration as meq of Ca, Mg and Na are determined on saturated soil by water leach. Results are used to calculate SAR.
Electrical Conductivity	EA010	SM 2510 B, APHA 22nd ed. Conductivity is determined on soil samples using a 1:5 soil/water leach.
Moisture Content / Dry matter	EA055	In-houses; A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) (Method 102)
Oil and Grease	EP020	US EPA 9071B; Oil & grease is a gravimetric procedure to determine the amount of oil & grease residue in an aqueous sample. The sample is extracted using n-hexane and the extract is dehydrated and concentrated prior to gravimetric determination.
Total Petroleum Hydrocarbon - Speciation	EP070	US EPA 8015 (M) GC/FID; The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards.
Total PHC >C35 (calculation method)	EP070_Cal	Total PHC >C35 (calculation method): Total PHC minus the Sum of the total fractions upto C 35). The method is not Accredited.
Polyaromatic Hydrocarbons (PAH) - SIM	EP075_B(SIM)	US EPA 8270 GC/MS; Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve.
Volatile Petroleum Hydrocarbon - Speciation	EP081	US EPA 8260 P&T/GC/MS; Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. TIC data (as fractions) and target aromatics (or groups of aromatics) are used to compute aliphatic and aromatic hydrocarbon fractions by addition or difference.
Density, Relative Density, API Gravity	PE-112	ASTM D4052-16 - Determination of the Density or Relative Density of Petroleum Distillates and Viscous Oils.
Preparation Methods	Method	Method Descriptions
Sodium Absorption Ration (SAR) preparation	EA006PR	USEPA 600/2. Soil is brought to saturation with distilled water by capillary action.
1:5 solid / water leach for soluble analytes	EN34	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Methanol Extraction of Soils for Purge and Trap	ORG16_SP	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids (Option B - Non-concentrating)	ORG17B	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial for analysis.
Tumbler Extraction of Solids (Option B - Non-concentrating)	ORG17B_SP	In-house, Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 20mL 1:1 DCM/Acetone by end over end tumble. The solvent is transferred directly to a GC vial for analysis.

A ``* symbol preceding any method indicates laboratory or subcontractor non-accredited test. In the case when a procedure belonging to an accredited method was used for non-accredited matrix, would apply that the reported results are non-accredited. Please refer to General Comment section on front page for information. If the report contains subcontracted analysis, those are made in a subcontracted laboratory.

The calculation methods of summation parameters are available on request in the client service.

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