- TPH – Total Petroleum Hydrocarbon
- UCS – Unconfined Compressive Strength measured by NSW RTA Test Method T131
- Waste Classification Guidelines – Refers to Table 2 of DECCW Waste Classification Guidelines, Part 1: Classifying Waste (2009)

Scope of work

Enviropacific was engaged by JBS to conduct an immobilisation treatment trial using Portland cement to immobilise three different materials originating from the former Macdonaldtown Gasworks.

The treatment trial included the following tasks:

1. Subsamples of each material were blended and homogenised in accordance with the flowchart shown below in Figure 1.
2. Each material was prepared in accordance with NSW RTA Test Method T131.
3. Three samples from each prepared material (total 9) were collected for pre-treatment chemical analysis. Each sample was analysed for the following:
    - As, Cd, Cr, Pb, Hg, Ni (SCC and TCLP)
    - Benzo(a)pyrene and PAHs (SCC and TCLP)
    - Phenols (SCC and TCLP)
    - BTEX and styrene (SCC and TCLP)
    - TPHs (C10-C36) (SCC and TCLP)
4. Each material was split into 12 kg subsamples for treatment.
5. Subsamples (12 kg) of each material were treated with 5%, 12.5% and 20% cement (by weight). The cement was mixed into the materials by hand, which has previously been demonstrated to replicate a pugmill or equivalent at full-scale treatment.
6. Two cylinders were cast per treatment per material (3 materials x 3 treatments x 2 replicates/treatment = 18 cylinders total).
7. A sufficient quantity of each treated material was separated and stored in tightly sealed plastics bags for five days prior to submitting them for post-treatment chemical analysis.
8. Each cast cylinder was cured and tested in accordance with NSW RTA Test Method T131, in accordance with DECCW General Immobilisation Approval for Coal Tar.
9. One sample from each treatment (total 9) plus 1 untreated control (Material 3) was collected and submitted for chemical analysis. Each sample was analysed for the following:
    - As, Cd, Cr, Pb, Hg, Ni (SCC and ASLP)
    - Benzo(a)pyrene and PAHs (SCC and ASLP)
    - Phenols (SCC and ASLP)
    - BTEX and styrene (SCC and ASLP)
    - TPHs (C10-C36) (SCC and TCLP)

10. JBS were unable to provide bulk groundwater samples for the ASLP tests, therefore DI water was used for the ASLP tests.

All chemical analyses were conducted by Envirolab Services and all UCS cylinders were prepared and tested by Douglas Partners Geotechnical Laboratory. Envirolab and Douglas Partners are NATA accredited and conducted the testing in accordance with laboratory testing quality assurance protocols. Laboratory reports are provided in Attachments 1-4.

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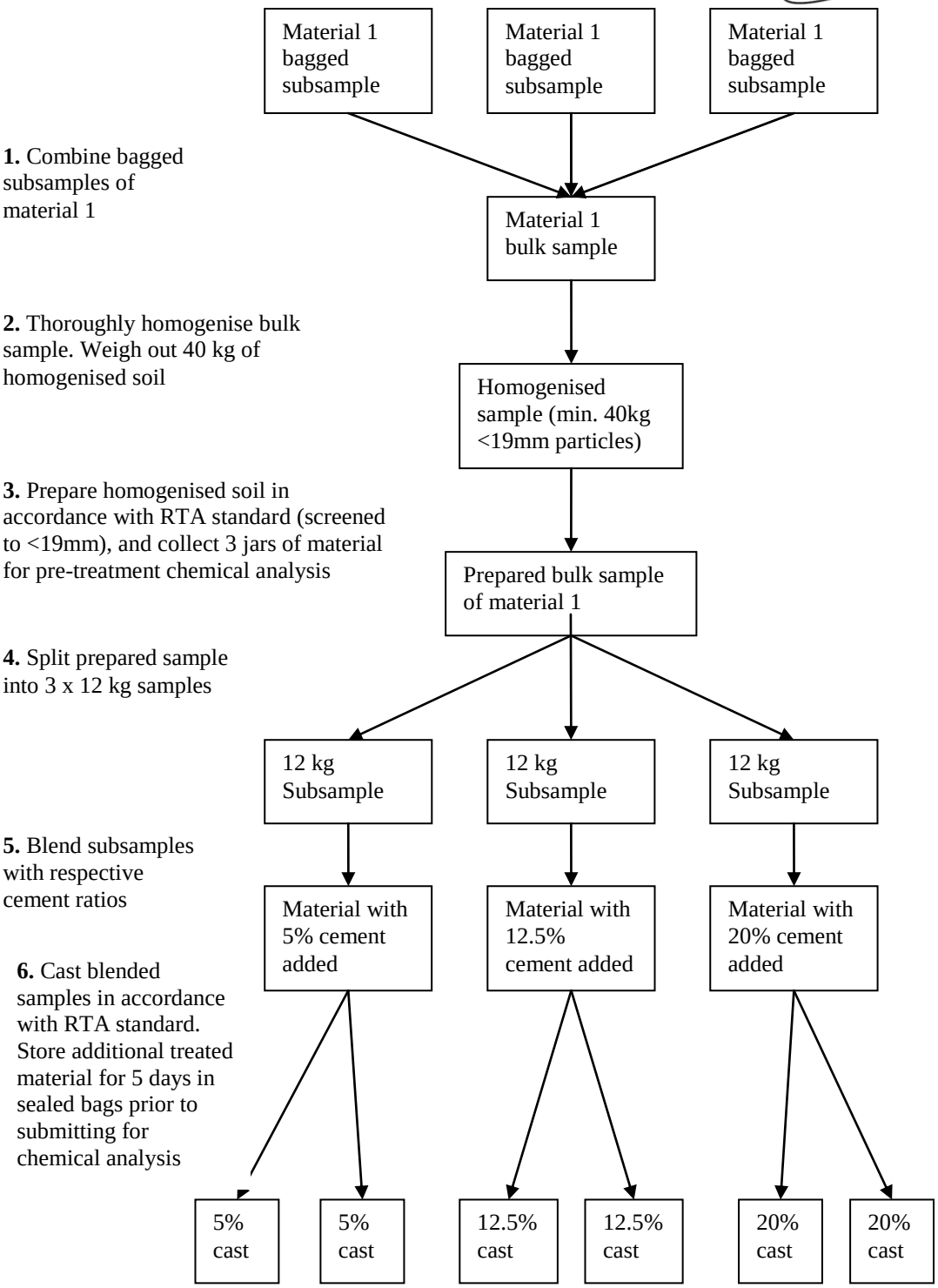

Figure 1. Procedural flowchart followed for each material.

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Sample Collection

Bulk sample collection at Macdonaldtown was conducted on 2nd July, 2010 by JBS and subsequently transferred to Enviropacific's Sydney office. Three types of material were targeted:

- Material 1: TP1 at 0.3 – 0.4 m depth
- Material 2: TP3 at 1.3 – 1.7 m depth
- Material 3: TP3 at 4.0 – 4.2 m depth

Material Description

- Material 1 was a silty, gravelly sand fill (refer to Fig 2).
- Material 2 was a silty clay fill (refer to Fig 3).
- Material 3 was a silty clay fill (refer to Fig 4).

Figure 2.

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Figure 3.

Figure 4.

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Results/Discussion

A detailed summary of the chemical analysis and UCS testing results is included in Attachment 5. The total and leachable (TCLP for pre-treated material and ASLP-DI water for post-treated material) concentrations for the main contaminants of concern (BaP, total PAHs and TPH-C10-C36) and UCS results are summarised in Table 1 below. A discussion of the results is provided below.

Table 1. Summary of total and leachable results (TCLP for pre-treated material and ASLP-DI water for post-treated material) for BaP, PAHs and TPH (C10-C36) (ND = Not Determined).

Sample ID	Total BaP (mg/kg)	Leachable BaP TCLP/ ASLP (mg/L)	Total PAHs (mg/kg)	Leachable PAHs TCLP/ ASLP (mg/L)	Total TPH C10-C36 (mg/kg)	Leachable TPH C10-C36 TCLP/ ASLP (µg/L)	Mean UCS 7-day curing (MPa)
General Solid Criteria	**10**	**40**	**200**	**-**	**10,000**	**-**	
Restricted Solid Criteria	*23*	*160*	*800*	*-*	*40,000*	-	
Pre-treated materials							
Material 1 Pre 1	4.4	<0.001	34	<0.001	700	120	ND
Material 1 Pre 2	4.5	<0.001	35	<0.001	700	110	ND
Material 1 Pre 3	5.6	<0.001	53	<0.001	760	<250	ND
Mean	4.8	<0.001	41	<0.001	720	115	
Material 2 Pre 1	0.9	<0.001	**276**	3.5	650	8740	ND
Material 2 Pre 2	1.1	<0.001	**292**	2.8	780	7060	ND
Material 2 Pre 3	1.0	<0.001	**331**	2.7	790	6150	ND
Mean	1.0	<0.001	**299**	3.0	740	7317	
Material 3 Pre 1	0.2	<0.001	5	3.3	<250	2120	ND
Material 3 Pre 2	2.1	<0.001	39	3.0	370	6960	ND
Material 3 Pre 3	1.7	<0.001	36	1.2	450	1480	ND
Mean	1.3	<0.001	27	2.5	410	3520	
Post-treated materials							
Control - Material 3	1.7	<0.001	51	0.083	500	680	ND
Material 1 Post 5%	4.7	<0.001	44	<0.001	360	400	2.18
Material 1 Post 12.5%	3.8	<0.001	34	<0.001	320	280	3.10
Material 1 Post 20%	3.9	<0.001	43	<0.001	300	290	5.85
Material 2 Post 5%	2.0	<0.001	171	2.6	810	6700	0.35
Material 2 Post 12.5%	1.6	<0.001	117	1.9	450	5700	1.00
Material 2 Post 20%	1.6	<0.001	101	1.5	420	4900	1.55
Material 3 Post 5%	0.8	<0.001	17	0.26	<250	1420	0.13
Material 3 Post 12.5%	0.8	<0.001	20	0.33	<280	1300	0.43
Material 3 Post 20%	1.7	<0.001	48	0.48	460	1950	0.60

Total (SCC) results - untreated samples:

The main contaminants of concern in the materials are total PAHs. The total PAHs in the Material 2 would result in this untreated material being classified as Restricted solid waste, whereas total PAHs in Materials 1 and 3 would result in these untreated materials being classified as General solid waste. Notably, naphthalene comprised ~1%, 90% and 30% of the total PAHs in Materials 1-3, respectively. Generally the percentage of small-ring PAHs in the material reflects both the aging and nature of the material (e.g. the percentage increases as the amount of coal tar material increases). All other contaminants of concern were well below the General solid waste criteria.

Total (SCC) results – cement treated samples:

The total contaminant results for treated samples for each of the materials were generally similar to the untreated sample. Any observed differences appear to be related more to the heterogeneity of the material, rather than dilution of the sample with treatment reagents. The total PAHs in treated samples of Material 2 however decreased by 43% (at 5% cement), 61% (at 12.5% cement) and 66% (at 20% cement), and is mainly attributable to decreased naphthalene in the treated samples of Material 2, which decreased from ~90% of total PAHs to 70% (at 5% cement), 63% (at 12.5% cement) and 59% (at 20% cement). This is most likely related to increased volatilisation of naphthalene with the amount of cement added, resulting from the heat of reaction (i.e. heat of hydration). The percentages of naphthalene in Material 1 and 3 were similar in the treated samples to the untreated samples.

Leachable results – General Comments/Limitations

With the exception of BaP, there are currently no criteria for the leachability of total PAHs or TPHs in either the Waste Classification Guidelines or the General IA for gasworks waste (2005/14). Hence there is no point of reference for the leachability of total PAHs and TPHs provided by the DECCW. The leachable PAHs and TPHs are discussed in this report in the context that this information is considered to be relevant to the retention of treated material on site. With regards to assessing the leachability of contaminants from cement stabilised waste, it is worth noting that current leachate methods (TCLP, ASLP and MEP are the only leachate tests currently used by regulatory authorities in Australia) have important limitations. For example, each of these methods require particle size reduction to either 9.5 mm (TCLP and MEP) or 2.4 mm (ASLP), which effectively contravenes the assessment of encapsulated wastes as the integrity of the monolithic structure is compromised, and each of these methods employ vigorous end-over-end agitation of the sample. In fact in AS4439.3-1997 (ASLP) the Scope states that "The procedure is not applicable to encapsulated wastes which cannot be reduced to the specified maximum particle size without breaking the

integrity of encapsulation". For this reason, in the General IA, the DECCW is in effect relying on the UCS measurement as an indicator of the stability of cement stabilised waste, whilst still requiring BaP leachability (TCLP) for cement stabilised samples to be below the Waste Classification Guidelines criteria (and from previous EPS experience with other gasworks projects BaP leachability has typically been non-detectable in both the untreated and cement stabilised samples using TCLP).

If a more appropriate leach test (e.g. a diffusion-based or column leach test on a moulded/monolithic sample) was adopted for assessing the leachability of cement stabilised materials destined for on-site placement, the optimum UCS required to minimise contaminant leachability could be more accurately determined, and a different leachability data set may result, that might be more appropriately applied to acceptance criteria for on-site placement of cement stabilised material.

Leachable results (TCLP) – untreated samples

Leachable results for the large-ring PAHs (>pyrene and including BaP) for all untreated materials were below laboratory detection limits. However, total PAH leachability was relatively high in Materials 2 and 3 (mean results of 3.0 and 2.5 mg/L, respectively) and was mainly attributable to leachable naphthalene (98%). Notably, total naphthalene in these two materials was significantly different (270 mg/kg for Material 2 compared to 6.7 mg/kg for Material 3). The ASLP-DI water total PAH leachability for the untreated control (Material 3) submitted with the treated samples was significantly lower (0.083 mg/L). The leachabilities of all other contaminants of concern for the untreated materials were well below the General solid waste criteria.

Leachable results (ASLP-DI water) – cement treated samples

BaP leachability remained non-detectable in all three materials for all ratios of cement addition. Total PAH leachability remained relatively high in Material 2 (max 2.6 mg/L at 5% cement, min 1.5 mg/L at 20% cement), and was again mainly attributable to leachable naphthalene (~91%). Given the lower total naphthalene in the treated samples for Material 2, there is little evidence of reduced leachability of naphthalene (and other PAHs) in the cement treated samples using the ASLP method, despite achieving UCS strengths of >1 MPa for Material 2 (refer Table 1). In fact, for Material 3 all three cement treated samples demonstrated higher total PAH leachability (up to six times higher for 20% cement) than for the control (untreated Material 3) using ASLP-DI water. Similarly, leachable TPHs for treated samples of Material 3 increased by at least two-fold compared to the untreated control using ASLP-DI water. Increased leachability of organic contaminants from cement stabilised

samples (and hence lack of evidence of their immobilisation) has been previously observed by EPS in other gasworks projects using TCLP and/or ASLP, and clearly demonstrates the limitations of these methods for assessing the leachability of cement stabilised materials, as mentioned above.

Notably, the leachability of some inorganic contaminants (e.g. arsenic, chromium) were higher in the treated ASLP results compared to untreated TCLP results, which is related to the amphoteric nature of these contaminants where their solubility increases at higher pH. However the leachabilities of all inorganic contaminants in the treated samples were well below the General solid waste criteria.

UCS Results – cement treated samples

UCS testing is currently required by DECCW as part of the General IA for gasworks waste for assessing the stability of cement stabilised wastes destined for off-site landfill disposal with a target of 1 MPa. UCS results for the cement treated materials (refer Table 1) showed that >1 MPa was readily achieved for Material 1 using 5% cement (mean result 2.2 MPa). For Material 2, a higher ratio of cement was required (12.5% cement resulted in 1.0 MPa UCS), which would be related to the higher level of organic contamination in this material and/or the higher clay content. For Material 3, treatment with 20% cement resulted in a UCS of only 0.6 MPa. This sample was observed to have very high clay content, providing very little aggregate for the cement curing process. The low level of organic contaminants observed in Material 3 indicates that the contaminants did not have had a significant effect on the UCS results for this material.

Summary

The level of contamination in the three materials was relatively low for gasworks waste. Total PAHs in the Material 2 would result in the untreated material being classified as Restricted solid waste. All other contaminants of concern were well below the General solid waste criteria. UCS measurements of >1 MPa were achieved for Materials 1 and 2, whereas a maximum UCS of 0.6 MPa was achieved for Material 3.

The results from this trial show that there is no direct relationship between the UCS measurement and the leachability of contaminants from cement stabilised materials. In fact, cement treatment appears to increase the leachability of organic contaminants, as assessed using ASLP-DI water. If a more appropriate (alternative) test was used to assess the leachability of contaminants from stabilised waste to be placed on-site, the optimum UCS required to minimise leachability of contaminants could be more accurately determined.

Historically in NSW some degree of macroencapsulation of gasworks waste with cement has been undertaken for waste being disposed of to landfill, in order to provide a sufficient level of confidence in the long-term stability of the treated waste.

Attachments

Attachments 1-3 – Laboratory reports from Envirolab Services

Attachment 4 – Laboratory reports from Douglas Partners

Attachment 5 – Macdonaldtown Results Summary

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DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH OF COMPACTED MATERIALS

Client:	**Enviropacific Services Pty Ltd**	**Project No:**	66360
		Report No:	S10-006 D
Project:	Macdonaldtown Gasworks	**Report Date:**	04/08/10
		Date Sampled:	27/07/10
Location:	Macdonaldtown	**Date of Test:**	27/07/10
		Page:	1 of 1

Material Retained on 19mm sieve:	0%	
Material Description:	Material 1 + 5% cement	
Elapsed time between addition of binder and compaction:	15 mins	
Method of Compaction:	Standard	
No. of layers	3	
Curing Details:	7 day accelerated curing at 65°C & +-5°C	
	Specimen A	**Specimen B**
Moisture Content at Compaction:	14.5%	14.0%
Load at failure kN:	16.576%	21.042%
Dry Density of test specimens:	1.83t/m³	1.86t/m³
Unconfined Compressive Strength:	1.90MPa	2.45MPa

Test Method(s): RTA ~~T116~~, T131

Sampling Method(s): Sampled by client – compacted in laboratory

Remarks:

Approved Signatory:

Tested: MBG
Checked. NW

Norman Weimann
Laboratory Manager

NATA Accredited Laboratory Number: 828

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DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH OF COMPACTED MATERIALS

Client:	**Enviropacific Services Pty Ltd**	**Project No:**	66360
		Report No:	S10-006 E
Project:	Macdonaldtown Gasworks	**Report Date:**	04/08/10
		Date Sampled:	27/07/10
Location:	Macdonaldtown	**Date of Test:**	27/07/10
		Page:	1 of 1

Material Retained on 19mm sieve:	0%	
Material Description:	Material 1 + 12.5% cement	
Elapsed time between addition of binder and compaction:	15 mins	
Method of Compaction:	Standard	
No. of layers	3	
Curing Details:	7 day accelerated curing at 65°C & +-5°C	
	Specimen C	**Specimen D**
Moisture Content at Compaction:	12.5%	12.5%
Load at failure kN:	28.914%	25.484%
Dry Density of test specimens:	1.86t/m³	1.84t/m³
Unconfined Compressive Strength:	3.30MPa	2.90MPa

Test Method(s): RTA ~~T116~~, T131
Sampling Method(s): Sampled by client – compacted in laboratory
Remarks:

Approved Signatory: NWeimann

Tested: MBG
Checked: NW

Norman Weimann
Laboratory Manager

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DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH OF COMPACTED MATERIALS

Client:	**Enviropacific Services Pty Ltd**	**Project No:**	66360
		Report No:	S10-006 F
Project:	Macdonaldtown Gasworks	**Report Date:**	04/08/10
		Date Sampled:	27/07/10
Location:	Macdonaldtown	**Date of Test:**	27/07/10
		Page:	1 of 1

Material Retained on 19mm sieve:	0%	
Material Description:	Material 1 + 20.0% cement	
Elapsed time between addition of binder and compaction:	15 mins	
Method of Compaction:	Standard	
No. of layers	3	
Curing Details:	7 day accelerated curing at 65°C & +-5°C	
	Specimen E	**Specimen F**
Moisture Content at Compaction:	11.5%	11.5%
Load at failure kN:	53.145%	47.990%
Dry Density of test specimens:	1.82t/m³	1.85t/m³
Unconfined Compressive Strength:	6.15MPa	5.55MPa

Test Method(s): RTA ~~T116~~, T131

Sampling Method(s): Sampled by client – compacted in laboratory

Remarks:

Approved Signatory: MWeimann

Tested: MBG
Checked: NW

Norman Weimann
Laboratory Manager

NATA Accredited Laboratory Number: 828

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DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH OF COMPACTED MATERIALS

Client:	**Enviropacific Services Pty Ltd**	**Project No:**	66360
		Report No:	S10-006 G
Project:	Macdonaldtown Gasworks	**Report Date:**	06/08/10
		Date Sampled:	30/07/10
Location:	Macdonaldtown	**Date of Test:**	30/07/10
		Page:	1 of 1

Material Retained on 19mm sieve:	0%	
Material Description:	Material 2 + 5%	
Elapsed time between addition of binder and compaction:	15 mins	
Method of Compaction:	Standard	
No. of layers	3	
Curing Details:	7 day accelerated curing at 65°C & +-5°C	
	Specimen A	**Specimen B**
Moisture Content at Compaction:	16.5%	17.0%
Load at failure kN:	3.008%	3.018%
Dry Density of test specimens:	1.76t/m³	1.74t/m³
Unconfined Compressive Strength:	0.35MPa	0.35MPa

Test Method(s): RTA ~~T116~~, T131
Sampling Method(s): Sampled by client – compacted in laboratory
Remarks:

Approved Signatory:

Tested: MBG
Checked: NW

Norman Weimann
Laboratory Manager

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DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH OF COMPACTED MATERIALS

Client:	**Enviropacific Services Pty Ltd**	**Project No:**	66360
		Report No:	S10-006 H
Project:	Macdonaldtown Gasworks	**Report Date:**	06/08/10
		Date Sampled:	30/07/10
Location:	Macdonaldtown	**Date of Test:**	30/07/10
		Page:	1 of 1

Material Retained on 19mm sieve:	0%	
Material Description:	Material 2 + 12.5%	
Elapsed time between addition of binder and compaction:	15 mins	
Method of Compaction:	Standard	
No. of layers	3	
Curing Details:	7 day accelerated curing at 65°C & +-5°C	
	Specimen C	**Specimen D**
Moisture Content at Compaction:	15.5%	15.0%
Load at failure kN:	8.928%	8.353%
Dry Density of test specimens:	1.77t/m³	1.72t/m³
Unconfined Compressive Strength:	1.05MPa	0.95MPa

Test Method(s): RTA ~~T116~~, T131
Sampling Method(s): Sampled by client – compacted in laboratory
Remarks:

Approved Signatory:

Tested: MBG
Checked: NW

Norman Weimann
Laboratory Manager

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DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH OF COMPACTED MATERIALS

Client:	**Enviropacific Services Pty Ltd**	**Project No:**	66360
		Report No:	S10-006 I
Project:	Macdonaldtown Gasworks	**Report Date:**	06/08/10
		Date Sampled:	30/07/10
Location:	Macdonaldtown	**Date of Test:**	30/07/10
		Page:	1 of 1

Material Retained on 19mm sieve:	0%	
Material Description:	Material 2 + 20.0%	
Elapsed time between addition of binder and compaction:	15 mins	
Method of Compaction:	Standard	
No. of layers	3	
Curing Details:	7 day accelerated curing at 65°C & +-5°C	
	Specimen E	**Specimen F**
Moisture Content at Compaction:	14.5%	13.5%
Load at failure kN:	14.184%	12.705%
Dry Density of test specimens:	1.76t/m³	1.76t/m³
Unconfined Compressive Strength:	1.65MPa	1.45MPa

Test Method(s): RTA ~~T116~~, T131
Sampling Method(s): Sampled by client – compacted in laboratory
Remarks:

Approved Signatory:

Tested: MBG
Checked: NW

Norman Weimann
Laboratory Manager

NATA Accredited Laboratory Number: 828

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ACCREDITED FOR TECHNICAL COMPETENCE

Douglas Partners
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DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH OF COMPACTED MATERIALS

Client:	**Enviropacific Services Pty Ltd**	**Project No:**	66360
		Report No:	S10-006 A
Project:	Macdonaldtown Gasworks	**Report Date:**	04/08/10
		Date Sampled:	27/07/10
Location:	Macdonaldtown	**Date of Test:**	27/07/10
		Page:	1 of 1

Material Retained on 19mm sieve:	0%	
Material Description:	Material 3 + 5% cement	
Elapsed time between addition of binder and compaction:	15 mins	
Method of Compaction:	Standard	
No. of layers	3	
Curing Details:	7 day accelerated curing at 65°C & +-5°C	
	Specimen A	**Specimen B**
Moisture Content at Compaction:	27.5%	26.5%
Load at failure kN:	0.894%	1.417%
Dry Density of test specimens:	1.57t/m³	1.58t/m³
Unconfined Compressive Strength:	0.10MPa	0.15MPa

Test Method(s): RTA ~~T116~~, T131

Sampling Method(s): Sampled by client – compacted in laboratory

Remarks:

Approved Signatory:

Tested: MBG
Checked: NW

Norman Weimann
Laboratory Manager

NATA Accredited Laboratory Number: 828

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DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH OF COMPACTED MATERIALS

Client:	**Enviropacific Services Pty Ltd**	**Project No:**	66360
		Report No:	S10-006 B
Project:	Macdonaldtown Gasworks	**Report Date:**	04/08/10
		Date Sampled:	27/07/10
Location:	Macdonaldtown	**Date of Test:**	27/07/10
		Page:	1 of 1

Material Retained on 19mm sieve:	0%	
Material Description:	Material 3 + 12.5% cement	
Elapsed time between addition of binder and compaction:	15 mins	
Method of Compaction:	Standard	
No. of layers	3	
Curing Details:	7 day accelerated curing at 65°C & +- 5°C	
	Specimen C	**Specimen D**
Moisture Content at Compaction:	26.0%	26.0%
Load at failure kN:	3.991%	3.395%
Dry Density of test specimens:	1.60t/m³	1.59t/m³
Unconfined Compressive Strength:	0.45MPa	0.40MPa

Test Method(s): RTA ~~T146~~, T131

Sampling Method(s): Sampled by client – compacted in laboratory

Remarks:

Approved Signatory:

Tested: MBG
Checked: NW

Norman Weimann
Laboratory Manager

NATA Accredited Laboratory Number: 828

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DETERMINATION OF UNCONFINED COMPRESSIVE STRENGTH OF COMPACTED MATERIALS

Client:	**Enviropacific Services Pty Ltd**	**Project No:**	66360
Project:	Macdonaldtown Gasworks	**Report No:**	S10-006 C
		Report Date:	04/08/10
Location:	Macdonaldtown	**Date Sampled:**	27/07/10
		Date of Test:	27/07/10
		Page:	1 of 1

Material Retained on 19mm sieve:	0%	
Material Description:	Material 3 + 20% cement	
Elapsed time between addition of binder and compaction:	15 mins	
Method of Compaction:	Standard	
No. of layers	3	
Curing Details:	7 day accelerated curing at 65°C & +-5°C	
	Specimen E	**Specimen F**
Moisture Content at Compaction:	22.0%	24.0%
Load at failure kN:	4.879%	5.588%
Dry Density of test specimens:	1.62t/m³	1.60t/m³
Unconfined Compressive Strength:	0.55MPa	0.65MPa

Test Method(s): RTA ~~T116~~, T131
Sampling Method(s): Sampled by client – compacted in laboratory
Remarks:

Approved Signatory: MWeimann

Tested: MBG
Checked: NW

Norman Weimann
Laboratory Manager

NATA Accredited Laboratory Number: 828
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ph 02 9910 6200 fax 02 9910 6201
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CERTIFICATE OF ANALYSIS 43953

Client:
Enviropacific Services (Chatswood) Pty Ltd
1/28 Barcoo St
Chatswood
NSW 2067

Attention: Marty Croker

Sample log in details:

Your Reference:	**E10100 Macdonaldtown Gasworks**
No. of samples:	9 Soils
Date samples received:	26/07/10
Date completed instructions received:	26/07/10

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by:	2/08/10
Date of Preliminary Report:	Not Issued
Issue Date:	13/08/10

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Tests not covered by NATA are denoted with *.

Results Approved By:

Giovanni Agosti
Technical Manager

Sandra Taylor
Senior Organic Chemist

Jacinta Hurst
Laboratory Manager

Nancy Zhang
Chemist

VOCs in soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	43953-1 Material 1 Pre 1 26/07/2010 Soil	43953-2 Material 1 Pre 2 26/07/2010 Soil	43953-3 Material 1 Pre 3 26/07/2010 Soil	43953-4 Material 2 Pre 1 26/07/2010 Soil	43953-5 Material 2 Pre 2 26/07/2010 Soil
Date extracted	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010	29/7/2010
Date analysed	-	31/7/2010	31/7/2010	31/7/2010	31/7/2010	31/7/2010
styrene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluorometha	%	93	91	90	92	92
Surrogate aaa-Trifluorotoluene	%	70	77	75	75	72
Surrogate Toluene-d_8	%	110	107	96	112	113
Surrogate 4-Bromofluorobenzene	%	94	93	92	110	103

VOCs in soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	43953-6 Material 2 Pre 3 26/07/2010 Soil	43953-7 Material 3 Pre 1 26/07/2010 Soil	43953-8 Material 3 Pre 2 26/07/2010 Soil	43953-9 Material 3 Pre 3 26/07/2010 Soil
Date extracted	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010
Date analysed	-	31/7/2010	31/7/2010	31/7/2010	31/7/2010
styrene	mg/kg	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluorometha	%	95	95	96	95
Surrogate aaa-Trifluorotoluene	%	73	73	73	72
Surrogate Toluene-d_8	%	114	114	114	113
Surrogate 4-Bromofluorobenzene	%	105	96	95	96

vTPH & BTEX in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	43953-1 Material 1 Pre 1 26/07/2010 Soil	43953-2 Material 1 Pre 2 26/07/2010 Soil	43953-3 Material 1 Pre 3 26/07/2010 Soil	43953-4 Material 2 Pre 1 26/07/2010 Soil	43953-5 Material 2 Pre 2 26/07/2010 Soil
Date extracted	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010	29/7/2010
Date analysed	-	30/7/2010	30/7/2010	30/7/2010	30/7/2010	30/7/2010
vTPH C_6 - C_9	mg/kg	<25	<25	<25	54	37
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	0.70	0.60
Ethylbenzene	mg/kg	<1.0	<1.0	<1.0	19	14
m+p-xylene	mg/kg	<2.0	<2.0	<2.0	16	11
o-Xylene	mg/kg	<1.0	<1.0	<1.0	15	11
Surrogate aaa-Trifluorotoluene	%	70	77	75	75	72

vTPH & BTEX in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	43953-6 Material 2 Pre 3 26/07/2010 Soil	43953-7 Material 3 Pre 1 26/07/2010 Soil	43953-8 Material 3 Pre 2 26/07/2010 Soil	43953-9 Material 3 Pre 3 26/07/2010 Soil
Date extracted	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010
Date analysed	-	30/7/2010	30/7/2010	30/7/2010	30/7/2010
vTPH C_6 - C_9	mg/kg	65	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	0.80	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	21	<1.0	<1.0	<1.0
m+p-xylene	mg/kg	17	<2.0	<2.0	<2.0
o-Xylene	mg/kg	15	<1.0	<1.0	<1.0
Surrogate aaa-Trifluorotoluene	%	73	73	73	72

sTPH in Soil (C10-C36)						
Our Reference:	UNITS	43953-1	43953-2	43953-3	43953-4	43953-5
Your Reference	----------	Material 1 Pre 1	Material 1 Pre 2	Material 1 Pre 3	Material 2 Pre 1	Material 2 Pre 2
Date Sampled	----------	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010	29/7/2010
Date analysed	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010	29/7/2010
TPH C_{10} - C_{14}	mg/kg	<50	<50	<50	440	580
TPH C_{15} - C_{28}	mg/kg	320	330	390	210	200
TPH C_{29} - C_{36}	mg/kg	380	370	370	<100	<100
Surrogate o-Terphenyl	%	#	#	#	#	#

sTPH in Soil (C10-C36)					
Our Reference:	UNITS	43953-6	43953-7	43953-8	43953-9
Your Reference	----------	Material 2 Pre 3	Material 3 Pre 1	Material 3 Pre 2	Material 3 Pre 3
Date Sampled	----------	26/07/2010	26/07/2010	26/07/2010	26/07/2010
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010
Date analysed	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010
TPH C_{10} - C_{14}	mg/kg	570	<50	110	140
TPH C_{15} - C_{28}	mg/kg	220	<100	260	310
TPH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100
Surrogate o-Terphenyl	%	#	100	#	#

PAHs in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	43953-1 Material 1 Pre 1 26/07/2010 Soil	43953-2 Material 1 Pre 2 26/07/2010 Soil	43953-3 Material 1 Pre 3 26/07/2010 Soil	43953-4 Material 2 Pre 1 26/07/2010 Soil	43953-5 Material 2 Pre 2 26/07/2010 Soil
Date extracted	-	29/07/2010	29/07/2010	29/07/2010	29/07/2010	29/07/2010
Date analysed	-	30/07/2010	30/07/2010	30/07/2010	30/07/2010	30/07/2010
Naphthalene	mg/kg	0.4	0.4	0.5	250	260
Acenaphthylene	mg/kg	0.7	0.7	1.4	1.6	2.0
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	3.7	4.9
Fluorene	mg/kg	0.2	0.2	0.5	3.3	4.2
Phenanthrene	mg/kg	2.0	1.8	5.8	5.8	7.1
Anthracene	mg/kg	0.6	0.6	1.5	1.6	2.0
Fluoranthene	mg/kg	4.3	4.7	8.3	2.4	2.8
Pyrene	mg/kg	5.0	6.2	8.5	3.0	3.4
Benzo(a)anthracene	mg/kg	3.3	3.3	4.4	1	1.1
Chrysene	mg/kg	2.7	3.2	4.0	0.9	1.1
Benzo(b+k)fluoranthene	mg/kg	6.0	5.5	7.5	1.0	1.2
Benzo(a)pyrene	mg/kg	4.4	4.5	5.6	0.9	1.1
Indeno(1,2,3-c,d)pyrene	mg/kg	2.0	1.9	2.4	0.3	0.3
Dibenzo(a,h)anthracene	mg/kg	0.5	0.4	0.5	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	1.9	2.0	2.3	0.3	0.4
Surrogate p-Terphenyl-d_{14}	%	75	77	74	80	66

PAHs in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	43953-6 Material 2 Pre 3 26/07/2010 Soil	43953-7 Material 3 Pre 1 26/07/2010 Soil	43953-8 Material 3 Pre 2 26/07/2010 Soil	43953-9 Material 3 Pre 3 26/07/2010 Soil
Date extracted	-	29/07/2010	29/07/2010	29/07/2010	29/07/2010
Date analysed	-	30/07/2010	30/07/2010	30/07/2010	30/07/2010
Naphthalene	mg/kg	300	1.7	11	7.4
Acenaphthylene	mg/kg	1.9	0.1	0.8	0.9
Acenaphthene	mg/kg	4.6	0.1	0.4	0.7
Fluorene	mg/kg	4.0	0.2	1.3	1.7
Phenanthrene	mg/kg	6.9	0.6	4.3	5.2
Anthracene	mg/kg	1.9	0.2	1.2	1.5
Fluoranthene	mg/kg	2.8	0.4	4.1	4.1
Pyrene	mg/kg	3.5	0.6	5.0	5.3
Benzo(a)anthracene	mg/kg	1.1	0.2	2.2	1.9
Chrysene	mg/kg	1.1	0.2	2.1	1.8
Benzo(b+k)fluoranthene	mg/kg	1.1	0.3	2.9	2.3
Benzo(a)pyrene	mg/kg	1.0	0.2	2.1	1.7
Indeno(1,2,3-c,d)pyrene	mg/kg	0.3	<0.1	0.8	0.6
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	0.2	0.2
Benzo(g,h,i)perylene	mg/kg	0.3	<0.1	0.9	0.7
Surrogate p-Terphenyl-d_{14}	%	76	75	79	92

Speciated Phenols in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	43953-1 Material 1 Pre 1 26/07/2010 Soil	43953-2 Material 1 Pre 2 26/07/2010 Soil	43953-3 Material 1 Pre 3 26/07/2010 Soil	43953-4 Material 2 Pre 1 26/07/2010 Soil	43953-5 Material 2 Pre 2 26/07/2010 Soil
Date extracted	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010	29/7/2010
Date analysed	-	2/8/2010	2/8/2010	2/8/2010	2/8/2010	2/8/2010
Phenol	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chlorophenol	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
2-Methylphenol	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
3/4-Methylphenol	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
2-Nitrophenol	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dimethylphenol	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dichlorophenol	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
2,6-dichlorophenol	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
2,4,5-trichlorophenol	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
2,4,6-trichlorophenol	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-dinitrophenol	mg/kg	<10	<10	<10	<10	<10
4-nitrophenol	mg/kg	<10	<10	<10	<10	<10
2,3,4,6-tetrachlorophenol	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
2-methyl-4,6-dinitrophenol	mg/kg	<10	<10	<10	<10	<10
pentachlorophenol	mg/kg	<10	<10	<10	<10	<10
Surrogate 2-fluorophenol	%	105	95	92	116	123
Surrogate Phenol-d_6	%	68	84	82	96	89
Surrogate 2,4,6-Tribromophenol	%	93	99	89	139	140
Surrogate p-Terphenyl-d_{14}	%	114	114	105	116	114

Speciated Phenols in Soil Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	43953-6 Material 2 Pre 3 26/07/2010 Soil	43953-7 Material 3 Pre 1 26/07/2010 Soil	43953-8 Material 3 Pre 2 26/07/2010 Soil	43953-9 Material 3 Pre 3 26/07/2010 Soil
Date extracted	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010
Date analysed	-	2/8/2010	2/8/2010	2/8/2010	2/8/2010
Phenol	mg/kg	<1.0	<1.0	<1.0	<1.0
2-Chlorophenol	mg/kg	<1.0	<1.0	<1.0	<1.0
2-Methylphenol	mg/kg	<1.0	<1.0	<1.0	<1.0
3/4-Methylphenol	mg/kg	<2.0	<2.0	<2.0	<2.0
2-Nitrophenol	mg/kg	<1.0	<1.0	<1.0	<1.0
2,4-Dimethylphenol	mg/kg	<1.0	<1.0	<1.0	<1.0
2,4-Dichlorophenol	mg/kg	<1.0	<1.0	<1.0	<1.0
2,6-dichlorophenol	mg/kg	<1.0	<1.0	<1.0	<1.0
2,4,5-trichlorophenol	mg/kg	<1.0	<1.0	<1.0	<1.0
2,4,6-trichlorophenol	mg/kg	<1.0	<1.0	<1.0	<1.0
2,4-dinitrophenol	mg/kg	<10	<10	<10	<10
4-nitrophenol	mg/kg	<10	<10	<10	<10
2,3,4,6-tetrachlorophenol	mg/kg	<1.0	<1.0	<1.0	<1.0
2-methyl-4,6-dinitrophenol	mg/kg	<10	<10	<10	<10
pentachlorophenol	mg/kg	<10	<10	<10	<10
Surrogate 2-fluorophenol	%	122	111	116	72
Surrogate Phenol-d_6	%	82	72	122	63
Surrogate 2,4,6-Tribromophenol	%	127	100	120	78
Surrogate p-Terphenyl-d_{14}	%	108	106	110	76

Acid Extractable metals in soil						
Our Reference:	UNITS	43953-1	43953-2	43953-3	43953-4	43953-5
Your Reference	----------	Material 1 Pre 1	Material 1 Pre 2	Material 1 Pre 3	Material 2 Pre 1	Material 2 Pre 2
Date Sampled	----------	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	29/07/2010	29/07/2010	29/07/2010	29/07/2010	29/07/2010
Date analysed	-	29/07/2010	29/07/2010	29/07/2010	29/07/2010	29/07/2010
Arsenic	mg/kg	36	38	44	<4	<4
Cadmium	mg/kg	1.1	1.4	1.3	<0.5	<0.5
Chromium	mg/kg	19	20	20	14	14
Lead	mg/kg	230	230	300	27	32
Mercury	mg/kg	0.4	0.3	0.4	<0.1	<0.1
Nickel	mg/kg	21	26	27	3	3

Acid Extractable metals in soil					
Our Reference:	UNITS	43953-6	43953-7	43953-8	43953-9
Your Reference	----------	Material 2 Pre 3	Material 3 Pre 1	Material 3 Pre 2	Material 3 Pre 3
Date Sampled	----------	26/07/2010	26/07/2010	26/07/2010	26/07/2010
Type of sample		Soil	Soil	Soil	Soil
Date digested	-	29/07/2010	29/07/2010	29/07/2010	29/07/2010
Date analysed	-	29/07/2010	29/07/2010	29/07/2010	29/07/2010
Arsenic	mg/kg	8	<4	5	6
Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg	19	14	20	24
Lead	mg/kg	43	11	21	29
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	2	2	3

Moisture Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	43953-1 Material 1 Pre 1 26/07/2010 Soil	43953-2 Material 1 Pre 2 26/07/2010 Soil	43953-3 Material 1 Pre 3 26/07/2010 Soil	43953-4 Material 2 Pre 1 26/07/2010 Soil	43953-5 Material 2 Pre 2 26/07/2010 Soil
Date prepared	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010	29/7/2010
Date analysed	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010	29/7/2010
Moisture	%	15	10	16	21	21

Moisture Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	43953-6 Material 2 Pre 3 26/07/2010 Soil	43953-7 Material 3 Pre 1 26/07/2010 Soil	43953-8 Material 3 Pre 2 26/07/2010 Soil	43953-9 Material 3 Pre 3 26/07/2010 Soil
Date prepared	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010
Date analysed	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010
Moisture	%	2.7	21	22	20

VOCs in Zero Headspace Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	43953-1 Material 1 Pre 1 26/07/2010 Soil	43953-2 Material 1 Pre 2 26/07/2010 Soil	43953-3 Material 1 Pre 3 26/07/2010 Soil	43953-4 Material 2 Pre 1 26/07/2010 Soil	43953-5 Material 2 Pre 2 26/07/2010 Soil
Date extracted	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010	29/7/2010
Date analysed	-	31/7/2010	31/7/2010	31/7/2010	31/7/2010	31/7/2010
Styrene	µg/L	<1.0	<1.0	<1.0	3.2	3.0
Surrogate Dibromofluoromethane	%	107	109	111	108	104
Surrogate toluene-d8	%	61	110	97	112	99
Surrogate 4-BFB	%	95	93	94	121	115

VOCs in Zero Headspace Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	43953-6 Material 2 Pre 3 26/07/2010 Soil	43953-7 Material 3 Pre 1 26/07/2010 Soil	43953-8 Material 3 Pre 2 26/07/2010 Soil	43953-9 Material 3 Pre 3 26/07/2010 Soil
Date extracted	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010
Date analysed	-	31/7/2010	31/7/2010	31/7/2010	31/7/2010
Styrene	µg/L	2.3	1.2	1.3	1.2
Surrogate Dibromofluoromethane	%	100	98	106	107
Surrogate toluene-d8	%	102	117	108	100
Surrogate 4-BFB	%	114	103	105	107

BTEX in Zero Headspace Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	43953-1 Material 1 Pre 1 26/07/2010 Soil	43953-2 Material 1 Pre 2 26/07/2010 Soil	43953-3 Material 1 Pre 3 26/07/2010 Soil	43953-4 Material 2 Pre 1 26/07/2010 Soil	43953-5 Material 2 Pre 2 26/07/2010 Soil
Date extracted	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010	29/7/2010
Date analysed	-	31/7/2010	31/7/2010	31/7/2010	31/7/2010	31/7/2010
Benzene	µg/L	<1.0	<1.0	<1.0	10	10
Toluene	µg/L	<1.0	<1.0	<1.0	19	17
Ethylbenzene	µg/L	<1.0	<1.0	<1.0	270	260
m+p-xylene	µg/L	<2.0	<2.0	<2.0	250	240
o-xylene	µg/L	<1.0	<1.0	<1.0	210	200
Surrogate Dibromofluoromethane	%	107	109	111	108	104
Surrogate toluene-d8	%	101	110	97	112	99
Surrogate 4-BFB	%	95	93	94	121	115

BTEX in Zero Headspace Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	43953-6 Material 2 Pre 3 26/07/2010 Soil	43953-7 Material 3 Pre 1 26/07/2010 Soil	43953-8 Material 3 Pre 2 26/07/2010 Soil	43953-9 Material 3 Pre 3 26/07/2010 Soil
Date extracted	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010
Date analysed	-	31/7/2010	31/7/2010	31/7/2010	31/7/2010
Benzene	µg/L	13	<1.0	<1.0	<1.0
Toluene	µg/L	21	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	290	3.7	8.1	8.8
m+p-xylene	µg/L	270	2.2	5.0	6.1
o-xylene	µg/L	230	2.7	5.9	6.8
Surrogate Dibromofluoromethane	%	100	98	106	107
Surrogate toluene-d8	%	102	117	108	100
Surrogate 4-BFB	%	114	103	105	107

Metals in TCLP USEPA1311						
Our Reference:	UNITS	43953-1	43953-2	43953-3	43953-4	43953-5
Your Reference	----------	Material 1 Pre 1	Material 1 Pre 2	Material 1 Pre 3	Material 2 Pre 1	Material 2 Pre 2
Date Sampled	----------	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/07/2010	29/07/2010	29/07/2010	29/07/2010	29/07/2010
Date analysed	-	29/07/2010	29/07/2010	29/07/2010	29/07/2010	29/07/2010
pH of soil for fluid# determ.	pH units	6.80	7.40	7.70	7.90	7.60
pH of soil for fluid # determ. (acid)	pH units	1.50	1.50	1.50	1.50	1.40
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	5.10	5.10	5.10	5.00	5.00
Arsenic in TCLP	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium in TCLP	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium in TCLP	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Lead in TCLP	mg/L	0.04	0.07	0.03	<0.03	<0.03
Mercury in TCLP	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Nickel in TCLP	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02

Metals in TCLP USEPA1311					
Our Reference:	UNITS	43953-6	43953-7	43953-8	43953-9
Your Reference	----------	Material 2 Pre 3	Material 3 Pre 1	Material 3 Pre 2	Material 3 Pre 3
Date Sampled	----------	26/07/2010	26/07/2010	26/07/2010	26/07/2010
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	29/07/2010	29/07/2010	29/07/2010	29/07/2010
Date analysed	-	29/07/2010	29/07/2010	29/07/2010	29/07/2010
pH of soil for fluid# determ.	pH units	7.40	5.00	6.10	5.90
pH of soil for fluid # determ. (acid)	pH units	1.50	1.40	1.40	1.40
Extraction fluid used	-	1	1	1	1
pH of final Leachate	pH units	5.00	4.90	4.90	4.90
Arsenic in TCLP	mg/L	<0.05	<0.05	<0.05	<0.05
Cadmium in TCLP	mg/L	<0.01	<0.01	<0.01	<0.01
Chromium in TCLP	mg/L	<0.01	<0.01	<0.01	<0.01
Lead in TCLP	mg/L	<0.03	<0.03	<0.03	0.05
Mercury in TCLP	mg/L	<0.0005	<0.0005	<0.0005	<0.0005
Nickel in TCLP	mg/L	<0.02	<0.02	<0.02	<0.02

TPH in TCLP extract						
Our Reference:	UNITS	43953-1	43953-2	43953-3	43953-4	43953-5
Your Reference	----------	Material 1 Pre 1	Material 1 Pre 2	Material 1 Pre 3	Material 2 Pre 1	Material 2 Pre 2
Date Sampled	----------	26/07/2010	26/07/2010	26/07/2010	26/07/2010	26/07/2010
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010	29/7/2010
Date analysed	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010	29/7/2010
TPH C_{10} - C_{14}	µg/L	<50	<50	<50	8,000	6,500
TPH C_{15} - C_{28}	µg/L	120	110	<100	740	560
TPH C_{29} - C_{36}	µg/L	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	120	129	109	#	#

TPH in TCLP extract					
Our Reference:	UNITS	43953-6	43953-7	43953-8	43953-9
Your Reference	----------	Material 2 Pre 3	Material 3 Pre 1	Material 3 Pre 2	Material 3 Pre 3
Date Sampled	----------	26/07/2010	26/07/2010	26/07/2010	26/07/2010
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010
Date analysed	-	29/7/2010	29/7/2010	29/7/2010	29/7/2010
TPH C_{10} - C_{14}	µg/L	5,700	1,700	6,000	990
TPH C_{15} - C_{28}	µg/L	450	420	960	490
TPH C_{29} - C_{36}	µg/L	<100	<100	<100	<100
Surrogate o-Terphenyl	%	#	#	#	123

PAHs in TCLP (USEPA 1311) Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	43953-1 Material 1 Pre 1 26/07/2010 Soil	43953-2 Material 1 Pre 2 26/07/2010 Soil	43953-3 Material 1 Pre 3 26/07/2010 Soil	43953-4 Material 2 Pre 1 26/07/2010 Soil	43953-5 Material 2 Pre 2 26/07/2010 Soil
Date extracted	-	29/07/2010	29/07/2010	29/07/2010	29/07/2010	29/07/2010
Date analysed	-	29/07/2010	29/07/2010	29/07/2010	29/07/2010	29/07/2010
Naphthalene in TCLP	mg/L	<0.001	<0.001	<0.001	3.4	2.7
Acenaphthylene in TCLP	mg/L	<0.001	<0.001	<0.001	0.03	0.02
Acenaphthene in TCLP	mg/L	<0.001	<0.001	<0.001	0.040	0.030
Fluorene in TCLP	mg/L	<0.001	<0.001	<0.001	0.020	0.020
Phenanthrene in TCLP	mg/L	<0.001	<0.001	<0.001	0.010	0.010
Anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	0.002	0.002
Fluoranthene in TCLP	mg/L	<0.001	<0.001	<0.001	0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001	<0.001	0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Benzo(b+k)fluoranthene in TCLP	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Surrogate p-Terphenyl-d_{14}	%	103	108	93	85	129

PAHs in TCLP (USEPA 1311) Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	43953-6 Material 2 Pre 3 26/07/2010 Soil	43953-7 Material 3 Pre 1 26/07/2010 Soil	43953-8 Material 3 Pre 2 26/07/2010 Soil	43953-9 Material 3 Pre 3 26/07/2010 Soil
Date extracted	-	29/07/2010	29/07/2010	29/07/2010	29/07/2010
Date analysed	-	29/07/2010	29/07/2010	29/07/2010	29/07/2010
Naphthalene in TCLP	mg/L	2.6	3.2	2.9	1.2
Acenaphthylene in TCLP	mg/L	0.02	0.001	0.003	0.001
Acenaphthene in TCLP	mg/L	0.030	0.009	0.010	0.007
Fluorene in TCLP	mg/L	0.020	0.020	0.020	0.010
Phenanthrene in TCLP	mg/L	0.010	0.020	0.020	0.010
Anthracene in TCLP	mg/L	0.002	0.003	0.003	0.002
Fluoranthene in TCLP	mg/L	0.001	0.002	0.002	0.002
Pyrene in TCLP	mg/L	0.001	0.002	0.002	0.002
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Benzo(b+k)fluoranthene in TCLP	mg/L	<0.002	<0.002	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Surrogate p-Terphenyl-d_{14}	%	90	104	86	101

Speciated Phenols in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	43953-1 Material 1 Pre 1 26/07/2010 Soil	43953-2 Material 1 Pre 2 26/07/2010 Soil	43953-3 Material 1 Pre 3 26/07/2010 Soil	43953-4 Material 2 Pre 1 26/07/2010 Soil	43953-5 Material 2 Pre 2 26/07/2010 Soil
Date extracted	-	29/07/2010	29/07/2010	29/07/2010	29/07/2010	29/07/2010
Date analysed	-	30/07/2010	30/07/2010	30/07/2010	30/07/2010	30/07/2010
Phenol	µg/L	<10	<10	<10	<10	<10
2-Chlorophenol	µg/L	<10	<10	<10	<10	<10
2-Methylphenol	µg/L	<10	<10	<10	<10	<10
3/4-Methylphenol	µg/L	<20	<20	<20	<20	<20
2-Nitrophenol	µg/L	<10	<10	<10	<10	<10
2,4-Dimethylphenol	µg/L	<10	<10	<10	<10	<10
2,4-Dichlorophenol	µg/L	<10	<10	<10	<10	<10
2,6-Dichlorophenol	µg/L	<10	<10	<10	<10	<10
2,4,5-Trichlorophenol	µg/L	<10	<10	<10	<10	<10
2,4,6-Trichlorophenol	µg/L	<10	<10	<10	<10	<10
2,4-Dinitrophenol	µg/L	<100	<100	<100	<100	<100
4-Nitrophenol	µg/L	<100	<100	<100	<100	<100
2,3,4,6-Tetrachlorophenol	µg/L	<10	<10	<10	<10	<10
2-methyl-4,6-dinitrophenol	µg/L	<100	<100	<100	<100	<100
Pentachlorophenol	µg/L	<100	<100	<100	<100	<100
Surrogate 2-fluorophenol	%	68	59	54	90	66
Surrogate Phenol-d_6	%	52	44	42	49	35
Surrogate 2,4,6-Tribromophenol	%	131	128	105	116	101
Surrogate *p*-Terphenyl-d_{14}	%	85	93	95	75	60

Speciated Phenols in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	43953-6 Material 2 Pre 3 26/07/2010 Soil	43953-7 Material 3 Pre 1 26/07/2010 Soil	43953-8 Material 3 Pre 2 26/07/2010 Soil	43953-9 Material 3 Pre 3 26/07/2010 Soil
Date extracted	-	29/07/2010	29/07/2010	29/07/2010	29/07/2010
Date analysed	-	30/07/2010	30/07/2010	30/07/2010	30/07/2010
Phenol	µg/L	<10	<10	<10	<10
2-Chlorophenol	µg/L	<10	<10	<10	<10
2-Methylphenol	µg/L	<10	<10	<10	<10
3/4-Methylphenol	µg/L	<20	<20	<20	<20
2-Nitrophenol	µg/L	<10	<10	<10	<10
2,4-Dimethylphenol	µg/L	<10	<10	<10	<10
2,4-Dichlorophenol	µg/L	<10	<10	<10	<10
2,6-Dichlorophenol	µg/L	<10	<10	<10	<10
2,4,5-Trichlorophenol	µg/L	<10	<10	<10	<10
2,4,6-Trichlorophenol	µg/L	<10	<10	<10	<10
2,4-Dinitrophenol	µg/L	<100	<100	<100	<100
4-Nitrophenol	µg/L	<100	<100	<100	<100
2,3,4,6-Tetrachlorophenol	µg/L	<10	<10	<10	<10
2-methyl-4,6-dinitrophenol	µg/L	<100	<100	<100	<100
Pentachlorophenol	µg/L	<100	<100	<100	<100
Surrogate 2-fluorophenol	%	59	59	66	58
Surrogate Phenol-d_6	%	32	46	45	46
Surrogate 2,4,6-Tribromophenol	%	71	126	121	121
Surrogate *p*-Terphenyl-d_{14}	%	89	91	84	86

Method ID	Methodology Summary
GC.14	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
GC.16	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS.
GC.3	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.
GC.12 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
GC.12	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Metals.20 ICP-AES	Determination of various metals by ICP-AES.
Metals.21 CV-AAS	Determination of Mercury by Cold Vapour AAS.
LAB.8	Moisture content determined by heating at 105 deg C for a minimum of 4 hours.
GC.13	Water samples are analysed directly by purge and trap GC-MS.
LAB.4	Toxicity Characteristic Leaching Procedure (TCLP).
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
LAB.1	pH - Measured using pH meter and electrode in accordance with APHA 20th ED, 4500-H+.
Metals.20 ICP-AES	Determination of various metals by ICP-AES.
Metals.21 CV-AAS	Determination of Mercury by Cold Vapour AAS.
GC.12 subset	Leachates are extracted with Dichloromethane and analysed by GC-MS.

QUALITY CONTROL VOCs in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/7/2010	43953-1	29/7/2010 || 29/7/2010	LCS-1	29/7/2010
Date analysed	-			31/7/2010	43953-1	31/7/2010 || 31/7/2010	LCS-1	31/7/2010
styrene	mg/kg	1	GC.14	<1.0	43953-1	<1.0 || <1.0	LCS-1	98%
Surrogate Dibromofluorometha	%		GC.14	95	43953-1	93 || 90 || RPD: 3	LCS-1	97%
Surrogate aaa-Trifluorotoluene	%		GC.14	62	43953-1	70 || 75 || RPD: 7	LCS-1	80%
Surrogate Toluene-d_8	%		GC.14	105	43953-1	110 || 109 || RPD: 1	LCS-1	98%
Surrogate 4-Bromofluorobenzene	%		GC.14	98	43953-1	94 || 93 || RPD: 1	LCS-1	93%

QUALITY CONTROL vTPH & BTEX in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/7/2010	43953-1	29/7/2010 || 29/7/2010	LCS-1	29/7/2010
Date analysed	-			31/7/2010	43953-1	30/7/2010 || 30/7/2010	LCS-1	31/7/2010
vTPH C_6 - C_9	mg/kg	25	GC.16	<25	43953-1	<25 || <25	LCS-1	86%
Benzene	mg/kg	0.5	GC.16	<0.5	43953-1	<0.5 || <0.5	LCS-1	78%
Toluene	mg/kg	0.5	GC.16	<0.5	43953-1	<0.5 || <0.5	LCS-1	88%
Ethylbenzene	mg/kg	1	GC.16	<1.0	43953-1	<1.0 || <1.0	LCS-1	88%
m+p-xylene	mg/kg	2	GC.16	<2.0	43953-1	<2.0 || <2.0	LCS-1	90%
o-Xylene	mg/kg	1	GC.16	<1.0	43953-1	<1.0 || <1.0	LCS-1	92%
Surrogate aaa-Trifluorotoluene	%		GC.16	62	43953-1	70 || 75 || RPD: 7	LCS-1	106%

QUALITY CONTROL sTPH in Soil (C10-C36)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/7/2010	43953-1	29/7/2010 || 29/7/2010	LCS-5	29/7/2010
Date analysed	-			29/7/2010	43953-1	29/7/2010 || 29/7/2010	LCS-5	29/7/2010
TPH C_{10} - C_{14}	mg/kg	50	GC.3	<50	43953-1	<50 || <50	LCS-5	81%
TPH C_{15} - C_{28}	mg/kg	100	GC.3	<100	43953-1	320 || 360 || RPD: 12	LCS-5	89%
TPH C_{29} - C_{36}	mg/kg	100	GC.3	<100	43953-1	380 || 380 || RPD: 0	LCS-5	99%
Surrogate o-Terphenyl	%		GC.3	110	43953-1	# || #	LCS-5	96%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/07/2010	43953-1	29/07/2010 || 29/07/2010	LCS-5	29/07/2010
Date analysed	-			30/07/2010	43953-1	30/07/2010 || 30/07/2010	LCS-5	30/07/2010
Naphthalene	mg/kg	0.1	GC.12 subset	<0.1	43953-1	0.4 || 0.5 || RPD: 22	LCS-5	85%
Acenaphthylene	mg/kg	0.1	GC.12 subset	<0.1	43953-1	0.7 || 0.9 || RPD: 25	[NR]	[NR]
Acenaphthene	mg/kg	0.1	GC.12 subset	<0.1	43953-1	<0.1 || 0.3	[NR]	[NR]
Fluorene	mg/kg	0.1	GC.12 subset	<0.1	43953-1	0.2 || 0.4 || RPD: 67	LCS-5	102%
Phenanthrene	mg/kg	0.1	GC.12 subset	<0.1	43953-1	2.0 || 4.9 || RPD: 84	LCS-5	92%
Anthracene	mg/kg	0.1	GC.12 subset	<0.1	43953-1	0.6 || 1.2 || RPD: 67	[NR]	[NR]
Fluoranthene	mg/kg	0.1	GC.12 subset	<0.1	43953-1	4.3 || 7.7 || RPD: 57	LCS-5	87%
Pyrene	mg/kg	0.1	GC.12 subset	<0.1	43953-1	5.0 || 8.1 || RPD: 47	LCS-5	108%
Benzo(a)anthracene	mg/kg	0.1	GC.12 subset	<0.1	43953-1	3.3 || 4.2 || RPD: 24	[NR]	[NR]
Chrysene	mg/kg	0.1	GC.12 subset	<0.1	43953-1	2.7 || 4.2 || RPD: 43	LCS-5	108%
Benzo(b+k)fluoranthene	mg/kg	0.2	GC.12 subset	<0.2	43953-1	6.0 || 6.7 || RPD: 11	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	GC.12 subset	<0.05	43953-1	4.4 || 5.0 || RPD: 13	LCS-5	103%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	GC.12 subset	<0.1	43953-1	2.0 || 2.3 || RPD: 14	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	GC.12 subset	<0.1	43953-1	0.5 || 0.5 || RPD: 0	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	GC.12 subset	<0.1	43953-1	1.9 || 2.2 || RPD: 15	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		GC.12 subset	89	43953-1	75 || 78 || RPD: 4	LCS-5	86%

QUALITY CONTROL Speciated Phenols in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/7/2010	43953-1	29/7/2010 || 29/7/2010	LCS-1	29/7/2010
Date analysed	-			2/8/2010	43953-1	2/8/2010 || 2/8/2010	LCS-1	2/8/2010
Phenol	mg/kg	1	GC.12	<1.0	43953-1	<1.0 || <1.0	LCS-1	95%
2-Chlorophenol	mg/kg	1	GC.12	<1.0	43953-1	<1.0 || <1.0	LCS-1	102%
2-Methylphenol	mg/kg	1	GC.12	<1.0	43953-1	<1.0 || <1.0	[NR]	[NR]
3/4-Methylphenol	mg/kg	2	GC.12	<2.0	43953-1	<2.0 || <2.0	[NR]	[NR]
2-Nitrophenol	mg/kg	1	GC.12	<1.0	43953-1	<1.0 || <1.0	[NR]	[NR]
2,4-Dimethylphenol	mg/kg	1	GC.12	<1.0	43953-1	<1.0 || <1.0	[NR]	[NR]
2,4-Dichlorophenol	mg/kg	1	GC.12	<1.0	43953-1	<1.0 || <1.0	[NR]	[NR]
2,6-dichlorophenol	mg/kg	1	GC.12	<1.0	43953-1	<1.0 || <1.0	[NR]	[NR]
2,4,5-trichlorophenol	mg/kg	1	GC.12	<1.0	43953-1	<1.0 || <1.0	[NR]	[NR]
2,4,6-trichlorophenol	mg/kg	1	GC.12	<1.0	43953-1	<1.0 || <1.0	[NR]	[NR]
2,4-dinitrophenol	mg/kg	10	GC.12	<10	43953-1	<10 || <10	[NR]	[NR]
4-nitrophenol	mg/kg	10	GC.12	<10	43953-1	<10 || <10	LCS-1	74%
2,3,4,6-tetrachlorophenol	mg/kg	1	GC.12	<1.0	43953-1	<1.0 || <1.0	[NR]	[NR]
2-methyl-4,6-dinitrophenol	mg/kg	10	GC.12	<10	43953-1	<10 || <10	[NR]	[NR]
pentachlorophenol	mg/kg	10	GC.12	<10	43953-1	<10 || <10	[NR]	[NR]
Surrogate 2-fluorophenol	%		GC.12	123	43953-1	105 || 113 || RPD: 7	LCS-1	118%
Surrogate Phenol-d_6	%		GC.12	85	43953-1	68 || 83 || RPD: 20	LCS-1	99%
Surrogate 2,4,6-Tribromophenol	%		GC.12	59	43953-1	93 || 96 || RPD: 3	LCS-1	65%
Surrogate p-Terphenyl-d_{14}	%		GC.12	102	43953-1	114 || 106 || RPD: 7	LCS-1	92%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date digested	-			29/07/2010	43953-1	29/07/2010 || 29/07/2010	LCS-2	29/07/2010
Date analysed	-			29/07/2010	43953-1	29/07/2010 || 29/07/2010	LCS-2	29/07/2010
Arsenic	mg/kg	4	Metals.20 ICP-AES	<4	43953-1	36 || 30 || RPD: 18	LCS-2	100%
Cadmium	mg/kg	0.5	Metals.20 ICP-AES	<0.5	43953-1	1.1 || 1.1 || RPD: 0	LCS-2	96%
Chromium	mg/kg	1	Metals.20 ICP-AES	<1	43953-1	19 || 14 || RPD: 30	LCS-2	101%
Lead	mg/kg	1	Metals.20 ICP-AES	<1	43953-1	230 || 180 || RPD: 24	LCS-2	100%
Mercury	mg/kg	0.1	Metals.21 CV-AAS	<0.1	43953-1	0.4 || 0.3 || RPD: 29	LCS-2	97%
Nickel	mg/kg	1	Metals.20 ICP-AES	<1	43953-1	21 || 17 || RPD: 21	LCS-2	104%

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank
Date prepared	-			29/7/2010
Date analysed	-			29/7/2010
Moisture	%	0.1	LAB.8	<0.10

QUALITY CONTROL VOCs in Zero Headspace	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/7/2010	[NT]	[NT]	LCS-W1	29/7/2010
Date analysed	-			31/7/2010	[NT]	[NT]	LCS-W1	31/7/2010
Styrene	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	98%
Surrogate Dibromofluoromethane	%		GC.13	95	[NT]	[NT]	LCS-W1	97%
Surrogate toluene-d8	%		GC.13	105	[NT]	[NT]	LCS-W1	98%
Surrogate 4-BFB	%		GC.13	98	[NT]	[NT]	LCS-W1	93%

QUALITY CONTROL BTEX in Zero Headspace	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/7/2010	[NT]	[NT]	LCS-W1	29/7/2010
Date analysed	-			31/7/2010	[NT]	[NT]	LCS-W1	31/7/2010
Benzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	115%
Toluene	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	106%
Ethylbenzene	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	97%
m+p-xylene	µg/L	2	GC.13	<2.0	[NT]	[NT]	LCS-W1	96%
o-xylene	µg/L	1	GC.13	<1.0	[NT]	[NT]	LCS-W1	98%
Surrogate Dibromofluoromethane	%		GC.13	95	[NT]	[NT]	LCS-W1	102%
Surrogate toluene-d8	%		GC.13	105	[NT]	[NT]	LCS-W1	101%
Surrogate 4-BFB	%		GC.13	98	[NT]	[NT]	LCS-W1	109%

QUALITY CONTROL Metals in TCLP USEPA1311	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/07/2010	[NT]	[NT]	LCS-W1	29/07/2010
Date analysed	-			29/07/2010	[NT]	[NT]	LCS-W1	29/07/2010
Arsenic in TCLP	mg/L	0.05	Metals.20 ICP-AES	<0.05	[NT]	[NT]	LCS-W1	107%
Cadmium in TCLP	mg/L	0.01	Metals.20 ICP-AES	<0.01	[NT]	[NT]	LCS-W1	97%
Chromium in TCLP	mg/L	0.01	Metals.20 ICP-AES	<0.01	[NT]	[NT]	LCS-W1	101%
Lead in TCLP	mg/L	0.03	Metals.20 ICP-AES	<0.03	[NT]	[NT]	LCS-W1	98%
Mercury in TCLP	mg/L	0.0005	Metals.21 CV-AAS	<0.0005	[NT]	[NT]	LCS-W1	100%
Nickel in TCLP	mg/L	0.02	Metals.20 ICP-AES	<0.02	[NT]	[NT]	LCS-W1	101%

QUALITY CONTROL TPH in TCLP extract	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/7/2010	[NT]	[NT]	LCS-W2	29/7/2010
Date analysed	-			29/7/2010	[NT]	[NT]	LCS-W2	29/7/2010
TPH C_{10} - C_{14}	µg/L	50	GC.3	<50	[NT]	[NT]	LCS-W2	71%
TPH C_{15} - C_{28}	µg/L	100	GC.3	<100	[NT]	[NT]	LCS-W2	113%
TPH C_{29} - C_{36}	µg/L	100	GC.3	<100	[NT]	[NT]	LCS-W2	96%
Surrogate o-Terphenyl	%		GC.3	123	[NT]	[NT]	LCS-W2	116%

QUALITY CONTROL PAHs in TCLP (USEPA 1311)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/07/2010	[NT]	[NT]	LCS-W1	29/07/2010
Date analysed	-			29/07/2010	[NT]	[NT]	LCS-W1	29/07/2010
Naphthalene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	LCS-W1	91%
Acenaphthylene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Acenaphthene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluorene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	LCS-W1	108%
Phenanthrene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	LCS-W1	103%
Anthracene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluoranthene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	LCS-W1	99%
Pyrene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	LCS-W1	109%
Benzo(a)anthracene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Chrysene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	LCS-W1	106%
Benzo(b+k)fluoranthene in TCLP	mg/L	0.002	GC.12 subset	<0.002	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	LCS-W1	119%
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	GC.12 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%		GC.12	111	[NT]	[NT]	LCS-W1	120%

QUALITY CONTROL Speciated Phenols in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/07/2010	[NT]	[NT]	LCS-W1	29/07/2010
Date analysed	-			30/07/2010	[NT]	[NT]	LCS-W1	30/07/2010
Phenol	µg/L	10	GC.12	<10	[NT]	[NT]	LCS-W1	38%
2-Chlorophenol	µg/L	10	GC.12	<10	[NT]	[NT]	LCS-W1	78%
2-Methylphenol	µg/L	10	GC.12	<10	[NT]	[NT]	[NR]	[NR]
3/4-Methylphenol	µg/L	20	GC.12	<20	[NT]	[NT]	[NR]	[NR]
2-Nitrophenol	µg/L	10	GC.12	<10	[NT]	[NT]	[NR]	[NR]
2,4-Dimethylphenol	µg/L	10	GC.12	<10	[NT]	[NT]	[NR]	[NR]
2,4-Dichlorophenol	µg/L	10	GC.12	<10	[NT]	[NT]	[NR]	[NR]
2,6-Dichlorophenol	µg/L	10	GC.12	<10	[NT]	[NT]	[NR]	[NR]
2,4,5-Trichlorophenol	µg/L	10	GC.12	<10	[NT]	[NT]	[NR]	[NR]
2,4,6-Trichlorophenol	µg/L	10	GC.12	<10	[NT]	[NT]	[NR]	[NR]
2,4-Dinitrophenol	µg/L	100	GC.12	<100	[NT]	[NT]	[NR]	[NR]
4-Nitrophenol	µg/L	100	GC.12	<100	[NT]	[NT]	LCS-W1	36%
2,3,4,6-Tetrachlorophenol	µg/L	10	GC.12	<10	[NT]	[NT]	[NR]	[NR]
2-methyl-4,6-dinitrophenol	µg/L	100	GC.12	<100	[NT]	[NT]	[NR]	[NR]
Pentachlorophenol	µg/L	100	GC.12	<100	[NT]	[NT]	[NR]	[NR]
Surrogate 2-fluorophenol	%		GC.12	63	[NT]	[NT]	LCS-W1	70%
Surrogate Phenol-d_6	%		GC.12	47	[NT]	[NT]	LCS-W1	57%
Surrogate 2,4,6-Tribromophenol	%		GC.12	90	[NT]	[NT]	LCS-W1	105%
Surrogate p-Terphenyl-d_{14}	%		GC.12	115	[NT]	[NT]	LCS-W1	121%

QUALITY CONTROL vTPH & BTEX in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	43953-2	29/7/2010
Date analysed	-	[NT]	[NT]	43953-2	31/7/2010
vTPH C_6 - C_9	mg/kg	[NT]	[NT]	43953-2	93%
Benzene	mg/kg	[NT]	[NT]	43953-2	95%
Toluene	mg/kg	[NT]	[NT]	43953-2	94%
Ethylbenzene	mg/kg	[NT]	[NT]	43953-2	90%
m+p-xylene	mg/kg	[NT]	[NT]	43953-2	92%
o-Xylene	mg/kg	[NT]	[NT]	43953-2	95%
Surrogate aaa-Trifluorotoluene	%	[NT]	[NT]	43953-2	111%

QUALITY CONTROL sTPH in Soil (C10-C36)	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	43953-2	29/7/2010
Date analysed	-	[NT]	[NT]	43953-2	29/7/2010
TPH C_{10} - C_{14}	mg/kg	[NT]	[NT]	43953-2	86%
TPH C_{15} - C_{28}	mg/kg	[NT]	[NT]	43953-2	#
TPH C_{29} - C_{36}	mg/kg	[NT]	[NT]	43953-2	#
Surrogate o-Terphenyl	%	[NT]	[NT]	43953-2	#
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	43953-2	29/07/2010
Date analysed	-	[NT]	[NT]	43953-2	30/07/2010
Naphthalene	mg/kg	[NT]	[NT]	43953-2	89%
Acenaphthylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	[NT]	[NT]	43953-2	115%
Phenanthrene	mg/kg	[NT]	[NT]	43953-2	#
Anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	[NT]	[NT]	43953-2	#
Pyrene	mg/kg	[NT]	[NT]	43953-2	#
Benzo(a)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	[NT]	[NT]	43953-2	#
Benzo(b+k)fluoranthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	[NT]	[NT]	43953-2	#
Indeno(1,2,3-c,d)pyrene	mg/kg	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%	[NT]	[NT]	43953-2	89%

QUALITY CONTROL Speciated Phenols in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	43953-2	29/7/2010
Date analysed	-	[NT]	[NT]	43953-2	2/8/2010
Phenol	mg/kg	[NT]	[NT]	43953-2	83%
2-Chlorophenol	mg/kg	[NT]	[NT]	43953-2	90%
2-Methylphenol	mg/kg	[NT]	[NT]	[NR]	[NR]
3/4-Methylphenol	mg/kg	[NT]	[NT]	[NR]	[NR]
2-Nitrophenol	mg/kg	[NT]	[NT]	[NR]	[NR]
2,4-Dimethylphenol	mg/kg	[NT]	[NT]	[NR]	[NR]
2,4-Dichlorophenol	mg/kg	[NT]	[NT]	[NR]	[NR]
2,6-dichlorophenol	mg/kg	[NT]	[NT]	[NR]	[NR]
2,4,5-trichlorophenol	mg/kg	[NT]	[NT]	[NR]	[NR]
2,4,6-trichlorophenol	mg/kg	[NT]	[NT]	[NR]	[NR]
2,4-dinitrophenol	mg/kg	[NT]	[NT]	[NR]	[NR]
4-nitrophenol	mg/kg	[NT]	[NT]	43953-2	80%
2,3,4,6-tetrachlorophenol	mg/kg	[NT]	[NT]	[NR]	[NR]
2-methyl-4,6-dinitrophenol	mg/kg	[NT]	[NT]	[NR]	[NR]
pentachlorophenol	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate 2-fluorophenol	%	[NT]	[NT]	43953-2	105%
Surrogate Phenol-d_6	%	[NT]	[NT]	43953-2	84%
Surrogate 2,4,6-Tribromophenol	%	[NT]	[NT]	43953-2	107%
Surrogate p-Terphenyl-d_{14}	%	[NT]	[NT]	43953-2	108%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	[NT]	[NT]	43953-2	29/07/2010
Date analysed	-	[NT]	[NT]	43953-2	29/07/2010
Arsenic	mg/kg	[NT]	[NT]	43953-2	96%
Cadmium	mg/kg	[NT]	[NT]	43953-2	83%
Chromium	mg/kg	[NT]	[NT]	43953-2	92%
Lead	mg/kg	[NT]	[NT]	43953-2	83%
Mercury	mg/kg	[NT]	[NT]	43953-2	92%
Nickel	mg/kg	[NT]	[NT]	43953-2	83%

Report Comments:

Total Petroleum Hydrocarbons in water:# Percent recovery is not possible to report as the high concentration of analytes in the sample/s have caused interference.

Total Petroleum Hydrocarbons in soil:# Percent recovery is not possible to report as the high concentration of analytes in the sample/s have caused interference.

PAH's in soil:# Percent recovery is not possible to report as the high concentration of analytes in the sample/s have caused interference and The RPD for duplicate results is accepted due to the non homogenous natu

Asbestos was analysed by Approved Identifier: Not applicable for this job
Asbestos was authorised by Approved Signatory: Not applicable for this job

INS: Insufficient sample for this test
NA: Test not required
<: Less than

PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than

NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike: A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample): This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batched of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.