



WorleyParsons

resources & energy

EcoNomics™

CALTEX REFINERIES NSW

CALTEX DREDGING

SEDIMENT SAMPLING AND ANALYSIS PLAN IMPLEMENTATION REPORT

PARTICLE SIZE DISTRIBUTION RESULTS



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES0917542	Page	: 1 of 3
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 17-NOV-2009
C-O-C number	: ----	Issue Date	: 26-NOV-2009
Sampler	: NH	No. of samples received	: 6
Site	: ----	No. of samples analysed	: 4
Quote number	: SY/503/09		

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



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Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Dianne Blane		Newcastle



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

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When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				VC2A 1.4-2.0	VC2A 2.3-2.6	VC1A 1.2-1.6	VC3A 0-0.6	----
				17-NOV-2009 10:00	[17-NOV-2009]	[17-NOV-2009]	[17-NOV-2009]	----
Compound	CAS Number	LOR	Unit	ES0917542-003	ES0917542-004	ES0917542-005	ES0917542-006	----
EA150: Particle Sizing								
+75µm	----	1	%	90	95	98	94	----
+150µm	----	1	%	84	88	98	88	----
+300µm	----	1	%	50	41	74	46	----
+425µm	----	1	%	12	9	32	19	----
+600µm	----	1	%	<1	1	10	10	----
+1180µm	----	1	%	<1	<1	1	5	----
+2.36mm	----	1	%	<1	<1	<1	2	----
+4.75mm	----	1	%	<1	<1	<1	<1	----
+9.5mm	----	1	%	<1	<1	<1	<1	----
+19.0mm	----	1	%	<1	<1	<1	<1	----
+37.5mm	----	1	%	<1	<1	<1	<1	----
+75.0mm	----	1	%	<1	<1	<1	<1	----
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	7	4	2	5	----
Silt (2-60 µm)	----	1	%	3	2	<1	<1	----
Sand (0.06-2.00 mm)	----	1	%	90	94	98	93	----
Gravel (>2mm)	----	1	%	<1	<1	<1	2	----
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	----



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES0917660	Page	: 1 of 3
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 18-NOV-2009
C-O-C number	: ----	Issue Date	: 01-DEC-2009
Sampler	: NH	No. of samples received	: 3
Site	: ----	No. of samples analysed	: 3
Quote number	: SY/503/09		

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Dianne Blane		Newcastle

Page : 2 of 3
Work Order : ES0917660
Client : WORLEY PARSONS - INFRASTRUCTURE MWE
Project : CALTEX MAINTENANCE DREDGING



General Comments

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Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting



Analytical Results

Sub-Matrix: SOIL

Client sample ID
 Client sampling date / time

Compound	CAS Number	LOR	Unit	VC3B_0-0.5	VC2B_0-0.5	VC2B_0.5-0.9	----	----
				17-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	----	----
				ES0917660-001	ES0917660-002	ES0917660-003	----	----
EA150: Particle Sizing								
+75µm	----	1	%	95	96	89	----	----
+150µm	----	1	%	90	94	83	----	----
+300µm	----	1	%	39	51	44	----	----
+425µm	----	1	%	9	13	15	----	----
+600µm	----	1	%	2	2	5	----	----
+1180µm	----	1	%	1	1	1	----	----
+2.36mm	----	1	%	<1	1	<1	----	----
+4.75mm	----	1	%	<1	<1	<1	----	----
+9.5mm	----	1	%	<1	<1	<1	----	----
+19.0mm	----	1	%	<1	<1	<1	----	----
+37.5mm	----	1	%	<1	<1	<1	----	----
+75.0mm	----	1	%	<1	<1	<1	----	----
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	4	4	9	----	----
Silt (2-60 µm)	----	1	%	2	1	2	----	----
Sand (0.06-2.00 mm)	----	1	%	94	95	89	----	----
Gravel (>2mm)	----	1	%	<1	<1	<1	----	----
Cobbles (>6cm)	----	1	%	<1	<1	<1	----	----



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES0917542	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
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Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 17-NOV-2009
C-O-C number	: ----	Issue Date	: 26-NOV-2009
Sampler	: NH	No. of samples received	: 6
Order number	: ----	No. of samples analysed	: 4
Quote number	: SY/503/09		

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



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Dianne Blane		Newcastle



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Key :
Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
= Indicates failed QC



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

- **No Method Blank (MB) or Laboratory Control Spike (SCS) Results are required to be reported.**



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES0917660	Page	: 1 of 5
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Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
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Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 18-NOV-2009
C-O-C number	: ----	Issue Date	: 01-DEC-2009
Sampler	: NH	No. of samples received	: 3
Order number	: ----	No. of samples analysed	: 3
Quote number	: SY/503/09		

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- **No Matrix Spike (MS) Results are required to be reported.**

Certificate of Analysis

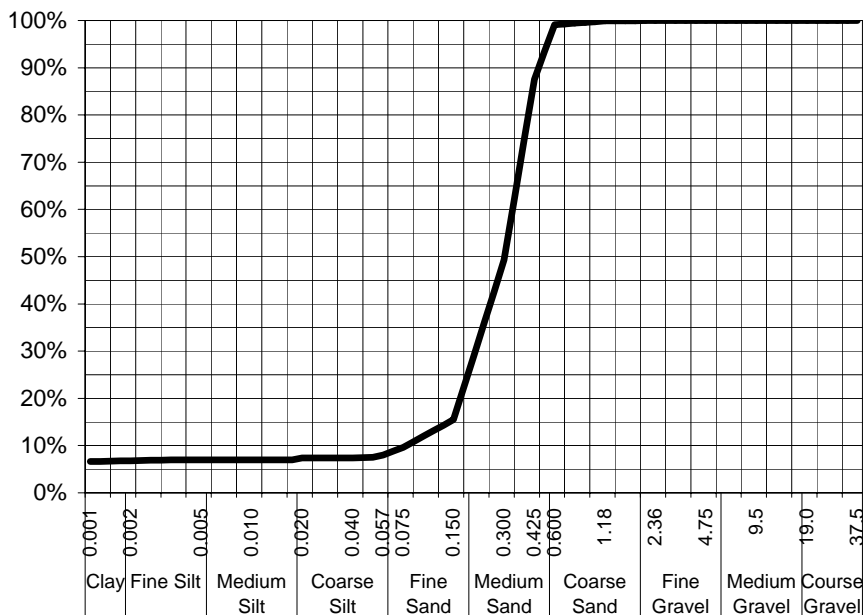
ALS Laboratory Group Pty Ltd
 5 Rosegum Road
 Warabrook, NSW 2304
 pH 02 4968 9433
 fax 02 4968 0349
 samples.newcastle@alsenviro.com

ALS Environmental
 Newcastle, NSW



CLIENT:	Ali Watters	DATE REPORTED:	26-Nov-2009
COMPANY:	Worley Parsons - Infrastructure MWE	DATE RECEIVED:	17-Nov-2009
ADDRESS:	Level 10/141 Walker Street North Sydney, NSW, Australia 2060	REPORT NO:	ES0917542-003 / PSD
PROJECT:	Caltex Maintenance Dredging	SAMPLE ID:	VC2A 1.4-2.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	100%
0.600	99%
0.425	88%
0.300	49%
0.150	16%
0.075	10%
Particle Size (microns)	
57	8%
40	7%
20	7%
10	7%
5	7%
4	7%
1	7%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Sand & fines

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

NATA Accreditation: 825 Site: Newcastle
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Analysed: 20-Nov-09

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Dianne Blane
 Senior Analyst
 Authorised Signatory

Certificate of Analysis

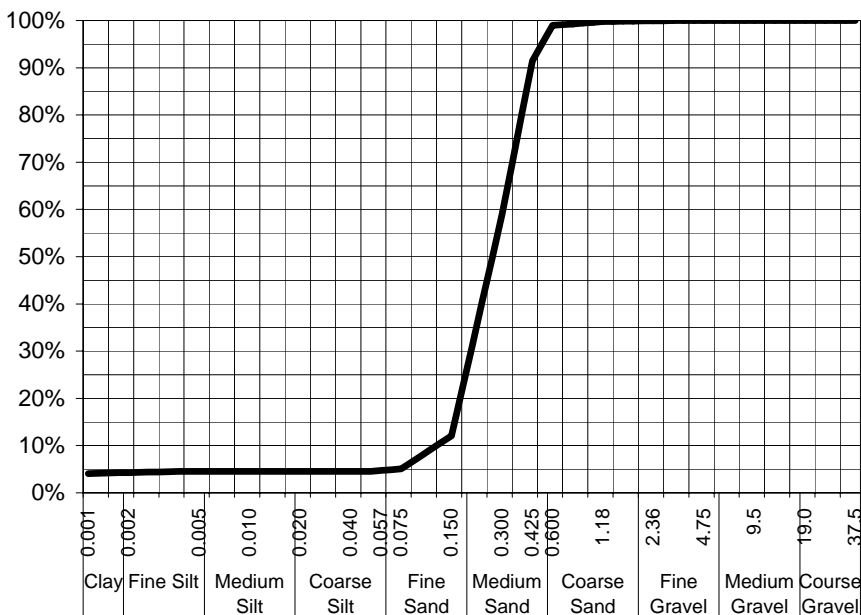
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ALS Environmental
 Newcastle, NSW



CLIENT:	Ali Watters	DATE REPORTED:	26-Nov-2009
COMPANY:	Worley Parsons - Infrastructure MWE	DATE RECEIVED:	17-Nov-2009
ADDRESS:	Level 10/141 Walker Street North Sydney, NSW, Australia 2060	REPORT NO:	ES0917542-004 / PSD
PROJECT:	Caltex Maintenance Dredging	SAMPLE ID:	VC2A 2.3-2.6

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	100%
0.600	99%
0.425	91%
0.300	59%
0.150	12%
0.075	5%
Particle Size (microns)	
57	5%
40	5%
20	5%
10	5%
5	5%
4	5%
1	4%

Samples analysed as received.

Sample Comments:	Analysed: 20-Nov-09
Loss on Pretreatment NA	Limit of Reporting: 1%
Sample Description: Sand & fines	Dispersion Method Shaker
Test Method: AS1289.3.6.2/AS1289.3.6.3	Hydrometer Type ASTM E100
Soil Particle Density 2.65 Assumed	

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Dianne Blane
 Senior Analyst
 Authorised Signatory

Certificate of Analysis

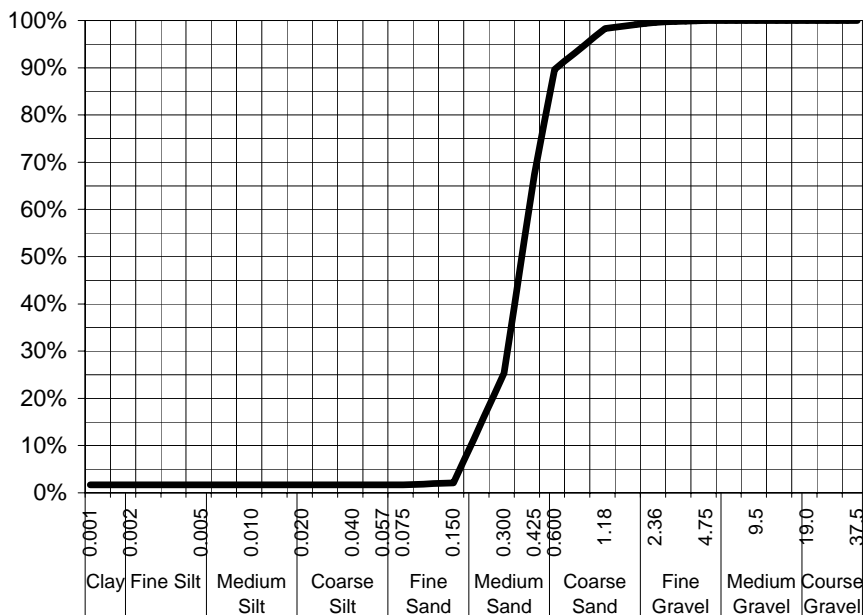
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 pH 02 4968 9433
 fax 02 4968 0349
 samples.newcastle@alsenviro.com

ALS Environmental
 Newcastle, NSW



CLIENT: Ali Watters **DATE REPORTED:** 26-Nov-2009
COMPANY: Worley Parsons - Infrastructure MWE **DATE RECEIVED:** 17-Nov-2009
ADDRESS: Level 10/141 Walker Street North Sydney, NSW, Australia 2060 **REPORT NO:** ES0917542-005 / PSD
PROJECT: Caltex Maintenance Dredging **SAMPLE ID:** VC1A 1.2-1.6

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	98%
0.600	90%
0.425	67%
0.300	25%
0.150	2%
0.075	2%
Particle Size (microns)	
57	2%
40	2%
20	2%
10	2%
5	2%
4	2%
1	2%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Sand

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

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Analysed: 20-Nov-09

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Dianne Blane
 Senior Analyst
 Authorised Signatory

Certificate of Analysis

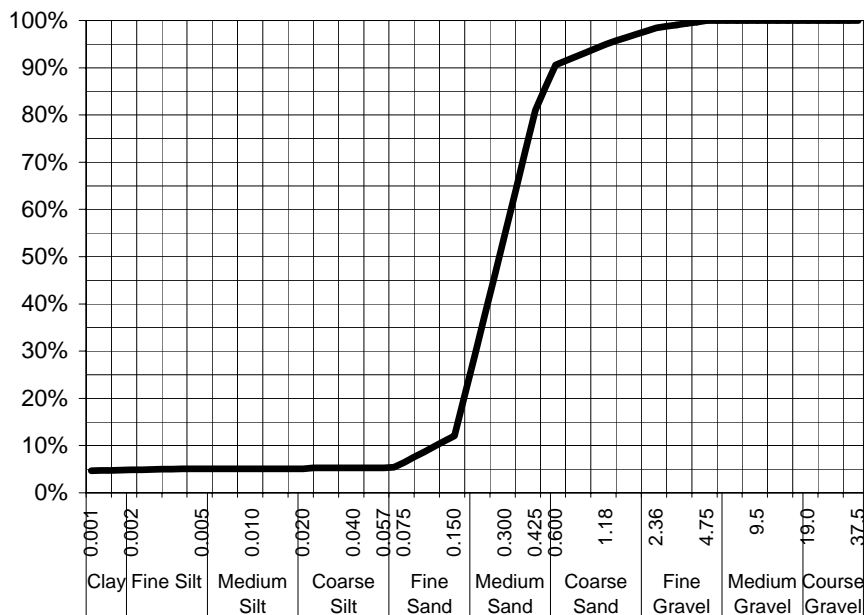
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CLIENT: Ali Watters **DATE REPORTED:** 26-Nov-2009
COMPANY: Worley Parsons - Infrastructure MWE **DATE RECEIVED:** 17-Nov-2009
ADDRESS: Level 10/141 Walker Street North Sydney, NSW, Australia 2060 **REPORT NO:** ES0917542-006 / PSD
PROJECT: Caltex Maintenance Dredging **SAMPLE ID:** VC3A 0-0.6

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	98%
1.18	95%
0.600	91%
0.425	81%
0.300	55%
0.150	12%
0.075	6%
Particle Size (microns)	
57	5%
40	5%
20	5%
10	5%
5	5%
4	5%
1	5%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Sand, shell & vegetation

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

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Analysed: 20-Nov-09

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Dianne Blane
 Senior Analyst
 Authorised Signatory

Certificate of Analysis

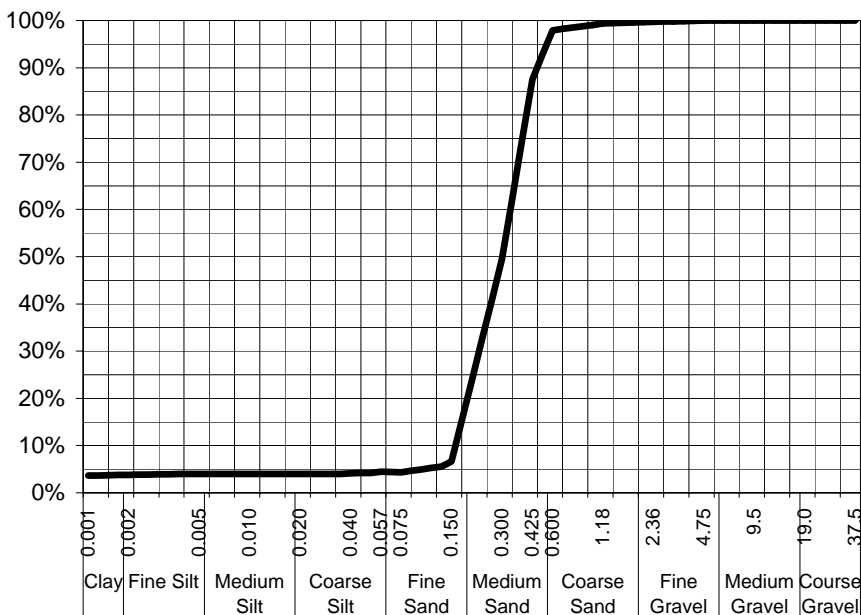
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 fax 02 4968 0349
 samples.newcastle@alsenviro.com

ALS Environmental
 Newcastle, NSW



CLIENT:	Ali Watters	DATE REPORTED:	1-Dec-2009
COMPANY:	Worley Parsons - Infrastructure MWE	DATE RECEIVED:	18-Nov-2009
ADDRESS:	Level 10/141 Walker Street North Sydney, NSW, Australia 2060	REPORT NO:	ES0917660-002 / PSD
PROJECT:	Caltex Maintenance Dredging	SAMPLE ID:	VC2B_0-0.5

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	99%
0.600	98%
0.425	88%
0.300	50%
0.150	7%
0.075	4%
Particle Size (microns)	
57	4%
40	4%
20	4%
10	4%
5	4%
4	4%
1	4%

Samples analysed as received.

Sample Comments:	Analysed: 26-Nov-09
Loss on Pretreatment NA	Limit of Reporting: 1%
Sample Description: Sand & fines	Dispersion Method Shaker
Test Method: AS1289.3.6.2/AS1289.3.6.3	Hydrometer Type ASTM E100
Soil Particle Density 2.65 Assumed	

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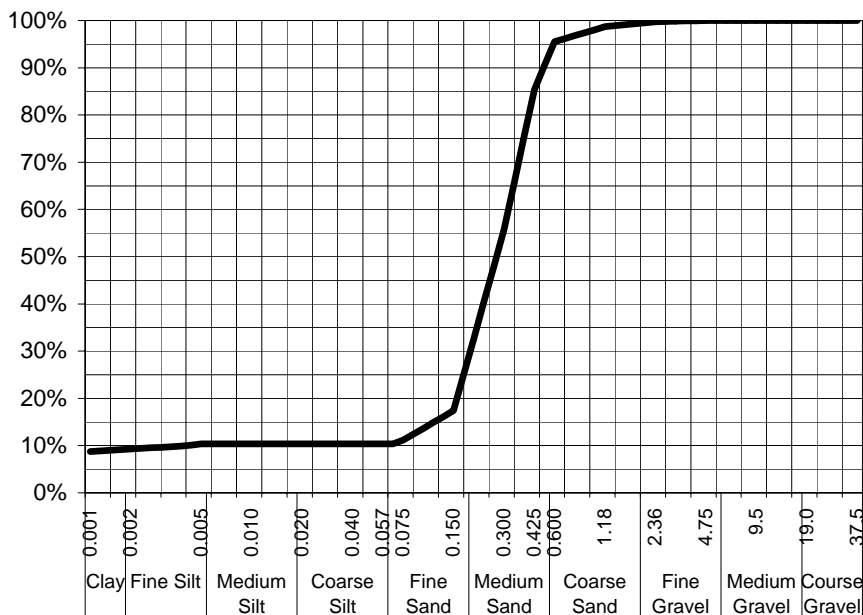
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ADDRESS:	Level 10/141 Walker Street North Sydney, NSW, Australia 2060	REPORT NO:	ES0917660-003 / PSD
PROJECT:	Caltex Maintenance Dredging	SAMPLE ID:	VC2B_0.5-0.9

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	99%
0.600	96%
0.425	85%
0.300	56%
0.150	17%
0.075	11%
Particle Size (microns)	
57	10%
40	10%
20	10%
10	10%
5	10%
4	10%
1	9%

Samples analysed as received.

Sample Comments:	Analysed: 26-Nov-09
Loss on Pretreatment NA	Limit of Reporting: 1%
Sample Description: Sand & fines	Dispersion Method Shaker
Test Method: AS1289.3.6.2/AS1289.3.6.3	Hydrometer Type ASTM E100
Soil Particle Density 2.65 Assumed	

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 Senior Analyst
 Authorised Signatory

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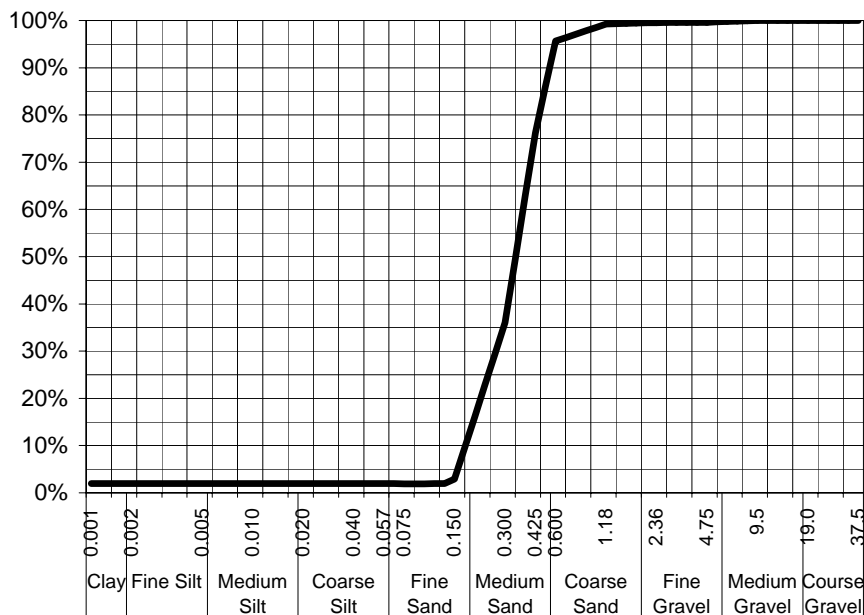
ALS Laboratory Group Pty Ltd
 5 Rosegum Road
 Warabrook, NSW 2304
 pH 02 4968 9433
 fax 02 4968 0349
 samples.newcastle@alsenviro.com

ALS Environmental
 Newcastle, NSW



CLIENT: Ali Watters **DATE REPORTED:** 1-Dec-2009
COMPANY: Worley Parsons - Infrastructure MWE **DATE RECEIVED:** 19-Nov-2009
ADDRESS: Level 10/141 Walker Street **REPORT NO:** ES0917732-001 / PSD
 North Sydney, NSW, Australia
PROJECT: Caltex Maintenance Dredging **SAMPLE ID:** VC1A1 0-0.6

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	99%
0.600	96%
0.425	76%
0.300	36%
0.150	3%
0.075	2%
Particle Size (microns)	
57	2%
40	2%
20	2%
10	2%
5	2%
4	2%
1	2%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Sand

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

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Analysed: 25-Nov-09

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

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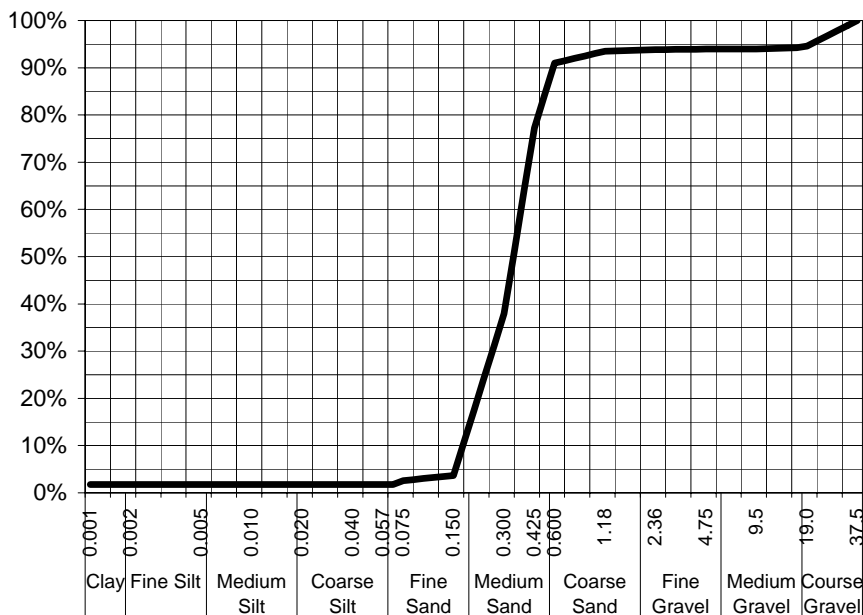
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 pH 02 4968 9433
 fax 02 4968 0349
 samples.newcastle@alsenviro.com

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CLIENT: Ali Watters **DATE REPORTED:** 1-Dec-2009
COMPANY: Worley Parsons - Infrastructure MWE **DATE RECEIVED:** 19-Nov-2009
ADDRESS: Level 10/141 Walker Street North Sydney, NSW, Australia 2060 **REPORT NO:** ES0917732-002 / PSD
PROJECT: Caltex Maintenance Dredging **SAMPLE ID:** VC1A1 0.6-1.2

Particle Size Distribution



Particle Size (mm)	Percent Passing
37.5	100%
19.0	95%
9.5	94%
4.75	94%
2.36	94%
1.18	93%
0.600	91%
0.425	77%
0.300	38%
0.150	4%
0.075	3%
Particle Size (microns)	
57	2%
40	2%
20	2%
10	2%
5	2%
4	2%
1	2%

Samples analysed as received.

Sample Comments:

Loss on Pretreatment NA

Sample Description: Sand

Test Method: AS1289.3.6.2/AS1289.3.6.3

Soil Particle Density 2.65 Assumed

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Analysed: 25-Nov-09

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

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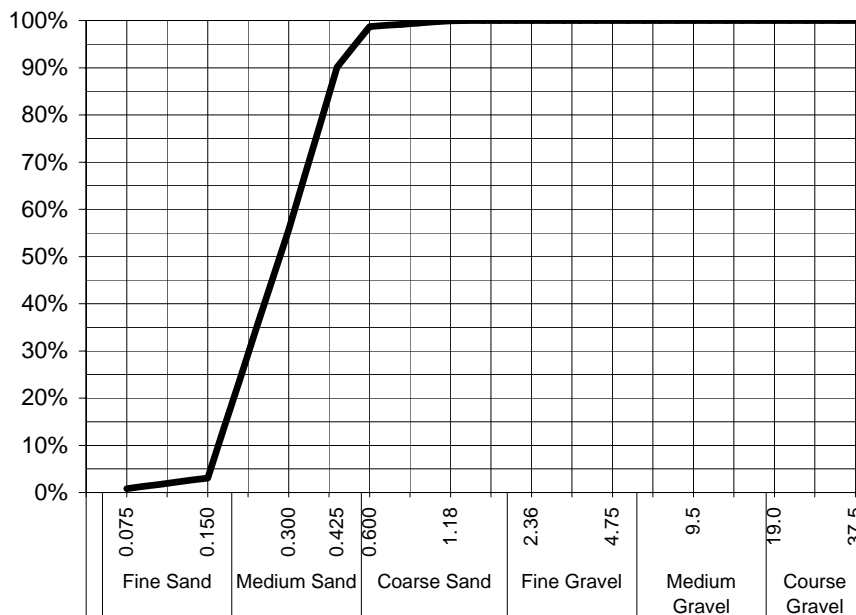
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 fax 02 4968 0349
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CLIENT: Orla Murray **DATE REPORTED:** 28-Nov-2011
COMPANY: Worley Parsons - Infrastructure **DATE RECEIVED:** 18-Nov-2011
ADDRESS: Level 10/141 Walker Street **REPORT NO:** ES1125458-001 / PSD
 North Sydney, NSW, Australia
PROJECT: Caltex **SAMPLE ID:** SS5A

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	100%
0.600	99%
0.425	90%
0.300	56%
0.150	3%
0.075	1%

Samples analysed as received.

* Insufficient sample provided for Soil Particle Density analysis according to AS 1289.3.5.1—2006.
 Typical sediment SPD values used for calculations

Sample Comments:

Loss on Pretreatment NA

Sample Description: Medium fine sand

Test Method: AS1289.3.6.1

Median Particle Size (mm)	0.225
---------------------------	-------

Analysed: 25-Nov-11

Limit of Reporting: 1%

NATA Accreditation: 825 Site: Newcastle

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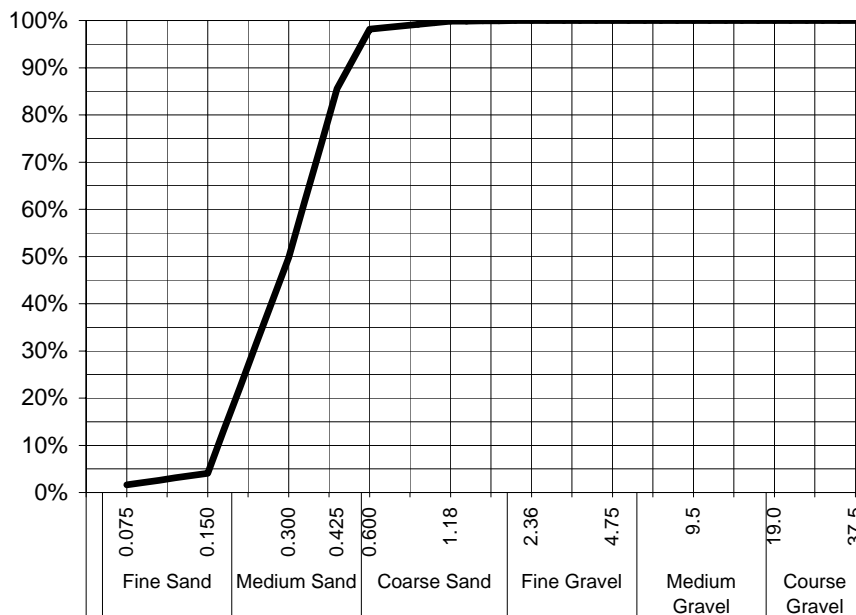
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 fax 02 4968 0349
 samples.newcastle@alsenviro.com

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CLIENT: Orla Murray **DATE REPORTED:** 28-Nov-2011
COMPANY: Worley Parsons - Infrastructure **DATE RECEIVED:** 18-Nov-2011
ADDRESS: Level 10/141 Walker Street **REPORT NO:** ES1125458-005 / PSD
 North Sydney, NSW, Australia
PROJECT: Caltex **SAMPLE ID:** SS5C

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	100%
0.600	98%
0.425	86%
0.300	50%
0.150	4%
0.075	2%

Samples analysed as received.

* Insufficient sample provided for Soil Particle Density analysis according to AS 1289.3.5.1—2006.
 Typical sediment SPD values used for calculations

Sample Comments:

Loss on Pretreatment NA

Sample Description: Medium fine sand

Test Method: AS1289.3.6.1

Median Particle Size (mm)	0.300
---------------------------	-------

Analysed: 25-Nov-11

Limit of Reporting: 1%

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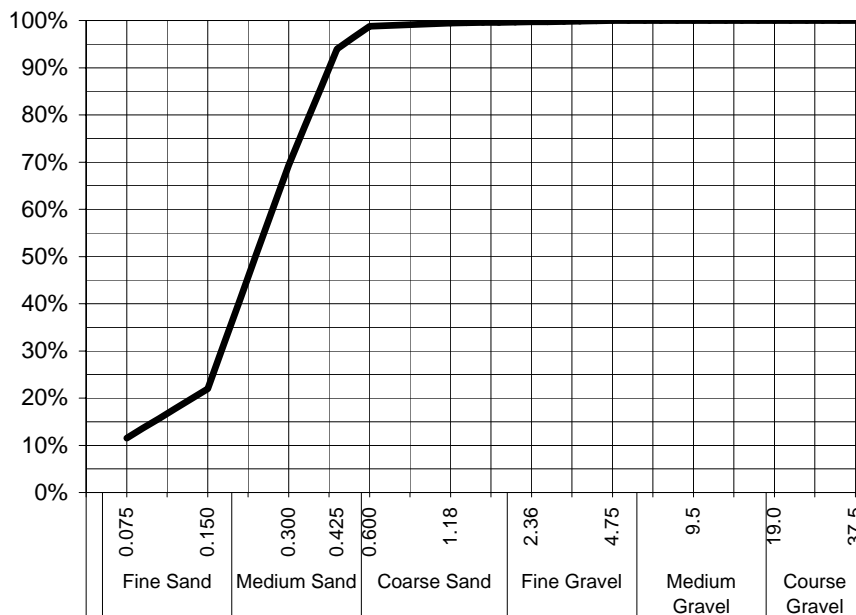
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 pH 02 4968 9433
 fax 02 4968 0349
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CLIENT: Orla Murray **DATE REPORTED:** 28-Nov-2011
COMPANY: Worley Parsons - Infrastructure **DATE RECEIVED:** 18-Nov-2011
ADDRESS: Level 10/141 Walker Street **REPORT NO:** ES1125458-006 / PSD
 North Sydney, NSW, Australia
PROJECT: Caltex **SAMPLE ID:** SS5D

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	99%
0.600	99%
0.425	94%
0.300	69%
0.150	22%
0.075	12%

Samples analysed as received.
 * Insufficient sample provided for Soil Particle Density analysis according to AS 1289.3.5.1—2006.
 Typical sediment SPD values used for calculations

Median Particle Size (mm)	0.150
---------------------------	-------

Sample Comments:

Analysed: 25-Nov-11

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Medium fine sand and fines

Test Method: AS1289.3.6.1

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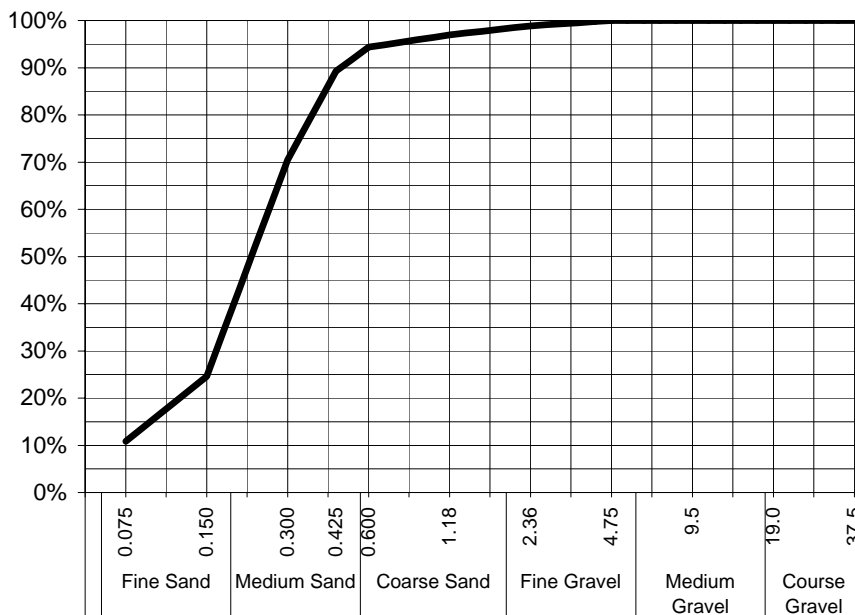
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CLIENT: Orla Murray **DATE REPORTED:** 28-Nov-2011
COMPANY: Worley Parsons - Infrastructure **DATE RECEIVED:** 18-Nov-2011
ADDRESS: Level 10/141 Walker Street **REPORT NO:** ES1125458-009 / PSD
 North Sydney, NSW, Australia
PROJECT: Caltex **SAMPLE ID:** SS5E

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	99%
1.18	97%
0.600	94%
0.425	89%
0.300	70%
0.150	25%
0.075	11%

Samples analysed as received.

* Insufficient sample provided for Soil Particle Density analysis according to AS 1289.3.5.1—2006.
 Typical sediment SPD values used for calculations

Sample Comments:

Loss on Pretreatment NA

Sample Description: Medium fine sand and fines

Test Method: AS1289.3.6.1

Median Particle Size (mm)	0.150
---------------------------	-------

Analysed: 25-Nov-11

Limit of Reporting: 1%

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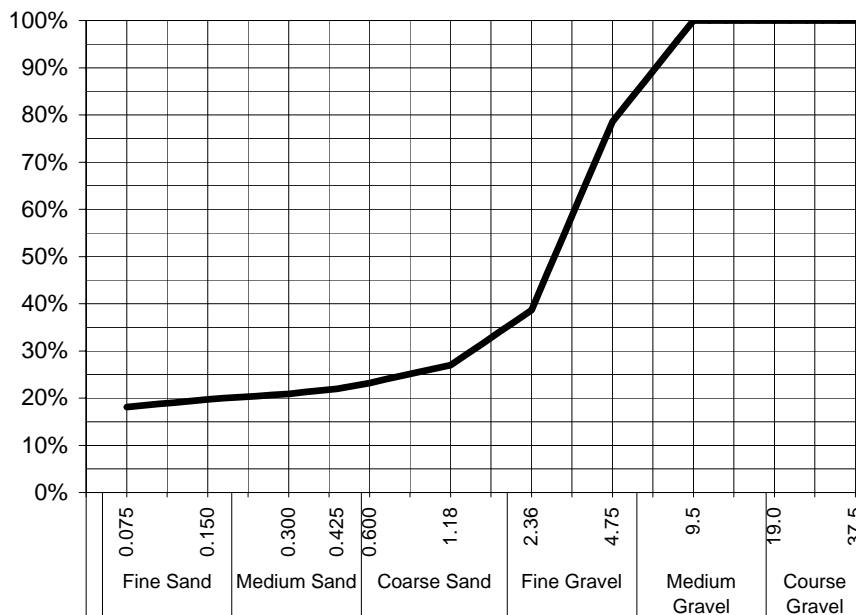
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 Warabrook, NSW 2304
 pH 02 4968 9433
 fax 02 4968 0349
 samples.newcastle@alsenviro.com

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 Newcastle, NSW



CLIENT: Orla Murray **DATE REPORTED:** 28-Nov-2011
COMPANY: Worley Parsons - Infrastructure MWE **DATE RECEIVED:** 18-Nov-2011
ADDRESS: Level 10/141 Walker Street North Sydney, NSW, Australia **REPORT NO:** ES1125458-020 / PSD
PROJECT: Caltex **SAMPLE ID:** VC5C 0.5-1

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	79%
2.36	39%
1.18	27%
0.600	23%
0.425	22%
0.300	21%
0.150	20%
0.075	18%

Samples analysed as received.
 * Insufficient sample provided for Soil Particle Density analysis according to AS 1289.3.5.1—2006.
 Typical sediment SPD values used for calculations

Median Particle Size (mm)	2.360
---------------------------	-------

Sample Comments:

Analysed: 25-Nov-11

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Gravel, coarse sand and fines

Test Method: AS1289.3.6.1

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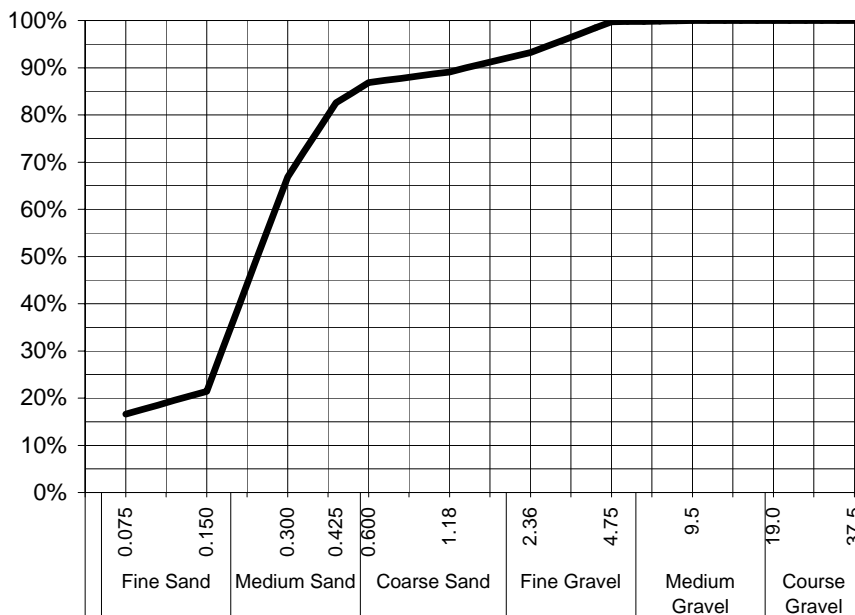
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 pH 02 4968 9433
 fax 02 4968 0349
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CLIENT: Orla Murray **DATE REPORTED:** 28-Nov-2011
COMPANY: Worley Parsons - Infrastructure **DATE RECEIVED:** 18-Nov-2011
ADDRESS: Level 10/141 Walker Street **REPORT NO:** ES1125458-026 / PSD
 North Sydney, NSW, Australia
PROJECT: Caltex **SAMPLE ID:** VCSD_2.1-3.1

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	93%
1.18	89%
0.600	87%
0.425	83%
0.300	67%
0.150	21%
0.075	17%

Samples analysed as received.

* Insufficient sample provided for Soil Particle Density analysis according to AS 1289.3.5.1—2006.
 Typical sediment SPD values used for calculations

Sample Comments:

Loss on Pretreatment NA

Sample Description: Medium fine sand and fines

Test Method: AS1289.3.6.1

Median Particle Size (mm)	0.150
---------------------------	-------

Analysed: 25-Nov-11

Limit of Reporting: 1%

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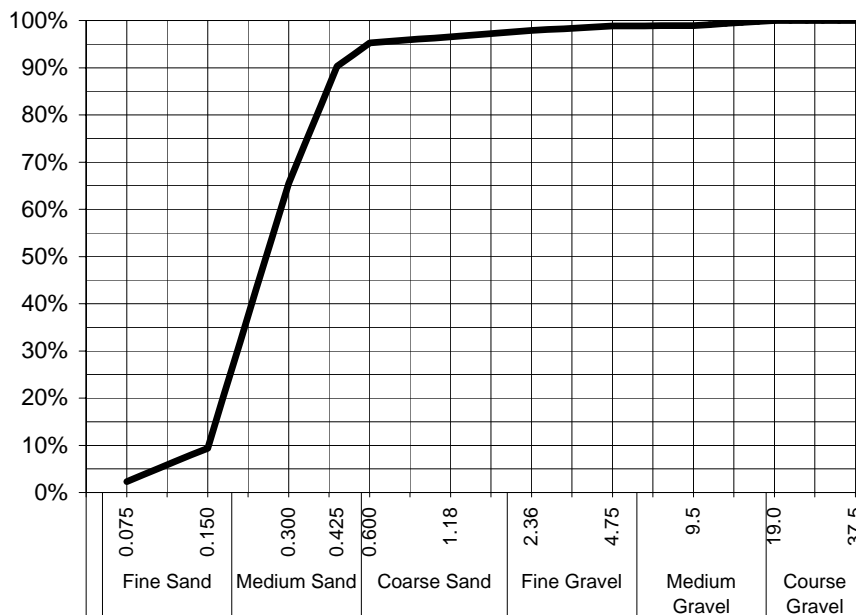
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 Warabrook, NSW 2304
 pH 02 4968 9433
 fax 02 4968 0349
 samples.newcastle@alsenviro.com

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CLIENT: Orla Murray **DATE REPORTED:** 28-Nov-2011
COMPANY: Worley Parsons - Infrastructure **DATE RECEIVED:** 18-Nov-2011
ADDRESS: Level 10/141 Walker Street **REPORT NO:** ES1125458-028 / PSD
 North Sydney, NSW, Australia
PROJECT: Caltex **SAMPLE ID:** VCSA(0-0.5)

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	99%
4.75	99%
2.36	98%
1.18	97%
0.600	95%
0.425	90%
0.300	65%
0.150	9%
0.075	2%

Samples analysed as received.
 * Insufficient sample provided for Soil Particle Density analysis according to AS 1289.3.5.1—2006.
 Typical sediment SPD values used for calculations

Median Particle Size (mm)	0.150
---------------------------	-------

Sample Comments:

Analysed: 25-Nov-11

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Medium fine sand

Test Method: AS1289.3.6.1

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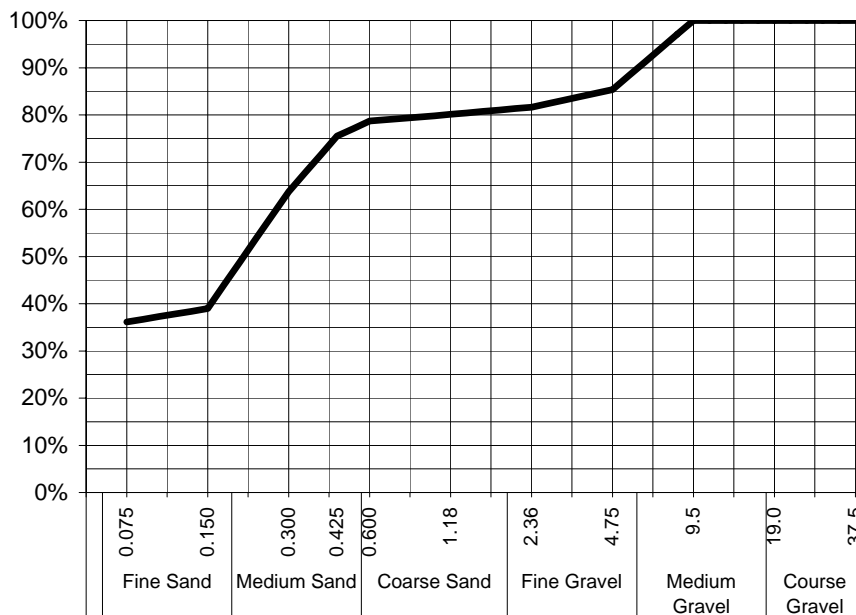
ALS Laboratory Group Pty Ltd
 5 Rosegum Road
 Warabrook, NSW 2304
 pH 02 4968 9433
 fax 02 4968 0349
 samples.newcastle@alsenviro.com

ALS Environmental
 Newcastle, NSW



CLIENT: Orla Murray **DATE REPORTED:** 28-Nov-2011
COMPANY: Worley Parsons - Infrastructure **DATE RECEIVED:** 18-Nov-2011
ADDRESS: Level 10/141 Walker Street **REPORT NO:** ES1125458-030 / PSD
 North Sydney, NSW, Australia
PROJECT: Caltex **SAMPLE ID:** VCSA1.5-2

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	85%
2.36	82%
1.18	80%
0.600	79%
0.425	76%
0.300	64%
0.150	39%
0.075	36%

Samples analysed as received.

* Insufficient sample provided for Soil Particle Density analysis according to AS 1289.3.5.1—2006.
 Typical sediment SPD values used for calculations

Sample Comments:

Loss on Pretreatment NA

Sample Description: Medium fine sand, fines and gravel

Test Method: AS1289.3.6.1

Median Particle Size (mm)	0.150
---------------------------	-------

Analysed: 25-Nov-11

Limit of Reporting: 1%

NATA Accreditation: 825 Site: Newcastle

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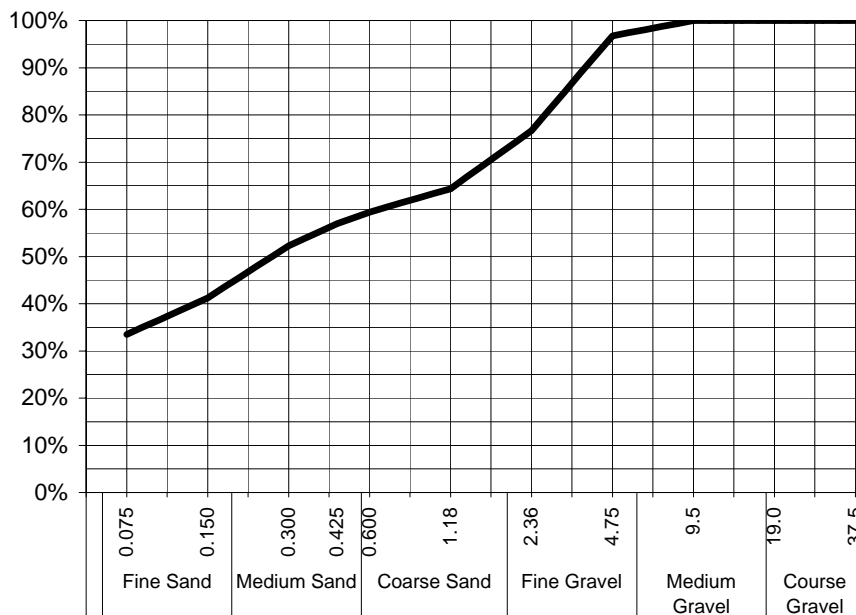
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 Warabrook, NSW 2304
 pH 02 4968 9433
 fax 02 4968 0349
 samples.newcastle@alsenviro.com

ALS Environmental
 Newcastle, NSW



CLIENT: Orla Murray **DATE REPORTED:** 28-Nov-2011
COMPANY: Worley Parsons - Infrastructure **DATE RECEIVED:** 18-Nov-2011
ADDRESS: Level 10/141 Walker Street **REPORT NO:** ES1125458-036 / PSD
 North Sydney, NSW, Australia
PROJECT: Caltex **SAMPLE ID:** VCSE 0-0.6

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	97%
2.36	77%
1.18	64%
0.600	59%
0.425	57%
0.300	52%
0.150	41%
0.075	33%

Samples analysed as received.
 * Insufficient sample provided for Soil Particle Density analysis according to AS 1289.3.5.1—2006.
 Typical sediment SPD values used for calculations

Median Particle Size (mm)	0.150
---------------------------	-------

Sample Comments:

Analysed: 25-Nov-11

Loss on Pretreatment NA

Limit of Reporting: 1%

Sample Description: Medium fine sand, fines and gravel

Test Method: AS1289.3.6.1

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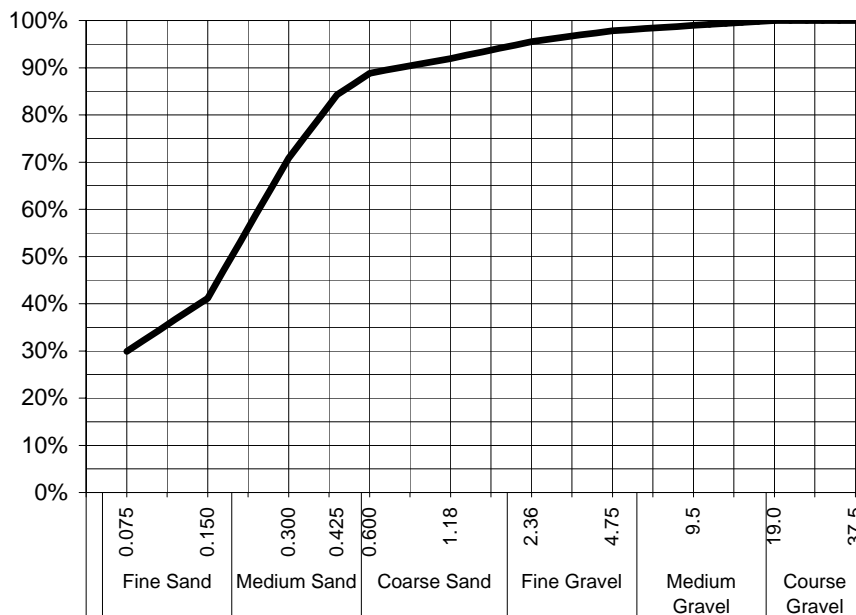
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 Warabrook, NSW 2304
 pH 02 4968 9433
 fax 02 4968 0349
 samples.newcastle@alsenviro.com

ALS Environmental
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CLIENT: Orla Murray **DATE REPORTED:** 28-Nov-2011
COMPANY: Worley Parsons - Infrastructure **DATE RECEIVED:** 18-Nov-2011
ADDRESS: Level 10/141 Walker Street **REPORT NO:** ES1125458-037 / PSD
 North Sydney, NSW, Australia
PROJECT: Caltex **SAMPLE ID:** VCSE 1-1.6

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	99%
4.75	98%
2.36	96%
1.18	92%
0.600	89%
0.425	84%
0.300	71%
0.150	41%
0.075	30%

Samples analysed as received.

* Insufficient sample provided for Soil Particle Density analysis according to AS 1289.3.5.1—2006.
 Typical sediment SPD values used for calculations

Sample Comments:

Loss on Pretreatment NA

Sample Description: Medium fine sand and fines

Test Method: AS1289.3.6.1

Median Particle Size (mm)	0.150
---------------------------	-------

Analysed: 25-Nov-11

Limit of Reporting: 1%

NATA Accreditation: 825 Site: Newcastle

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CALTEX REFINERIES NSW

CALTEX DREDGING

SEDIMENT SAMPLING AND ANALYSIS PLAN IMPLEMENTATION REPORT

GEOCHEMISTRY LABORATORY RESULTS



CHAIN OF CUSTODY

ALS Laboratory: please tick →

CLIENT: WORLEY PARSONS	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: N. SYDNEY	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) <input type="checkbox"/> Non Standard or urgent TAT (List due date):	COC SEQUENCE NUMBER (Circle)	Custody Seal Intact? <input checked="" type="checkbox"/>
PROJECT: CALTEX MAINTENANCE DRAGGING	ALS QUOTE NO.: 59/503/109	Free Ice / Frozen ice bricks present <input checked="" type="checkbox"/>	Random Sample Temperature on
ORDER NUMBER:		OF: 1 2 3 4 5 6 7	Other comment:
PROJECT MANAGER: AU WATTERS	CONTACT PH: 0422 763 386	RECEIVED BY: Sgt Stephen	RECEIVED BY:
SAMPLER: ALICK HANNAFORD	SAMPLER MOBILE: 0402365428	DATE/TIME: 17/11/19 17:20	DATE/TIME:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	RECEIVED BY: Acc Sydney	
Email Reports to (will default to PM if no other addresses are listed):		RECEIVED BY:	
Email Invoice to (will default to PM if no other addresses are listed):		DATE/TIME:	

Environmental Division
Sydney
Work Order
ES0917541

Yes No N/A
Yes No N/A
4-60 °C



Telephone: +61-2-8784 8555

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

Subcon / Forward Lab / Split WO
Lab / Analysis: **Sydney ALS**
Organised By / Date: **TBT + TOC : ES0917544**
Relinquished By / Date: **PSD : ES0917541**
Connote / Courier: **PH Fox : ES0917543**
WO No: **ES0917541**
Attach By PO / Internal Sheet:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	ANALYSIS REQUIRED including SUITES (NB: Suite Cod Where Metals are required, specify Total (undiluted bottle required) or																STORE	STORE
						EG020SD (trace metals)	EG035L (Mercury)	EP123SD (PAHs)	EP004 (TOC)	EP060 (TBT)	EP131A (OC Pesticides)	EP131B (PCBs)	EP080-JT (TPH (CG-C9) / BTEX)	EP071SD (TPH C10-C36)	EA100-H (Particle sizing)	EN020PR (dryBag/Label)	EA003 (pH & pHox)	EA033 (chromium)	(TCOR) (date)				
14	VCIA 0-0.5	17/11 am	s	Glass bottle/bags	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	STORE	STORE	
15	VCIA 0-0.5X	17/11 am	s	Glass bottle/bags	2	HOLD																STORE	STORE
16	VCIA 0.5-1.2	17/11 am	s	Glass bottle/bags	3	✓	✓	✓	✓	-	-	-	-	-	-	-	-	✓	✓	-	STORE	STORE	
17	VCIA 0.5-1.2	17/11 am	s	Glass bottle/bags	2	HOLD																STORE	STORE
18	VC2A 0-1.0	17/11 am	s	Glass bottle/bags	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	STORE	STORE
19	VC2A 0-1.0 DUP	17/11 am	s	Glass bottle/bags	1	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	STORE	STORE	
20	VC2A 0-1.0 X	17/11 am	s	Glass bottle/bags	2	HOLD																STORE	STORE
21	VC2A 1.0-1.4	17/11 am	s	Glass bottle/bags	3	✓	✓	✓	✓	-	-	-	-	-	-	-	✓	✓	-	-	STORE	STORE	
22	VC2A 1.0-1.4 Y	17/11 am	s	Glass bottle/bags	2	HOLD																STORE	STORE
23	VC2A 1.4-2.0	17/11 am	s	Glass bottle/bags	4	✓	✓	✓	✓	✓	-	-	-	-	-	-	✓	✓	✓	-	STORE	STORE	
24	VC2A 1.4-2.0 Z	17/11 am	s	Glass bottle/bags	2	HOLD																STORE	STORE
25	VC2A 2.0-2.3	17/11 am	s	Glass bottle/bags	3	✓	✓	✓	✓	✓	-	-	-	-	-	-	✓	✓	-	-	STORE	STORE	
26	VC2A 2.3-2.6	17/11 pm	s	Glass bottle/bags	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	STORE	STORE	
27	VC2A 2.3-2.6 x	17/11 pm	s	Glass bottle/bags	2	HOLD																STORE	STORE
28	VC2A 2.3-2.6 y	17/11 pm	s	Glass bottle/bags	2	HOLD																STORE	STORE
29	VC2A 2.3-2.6 z	17/11 pm	s	Glass bottle/bags	2	HOLD																STORE	STORE
30	VCIA 1.2-1.6	17/11 pm	s	Glass bottle/bags	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	STORE	STORE	
31	VCIA 1.2-1.6 2	17/11 pm	s	Glass bottle/bags	2	HOLD																STORE	STORE
32	VCIA 1.2-1.6 3	17/11 pm	s	Glass bottle/bags	2	HOLD																STORE	STORE

Additional Information

Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.

STORE remaining sample - will select following review of results



CHAIN OF CUSTODY

ALS Laboratory: please tick →

CLIENT: <u>Worley Parsons</u>	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: <u>N. Sydney</u>	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) <input type="checkbox"/> Non Standard or urgent TAT (List due date):	Custody Seal Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
PROJECT: <u>Caltex maintenance & redy</u>	ALS QUOTE NO.:	Free ice / frozen ice bricks present upon receipt? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
ORDER NUMBER:	COC SEQUENCE NUMBER (Circle)	Random Sample Temperature on Receipt:	
PROJECT MANAGER: <u>Al. Walters</u>	CONTACT PH: <u>0422763337</u>	OF: 1 2 3 4 5 6 7	Other comment: <u>4.6 e</u>
SAMPLER: <u>Nick Hennel</u>	SAMPLER MOBILE: <u>0402365423</u>	RECEIVED BY: <u>Steph ALS</u>	RECEIVED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: <u>17/11/19 17:20</u>	DATE/TIME:
Email Reports to (will default to PM if no other addresses are listed):			
Email Invoice to (will default to PM if no other addresses are listed):			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfrozen bottle required) or Dissolved (fild filled bottle required).													Additional Information				
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE <i>(refer to codes below)</i>	TOTAL BOTTLES	EG020SD (trace metals)	EG035L (Mercury)	EP132SD (PAHs)	EP004 (TOC)	EP000 (TBT)	EP131A (OC Pesticides)	EP131B (PCBs)	EP000-UT (TPH (C6-C9) / BTEX)	EP071SD (TPH C-10-C16)	EA150-H (Particle sizing)	EN020PR (dry/bag/label)	EA0003 (pH & pHox)	EA033 (chromium)	(TCLP/Eutrate)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.		
10	UC3a0-0.6		S	Glass bottle/bags	4	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
21	UC3a0-0.6x		S	Glass bottle/bags	2	Hold													STORE	STORE		
11	UC3a0.6-1.3		S	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
22	UC3a0.6-1.3y		S	Glass bottle/bags	2	Hold													STORE	STORE		
12	UC3a1.3-1.9		S	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
23	UC3a1.3-1.9z		S	Glass bottle/bags	2	Hold													STORE	STORE		
13	UC3a1.9-2.4		S	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
Not received	UC3b0.5-0.9		S	Glass bottle/bags	3	Hold													STORE	STORE		
	UC3b0-0.5		S	Glass bottle/bags	2	Hold													STORE	STORE		
	UC3b0-0.5x		S	Glass bottle/bags	2	Hold													STORE	STORE		
	UC3b0-0.5y		S	Glass bottle/bags	2	Hold													STORE	STORE		
TOTAL						30	30	30	30	18	6	6	6	6	6	30	30	?	?			

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

ES0917541

Uma Nagendiram

From: Charlie Pierce
Sent: Thursday, 19 November 2009 11:41 AM
To: Uma Nagendiram; Peter Donaghy; Frank Ferraro; Edwandy Fadjar; Alex Rossi
Cc: Jacob Waugh
Subject: FW: Your Reference : CALTEX MAINTENANCE DREDGING. COC/COC/COC/COC/SRN for ALSE Workorder : ES0917541

Dear Everyone,

The client has requested that we no longer test sample 001 and sample ⁰⁰³ ~~002~~ for the tests shown below. Please stop these tests immediately. If testing has been completed, please let me know.

Dear Frank

Can you confirm that:
 VC3B0.5-0.9
 VC3B0-0.5
 VC3B0-0.5x

Were not received?

Kind Regards

Charlie Pierce
 Laboratory Manager - Sydney
ALS Laboratory Group
Environmental Division
 Sydney, Australia
 Phone: + 61 2 8784 8555
 Fax: + 61 2 8784 8500
 Mobile: +61 0466309729
www.alsglobal.com

Telephone : +61-2-8784 8555
 Environmental Division
 Sydney
 Work Order
ES0917541

From: Hannaford, Nick (Sydney) [mailto:Nicholas.Hannaford@WorleyParsons.com]
Sent: Thursday, 19 November 2009 11:20 AM
To: Charlie Pierce
Cc: Watters, Ali (Sydney)
Subject: FW: Your Reference : CALTEX MAINTENANCE DREDGING. COC/COC/COC/COC/SRN for ALSE Workorder : ES0917541

Hi Charlie,

Please see the following amendments to the attached SRN below.

Lab ID	Our ID	Change
ES0917541-001 #1	VC1A 0-0.5	No longer require the following tests: EP090 (TBT) ← ES0917541 EP131A (OC Pesticides) ✓ EP131B (PCBs) ✓ EP080-UT (TPH(C6-C9)/BTEX) ✓ ES0917541 #1 + #3 EP071SD (TPH C10-C36) ✓ EA150-H (Particle Sizing) ← ES0917542 (#1) + #2
		No longer require the following tests: EP090 (TBT) EP131A (OC Pesticides)

ES0917541-003	VC2A 0-1.0	EP131B (PCBs) EP080-UT (TPH(C6-C9)/BTEX) EP071SD (TPH C10-C36) EA150-H (Particle Sizing)
---------------	------------	---

I also note that on the second copy of the COD form that you sent Ali it is stated that the following samples were not received:

- VC3B0.5-0.9
- VC3B0-0.5
- VC3B0-0.5x

However on the first copy of the CoC these are given a lab ID. These samples are also missing from the SRN. Please advise.

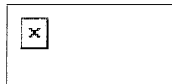
Regards,

Nick Hannaford
 Environmental Scientist
 WorleyParsons
 Tel: +61 2 8456 7357
 Fax: +62 2 8923 6877
 WorleyParsons Services Pty Ltd
 Level 11, 141 Walker St
 Nth Sydney NSW 2060
 WorleyParsons | www.worleyparsons.com



From: Watters, Ali (Sydney)
Sent: Wednesday, November 18, 2009 2:47 PM
To: Hannaford, Nick (Sydney)
Subject: FW: Your Reference : CALTEX MAINTENANCE DREDGING. COC/COC/COC/COC/SRN for ALSE
 Workorder : ES0917541

FYI



From: ALSE Sydney Aus [<mailto:alse.sydney.als@als.com.au>]
Sent: Wednesday, 18 November 2009 2:39 PM
To: Watters, Ali (Sydney)
Subject: Your Reference : CALTEX MAINTENANCE DREDGING. COC/COC/COC/COC/SRN for ALSE
 Workorder : ES0917541

This e-mail has been automatically generated.

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 If the reader of this message is not the intended recipient,

19/11/2009



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES0917541	Page	: 1 of 10
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 17-NOV-2009
C-O-C number	: ----	Issue Date	: 27-NOV-2009
Sampler	: NH	No. of samples received	: 23
Site	: ----	No. of samples analysed	: 13
Quote number	: SY/503/09		

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Celine Conceicao	Spectroscopist	Inorganics
Edwandy Fadjar	Senior Organic Chemist	Organics
Hoa Nguyen	Inorganic Chemist	Inorganics

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **EG020T: Poor precision was obtained for Chromium on sample ES0917541 #6 due to sample heterogeneity. Results have been confirmed by re-extraction and reanalysis.**
- **EP071-SD: The result for sample VC3A 0-0.6 was confirmed by re-extraction and re-analysis.**



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VC1A 0-0.5	VC1A 0.5-1.2	VC2A 0-1.0	VC2A 0-1.0 DUP	VC2A 1.0-1.4
				17-NOV-2009 10:00	17-NOV-2009 10:00	17-NOV-2009 10:00	17-NOV-2009 10:00	17-NOV-2009 10:00
				ES0917541-001	ES0917541-002	ES0917541-003	ES0917541-004	ES0917541-005
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	18.3	19.9	17.1	16.9	15.4
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	<1.00	<1.00	<1.00	<1.00	15.0
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Chromium	7440-47-3	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0	14.5
Copper	7440-50-8	1.0	mg/kg	4.1	3.3	<1.0	<1.0	<1.0
Cobalt	7440-48-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	3.1
Lead	7439-92-1	1.0	mg/kg	1.6	2.6	<1.0	<1.0	1.4
Manganese	7439-96-5	10	mg/kg	<10	<10	<10	<10	<10
Nickel	7440-02-0	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0	2.4
Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	1.9
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	22.8
Zinc	7440-66-6	1.0	mg/kg	6.1	16.5	1.4	1.4	3.3
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.71	<0.01	<0.01	<0.01	<0.01
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	<4	<4
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	<4	<4
Fluoranthene	206-44-0	4	µg/kg	<4	<4	<4	<4	<4
Pyrene	129-00-0	4	µg/kg	<4	<4	<4	<4	<4
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	<4	<4
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	<4	<4	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	<4	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	<4	<4
Perylene	198-55-0	4	µg/kg	<4	<4	<4	<4	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	<4	<4
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	<4
Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	<4	<4
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				VC1A 0-0.5	VC1A 0.5-1.2	VC2A 0-1.0	VC2A 0-1.0 DUP	VC2A 1.0-1.4
				17-NOV-2009 10:00	17-NOV-2009 10:00	17-NOV-2009 10:00	17-NOV-2009 10:00	17-NOV-2009 10:00
Compound	CAS Number	LOR	Unit	ES0917541-001	ES0917541-002	ES0917541-003	ES0917541-004	ES0917541-005
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
^ Sum of PAHs	----	4	µg/kg	<4	<4	<4	<4	<4
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	86.1	76.0	73.7	87.4	101
Anthracene-d10	1719-06-8	0.1	%	89.8	94.7	95.6	97.5	89.8
4-Terphenyl-d14	1718-51-0	0.1	%	85.2	89.3	98.2	99.1	76.5



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VC2A 1.4-2.0	VC2A 2.0-2.3	VC2A 2.3-2.6	VC1A 1.2-1.6	VC3A 0-0.6
				17-NOV-2009 10:00	17-NOV-2009 10:00	[17-NOV-2009]	[17-NOV-2009]	[17-NOV-2009]
				ES0917541-006	ES0917541-007	ES0917541-008	ES0917541-009	ES0917541-010
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	25.6	23.4	21.3	20.4	24.0
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	3.21	<1.00	1.18	<1.00	1.98
Cadmium	7440-43-9	0.1	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	24.4	3.1	3.4	1.7	5.0
Copper	7440-50-8	1.0	mg/kg	4.6	2.3	3.2	2.8	3.1
Cobalt	7440-48-4	0.5	mg/kg	0.7	<0.5	<0.5	<0.5	<0.5
Lead	7439-92-1	1.0	mg/kg	10.7	4.2	3.1	<1.0	9.0
Manganese	7439-96-5	10	mg/kg	12	<10	<10	34	<10
Nickel	7440-02-0	1.0	mg/kg	2.3	<1.0	<1.0	<1.0	1.3
Selenium	7782-49-2	0.1	mg/kg	0.3	<0.1	<0.1	<0.1	0.2
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	6.2	3.0	2.6	<2.0	6.4
Zinc	7440-66-6	1.0	mg/kg	49.8	11.0	6.9	2.2	18.4
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.55	0.04	0.03	<0.01	0.06
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	----	----	<3	<3	<3
C10 - C14 Fraction	----	3	mg/kg	----	----	<3	<3	<3
C15 - C28 Fraction	----	3	mg/kg	----	----	<3	<3	13
C29 - C36 Fraction	----	5	mg/kg	----	----	<5	<5	15
^ C10 - C36 Fraction (sum)	----	3	mg/kg	----	----	----	----	28
C10 - C36 Fraction (sum)	----	3	mg/kg	----	----	<3	<3	----
EP080-SD: BTEX								
Benzene	71-43-2	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
Toluene	108-88-3	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
Ethylbenzene	100-41-4	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
ortho-Xylene	95-47-6	0.2	mg/kg	----	----	<0.2	<0.2	<0.2
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
alpha-BHC	319-84-6	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
beta-BHC	319-85-7	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
delta-BHC	319-86-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
4,4'-DDD	72-54-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
4,4'-DDE	72-55-9	0.50	µg/kg	----	----	<0.50	<0.50	<0.50



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VC2A 1.4-2.0	VC2A 2.0-2.3	VC2A 2.3-2.6	VC1A 1.2-1.6	VC3A 0-0.6
				17-NOV-2009 10:00	17-NOV-2009 10:00	[17-NOV-2009]	[17-NOV-2009]	[17-NOV-2009]
				ES0917541-006	ES0917541-007	ES0917541-008	ES0917541-009	ES0917541-010
EP131A: Organochlorine Pesticides - Continued								
4,4'-DDT	50-29-3	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
^ DDT (total)	----	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Dieldrin	60-57-1	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
alpha-Endosulfan	959-98-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Endrin	72-20-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Endrin ketone	53494-70-5	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Heptachlor	76-44-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
gamma-BHC	58-89-9	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Methoxychlor	72-43-5	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
cis-Chlordane	5103-71-9	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
trans-Chlordane	5103-74-2	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
^ Total Chlordane (sum)	----	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
Oxychlordane	27304-13-8	0.50	µg/kg	----	----	<0.50	<0.50	<0.50
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1016	12974-11-2	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1221	11104-28-2	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1232	11141-16-5	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1242	53469-21-9	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1248	12672-29-6	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1254	11097-69-1	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
Aroclor 1260	11096-82-5	5.0	µg/kg	----	----	<5.0	<5.0	<5.0
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	5	5	<5	16
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	10	<4	<4	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	10	4
Fluorene	86-73-7	4	µg/kg	4	<4	<4	7	<4
Phenanthrene	85-01-8	4	µg/kg	42	<4	<4	29	14
Anthracene	120-12-7	4	µg/kg	9	<4	<4	4	<4
Fluoranthene	206-44-0	4	µg/kg	65	<4	<4	29	21
Pyrene	129-00-0	4	µg/kg	61	<4	<4	23	22



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VC2A 1.4-2.0	VC2A 2.0-2.3	VC2A 2.3-2.6	VC1A 1.2-1.6	VC3A 0-0.6
				17-NOV-2009 10:00	17-NOV-2009 10:00	[17-NOV-2009]	[17-NOV-2009]	[17-NOV-2009]
				ES0917541-006	ES0917541-007	ES0917541-008	ES0917541-009	ES0917541-010
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Benz(a)anthracene	56-55-3	4	µg/kg	39	<4	<4	14	14
Chrysene	218-01-9	4	µg/kg	31	<4	<4	14	12
Benzo(b)fluoranthene	205-99-2	4	µg/kg	44	<4	<4	15	16
Benzo(k)fluoranthene	207-08-9	4	µg/kg	19	<4	<4	6	7
Benzo(e)pyrene	192-97-2	4	µg/kg	17	<4	<4	8	9
Benzo(a)pyrene	50-32-8	4	µg/kg	40	<4	<4	12	15
Perylene	198-55-0	4	µg/kg	8	<4	<4	<4	7
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	29	<4	<4	10	13
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	12	<4	<4	<4	<4
Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	23	<4	<4	9	12
Coronene	191-07-1	5	µg/kg	7	<5	<5	<5	7
^ Sum of PAHs	----	4	µg/kg	460	5	5	190	190
EP080-SD: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	----	----	91.3	109	102
Toluene-D8	2037-26-5	0.1	%	----	----	107	110	106
4-Bromofluorobenzene	460-00-4	0.1	%	----	----	95.5	104	103
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	----	----	72.9	42.4	46.6
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	72.9	42.2	45.1
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	75.3	72.7	108	82.9	105
Anthracene-d10	1719-06-8	0.1	%	82.9	80.1	87.2	87.5	85.1
4-Terphenyl-d14	1718-51-0	0.1	%	81.0	83.2	84.9	86.0	81.4



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VC3A 0.6-1.3	VC3A 1.3-1.9	VC3A 1.9-2.4	----	----
				[17-NOV-2009]	[17-NOV-2009]	[17-NOV-2009]		
				ES0917541-011	ES0917541-012	ES0917541-013		
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	22.6	21.6	22.2	----	----
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	----	----
Arsenic	7440-38-2	1.00	mg/kg	2.34	<1.00	10.1	----	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
Chromium	7440-47-3	1.0	mg/kg	2.8	3.0	2.3	----	----
Copper	7440-50-8	1.0	mg/kg	1.9	2.6	<1.0	----	----
Cobalt	7440-48-4	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Lead	7439-92-1	1.0	mg/kg	3.4	9.0	1.4	----	----
Manganese	7439-96-5	10	mg/kg	<10	<10	<10	----	----
Nickel	7440-02-0	1.0	mg/kg	<1.0	<1.0	<1.0	----	----
Selenium	7782-49-2	0.1	mg/kg	0.1	<0.1	0.2	----	----
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
Vanadium	7440-62-2	2.0	mg/kg	2.5	2.1	3.9	----	----
Zinc	7440-66-6	1.0	mg/kg	5.8	30.1	2.3	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.03	0.04	<0.01	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	9	5	<5	----	----
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	----	----
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	----	----
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	----	----
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	----	----
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	----	----
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	----	----
Fluoranthene	206-44-0	4	µg/kg	<4	4	<4	----	----
Pyrene	129-00-0	4	µg/kg	<4	5	<4	----	----
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	----	----
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	----	----
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	<4	----	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	----	----
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	----	----
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	----	----
Perylene	198-55-0	4	µg/kg	<4	<4	<4	----	----
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	----	----
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	----	----
Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	----	----
Coronene	191-07-1	5	µg/kg	<5	<5	<5	----	----



Analytical Results

Sub-Matrix: **SOIL**

				<i>Client sample ID</i>				
				<i>Client sampling date / time</i>				
<i>Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	VC3A 0.6-1.3	VC3A 1.3-1.9	VC3A 1.9-2.4		
				[17-NOV-2009]	[17-NOV-2009]	[17-NOV-2009]	----	----
				ES0917541-011	ES0917541-012	ES0917541-013	----	----
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
^ Sum of PAHs	----	4	µg/kg	9	15	<4	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	79.9	112	83.1	----	----
Anthracene-d10	1719-06-8	0.1	%	86.6	83.0	85.9	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	83.1	80.2	83.3	----	----



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080-SD: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	74.7	127
Toluene-D8	2037-26-5	74.8	129
4-Bromofluorobenzene	460-00-4	75.3	127
EP131S: OC Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	136
EP131T: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	10	164
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	30	115
Anthracene-d10	1719-06-8	27	133
4-Terphenyl-d14	1718-51-0	18	137

Hi All,

The following changes have been made to the below batches as per the client request.

NEWCASTLE PSD BATCH

ES0917542 – Cancelled analysis on samples **1 and 2** in this batch

BRISBANE TBT AND TOC BATCH

ES0917544 – Cancelled TBT on samples **1 and 3**. **TOC is still needed for these samples.**

SYDNEY BATCH

ES0917541 – Cancelled UT OC/PCB as well as Low Level TPH and BTEX on samples **1 and 3**. **This means metals, mercury and Sediment PAH's still need to continue on these samples.**

Jacob Waugh

Production Co-ordinator

ALS Laboratory Group

Environmental Division

Sydney, Australia

Phone: +61 2 8784 8555

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From: Charlie Pierce

Sent: Thursday, 19 November 2009 11:41 AM

To: Uma Nagendiram; Peter Donaghy; Frank Ferraro; Edwandy Fadjar; Alex Rossi

Cc: Jacob Waugh

Subject: FW: Your Reference : CALTEX MAINTENANCE DREDGING. COC/COC/COC/COC/SRN for ALSE Workorder : ES0917541

Dear Everyone,

The client has requested that we no longer test sample 001 and sample 002 for the tests shown below. Please stop these tests immediately. If testing has been completed, please let me know.

Dear Frank

Can you confirm that:

VC3B0.5-0.9

VC3B0-0.5

VC3B0-0.5x

Were not received?

Kind Regards

Charlie Pierce

Laboratory Manager - Sydney

ALS Laboratory Group

Environmental Division

Sydney, Australia

Phone: + 61 2 8784 8555

Fax: + 61 2 8784 8500

Mobile: +61 0466309729

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From: Hannaford, Nick (Sydney) [mailto:Nicholas.Hannaford@WorleyParsons.com]

Sent: Thursday, 19 November 2009 11:20 AM

To: Charlie Pierce

Cc: Watters, Ali (Sydney)

Subject: FW: Your Reference : CALTEX MAINTENANCE DREDGING. COC/COC/COC/COC/SRN for ALSE Workorder : ES0917541

Hi Charlie,

Please see the following amendments to the attached SRN below.

19/11/2009

Lab ID	Our ID	Change
ES0917541-001	VC1A 0-0.5	No longer require the following tests: EP090 (TBT) EP131A (OC Pesticides) EP131B (PCBs) EP080-UT (TPH(C6-C9)/BTEX) EP071SD (TPH C10-C36) EA150-H (Particle Sizing)
ES0917541-003	VC2A 0-1.0	No longer require the following tests: EP090 (TBT) EP131A (OC Pesticides) EP131B (PCBs) EP080-UT (TPH(C6-C9)/BTEX) EP071SD (TPH C10-C36) EA150-H (Particle Sizing)

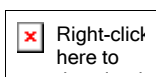
I also note that on the second copy of the COD form that you sent Ali it is stated that the following samples were not received:

VC3B0.5-0.9
VC3B0-0.5
VC3B0-0.5x

However on the first copy of the CoC these are given a lab ID. These samples are also missing from the SRN. Please advise.

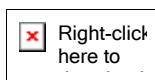
Regards,

Nick Hannaford
Environmental Scientist
WorleyParsons
Tel: +61 2 8456 7357
Fax: +62 2 8923 6877
WorleyParsons Services Pty Ltd
Level 11, 141 Walker St
Nth Sydney NSW 2060
WorleyParsons | www.worleyparsons.com



From: Watters, Ali (Sydney)
Sent: Wednesday, November 18, 2009 2:47 PM
To: Hannaford, Nick (Sydney)
Subject: FW: Your Reference : CALTEX MAINTENANCE DREDGING. COC/COC/COC/COC/SRN for ALSE Workorder : ES0917541

FYI



From: ALSE Sydney Aus [<mailto:alse.sydney.als@als.com.au>]
Sent: Wednesday, 18 November 2009 2:39 PM
To: Watters, Ali (Sydney)
Subject: Your Reference : CALTEX MAINTENANCE DREDGING. COC/COC/COC/COC/SRN for ALSE Workorder : ES0917541

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Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES0917541	Page	: 1 of 11
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 17-NOV-2009
C-O-C number	: ----	Issue Date	: 27-NOV-2009
Sampler	: NH	No. of samples received	: 23
Order number	: ----	No. of samples analysed	: 13
Quote number	: SY/503/09		

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Celine Conceicao	Spectroscopist	Inorganics
Edwandy Fadjar	Senior Organic Chemist	Organics
Hoa Nguyen	Inorganic Chemist	Inorganics

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
= Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 1168181)									
EB0918142-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	30.9	30.4	1.9	0% - 20%
EP0906633-009	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	27.5	27.2	1.0	0% - 20%
EA055: Moisture Content (QC Lot: 1168182)									
ES0917541-005	VC2A 1.0-1.4	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	15.4	16.8	8.9	0% - 50%
ES0917612-005	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	13.1	12.0	8.9	0% - 50%
EA055: Moisture Content (QC Lot: 1168642)									
ES0917541-008	VC2A 2.3-2.6	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	21.3	21.4	0.5	0% - 20%
ES0917644-004	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	13.8	12.6	9.5	0% - 50%
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 1166950)									
ES0917498-001	Anonymous	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.8	0.6	34.0	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	0.6	0.4	28.1	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	6.5	5.6	15.1	0% - 50%
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	65.8	56.0	16.0	0% - 20%
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	102	87.3	15.2	0% - 20%
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	163	142	13.9	0% - 20%
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	10.5	8.5	21.4	No Limit
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	346	301	14.0	0% - 20%
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	16.2	14.4	12.0	0% - 50%
		EG020-SD: Manganese	7439-96-5	10	mg/kg	99	161	47.5	0% - 50%
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	37.7	33.2	12.7	0% - 50%
		ES0917541-006	VC2A 1.4-2.0	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	0.1	0.2
EG020-SD: Selenium	7782-49-2			0.1	mg/kg	0.3	0.6	68.1	No Limit
EG020-SD: Silver	7440-22-4			0.1	mg/kg	<0.1	0.2	0.0	No Limit
EG020-SD: Cobalt	7440-48-4			0.5	mg/kg	0.7	1.4	60.6	No Limit
EG020-SD: Antimony	7440-36-0			0.50	mg/kg	<0.50	<0.50	0.0	No Limit
EG020-SD: Chromium	7440-47-3			1.0	mg/kg	24.4	32.9	# 29.5	0% - 20%
EG020-SD: Copper	7440-50-8			1.0	mg/kg	4.6	9.0	64.0	No Limit
EG020-SD: Lead	7439-92-1			1.0	mg/kg	10.7	17.1	45.9	0% - 50%
EG020-SD: Nickel	7440-02-0			1.0	mg/kg	2.3	4.2	59.9	No Limit
EG020-SD: Zinc	7440-66-6			1.0	mg/kg	49.8	49.4	0.8	0% - 20%
EG020-SD: Arsenic	7440-38-2			1.00	mg/kg	3.21	9.25	96.9	No Limit
EG020-SD: Manganese	7439-96-5			10	mg/kg	12	21	58.2	No Limit
EG020-SD: Vanadium	7440-62-2			2.0	mg/kg	6.2	11.2	57.3	No Limit



Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1166949)									
ES0917498-001	Anonymous	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	1.91	1.99	4.3	0% - 20%
ES0917541-006	VC2A 1.4-2.0	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.55	0.47	16.8	0% - 20%
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QC Lot: 1166947)									
ES0917541-001	VC1A 0-0.5	EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
		EP071-SD: C15 - C28 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
		EP071-SD: C29 - C36 Fraction	----	5	mg/kg	<5	<5	0.0	No Limit
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QC Lot: 1169136)									
ES0917541-008	VC2A 2.3-2.6	EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
EP080-SD: BTEX (QC Lot: 1169136)									
ES0917541-008	VC2A 2.3-2.6	EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: ortho-Xylene	106-42-3 95-47-6	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP131A: Organochlorine Pesticides (QC Lot: 1168438)									
ES0917541-008	VC2A 2.3-2.6	EP131A: Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: DDT (total)	----	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: gamma-BHC	58-89-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: cis-Chlordane	5103-71-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: trans-Chlordane	5103-74-2	0.50	µg/kg	<0.50	<0.50	0.0	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP131A: Organochlorine Pesticides (QC Lot: 1168438) - continued									
ES0917541-008	VC2A 2.3-2.6	EP131A: Total Chlordane (sum)	----	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
EP131B: Polychlorinated Biphenyls (as Aroclors) (QC Lot: 1168439)									
ES0917541-008	VC2A 2.3-2.6	EP131B: Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1016	12974-11-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1166946)									
ES0917541-001	VC1A 0-0.5	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit		
ES0917541-011	VC3A 0.6-1.3	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	5	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	5	28.6	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1166946) - continued									
ES0917541-011	VC3A 0.6-1.3	EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	4	0.0	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	9	21	81.8	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	9	7	24.9	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1166950)								
EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	----	----	----	----
EG020-SD: Arsenic	7440-38-2	1.0	mg/kg	<1.00	13.1 mg/kg	99.2	70	130
EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	2.76 mg/kg	95.7	70	130
EG020-SD: Chromium	7440-47-3	1.0	mg/kg	<1.0	60.9 mg/kg	97.9	70	130
EG020-SD: Copper	7440-50-8	1.0	mg/kg	<1.0	54.7 mg/kg	93.6	70	130
EG020-SD: Cobalt	7440-48-4	10	mg/kg	<10.0	24.5 mg/kg	104	70	130
EG020-SD: Lead	7439-92-1	1.0	mg/kg	<1.0	54.8 mg/kg	95.3	70	130
EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	136 mg/kg	90.6	70	130
EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	55.2 mg/kg	95.0	70	130
EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	5.6 mg/kg	96.8	70	130
EG020-SD: Vanadium	7440-62-2	2	mg/kg	<2.0	34 mg/kg	91.3	70	130
EG020-SD: Zinc	7440-66-6	1.0	mg/kg	<1.0	104 mg/kg	96.9	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1166949)								
EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.090 mg/kg	104	74.2	126
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1166947)								
EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	5 mg/kg	88.0	75.2	116
EP071-SD: C15 - C28 Fraction	----	3	mg/kg	<3	5 mg/kg	93.0	75.3	113
EP071-SD: C29 - C36 Fraction	----	5	mg/kg	<5	5 mg/kg	111	72.6	117
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1169136)								
EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	26 mg/kg	114	68.4	128
EP080-SD: BTEX (QCLot: 1169136)								
EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	120	67.5	125
EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	1 mg/kg	87.6	69	122
EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	1 mg/kg	104	65.3	126
EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	2.0 mg/kg	81.8	66.5	124
EP080-SD: ortho-Xylene	106-42-3							
EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	1 mg/kg	116	66.7	123
EP131A: Organochlorine Pesticides (QCLot: 1168438)								
EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	5 µg/kg	110	31.7	140
EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	5 µg/kg	124	24.5	150
EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	5 µg/kg	110	36.9	139
EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	5 µg/kg	111	38.2	137
EP131A: 4,4'-DDD	72-54-8	0.5	µg/kg	<0.50	5 µg/kg	128	42.5	141



Sub-Matrix: SOIL

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike	Spike Recovery (%)		Recovery Limits (%)	
					Concentration	LCS	Low	High	
EP131A: Organochlorine Pesticides (QCLot: 1168438) - continued									
EP131A: 4.4'-DDE	72-55-9	0.5	µg/kg	<0.50	5 µg/kg	65.9	34.8	140	
EP131A: 4.4'-DDT	50-29-3	0.5	µg/kg	<0.50	5 µg/kg	94.8	38	143	
EP131A: DDT (total)	----	0.5	µg/kg	<0.50	----	----	----	----	
EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	5 µg/kg	111	43.2	134	
EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	5 µg/kg	99.5	23.7	139	
EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	5 µg/kg	105	35.8	138	
EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	5 µg/kg	90.6	7.45	158	
EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	----	----	----	----	
EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	5 µg/kg	95.2	21.6	162	
EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	5 µg/kg	88.3	19.3	131	
EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	5 µg/kg	100	17.9	141	
EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	5 µg/kg	124	31	153	
EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	5 µg/kg	108	34.3	138	
EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	5 µg/kg	98.0	18.6	146	
EP131A: gamma-BHC	58-89-9	0.5	µg/kg	<0.50	5 µg/kg	118	30.7	145	
EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	5 µg/kg	95.7	15	157	
EP131A: cis-Chlordane	5103-71-9	0.5	µg/kg	<0.50	5 µg/kg	138	22.3	145	
EP131A: trans-Chlordane	5103-74-2	0.5	µg/kg	<0.50	5 µg/kg	107	42.4	139	
EP131A: Total Chlordane (sum)	----	0.5	µg/kg	<0.50	----	----	----	----	
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 1168439)									
EP131B: Total Polychlorinated biphenyls	----	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1016	12974-11-2	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1221	11104-28-2	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1232	11141-16-5	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1242	53469-21-9	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1248	12672-29-6	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1254	11097-69-1	5	µg/kg	<5.0	50 µg/kg	112	61.3	121	
EP131B: Aroclor 1260	11096-82-5	5	µg/kg	<5.0	----	----	----	----	
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1166946)									
EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	25 µg/kg	91.6	----	----	
EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	25 µg/kg	93.2	----	----	
EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	25 µg/kg	86.2	----	----	
EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	25 µg/kg	109	----	----	
EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	25 µg/kg	93.1	----	----	
EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	25 µg/kg	88.8	----	----	
EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	25 µg/kg	86.7	----	----	
EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	25 µg/kg	87.3	----	----	
EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	25 µg/kg	87.5	----	----	
EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	25 µg/kg	86.3	----	----	



Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1166946) - continued									
EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	25 µg/kg	86.6	----	----	
EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	25 µg/kg	99.2	----	----	
EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	25 µg/kg	78.3	----	----	
EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	25 µg/kg	75.3	----	----	
EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	25 µg/kg	84.5	----	----	
EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	25 µg/kg	53.2	----	----	
EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	25 µg/kg	85.0	----	----	
EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	25 µg/kg	86.9	----	----	
EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	25 µg/kg	79.2	----	----	
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	25 µg/kg	71.0	----	----	
EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	----	----	----	----	



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1166950)							
ES0917498-001	Anonymous	EG020-SD: Arsenic	7440-38-2	50 mg/kg	94.9	70	130
		EG020-SD: Cadmium	7440-43-9	50 mg/kg	97.0	70	130
		EG020-SD: Chromium	7440-47-3	50 mg/kg	85.8	70	130
		EG020-SD: Copper	7440-50-8	250 mg/kg	81.9	70	130
		EG020-SD: Lead	7439-92-1	250 mg/kg	77.8	70	130
		EG020-SD: Nickel	7440-02-0	50 mg/kg	96.0	70	130
		EG020-SD: Zinc	7440-66-6	250 mg/kg	75.4	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1166949)							
ES0917498-001	Anonymous	EG035T-LL: Mercury	7439-97-6	0.50 mg/kg	117	70	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1166947)							
ES0917541-001	VC1A 0-0.5	EP071-SD: C10 - C14 Fraction	----	19.75 mg/kg	86.3	70	130
		EP071-SD: C15 - C28 Fraction	----	87.25 mg/kg	89.8	70	130
		EP071-SD: C29 - C36 Fraction	----	60 mg/kg	108	70	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1169136)							
ES0917541-008	VC2A 2.3-2.6	EP080-SD: C6 - C9 Fraction	----	26 mg/kg	106	70	130
EP080-SD: BTEX (QCLot: 1169136)							
ES0917541-008	VC2A 2.3-2.6	EP080-SD: Benzene	71-43-2	2.5 mg/kg	76.8	70	130
		EP080-SD: Toluene	108-88-3	2.5 mg/kg	95.6	70	130
		EP080-SD: Ethylbenzene	100-41-4	2.5 mg/kg	72.9	70	130
		EP080-SD: meta- & para-Xylene	108-38-3	2.5 mg/kg	77.8	70	130
		EP080-SD: ortho-Xylene	106-42-3	2.5 mg/kg	74.3	70	130
EP131A: Organochlorine Pesticides (QCLot: 1168438)							
ES0917541-008	VC2A 2.3-2.6	EP131A: Aldrin	309-00-2	5 µg/kg	90.9	31.7	140
		EP131A: alpha-BHC	319-84-6	5 µg/kg	82.6	24.5	150
		EP131A: beta-BHC	319-85-7	5 µg/kg	88.2	36.9	139
		EP131A: delta-BHC	319-86-8	5 µg/kg	84.0	38.2	137
		EP131A: 4,4'-DDD	72-54-8	5 µg/kg	130	42.5	141
		EP131A: 4,4'-DDE	72-55-9	5 µg/kg	64.4	34.8	140
		EP131A: 4,4'-DDT	50-29-3	5 µg/kg	116	38	143
		EP131A: Dieldrin	60-57-1	5 µg/kg	88.9	43.2	134
		EP131A: alpha-Endosulfan	959-98-8	5 µg/kg	79.8	23.7	139
		EP131A: beta-Endosulfan	33213-65-9	5 µg/kg	94.4	35.8	138
		EP131A: Endosulfan sulfate	1031-07-8	5 µg/kg	108	7.45	158



Sub-Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
					MS	Low	High	
EP131A: Organochlorine Pesticides (QCLot: 1168438) - continued								
ES0917541-008	VC2A 2.3-2.6	EP131A: Endrin	72-20-8	5 µg/kg	73.1	21.6	162	
		EP131A: Endrin aldehyde	7421-93-4	5 µg/kg	61.7	19.3	131	
		EP131A: Endrin ketone	53494-70-5	5 µg/kg	101	17.9	141	
		EP131A: Heptachlor	76-44-8	5 µg/kg	82.5	31	153	
		EP131A: Heptachlor epoxide	1024-57-3	5 µg/kg	79.2	34.3	138	
		EP131A: Hexachlorobenzene (HCB)	118-74-1	5 µg/kg	67.3	18.6	146	
		EP131A: gamma-BHC	58-89-9	5 µg/kg	89.3	30.7	145	
		EP131A: Methoxychlor	72-43-5	5 µg/kg	104	15	157	
		EP131A: cis-Chlordane	5103-71-9	5 µg/kg	117	22.3	145	
		EP131A: trans-Chlordane	5103-74-2	5 µg/kg	84.1	42.4	139	
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 1168439)								
ES0917541-008	VC2A 2.3-2.6	EP131B: Aroclor 1254	11097-69-1	50 µg/kg	65.8	61.3	121	
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1166946)								
ES0917541-001	VC1A 0-0.5	EP132B-SD: Naphthalene	91-20-3	25 µg/kg	78.5	70	130	
		EP132B-SD: 2-Methylnaphthalene	91-57-6	25 µg/kg	84.7	70	130	
		EP132B-SD: Acenaphthylene	208-96-8	25 µg/kg	89.6	70	130	
		EP132B-SD: Acenaphthene	83-32-9	25 µg/kg	105	70	130	
		EP132B-SD: Fluorene	86-73-7	25 µg/kg	95.5	70	130	
		EP132B-SD: Phenanthrene	85-01-8	25 µg/kg	97.6	70	130	
		EP132B-SD: Anthracene	120-12-7	25 µg/kg	89.0	70	130	
		EP132B-SD: Fluoranthene	206-44-0	25 µg/kg	113	70	130	
		EP132B-SD: Pyrene	129-00-0	25 µg/kg	108	70	130	
		EP132B-SD: Benz(a)anthracene	56-55-3	25 µg/kg	114	70	130	
		EP132B-SD: Chrysene	218-01-9	25 µg/kg	96.5	70	130	
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	25 µg/kg	116	70	130	
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	25 µg/kg	81.5	70	130	
		EP132B-SD: Benzo(e)pyrene	192-97-2	25 µg/kg	82.0	70	130	
		EP132B-SD: Benzo(a)pyrene	50-32-8	25 µg/kg	102	70	130	
		EP132B-SD: Perylene	198-55-0	25 µg/kg	74.9	70	130	
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	25 µg/kg	114	70	130	
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	25 µg/kg	112	70	130	
		EP132B-SD: Indeno(1,2,3.cd)pyrene	193-39-5	25 µg/kg	110	70	130	
		EP132B-SD: Coronene	191-07-1	25 µg/kg	86.4	70	130	



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES0917541	Page	: 1 of 6
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
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Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 17-NOV-2009
Sampler	: NH	Issue Date	: 27-NOV-2009
Order number	: ----		
Quote number	: SY/503/09	No. of samples received	: 23
		No. of samples analysed	: 13

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content								
Soil Glass Jar - Unpreserved VC1A 0-0.5, VC2A 0-1.0, VC2A 1.0-1.4, VC2A 2.0-2.3, VC1A 1.2-1.6, VC3A 0.6-1.3, VC3A 1.9-2.4	VC1A 0.5-1.2, VC2A 0-1.0 DUP, VC2A 1.4-2.0, VC2A 2.3-2.6, VC3A 0-0.6, VC3A 1.3-1.9,	17-NOV-2009	----	----	----	19-NOV-2009	24-NOV-2009	✓
EG020-SD: Total Metals in Sediments by ICPMS								
Soil Glass Jar - Unpreserved VC1A 0-0.5, VC2A 0-1.0, VC2A 1.0-1.4, VC2A 2.0-2.3, VC1A 1.2-1.6, VC3A 0.6-1.3, VC3A 1.9-2.4	VC1A 0.5-1.2, VC2A 0-1.0 DUP, VC2A 1.4-2.0, VC2A 2.3-2.6, VC3A 0-0.6, VC3A 1.3-1.9,	17-NOV-2009	18-NOV-2009	15-DEC-2009	✓	19-NOV-2009	16-MAY-2010	✓
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved VC1A 0-0.5, VC2A 0-1.0, VC2A 1.0-1.4, VC2A 2.0-2.3, VC1A 1.2-1.6, VC3A 0.6-1.3, VC3A 1.9-2.4	VC1A 0.5-1.2, VC2A 0-1.0 DUP, VC2A 1.4-2.0, VC2A 2.3-2.6, VC3A 0-0.6, VC3A 1.3-1.9,	17-NOV-2009	18-NOV-2009	15-DEC-2009	✓	19-NOV-2009	15-DEC-2009	✓



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved VC2A 2.3-2.6, VC3A 0-0.6	VC1A 1.2-1.6,	17-NOV-2009	18-NOV-2009	01-DEC-2009	✓	19-NOV-2009	28-DEC-2009	✓
Soil Glass Jar - Unpreserved VC2A 2.3-2.6, VC3A 0-0.6	VC1A 1.2-1.6,	17-NOV-2009	20-NOV-2009	01-DEC-2009	✓	23-NOV-2009	01-DEC-2009	✓
EP080-SD: BTEX								
Soil Glass Jar - Unpreserved VC2A 2.3-2.6, VC3A 0-0.6	VC1A 1.2-1.6,	17-NOV-2009	20-NOV-2009	01-DEC-2009	✓	23-NOV-2009	01-DEC-2009	✓
EP131A: Organochlorine Pesticides								
Soil Glass Jar - Unpreserved VC2A 2.3-2.6, VC3A 0-0.6	VC1A 1.2-1.6,	17-NOV-2009	19-NOV-2009	01-DEC-2009	✓	24-NOV-2009	29-DEC-2009	✓
EP131B: Polychlorinated Biphenyls (as Aroclors)								
Soil Glass Jar - Unpreserved VC2A 2.3-2.6, VC3A 0-0.6	VC1A 1.2-1.6,	17-NOV-2009	19-NOV-2009	01-DEC-2009	✓	24-NOV-2009	29-DEC-2009	✓
EP132B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved VC1A 0-0.5, VC2A 0-1.0, VC2A 1.0-1.4, VC2A 2.0-2.3, VC1A 1.2-1.6, VC3A 0.6-1.3, VC3A 1.9-2.4	VC1A 0.5-1.2, VC2A 0-1.0 DUP, VC2A 1.4-2.0, VC2A 2.3-2.6, VC3A 0-0.6, VC3A 1.3-1.9,	17-NOV-2009	18-NOV-2009	01-DEC-2009	✓	20-NOV-2009	28-DEC-2009	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	6	57	10.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	6	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	2	13	15.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	6	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	2	16	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	2	18	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	3	33.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	5	20.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	3	33.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	5	20.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	13	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	16	6.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	18	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	3	33.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	5	20.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	6	16.7	5.0	✓	ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	13	7.7	5.0	✓	ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	6	16.7	5.0	✓	ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	16	6.3	5.0	✓	ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	18	5.6	5.0	✓	ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	3	33.3	5.0	✓	ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	5	20.0	5.0	✓	ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Total Metals in Sediments by ICPMS	EG020-SD	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. Analyte list and LORs per NODG.
Total Mercury by FIMS (Low Level)	EG035T-LL	SOIL	AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3)
TPH - Semivolatile Fraction	EP071-SD	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 504)
TPH Volatiles/BTEX in Sediments	EP080-SD	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 501)
Organochlorine Pesticides (Ultra-trace)	EP131A	SOIL	USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PCB's (Ultra-trace)	EP131B	SOIL	USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PAHs in Sediments by GCMS(SIM)	EP132B-SD	SOIL	8270 GCMS Capillary column, SIM mode using large volume programmed temperature vaporisation injection.
Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (1999) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(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/ Sample Cleanup	ORG17A-UTP	SOIL	In-house, Mechanical agitation (tumbler). 20g of sample, Na ₂ SO ₄ and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. Samples are extracted, concentrated (by KD) and exchanged into an appropriate solvent for GPC and florisil cleanup as required.
Tumbler Extraction of Solids for LVI (Non-concentrating)	ORG17D	SOIL	In house: 10g of sample, Na ₂ SO ₄ and surrogate are extracted with 50mL 1:1 DCM/Acetone by end over end tumbling. An aliquot is concentrated by nitrogen blowdown to a reduced volume for analysis if required.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EG020-SD: Total Metals in Sediments by ICPMS	ES0917541-006	VC2A 1.4-2.0	Chromium	7440-47-3	29.5 %	0-20%	RPD exceeds LOR based limits

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)
Comprehensive Report

Work Order : **ES0917541**

Client : **WORLEY PARSONS - INFRASTRUCTURE MWE** **Laboratory** : Environmental Division Sydney

Contact : Ms ALI WATTERS **Contact** : Charlie Pierce

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Project : CALTEX MAINTENANCE DREDGING **Page** : 1 of 3

Order number : ----

C-O-C number : ---- **Quote number** : ES2009WORPAR0232 (SY/503/09)

Site : ----

Sampler : NH **QC Level** : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received : 17-NOV-2009 **Issue Date** : 19-NOV-2009 14:47

Client Requested Due Date : 27-NOV-2009 **Scheduled Reporting Date** : **27-NOV-2009**

Delivery Details

Mode of Delivery : Carrier **Temperature** : 4.6'C - Ice present

No. of coolers/boxes : 1 HARD **No. of samples received** : 23

Security Seal : Intact. **No. of samples analysed** : 13

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Requested Deliverables
- Samples received in appropriately pretreated and preserved containers.
- OC/PCB/TPH/BTEX CANCELLED FOR SAMPLES 1 & 3 AS PER Nick Hannaford ON 19/11/09
- **Samples received in appropriately pretreated and preserved containers.**
- **Sample(s) have been received within recommended holding times.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- **Sample UC3b 0.5-0.9, UC3b 0-0.5 and UC3b 0-0.5x not received by ALS Sydney and this applies to batch ES0917542, ES0917543 and ES0917544.**
- **This batch is split into ES0917542 for PSD, ES0917543 for Ph FOX and ES0917544 for TBT and TOC.**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Jacob Waugh
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: **SOIL**

Laboratory sample ID Client sampling date / time Client sample ID

Laboratory sample ID	Client sampling date / time	Client sample ID	(On Hold) SOIL No analysis requested	SOIL - EA055-103 Moisture Content	SOIL - EG020-SD Total Metals in Sediments by ICPMS (NODG)	SOIL - EG035T-LL Total Mercury by FIMS - Low Level	SOIL - EP071 - SD TPH ultra trace in sediments	SOIL - EP080-SD TPH(V)/BTEX in Sediments	SOIL - EP131A OC Pesticides (Ultratrace)	SOIL - EP131B PCB's (Ultratrace)
ES0917541-001	17-NOV-2009 10:00	VC1A 0-0.5		✓	✓	✓				
ES0917541-002	17-NOV-2009 10:00	VC1A 0.5-1.2		✓	✓	✓				
ES0917541-003	17-NOV-2009 10:00	VC2A 0-1.0		✓	✓	✓				
ES0917541-004	17-NOV-2009 10:00	VC2A 0-1.0 DUP		✓	✓	✓				
ES0917541-005	17-NOV-2009 10:00	VC2A 1.0-1.4		✓	✓	✓				
ES0917541-006	17-NOV-2009 10:00	VC2A 1.4-2.0		✓	✓	✓				
ES0917541-007	17-NOV-2009 10:00	VC2A 2.0-2.3		✓	✓	✓				
ES0917541-008	[17-NOV-2009]	VC2A 2.3-2.6		✓	✓	✓	✓	✓	✓	✓
ES0917541-009	[17-NOV-2009]	VC1A 1.2-1.6		✓	✓	✓	✓	✓	✓	✓
ES0917541-010	[17-NOV-2009]	VC3A 0-0.6		✓	✓	✓	✓	✓	✓	✓
ES0917541-011	[17-NOV-2009]	VC3A 0.6-1.3		✓	✓	✓				
ES0917541-012	[17-NOV-2009]	VC3A 1.3-1.9		✓	✓	✓				
ES0917541-013	[17-NOV-2009]	VC3A 1.9-2.4		✓	✓	✓				
ES0917541-014	17-NOV-2009 10:00	VC1A 0-0.5X	✓							
ES0917541-015	17-NOV-2009 10:00	VC1A 0.5-1.2Y	✓							
ES0917541-016	17-NOV-2009 10:00	VC2A 0-1.0X	✓							
ES0917541-017	17-NOV-2009 10:00	VC2A 1.0-1.4Y	✓							
ES0917541-018	17-NOV-2009 10:00	VC2A 1.4-2.0Z	✓							
ES0917541-019	[17-NOV-2009]	VC2A 3-2.6X	✓							
ES0917541-020	[17-NOV-2009]	VC1A 1.2-1.6Z	✓							
ES0917541-021	[17-NOV-2009]	VC3A 0-0.6X	✓							
ES0917541-022	[17-NOV-2009]	VC3A 0.6-1.3Y	✓							
ES0917541-023	[17-NOV-2009]	VC3A 1.3-1.9Z	✓							



Matrix: SOIL

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EP132B-SD Ultra-trace PAHs in Sediments
ES0917541-001	17-NOV-2009 10:00	VC1A 0-0.5	✓
ES0917541-002	17-NOV-2009 10:00	VC1A 0.5-1.2	✓
ES0917541-003	17-NOV-2009 10:00	VC2A 0-1.0	✓
ES0917541-004	17-NOV-2009 10:00	VC2A 0-1.0 DUP	✓
ES0917541-005	17-NOV-2009 10:00	VC2A 1.0-1.4	✓
ES0917541-006	17-NOV-2009 10:00	VC2A 1.4-2.0	✓
ES0917541-007	17-NOV-2009 10:00	VC2A 2.0-2.3	✓
ES0917541-008	[17-NOV-2009]	VC2A 2.3-2.6	✓
ES0917541-009	[17-NOV-2009]	VC1A 1.2-1.6	✓
ES0917541-010	[17-NOV-2009]	VC3A 0-0.6	✓
ES0917541-011	[17-NOV-2009]	VC3A 0.6-1.3	✓
ES0917541-012	[17-NOV-2009]	VC3A 1.3-1.9	✓
ES0917541-013	[17-NOV-2009]	VC3A 1.9-2.4	✓

Requested Deliverables

Ms ALI WATTERS

- | | | |
|---|-------|-------------------------------|
| - *AU Certificate of Analysis - NATA (COA) | Email | ali.watters@worleyparsons.com |
| - *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) | Email | ali.watters@worleyparsons.com |
| - *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) | Email | ali.watters@worleyparsons.com |
| - A4 - AU Sample Receipt Notification - Environmental (SRN) | Email | ali.watters@worleyparsons.com |
| - A4 - AU Tax Invoice (INV) | Email | ali.watters@worleyparsons.com |
| - Default - Chain of Custody (COC) | Email | ali.watters@worleyparsons.com |
| - EDI Format - ENMRG (ENMRG) | Email | ali.watters@worleyparsons.com |



CHAIN OF CUSTODY

ALS Laboratory please tick →

CLIENT: <u>Waley Parsons</u>	TURNAROUND REQUIREMENTS : <input type="checkbox"/> Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: <u>N Sydney</u>	(Standard TAT may be longer for some tests e.g Ultra Trace Organics) <input type="checkbox"/> Non Standard or urgent TAT (List due date):	Custody Seal Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
PROJECT: <u>Catex maintenance & safety</u>	ALS QUOTE NO.:	<input checked="" type="checkbox"/> Free Ice / Frozen ice bricks present upon receipt?	
ORDER NUMBER:		COC SEQUENCE NUMBER (Circle)	
PROJECT MANAGER: <u>Al. Walters</u>	CONTACT PH: <u>0422763387</u>	COC: <u>0</u> 2 3 4 5 6 7	Random Sample Temperature on Receipt:
SAMPLER: <u>Nick Hamilton</u>	SAMPLER MOBILE: <u>0402365428</u>	OF: 1 2 3 4 5 6 7	Other comment:
COG emailed to ALS? (YES / NO)	EDD FORMAT (or default):	RECEIVED BY: <u>Steph ALS Safety</u>	RECEIVED BY:
Email Reports to (will default to PM if no other addresses are listed):	DATE/TIME:	DATE/TIME: <u>17/11/19 17:20</u>	DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed):			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) <small>Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required)</small>												Additional Information				
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE <small>(refer to codes below)</small>	TOTAL BOTTLES	EG020SD (trace metals)	EG035L (Mercury)	EP132SD (PAHs)	EP004 (TOC)	EP090 (TBT)	EP131A (OC Pesticides)	EP131B (PCBs)	EP080-LT (TPH (C6-C8) / BTEX)	EP071SD (TPH C10-C16)	EA160-H (Particle sizing)	EN020PR (dry/Bag/Label)	EA003 (pH & pffox)	EA033 (chromium)	(TCLP/Eutriate)	Comments on likely contaminant levels, dilutions or samples requiring specific QC analysis etc.		
6	UC3a0-06		S	Glass bottle/bags	4	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC3a006c		S	Glass bottle/bags	2	Hold														STORE	STORE	
	UC3a06-13		S	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC3a06-13y		S	Glass bottle/bags	2	Hold														STORE	STORE	
	UC3a13-191		S	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC3a13-192		S	Glass bottle/bags	2	Hold														STORE	STORE	
	UC3a19-24		S	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
7	UC3b05-09		S	Glass bottle/bags	2	Hold														STORE	STORE	
	UC3b0-05		S	Glass bottle/bags	2	Hold														STORE	STORE	
	UC3b0-05x		S	Glass bottle/bags	2	Hold														STORE	STORE	
			S	Glass bottle/bags																STORE	STORE	
						30	30	30	30	18	6	6	6	6	6	30	30	?	?			

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Solis; B = Unpreserved Bag.



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES0917542	Page	: 1 of 3
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 17-NOV-2009
C-O-C number	: ----	Issue Date	: 26-NOV-2009
Sampler	: NH	No. of samples received	: 6
Site	: ----	No. of samples analysed	: 4
Quote number	: SY/503/09		

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	Position	Accreditation Category
Dianne Blane		Newcastle

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				VC2A 1.4-2.0	VC2A 2.3-2.6	VC1A 1.2-1.6	VC3A 0-0.6	----
				17-NOV-2009 10:00	[17-NOV-2009]	[17-NOV-2009]	[17-NOV-2009]	----
Compound	CAS Number	LOR	Unit	ES0917542-003	ES0917542-004	ES0917542-005	ES0917542-006	----
EA150: Particle Sizing								
+75µm	----	1	%	90	95	98	94	----
+150µm	----	1	%	84	88	98	88	----
+300µm	----	1	%	50	41	74	46	----
+425µm	----	1	%	12	9	32	19	----
+600µm	----	1	%	<1	1	10	10	----
+1180µm	----	1	%	<1	<1	1	5	----
+2.36mm	----	1	%	<1	<1	<1	2	----
+4.75mm	----	1	%	<1	<1	<1	<1	----
+9.5mm	----	1	%	<1	<1	<1	<1	----
+19.0mm	----	1	%	<1	<1	<1	<1	----
+37.5mm	----	1	%	<1	<1	<1	<1	----
+75.0mm	----	1	%	<1	<1	<1	<1	----
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	7	4	2	5	----
Silt (2-60 µm)	----	1	%	3	2	<1	<1	----
Sand (0.06-2.00 mm)	----	1	%	90	94	98	93	----
Gravel (>2mm)	----	1	%	<1	<1	<1	2	----
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	----

Hi All,

The following changes have been made to the below batches as per the client request.

NEWCASTLE PSD BATCH

ES0917542 – Cancelled analysis on samples **1 and 2** in this batch

BRISBANE TBT AND TOC BATCH

ES0917544 – Cancelled TBT on samples **1 and 3**. **TOC is still needed for these samples.**

SYDNEY BATCH

ES0917541 – Cancelled UT OC/PCB as well as Low Level TPH and BTEX on samples **1 and 3**. **This means metals, mercury and Sediment PAH's still need to continue on these samples.**

Jacob Waugh

Production Co-ordinator

ALS Laboratory Group

Environmental Division

Sydney, Australia

Phone: +61 2 8784 8555

Fax: +61 2 8784 8500

www.alsglobal.com

From: Charlie Pierce

Sent: Thursday, 19 November 2009 11:41 AM

To: Uma Nagendiram; Peter Donaghy; Frank Ferraro; Edwandy Fadjar; Alex Rossi

Cc: Jacob Waugh

Subject: FW: Your Reference : CALTEX MAINTENANCE DREDGING. COC/COC/COC/COC/SRN for ALSE Workorder : ES0917541

Dear Everyone,

The client has requested that we no longer test sample 001 and sample 002 for the tests shown below. Please stop these tests immediately. If testing has been completed, please let me know.

Dear Frank

Can you confirm that:

VC3B0.5-0.9

VC3B0-0.5

VC3B0-0.5x

Were not received?

Kind Regards

Charlie Pierce

Laboratory Manager - Sydney

ALS Laboratory Group

Environmental Division

Sydney, Australia

Phone: + 61 2 8784 8555

Fax: + 61 2 8784 8500

Mobile: +61 0466309729

www.alsglobal.com

From: Hannaford, Nick (Sydney) [mailto:Nicholas.Hannaford@WorleyParsons.com]

Sent: Thursday, 19 November 2009 11:20 AM

To: Charlie Pierce

Cc: Watters, Ali (Sydney)

Subject: FW: Your Reference : CALTEX MAINTENANCE DREDGING. COC/COC/COC/COC/SRN for ALSE Workorder : ES0917541

Hi Charlie,

Please see the following amendments to the attached SRN below.

19/11/2009

Lab ID	Our ID	Change
ES0917541-001	VC1A 0-0.5	No longer require the following tests: EP090 (TBT) EP131A (OC Pesticides) EP131B (PCBs) EP080-UT (TPH(C6-C9)/BTEX) EP071SD (TPH C10-C36) EA150-H (Particle Sizing)
ES0917541-003	VC2A 0-1.0	No longer require the following tests: EP090 (TBT) EP131A (OC Pesticides) EP131B (PCBs) EP080-UT (TPH(C6-C9)/BTEX) EP071SD (TPH C10-C36) EA150-H (Particle Sizing)

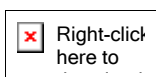
I also note that on the second copy of the COD form that you sent Ali it is stated that the following samples were not received:

VC3B0.5-0.9
VC3B0-0.5
VC3B0-0.5x

However on the first copy of the CoC these are given a lab ID. These samples are also missing from the SRN. Please advise.

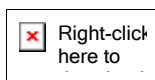
Regards,

Nick Hannaford
Environmental Scientist
WorleyParsons
Tel: +61 2 8456 7357
Fax: +62 2 8923 6877
WorleyParsons Services Pty Ltd
Level 11, 141 Walker St
Nth Sydney NSW 2060
WorleyParsons | www.worleyparsons.com



From: Watters, Ali (Sydney)
Sent: Wednesday, November 18, 2009 2:47 PM
To: Hannaford, Nick (Sydney)
Subject: FW: Your Reference : CALTEX MAINTENANCE DREDGING. COC/COC/COC/COC/SRN for ALSE Workorder : ES0917541

FYI



From: ALSE Sydney Aus [<mailto:alse.sydney.als@als.com.au>]
Sent: Wednesday, 18 November 2009 2:39 PM
To: Watters, Ali (Sydney)
Subject: Your Reference : CALTEX MAINTENANCE DREDGING. COC/COC/COC/COC/SRN for ALSE Workorder : ES0917541

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Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES0917542	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 17-NOV-2009
C-O-C number	: ----	Issue Date	: 26-NOV-2009
Sampler	: NH	No. of samples received	: 6
Order number	: ----	No. of samples analysed	: 4
Quote number	: SY/503/09		

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Dianne Blane		Newcastle



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
= Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

			----						No Limit
--	--	--	------	--	--	--	--	--	----------

- No Laboratory Duplicate (DUP) Results are required to be reported.



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

- **No Method Blank (MB) or Laboratory Control Spike (SCS) Results are required to be reported.**



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES0917542	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 17-NOV-2009
Sampler	: NH	Issue Date	: 26-NOV-2009
Order number	: ----		
Quote number	: SY/503/09	No. of samples received	: 6
		No. of samples analysed	: 4

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA150: Particle Sizing								
Snap Lock Bag VC2A 1.4-2.0, VC1A 1.2-1.6,	VC2A 2.3-2.6, VC3A 0-0.6	17-NOV-2009	---	---	----	24-NOV-2009	16-MAY-2010	✓
EA150: Soil Classification based on Particle Size								
Snap Lock Bag VC2A 1.4-2.0, VC1A 1.2-1.6,	VC2A 2.3-2.6, VC3A 0-0.6	17-NOV-2009	---	---	----	24-NOV-2009	16-MAY-2010	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix:

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Particle Size Analysis (Sieving)	EA150	SOIL	Particle Size Analysis by Sieving according to AS1289.3.6.1 - 1995
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3 - 2003



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)
Comprehensive Report

Work Order : **ES0917542**

Client : **WORLEY PARSONS - INFRASTRUCTURE MWE** **Laboratory** : Environmental Division Sydney

Contact : Ms ALI WATTERS **Contact** : Charlie Pierce

Address : Level 10/141 Walker Street **Address** : 277-289 Woodpark Road Smithfield
NORTH SYDNEY NSW, AUSTRALIA 2060 NSW Australia 2164

E-mail : ali.watters@worleyparsons.com **E-mail** : charlie.pierce@alsenviro.com

Telephone : +61 02 8907 2131 **Telephone** : +61-2-8784 8555

Facsimile : ---- **Facsimile** : +61-2-8784 8500

Project : CALTEX MAINTENANCE DREDGING **Page** : 1 of 2

Order number : ----

C-O-C number : ---- **Quote number** : ES2009WORPAR0223 (EN/034/09)

Site : ----

Sampler : NH **QC Level** : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received : 17-NOV-2009 **Issue Date** : 20-NOV-2009 17:53

Client Requested Due Date : 27-NOV-2009 **Scheduled Reporting Date** : **27-NOV-2009**

Delivery Details

Mode of Delivery : Carrier **Temperature** : 4.6'C - Ice present

No. of coolers/boxes : 1 HARD **No. of samples received** : 6

Security Seal : Intact. **No. of samples analysed** : 4

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Requested Deliverables
- Samples received in appropriately pretreated and preserved containers.
- Particle Size cancelled for Samples 1 & 2 as per Nick Hannaford on 19/11/09
- **Samples received in appropriately pretreated and preserved containers.**
- **PSD analysis will be conducted by ALS Newcastle.**
- **Sample(s) have been received within recommended holding times.**
- **This batch for PSD only and split from ES0917541**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Jacob Waugh
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: SOIL

Laboratory sample ID	Client sampling date / time	Client sample ID	(On Hold) SOIL No analysis requested	SOIL - EA150H Particle Sizing by Hydrometer
ES0917542-001	17-NOV-2009 10:00	VC1A 0-0.5	✓	
ES0917542-002	17-NOV-2009 10:00	VC2A 0-1.0	✓	
ES0917542-003	17-NOV-2009 10:00	VC2A 1.4-2.0		✓
ES0917542-004	[17-NOV-2009]	VC2A 2.3-2.6		✓
ES0917542-005	[17-NOV-2009]	VC1A 1.2-1.6		✓
ES0917542-006	[17-NOV-2009]	VC3A 0-0.6		✓

Requested Deliverables

MR NICK HANNAFORD

- *AU Certificate of Analysis - NATA (COA)	Email	Nicholas.Hannaford@WorleyParsons.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Nicholas.Hannaford@WorleyParsons.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Nicholas.Hannaford@WorleyParsons.com
- A4 - AU Sample Receipt Notification - Environmental (SRN)	Email	Nicholas.Hannaford@WorleyParsons.com
- Default - Chain of Custody (COC)	Email	Nicholas.Hannaford@WorleyParsons.com
- EDI Format - ENMRG (ENMRG)	Email	Nicholas.Hannaford@WorleyParsons.com
- Trigger - Subcontract Report (SUBCO)	Email	Nicholas.Hannaford@WorleyParsons.com

Ms ALI WATTERS

- *AU Certificate of Analysis - NATA (COA)	Email	ali.watters@worleyparsons.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ali.watters@worleyparsons.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ali.watters@worleyparsons.com
- A4 - AU Sample Receipt Notification - Environmental (SRN)	Email	ali.watters@worleyparsons.com
- A4 - AU Tax Invoice (INV)	Email	ali.watters@worleyparsons.com
- Default - Chain of Custody (COC)	Email	ali.watters@worleyparsons.com
- EDI Format - ENMRG (ENMRG)	Email	ali.watters@worleyparsons.com
- Trigger - Subcontract Report (SUBCO)	Email	ali.watters@worleyparsons.com



CHAIN OF CUSTODY

ALS Laboratory, please tick →

Environmental Division
Sydney

Work Order

ES0917543

Yes No N/A
Yes No N/A

RECEIVED BY:

DATE/TIME:



Telephone : + 61-2-8784 8555

CLIENT: WOLLEY PARSONS TURNAROUND REQUIREMENTS: Standard TAT (List due date): Non Standard or urgent TAT (List due date):

OFFICE: N SYDNEY (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)

PROJECT: CALTEX MARITIME DREDGING ALS QUOTE NO.: 59/503/09 FOR LABORATORY USE ON: Custody Seal Intact? Free ice / Frozen ice bricks present?

ORDER NUMBER: COC SEQUENCE NUMBER (Circle) 1 Random Sample Temperature on F

PROJECT MANAGER: AU WATTERS CONTACT PH: 0422 763 386 OF: 1 2 3 4 5 6 7 Other comment:

SAMPLER: MILL HANNAFORD SAMPLER MOBILE: 0402365428 RECEIVED BY: 30/8/09 RELINQUISHED BY: ALS Sydney

COC emailed to ALS? (YES / NO) EDD FORMAT (or default): DATE/TIME: 17/11/09 17:20

Email Reports to (will default to PM if no other addresses are listed): **Subcon / Forward Lab / Split WO**

Email Invoice to (will default to PM if no other addresses are listed): **Lab / Analysis: ALS Brisbane**

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: **Organised By / Date: PH Fox only.**
Relinquished By / Date: PH Fox 17/11/09
Connote / Courier: ALS SYD BATCH ONLY: ES0917541
WO No: ES0917543
Attach By PO / Internal Sheet:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) (When Metals are required, specify Total (unfiltered bottle required) or Dissolved (filtered bottle required))														Additional Information		
						EG020SD (trace metals)	EG035L (Mercury)	EP132SD (PAHs)	EP004 (TOC)	EP000 (TBT)	EP131A (OC Pesticides)	EP131B (PCBs)	EP000-UT (TPH C6-C9) / BTEX	EP071SD (TPH C10-C36)	EA150-H (Particulate sizing)	EN020PR (dry/Bagtl. abel)	EA0003 (pH & phlox)	EA033 (chromium)	(Total Chloride)			
1	VC1A 0-0.5	17/11 am	S	Glass bottle/bags	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	STORE	STORE	STORE remaining sample - will select following review of results
	VC1A 0-0.5X	17/11 am	S	Glass bottle/bags	2	HOLD														STORE	STORE	
2	VC1A 0.5-1.2	17/11 am	S	Glass bottle/bags	3	✓	✓	✓	✓	-	-	-	-	-	-	✓	✓	-	-	STORE	STORE	
	VC1A 0.5-1.27	17/11 am	S	Glass bottle/bags	2	HOLD														STORE	STORE	
3			S	Glass bottle/bags																STORE	STORE	
	VC2A 0-1.0	17/11 am	S	Glass bottle/bags	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	STORE	STORE	
	VC2A 0-1.0 DUP	17/11 am	S	Glass bottle/bags	1	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	STORE	STORE	
4	VC2A 0-1.0 X	17/11 am	S	Glass bottle/bags	2	HOLD														STORE	STORE	
	VC2A 1.0-1.4	17/11 am	S	Glass bottle/bags	3	✓	✓	✓	✓	-	-	-	-	-	-	✓	✓	✓	✓	STORE	STORE	
5	VC2A 1.0-1.47	17/11 am	S	Glass bottle/bags	2	HOLD														STORE	STORE	
	VC2A 1.4-2.0	17/11 am	S	Glass bottle/bags	4	✓	✓	✓	✓	-	-	-	-	-	-	✓	✓	✓	✓	STORE	STORE	
6	VC2A 1.4-2.0 Z	17/11 am	S	Glass bottle/bags	2	HOLD														STORE	STORE	
	VC2A 2.0-2.3	17/11 am	S	Glass bottle/bags	3	✓	✓	✓	✓	-	-	-	-	-	-	✓	✓	✓	✓	STORE	STORE	
7	VC2A 2.3-2.6	17/11 pm	S	Glass bottle/bags	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	STORE	STORE	
	VC2A 2.3-2.6 x	17/11 pm	S	Glass bottle/bags	2	Hold														STORE	STORE	
8			S	Glass bottle/bags																STORE	STORE	
	VC1A 1.2-1.6	17/11 pm	S	Glass bottle/bags	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	STORE	STORE	
	VC1A 1.2-1.62	17/11 pm	S	Glass bottle/bags	2	Hold														STORE	STORE	
			S	Glass bottle/bags																STORE	STORE	



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES0917543	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 17-NOV-2009
C-O-C number	: ----	Issue Date	: 23-NOV-2009
Sampler	: NH	No. of samples received	: 12
Site	: ----	No. of samples analysed	: 12
Quote number	: EN/034/09		

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Kim McCabe	Senior Inorganic Chemist	Inorganics



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- Analysis conducted by ALS Brisbane, NATA Site No. 818.
- pH FOX Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Vigorous; 4 - Very Vigorous



Analytical Results

Sub-Matrix: SOIL

				Client sample ID	VC1A 0-0.5	VC1A 0.5-1.2	VC2A 0-1.0	VC2A 1.0-1.4	VC2A 1.4-2.0
				Client sampling date / time	17-NOV-2009 10:00	17-NOV-2009 10:00	17-NOV-2009 10:00	17-NOV-2009 10:00	17-NOV-2009 10:00
Compound	CAS Number	LOR	Unit		ES0917543-001	ES0917543-002	ES0917543-003	ES0917543-004	ES0917543-005
EA003 :pH (field/fox)									
pH (F)	----	0.1	pH Unit		8.9	9.0	7.1	7.4	8.8
pH (Fox)	----	0.1	pH Unit		6.0	6.3	2.0	1.9	6.5
Reaction Rate	----	1	Reaction Uni		2	2	2	4	2



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VC2A 2.0-2.3	VC2A 2.3-2.6	VC1A 1.2-1.6	VC3A 0-0.6	VC3A 0.6-1.3
				ES0917543-006	ES0917543-007	ES0917543-008	ES0917543-009	ES0917543-010
				17-NOV-2009 10:00	[17-NOV-2009]	[17-NOV-2009]	[17-NOV-2009]	[17-NOV-2009]
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	8.9	8.8	9.0	8.8	8.9
pH (Fox)	----	0.1	pH Unit	6.5	6.5	6.2	6.5	6.5
Reaction Rate	----	1	Reaction Uni	2	2	2	2	2



Analytical Results

Sub-Matrix: SOIL

				Client sample ID	VC3A 1.3-1.9	VC3A 1.9-2.4	----	----	----
				Client sampling date / time	[17-NOV-2009]	[17-NOV-2009]	----	----	----
Compound	CAS Number	LOR	Unit	ES0917543-011	ES0917543-012	----	----	----	----
EA003 :pH (field/fox)									
pH (F)	----	0.1	pH Unit	8.9	8.9	----	----	----	----
pH (Fox)	----	0.1	pH Unit	6.6	6.6	----	----	----	----
Reaction Rate	----	1	Reaction Uni	1	1	----	----	----	----



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES0917543	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 17-NOV-2009
C-O-C number	: ----	Issue Date	: 23-NOV-2009
Sampler	: NH	No. of samples received	: 12
Order number	: ----	No. of samples analysed	: 12
Quote number	: EN/034/09		

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Kim McCabe	Senior Inorganic Chemist	Inorganics



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
= Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA003 :pH (field/fox) (QC Lot: 1168129)									
ES0917543-001	VC1A 0-0.5	EA003: Reaction Rate	----	1	--	2	2	0.0	No Limit
		EA003: pH (F)	----	0.1	pH Unit	8.9	9.0	1.1	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	6.0	6.0	0.0	0% - 20%
ES0917543-010	VC3A 0.6-1.3	EA003: Reaction Rate	----	1	--	2	2	0.0	No Limit
		EA003: pH (F)	----	0.1	pH Unit	8.9	9.0	1.1	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	6.5	6.5	0.0	0% - 20%



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

- **No Method Blank (MB) or Laboratory Control Spike (SCS) Results are required to be reported.**



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES0917543	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 17-NOV-2009
Sampler	: NH	Issue Date	: 23-NOV-2009
Order number	: ----		
Quote number	: EN/034/09	No. of samples received	: 12
		No. of samples analysed	: 12

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA003 :pH (field/fox)							
Snap Lock Bag - frozen							
VC1A 0-0.5,	VC1A 0.5-1.2,	17-NOV-2009	----	----	23-NOV-2009	17-NOV-2010	✓
VC2A 0-1.0,	VC2A 1.0-1.4,						
VC2A 1.4-2.0,	VC2A 2.0-2.3,						
VC2A 2.3-2.6,	VC1A 1.2-1.6,						
VC3A 0-0.6,	VC3A 0.6-1.3,						
VC3A 1.3-1.9,	VC3A 1.9-2.4						



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
pH field/fox	EA003	2	12	16.7	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
pH field/fox	EA003	SOIL	Ahern et al 1998 - determined on a 1:5 soil/water extract designed to simulate field measured pH and pH after the extract has been oxidised with peroxide.

<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)
Comprehensive Report

Work Order : **ES0917543**

Client : **WORLEY PARSONS - INFRASTRUCTURE MWE** **Laboratory** : Environmental Division Sydney

Contact : Ms ALI WATTERS **Contact** : Charlie Pierce

Address : Level 10/141 Walker Street **Address** : 277-289 Woodpark Road Smithfield
NORTH SYDNEY NSW, AUSTRALIA NSW Australia 2164
2060

E-mail : ali.watters@worleyparsons.com **E-mail** : charlie.pierce@alsenviro.com

Telephone : +61 02 8907 2131 **Telephone** : +61-2-8784 8555

Facsimile : ---- **Facsimile** : +61-2-8784 8500

Project : CALTEX MAINTENANCE DREDGING **Page** : 1 of 2

Order number : ----

C-O-C number : ---- **Quote number** : ES2009WORPAR0223 (EN/034/09)

Site : ----

Sampler : NH **QC Level** : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received : 17-NOV-2009 **Issue Date** : 19-NOV-2009 12:03

Client Requested Due Date : 23-NOV-2009 **Scheduled Reporting Date** : **23-NOV-2009**

Delivery Details

Mode of Delivery : Carrier **Temperature** : 4.6'C - Ice present

No. of coolers/boxes : 1 HARD **No. of samples received** : 12

Security Seal : Intact. **No. of samples analysed** : 12

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Requested Deliverables
- **Samples received in appropriately pretreated and preserved containers.**
- **PH FOX analysis will be conducted by ALS Brisbane**
- **Sample(s) have been received within recommended holding times.**
- **This batch for PHFOX only and split from ES0917541**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Jacob Waugh
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: SOIL

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA003 pH field/fox
ES0917543-001	17-NOV-2009 10:00	VC1A 0-0.5	✓
ES0917543-002	17-NOV-2009 10:00	VC1A 0.5-1.2	✓
ES0917543-003	17-NOV-2009 10:00	VC2A 0-1.0	✓
ES0917543-004	17-NOV-2009 10:00	VC2A 1.0-1.4	✓
ES0917543-005	17-NOV-2009 10:00	VC2A 1.4-2.0	✓
ES0917543-006	17-NOV-2009 10:00	VC2A 2.0-2.3	✓
ES0917543-007	[17-NOV-2009]	VC2A 2.3-2.6	✓
ES0917543-008	[17-NOV-2009]	VC1A 1.2-1.6	✓
ES0917543-009	[17-NOV-2009]	VC3A 0-0.6	✓
ES0917543-010	[17-NOV-2009]	VC3A 0.6-1.3	✓
ES0917543-011	[17-NOV-2009]	VC3A 1.3-1.9	✓
ES0917543-012	[17-NOV-2009]	VC3A 1.9-2.4	✓

Requested Deliverables

Ms ALI WATTERS

- *AU Certificate of Analysis - NATA (COA)	Email	ali.watters@worleyparsons.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ali.watters@worleyparsons.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ali.watters@worleyparsons.com
- A4 - AU Sample Receipt Notification - Environmental (SRN)	Email	ali.watters@worleyparsons.com
- A4 - AU Tax Invoice (INV)	Email	ali.watters@worleyparsons.com
- Default - Chain of Custody (COC)	Email	ali.watters@worleyparsons.com
- EDI Format - ENMRG (ENMRG)	Email	ali.watters@worleyparsons.com



CHAIN OF CUSTODY

ALS Laboratory, please tick →

Environmental Division
Sydney

Work Order

ES0917544

CLIENT: WOLEY PARSONS
OFFICE: N. SYDNEY
PROJECT: CATTEX MARINE/SHORE DREDGING
ORDER NUMBER:
PROJECT MANAGER: AU WATTERS
SAMPLER: ALICE HANNAFFORD
COC emailed to ALS? (YES / NO)
Email Reports to (will default to PM if no other addresses are listed):
Email Invoice to (will default to PM if no other addresses are listed):
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS:
 Standard TAT (List due date):
 Non Standard or urgent TAT (List due date):
FOR LABORATORY USE:
Custody Seal Intact?
 Yes
 No
 Free Ice / Frozen ice bricks
 Random Sample Temperature
 Other comment:

COSEQUENCE NUMBER (Circle)
COC: 3 2 3 4 5 6 7
OF: 1 2 3 4 5 6 7

RELINQUISHED BY:
RECEIVED BY: Sydney
DATE/TIME: 17/11/19 17:20

CONTACT PH: 0422 763 386
SAMPLER MOBILE: 0402365428
EDD FORMAT (or default):
DATE/TIME: 17/11/19 17:20



Telephone : +61-2-8784 8555

Yes No N/A
Yes No N/A
4-5°C
RECEIVED BY:
DATE/TIME:

Subcon / Forward Lab / Split WO

Organised By / Date: ALS B.R. Evans - 17/11/19 TBT/TOC
Relinquished By / Date:
Connote / Courier:
WO No: ES0917544
Attach By PO / Internal Sheet:

ALS SYD BATCH ONLY: ES0917541
PSD: ES0917542
PH FOX: ES0917543

ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price)
Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (acid filtered bottle required).

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EG020SD (trace metals)	EG035L (Mercury)	EP132SD (PAHs)	EP004 (TOC)	EP080 (TBT)	EP131A (OC Pesticides)	EP131B (PCBs)	EP080-UT (TPH (C6-C9) / BTEX)	EP071SD (TPH C10-C36)	EA160-H (Particle sizing)	EN020PR (dry/Bag/Label)	EA003 (pH & pHfox)	EA033 (chromium)	(TOC) (Nitrate)	Additional Information		
1	VC1A 0-0.5	17/11 am	s	Glass bottle/bags	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	STORE	STORE	STORE remaining sample - will select following review of results
	VC1A 0-0.5X	17/11 am	s	Glass bottle/bags	2															STORE	STORE	
2	VC1A 0.5-1.2	17/11 am	s	Glass bottle/bags	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	STORE	STORE	
	VC1A 0.5-1.2X	17/11 am	s	Glass bottle/bags	2															STORE	STORE	
			s	Glass bottle/bags																STORE	STORE	
3	VC2A 0-1.0	17/11 am	s	Glass bottle/bags	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	STORE	STORE	
4	VC2A 0-1.0ND	17/11 am	s	Glass bottle/bags	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	STORE	STORE	
	VC2A 0-1.0X	17/11 am	s	Glass bottle/bags	2															STORE	STORE	
5	VC2A 1.0-1.4	17/11 am	s	Glass bottle/bags	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	STORE	STORE	
	VC2A 1.0-1.4Y	17/11 am	s	Glass bottle/bags	2															STORE	STORE	
6	VC2A 1.4-2.0	17/11 am	s	Glass bottle/bags	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	STORE	STORE	
	VC2A 1.4-2.0Z	17/11 am	s	Glass bottle/bags	2															STORE	STORE	
7	VC2A 2.0-2.3	17/11 am	s	Glass bottle/bags	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	STORE	STORE	
8	VC2A 2.3-2.6	17/11 pm	s	Glass bottle/bags	4															STORE	STORE	
	VC2A 2.3-2.6x	17/11 pm	s	Glass bottle/bags	2															STORE	STORE	
			s	Glass bottle/bags																STORE	STORE	
9	VC1A 12-1.6	17/11 pm	s	Glass bottle/bags	4															STORE	STORE	
	VC1A 12-1.62	17/11 pm	s	Glass bottle/bags	2															STORE	STORE	
			s	Glass bottle/bags																STORE	STORE	



CHAIN OF CUSTODY

ALS Laboratory please tick →

CLIENT: <u>Waley Parsons</u>	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: <u>N Sydney</u>	(Standard TAT may be longer for some tests e.g Ultra Trace Organics) <input type="checkbox"/> Non Standard or urgent TAT (List due date):	Custody Seal Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
PROJECT: <u>Catex maintenance & edging</u>	ALS QUOTE NO.:	Free ice / Frozen ice bricks present upon receipt? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
ORDER NUMBER:	COC SEQUENCE NUMBER (Circle)	Random Sample Temperature on Receipt:	
PROJECT MANAGER: <u>Al Watters</u>	CONTACT PH: <u>0422763381</u>	OF: 1 2 3 4 5 6 7	Other comment: <u>4.6 e</u>
SAMPLER: <u>Nick Hennaio</u>	SAMPLER MOBILE: <u>0402365423</u>	RECEIVED BY: <u>Stephano HASSGEM</u>	RELINQUISHED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: <u>17/11/19 17:20</u>	DATE/TIME:
Email Reports to (will default to PM if no other addresses are listed):			
Email Invoice to (will default to PM if no other addresses are listed):			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) <small>Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).</small>														Additional Information				
	LAB ID	SAMPLE ID	DATE / TIME		MATRIX	TYPE & PRESERVATIVE <small>(refer to codes below)</small>	TOTAL BOTTLES	EG020SD (trace metals)	EG035L (Mercury)	EP132SD (PAHs)	EP004 (TOC)	EP090 (TBT)	EP131A (OC Pesticides)	EP131B (PCBs)	EP080-LT (TPH (C8-C9) / BTEX)	EP071SD (TPH C10-C36)	EA150-H (Particle sizing)	EN020PR (dry/Bag/Label)		EA0003 (pH & pffox)	EA033 (chromium)	(TCLP/Elutriate)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
10	UC3a0-06		S	Glass bottle/bags	4	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC3a0-06x		S	Glass bottle/bags	2	Hold																	
11	UC3a06-13		S	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC3a06-13p		S	Glass bottle/bags	2	Hold																	
12	UC3a13-191		S	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC3a13-192		S	Glass bottle/bags	2	Hold																	
13	UC3a19-24		S	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
14	UC3b05-09		S	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
15	UC3b0-05		S	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC3b0-05x		S	Glass bottle/bags	2	Hold																	
			S	Glass bottle/bags																	STORE	STORE	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
 Y = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass.
 Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES0917544	Page	: 1 of 6
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 17-NOV-2009
C-O-C number	: ----	Issue Date	: 27-NOV-2009
Sampler	: NH	No. of samples received	: 13
Site	: ----	No. of samples analysed	: 13
Quote number	: EN/034/09		

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Matt Frost	Organic Instrument Chemist	Inorganics
Matt Frost	Organic Instrument Chemist	Organics
Stephen Hislop	Senior Inorganic Chemist	Stafford Minerals - AY

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **TBT: Matrix spike recovery not determined due to sample heterogeneity.**
- **TBT: Sample VC1A 1.2-1.6 required dilution due to the presence of high level contaminants. LOR values have been adjusted accordingly. Surrogate recovery not determined.**



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				VC1A 0-0.5	VC1A 0.5-1.2	VC2A 0-1.0	VC2A 0-1.0 DUP	VC2A 1.0-1.4
				17-NOV-2009 10:00	17-NOV-2009 10:00	17-NOV-2009 10:00	17-NOV-2009 10:00	17-NOV-2009 10:00
Compound	CAS Number	LOR	Unit	ES0917544-001	ES0917544-002	ES0917544-003	ES0917544-004	ES0917544-005
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	0.07	0.08	<0.02	<0.02	1.13



Analytical Results

Sub-Matrix: SOIL

Client sample ID
 Client sampling date / time

Compound	CAS Number	LOR	Unit	VC2A 1.4-2.0	VC2A 2.0-2.3	VC2A 2.3-2.6	VC1A 1.2-1.6	VC3A 0-0.6
				17-NOV-2009 10:00	17-NOV-2009 10:00	[17-NOV-2009]	[17-NOV-2009]	[17-NOV-2009]
				ES0917544-006	ES0917544-007	ES0917544-008	ES0917544-009	ES0917544-010
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	----	----	20.1	17.5	27.9
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	0.61	0.12	0.14	0.03	0.69
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	----	----	5.4	26.8	5.0
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	----	----	100	Not Determined	88.2



Analytical Results

Sub-Matrix: SOIL

				Client sample ID	VC3A 0.6-1.3	VC3A 1.3-1.9	VC3A 1.9-2.4	----	----
				Client sampling date / time	[17-NOV-2009]	[17-NOV-2009]	[17-NOV-2009]	----	----
Compound	CAS Number	LOR	Unit	ES0917544-011	ES0917544-012	ES0917544-013	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	0.02	%	0.19	0.25	0.14	----	----	----



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP090S: Organotin Surrogate			
Tripropyltin	----	34	108

Hi All,

The following changes have been made to the below batches as per the client request.

NEWCASTLE PSD BATCH

ES0917542 – Cancelled analysis on samples **1 and 2** in this batch

BRISBANE TBT AND TOC BATCH

ES0917544 – Cancelled TBT on samples **1 and 3**. **TOC is still needed for these samples.**

SYDNEY BATCH

ES0917541 – Cancelled UT OC/PCB as well as Low Level TPH and BTEX on samples **1 and 3**. **This means metals, mercury and Sediment PAH's still need to continue on these samples.**

Jacob Waugh

Production Co-ordinator

ALS Laboratory Group

Environmental Division

Sydney, Australia

Phone: +61 2 8784 8555

Fax: +61 2 8784 8500

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From: Charlie Pierce

Sent: Thursday, 19 November 2009 11:41 AM

To: Uma Nagendiram; Peter Donaghy; Frank Ferraro; Edwandy Fadjar; Alex Rossi

Cc: Jacob Waugh

Subject: FW: Your Reference : CALTEX MAINTENANCE DREDGING. COC/COC/COC/COC/SRN for ALSE Workorder : ES0917541

Dear Everyone,

The client has requested that we no longer test sample 001 and sample 002 for the tests shown below. Please stop these tests immediately. If testing has been completed, please let me know.

Dear Frank

Can you confirm that:

VC3B0.5-0.9

VC3B0-0.5

VC3B0-0.5x

Were not received?

Kind Regards

Charlie Pierce

Laboratory Manager - Sydney

ALS Laboratory Group

Environmental Division

Sydney, Australia

Phone: + 61 2 8784 8555

Fax: + 61 2 8784 8500

Mobile: +61 0466309729

www.alsglobal.com

From: Hannaford, Nick (Sydney) [mailto:Nicholas.Hannaford@WorleyParsons.com]

Sent: Thursday, 19 November 2009 11:20 AM

To: Charlie Pierce

Cc: Watters, Ali (Sydney)

Subject: FW: Your Reference : CALTEX MAINTENANCE DREDGING. COC/COC/COC/COC/SRN for ALSE Workorder : ES0917541

Hi Charlie,

Please see the following amendments to the attached SRN below.

19/11/2009

Lab ID	Our ID	Change
ES0917541-001	VC1A 0-0.5	No longer require the following tests: EP090 (TBT) EP131A (OC Pesticides) EP131B (PCBs) EP080-UT (TPH(C6-C9)/BTEX) EP071SD (TPH C10-C36) EA150-H (Particle Sizing)
ES0917541-003	VC2A 0-1.0	No longer require the following tests: EP090 (TBT) EP131A (OC Pesticides) EP131B (PCBs) EP080-UT (TPH(C6-C9)/BTEX) EP071SD (TPH C10-C36) EA150-H (Particle Sizing)

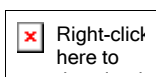
I also note that on the second copy of the COD form that you sent Ali it is stated that the following samples were not received:

VC3B0.5-0.9
VC3B0-0.5
VC3B0-0.5x

However on the first copy of the CoC these are given a lab ID. These samples are also missing from the SRN. Please advise.

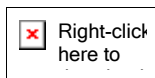
Regards,

Nick Hannaford
Environmental Scientist
WorleyParsons
Tel: +61 2 8456 7357
Fax: +62 2 8923 6877
WorleyParsons Services Pty Ltd
Level 11, 141 Walker St
Nth Sydney NSW 2060
WorleyParsons | www.worleyparsons.com



From: Watters, Ali (Sydney)
Sent: Wednesday, November 18, 2009 2:47 PM
To: Hannaford, Nick (Sydney)
Subject: FW: Your Reference : CALTEX MAINTENANCE DREDGING. COC/COC/COC/COC/SRN for ALSE Workorder : ES0917541

FYI



From: ALSE Sydney Aus [<mailto:alse.sydney.als@als.com.au>]
Sent: Wednesday, 18 November 2009 2:39 PM
To: Watters, Ali (Sydney)
Subject: Your Reference : CALTEX MAINTENANCE DREDGING. COC/COC/COC/COC/SRN for ALSE Workorder : ES0917541

This e-mail has been automatically generated.

-- PLEASE DO NOT REPLY --

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protection throughout their company resources. However, ALS cannot guarantee any attachment is virus free and will not be held liable for any disruption to business. It is highly recommended that all attachments received are scanned prior to opening.

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Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES0917544	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 17-NOV-2009
C-O-C number	: ----	Issue Date	: 27-NOV-2009
Sampler	: NH	No. of samples received	: 13
Order number	: ----	No. of samples analysed	: 13
Quote number	: EN/034/09		

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Matt Frost	Organic Instrument Chemist	Inorganics
Matt Frost	Organic Instrument Chemist	Organics
Stephen Hislop	Senior Inorganic Chemist	Stafford Minerals - AY

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 1171420)									
ES0917544-008	VC2A 2.3-2.6	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	20.1	20.0	0.0	0% - 20%
ES0917655-005	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	18.6	19.0	2.2	0% - 50%
EP005: Total Organic Carbon (TOC) (QC Lot: 1169775)									
ES0917544-001	VC1A 0-0.5	EP005: Total Organic Carbon	----	0.02	%	0.07	0.07	0.0	No Limit
ES0917544-011	VC3A 0.6-1.3	EP005: Total Organic Carbon	----	0.02	%	0.19	0.18	0.0	No Limit
EP090: Organotin Compounds (QC Lot: 1170808)									
EB0918340-003	Anonymous	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	1.9	1.4	33.6	No Limit
ES0917604-075	Anonymous	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	1.9	1.4	26.4	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit			LCS	Low	High	
EP005: Total Organic Carbon (TOC) (QCLot: 1169775)									
EP005: Total Organic Carbon	----	0.02	%	<0.02	100 %	101	70	130	
EP090: Organotin Compounds (QCLot: 1170808)									
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	105	24.1	129	



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				<i>Matrix Spike (MS) Report</i>			
		<i>Spike</i>	<i>Spike Recovery (%)</i>		<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Concentration</i>	<i>MS</i>	<i>Low</i>	<i>High</i>
EP090: Organotin Compounds (QCLot: 1170808)							
ES0917544-008	VC2A 2.3-2.6	EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	# Not Determined	20	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES0917544	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 17-NOV-2009
Sampler	: NH	Issue Date	: 27-NOV-2009
Order number	: ----		
Quote number	: EN/034/09	No. of samples received	: 13
		No. of samples analysed	: 13

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content								
Soil Glass Jar - Unpreserved VC2A 2.3-2.6, VC3A 0-0.6	VC1A 1.2-1.6,	17-NOV-2009	----	----	----	23-NOV-2009	24-NOV-2009	✓
EP005: Total Organic Carbon (TOC)								
Pulp Bag VC1A 0-0.5, VC2A 0-1.0, VC2A 1.0-1.4, VC2A 2.0-2.3, VC1A 1.2-1.6, VC3A 0.6-1.3, VC3A 1.9-2.4	VC1A 0.5-1.2, VC2A 0-1.0 DUP, VC2A 1.4-2.0, VC2A 2.3-2.6, VC3A 0-0.6, VC3A 1.3-1.9,	17-NOV-2009	20-NOV-2009	15-DEC-2009	✓	23-NOV-2009	15-DEC-2009	✓
EP090: Organotin Compounds								
Soil Glass Jar - Unpreserved VC2A 2.3-2.6, VC3A 0-0.6	VC1A 1.2-1.6,	17-NOV-2009	23-NOV-2009	01-DEC-2009	✓	25-NOV-2009	02-JAN-2010	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	2	11	18.2	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	2	18	11.1	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	13	15.4	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Organotin Analysis	EP090	1	18	5.6	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	13	7.7	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Organotin Analysis	EP090	1	18	5.6	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	13	7.7	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Organotin Analysis	EP090	1	18	5.6	5.0	✔	ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Total Organic Carbon	EP005	SOIL	In-house. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a LECO furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO ₂) is automatically measured by infra-red detector.
Organotin Analysis	EP090	SOIL	(USEPA SW 846 - 8270D) Prepared sample extracts are analysed by GC/MS coupled with high volume injection, and quantified against an established calibration curve.
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Organotin Sample Preparation	ORG35	SOIL	In house. 20g sample is spiked with surrogate and leached in a methanol:acetic acid:UHP water mix and vacuum filtered. Reagents and solvents are added to the sample and the mixture tumbled. The butyltin compounds are simultaneously derivatised and extracted. The extract is further extracted with petroleum ether. The resultant extracts are combined and concentrated for analysis.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP090: Organotin Compounds	ES0917544-008	VC2A 2.3-2.6	Tributyltin	56573-85-4	Not Determined	----	Matrix spike recovery not determined due to sample matrix interference.

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.

Regular Sample Surrogates

Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP090S: Organotin Surrogate	ES0917544-009	VC1A 1.2-1.6	Tripopyltin	----	Not Determined	----	Surrogate recovery not determined due to (target or non-target) matrix interferences

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)
Comprehensive Report

Work Order : **ES0917544**

Client : **WORLEY PARSONS - INFRASTRUCTURE MWE** **Laboratory** : Environmental Division Sydney

Contact : Ms ALI WATTERS **Contact** : Charlie Pierce

Address : Level 10/141 Walker Street **Address** : 277-289 Woodpark Road Smithfield
NORTH SYDNEY NSW, AUSTRALIA NSW Australia 2164
2060

E-mail : ali.watters@worleyparsons.com **E-mail** : charlie.pierce@alsenviro.com

Telephone : +61 02 8907 2131 **Telephone** : +61-2-8784 8555

Facsimile : ---- **Facsimile** : +61-2-8784 8500

Project : CALTEX MAINTENANCE DREDGING **Page** : 1 of 2

Order number : ----

C-O-C number : ---- **Quote number** : ES2009WORPAR0223 (EN/034/09)

Site : ----

Sampler : NH **QC Level** : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received : 17-NOV-2009 **Issue Date** : 20-NOV-2009 10:56

Client Requested Due Date : 27-NOV-2009 **Scheduled Reporting Date** : **27-NOV-2009**

Delivery Details

Mode of Delivery : Carrier **Temperature** : 4.6'C - Ice present

No. of coolers/boxes : 1 HARD **No. of samples received** : 13

Security Seal : Intact. **No. of samples analysed** : 13

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Requested Deliverables
- Samples received in appropriately pretreated and preserved containers.
- TBT cancelled for Samples 1 & 3 as per Nick Hannaford on 19/11/09
- **Samples received in appropriately pretreated and preserved containers.**
- **TBT AND TOC analysis will be conducted by ALS Brisbane**
- **Sample(s) have been received within recommended holding times.**
- **Sample id UC3b0.5-0.9 and UC3b 0-0.5 were not received.**
- **This batch for TBT & TOC only and split from ES0917541**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Jacob Waugh
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EP005 (solids) Total Organic Carbon (TOC) soils	SOIL - EA055-103 Moisture Content	SOIL - EP090 (solids) Organotins
ES0917544-001	17-NOV-2009 10:00	VC1A 0-0.5	✓		
ES0917544-002	17-NOV-2009 10:00	VC1A 0.5-1.2	✓		
ES0917544-003	17-NOV-2009 10:00	VC2A 0-1.0	✓		
ES0917544-004	17-NOV-2009 10:00	VC2A 0-1.0 DUP	✓		
ES0917544-005	17-NOV-2009 10:00	VC2A 1.0-1.4	✓		
ES0917544-006	17-NOV-2009 10:00	VC2A 1.4-2.0	✓		
ES0917544-007	17-NOV-2009 10:00	VC2A 2.0-2.3	✓		
ES0917544-008	[17-NOV-2009]	VC2A 2.3-2.6	✓	✓	✓
ES0917544-009	[17-NOV-2009]	VC1A 1.2-1.6	✓	✓	✓
ES0917544-010	[17-NOV-2009]	VC3A 0-0.6	✓	✓	✓
ES0917544-011	[17-NOV-2009]	VC3A 0.6-1.3	✓		
ES0917544-012	[17-NOV-2009]	VC3A 1.3-1.9	✓		
ES0917544-013	[17-NOV-2009]	VC3A 1.9-2.4	✓		

Requested Deliverables

MR NICK HANNAFORD

- *AU Certificate of Analysis - NATA (COA)	Email	Nicholas.Hannaford@WorleyParsons.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Nicholas.Hannaford@WorleyParsons.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Nicholas.Hannaford@WorleyParsons.com
- A4 - AU Sample Receipt Notification - Environmental (SRN)	Email	Nicholas.Hannaford@WorleyParsons.com
- Default - Chain of Custody (COC)	Email	Nicholas.Hannaford@WorleyParsons.com
- EDI Format - ENMRG (ENMRG)	Email	Nicholas.Hannaford@WorleyParsons.com

Ms ALI WATTERS

- *AU Certificate of Analysis - NATA (COA)	Email	ali.watters@worleyparsons.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ali.watters@worleyparsons.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ali.watters@worleyparsons.com
- A4 - AU Sample Receipt Notification - Environmental (SRN)	Email	ali.watters@worleyparsons.com
- A4 - AU Tax Invoice (INV)	Email	ali.watters@worleyparsons.com
- Default - Chain of Custody (COC)	Email	ali.watters@worleyparsons.com
- EDI Format - ENMRG (ENMRG)	Email	ali.watters@worleyparsons.com



CHAIN OF CUSTODY

ALS Laboratory, please tick →

CLIENT: <u>Woley Park</u>	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date); <small>(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)</small>	FOR LABORATORY USE ONLY (Cir)
OFFICE: <u>North Sydney</u>	<input type="checkbox"/> Non Standard or urgent TAT (List due date);	Custody Seal Intact?
PROJECT: <u>Calder maintenance already</u>	ALS QUOTE NO.:	<input type="checkbox"/> Free ice / frozen ice bricks present upon rec
ORDER NUMBER:	COC SEQUENCE NUMBER (Circle)	Random Sample Temperature on Receipt:
PROJECT MANAGER: <u>Ali Willetts</u>	CONTACT PH: <u>0427 763 386</u>	OF: 1 2 3 4 5 6 7
SAMPLER: <u>Nick Hearnston</u>	SAMPLER MOBILE: <u>0402365428</u>	RECEIVED BY: <u>Frank ALS</u>
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	RELINQUISHED BY:
Email Reports to (will default to PM if no other addresses are listed):	DATE/TIME:	DATE/TIME: <u>18/11/09 5:15pm</u>
Email Invoice to (will default to PM if no other addresses are listed):		

Environmental Division
Sydney
Work Order
ES0917649

Yes No
Yes No
0-6 °C



Telephone : +61-2-8784 8555

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (see...))													Additional Information					
	LAB ID	SAMPLE ID	DATE / TIME		MATRIX	TYPE & PRESERVATIVE <small>(refer to codes below)</small>	TOTAL BOTTLES	EG020SD (trace metals)	EG035L (Mercury)	EP132SD (PAHs)	EP004 (TOC)	EP080 (TBT)	EP131A (OC Pesticides)	EP131B (PCBs)	EP080-UT (TPH (C6-C9) / BTEX)	EP071SD (TPH C10-C36)	EA150-H (Particle sizing)		EN020PR (dry/Bag/Label)	EA003 (pH & pffox)	EA033 (chromium)	(TCLP/Elutriate)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	1	SS3c		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	STORE remaining sample - will select following review of results
(16)		SS3cx		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
2		SS3d		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
(17)		SS3dx		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
3		SS3b		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
(18)		SS3bx		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
4		SS3a		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
(19)		SS3ax		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
5		UC3b0-05		s	Glass bottle/bags	4	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
6		UC3b0-05x		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
7		UC3b0.5-09		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
8		UC2B0-05		s	Glass bottle/bags	4	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
(20)		UC2B0-05x		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
9		UC2B05-09		s	Glass bottle/bags	4	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
(21)		UC2B05-09x		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
10		UC2B09-15		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
(22)		UC2B09-15x		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
11		UC2B15-22		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
(23)		UC2B15-22x		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	

CONTRACT WORK
 WO: _____
 LAB: ALS Brisbane / Newcastle
 DATE: 19/11/09
 TBT/TOC: _____
 PHIT/PHOX: _____
 PSD: _____



CHAIN OF CUSTODY

ALS Laboratory, please tick →

CLIENT: Workfloors	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date);	FOR LABORATORY USE ONLY (Circle)	
OFFICE: NHSprey	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) <input type="checkbox"/> Non Standard or urgent TAT (List due date):	Custody Seal Intact?	Yes No N/A
PROJECT: Cater maintenance dredging	ALS QUOTE NO.:	Free ice / frozen ice bricks present upon receipt?	Yes No N/A
ORDER NUMBER:		Random Sample Temperature on Receipt:	°C
PROJECT MANAGER: Al. water	CONTACT PH: 0422 763 336	Other comment:	
SAMPLER: Nick Kennelord	SAMPLER MOBILE: 040 2365423	RECEIVED BY: Frank - ALS	RECEIVED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: 18/11/09 5:15pm	DATE/TIME:
Email Reports to (will default to PM if no other addresses are listed)			
Email Invoice to (will default to PM if no other addresses are listed)			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfilled bottle required) or Dissolved (fold filled bottle required).													Additional Information				
	LAB ID	SAMPLE ID	DATE / TIME		MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EG020SD (trace metals)	EG035L (Mercury)	EP132SD (PAHs)	EP004 (TOC)	EP080 (TBT)	EP131A (OC Pesticides)	EP131B (PCBs)	EP080-UT (TPH (C6-C9) / BTEX)	EP071SD (TPH C10-C38)	EA150-H (Particle sizing)		EN020PR (dry/Bag/L.abel)	EA0003 (pH & phlox)	EA033 (chromium)	(TCLP/Elutriate)
	12	SS2D	18/11/09 am	S	Glass bottle/bags	3	/	/	/	/	/									STORE	STORE	
(24)		SS2Dx	18/11/09 am	S	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	13	SS1C	18/11/09 am	S	Glass bottle/bags	3	/	/	/	/	/									STORE	STORE	
(25)		SS1Cx	18/11/09 am	S	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	14	SS2A	18/11/09 am	S	Glass bottle/bags	3	/	/	/	/	/									STORE	STORE	
(26)		SS2Ax	18/11/09 am	S	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
	15	SS1D	18/11/09 am	S	Glass bottle/bags	3	/	/	/	/	/									STORE	STORE	
(27)		SS1Dx	18/11/09 am	S	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
				S	Glass bottle/bags															STORE	STORE	
				S	Glass bottle/bags															STORE	STORE	
				S	Glass bottle/bags															STORE	STORE	
TOTAL							30	30	30	30	18	6	6	6	6	6	30	30	?	?		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
 V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass.
 Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES0917649	Page	: 1 of 11
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 18-NOV-2009
C-O-C number	: ----	Issue Date	: 27-NOV-2009
Sampler	: NH	No. of samples received	: 27
Site	: ----	No. of samples analysed	: 15
Quote number	: SY/503/09		

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Celine Conceicao	Spectroscopist	Inorganics
Edwandy Fadjar	Senior Organic Chemist	Organics
Hoa Nguyen	Inorganic Chemist	Inorganics

Environmental Division Sydney

Part of the **ALS Laboratory Group**

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	SS3C	SS3D	SS3B	SS3A	VC3B0-0.5
				17-NOV-2009 15:00	17-NOV-2009 15:00	17-NOV-2009 15:00	17-NOV-2009 15:00	17-NOV-2009 15:00
				ES0917649-001	ES0917649-002	ES0917649-003	ES0917649-004	ES0917649-005
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	40.0	22.0	47.4	24.7	19.1
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	0.56	<0.50
Arsenic	7440-38-2	1.00	mg/kg	5.85	1.50	8.85	1.70	<1.00
Cadmium	7440-43-9	0.1	mg/kg	0.1	<0.1	0.2	0.2	<0.1
Chromium	7440-47-3	1.0	mg/kg	19.1	5.3	22.8	7.1	2.2
Copper	7440-50-8	1.0	mg/kg	15.2	5.1	21.7	33.2	1.3
Cobalt	7440-48-4	0.5	mg/kg	1.4	<0.5	1.8	1.5	<0.5
Lead	7439-92-1	1.0	mg/kg	19.9	4.5	25.5	60.2	2.4
Manganese	7439-96-5	10	mg/kg	33	12	40	14	<10
Nickel	7440-02-0	1.0	mg/kg	4.6	1.0	5.7	2.0	<1.0
Selenium	7782-49-2	0.1	mg/kg	0.5	0.2	1.0	0.2	<0.1
Silver	7440-22-4	0.1	mg/kg	0.1	<0.1	0.2	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	15.2	3.8	19.3	3.6	2.5
Zinc	7440-66-6	1.0	mg/kg	64.2	19.1	95.9	460	6.3
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.15	0.03	0.20	0.01	0.02
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	----	----	----	----	<3
C10 - C14 Fraction	----	3	mg/kg	----	----	----	----	<3
C15 - C28 Fraction	----	3	mg/kg	----	----	----	----	3
C29 - C36 Fraction	----	5	mg/kg	----	----	----	----	<5
^ C10 - C36 Fraction (sum)	----	3	mg/kg	----	----	----	----	3
EP080-SD: BTEX								
Benzene	71-43-2	0.2	mg/kg	----	----	----	----	<0.2
Toluene	108-88-3	0.2	mg/kg	----	----	----	----	<0.2
Ethylbenzene	100-41-4	0.2	mg/kg	----	----	----	----	<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	----	----	----	----	<0.2
ortho-Xylene	95-47-6	0.2	mg/kg	----	----	----	----	<0.2
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	----	----	----	----	<0.50
alpha-BHC	319-84-6	0.50	µg/kg	----	----	----	----	<0.50
beta-BHC	319-85-7	0.50	µg/kg	----	----	----	----	<0.50
delta-BHC	319-86-8	0.50	µg/kg	----	----	----	----	<0.50
4,4'-DDD	72-54-8	0.50	µg/kg	----	----	----	----	<0.50
4,4'-DDE	72-55-9	0.50	µg/kg	----	----	----	----	<0.50
4,4'-DDT	50-29-3	0.50	µg/kg	----	----	----	----	<0.50



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	SS3C	SS3D	SS3B	SS3A	VC3B0-0.5
				17-NOV-2009 15:00	17-NOV-2009 15:00	17-NOV-2009 15:00	17-NOV-2009 15:00	17-NOV-2009 15:00
				ES0917649-001	ES0917649-002	ES0917649-003	ES0917649-004	ES0917649-005
EP131A: Organochlorine Pesticides - Continued								
^ DDT (total)	----	0.50	µg/kg	----	----	----	----	<0.50
Dieldrin	60-57-1	0.50	µg/kg	----	----	----	----	<0.50
alpha-Endosulfan	959-98-8	0.50	µg/kg	----	----	----	----	<0.50
beta-Endosulfan	33213-65-9	0.50	µg/kg	----	----	----	----	<0.50
Endosulfan sulfate	1031-07-8	0.50	µg/kg	----	----	----	----	<0.50
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	----	----	----	----	<0.50
Endrin	72-20-8	0.50	µg/kg	----	----	----	----	<0.50
Endrin aldehyde	7421-93-4	0.50	µg/kg	----	----	----	----	<0.50
Endrin ketone	53494-70-5	0.50	µg/kg	----	----	----	----	<0.50
Heptachlor	76-44-8	0.50	µg/kg	----	----	----	----	<0.50
Heptachlor epoxide	1024-57-3	0.50	µg/kg	----	----	----	----	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	----	----	----	----	<0.50
gamma-BHC	58-89-9	0.50	µg/kg	----	----	----	----	<0.50
Methoxychlor	72-43-5	0.50	µg/kg	----	----	----	----	<0.50
cis-Chlordane	5103-71-9	0.50	µg/kg	----	----	----	----	<0.50
trans-Chlordane	5103-74-2	0.50	µg/kg	----	----	----	----	<0.50
^ Total Chlordane (sum)	----	0.50	µg/kg	----	----	----	----	<0.50
Oxychlordane	27304-13-8	0.50	µg/kg	----	----	----	----	<0.50
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	----	----	----	----	<5.0
Aroclor 1016	12974-11-2	5.0	µg/kg	----	----	----	----	<5.0
Aroclor 1221	11104-28-2	5.0	µg/kg	----	----	----	----	<5.0
Aroclor 1232	11141-16-5	5.0	µg/kg	----	----	----	----	<5.0
Aroclor 1242	53469-21-9	5.0	µg/kg	----	----	----	----	<5.0
Aroclor 1248	12672-29-6	5.0	µg/kg	----	----	----	----	<5.0
Aroclor 1254	11097-69-1	5.0	µg/kg	----	----	----	----	<5.0
Aroclor 1260	11096-82-5	5.0	µg/kg	----	----	----	----	<5.0
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	5	39	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	13	<5	7	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	15	<4	12	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	7	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	45	<4	33	<4	<4
Anthracene	120-12-7	4	µg/kg	10	<4	9	<4	<4
Fluoranthene	206-44-0	4	µg/kg	108	4	54	<4	<4
Pyrene	129-00-0	4	µg/kg	158	4	50	<4	<4
Benz(a)anthracene	56-55-3	4	µg/kg	93	<4	28	<4	<4



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	SS3C	SS3D	SS3B	SS3A	VC3B0-0.5
				17-NOV-2009 15:00	17-NOV-2009 15:00	17-NOV-2009 15:00	17-NOV-2009 15:00	17-NOV-2009 15:00
				ES0917649-001	ES0917649-002	ES0917649-003	ES0917649-004	ES0917649-005
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Chrysene	218-01-9	4	µg/kg	107	<4	25	<4	<4
Benzo(b)fluoranthene	205-99-2	4	µg/kg	169	4	42	<4	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	44	<4	13	<4	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	94	<4	21	<4	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	192	<4	34	<4	<4
Perylene	198-55-0	4	µg/kg	36	<4	16	<4	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	124	<4	31	<4	<4
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	27	<4	6	<4	<4
Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	119	<4	27	<4	<4
Coronene	191-07-1	5	µg/kg	20	<5	13	<5	<5
^ Sum of PAHs	----	4	µg/kg	1380	18	462	<4	<4
EP080-SD: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	----	----	----	----	108
Toluene-D8	2037-26-5	0.1	%	----	----	----	----	104
4-Bromofluorobenzene	460-00-4	0.1	%	----	----	----	----	112
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	----	----	----	----	58.3
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	----	----	55.3
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	80.7	100	90.0	88.6	116
Anthracene-d10	1719-06-8	0.1	%	88.8	80.4	93.3	89.6	88.3
4-Terphenyl-d14	1718-51-0	0.1	%	85.6	77.8	96.4	86.9	82.1



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VC3B0-0.5X	VC3B0.5-0.9	VC2B0-0.5	VC2B0.5-0.9	VC2B0.9-1.5
				17-NOV-2009 15:00	17-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00
				ES0917649-006	ES0917649-007	ES0917649-008	ES0917649-009	ES0917649-010
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	23.2	23.9	15.8	19.4	19.3
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	1.02	<1.00	<1.00	<1.00	<1.00
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	3.2	2.9	3.6	2.6	2.5
Copper	7440-50-8	1.0	mg/kg	1.7	2.0	3.6	<1.0	<1.0
Cobalt	7440-48-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Lead	7439-92-1	1.0	mg/kg	3.6	3.4	3.9	1.4	1.2
Manganese	7439-96-5	10	mg/kg	<10	<10	<10	<10	<10
Nickel	7440-02-0	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Selenium	7782-49-2	0.1	mg/kg	<0.1	0.1	<0.1	0.2	0.3
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	3.4	3.3	3.3	2.2	2.9
Zinc	7440-66-6	1.0	mg/kg	9.0	9.0	20.7	3.5	2.6
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.02	0.02	0.03	0.02	0.02
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	----	----	<3	----	----
C10 - C14 Fraction	----	3	mg/kg	----	----	<3	----	----
C15 - C28 Fraction	----	3	mg/kg	----	----	4	----	----
C29 - C36 Fraction	----	5	mg/kg	----	----	<5	----	----
^ C10 - C36 Fraction (sum)	----	3	mg/kg	----	----	4	----	----
EP080-SD: BTEX								
Benzene	71-43-2	0.2	mg/kg	----	----	<0.2	----	----
Toluene	108-88-3	0.2	mg/kg	----	----	<0.2	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	----	----	<0.2	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	----	----	<0.2	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	----	----	<0.2	----	----
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	----	----	<0.50	----	----
alpha-BHC	319-84-6	0.50	µg/kg	----	----	<0.50	----	----
beta-BHC	319-85-7	0.50	µg/kg	----	----	<0.50	----	----
delta-BHC	319-86-8	0.50	µg/kg	----	----	<0.50	----	----
4,4'-DDD	72-54-8	0.50	µg/kg	----	----	<0.50	----	----
4,4'-DDE	72-55-9	0.50	µg/kg	----	----	<0.50	----	----
4,4'-DDT	50-29-3	0.50	µg/kg	----	----	<0.50	----	----



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VC3B0-0.5X	VC3B0.5-0.9	VC2B0-0.5	VC2B0.5-0.9	VC2B0.9-1.5
				17-NOV-2009 15:00	17-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00
				ES0917649-006	ES0917649-007	ES0917649-008	ES0917649-009	ES0917649-010
EP131A: Organochlorine Pesticides - Continued								
^ DDT (total)	----	0.50	µg/kg	----	----	<0.50	----	----
Dieldrin	60-57-1	0.50	µg/kg	----	----	<0.50	----	----
alpha-Endosulfan	959-98-8	0.50	µg/kg	----	----	<0.50	----	----
beta-Endosulfan	33213-65-9	0.50	µg/kg	----	----	<0.50	----	----
Endosulfan sulfate	1031-07-8	0.50	µg/kg	----	----	<0.50	----	----
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	----	----	<0.50	----	----
Endrin	72-20-8	0.50	µg/kg	----	----	<0.50	----	----
Endrin aldehyde	7421-93-4	0.50	µg/kg	----	----	<0.50	----	----
Endrin ketone	53494-70-5	0.50	µg/kg	----	----	<0.50	----	----
Heptachlor	76-44-8	0.50	µg/kg	----	----	<0.50	----	----
Heptachlor epoxide	1024-57-3	0.50	µg/kg	----	----	<0.50	----	----
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	----	----	<0.50	----	----
gamma-BHC	58-89-9	0.50	µg/kg	----	----	<0.50	----	----
Methoxychlor	72-43-5	0.50	µg/kg	----	----	<0.50	----	----
cis-Chlordane	5103-71-9	0.50	µg/kg	----	----	<0.50	----	----
trans-Chlordane	5103-74-2	0.50	µg/kg	----	----	<0.50	----	----
^ Total Chlordane (sum)	----	0.50	µg/kg	----	----	<0.50	----	----
Oxychlordane	27304-13-8	0.50	µg/kg	----	----	<0.50	----	----
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	----	----	<5.0	----	----
Aroclor 1016	12974-11-2	5.0	µg/kg	----	----	<5.0	----	----
Aroclor 1221	11104-28-2	5.0	µg/kg	----	----	<5.0	----	----
Aroclor 1232	11141-16-5	5.0	µg/kg	----	----	<5.0	----	----
Aroclor 1242	53469-21-9	5.0	µg/kg	----	----	<5.0	----	----
Aroclor 1248	12672-29-6	5.0	µg/kg	----	----	<5.0	----	----
Aroclor 1254	11097-69-1	5.0	µg/kg	----	----	<5.0	----	----
Aroclor 1260	11096-82-5	5.0	µg/kg	----	----	<5.0	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	6	5	9	20	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	7	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	17	<4
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	5	<4
Fluoranthene	206-44-0	4	µg/kg	<4	<4	<4	23	<4
Pyrene	129-00-0	4	µg/kg	<4	<4	<4	23	<4
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	17	<4



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VC3B0-0.5X	VC3B0.5-0.9	VC2B0-0.5	VC2B0.5-0.9	VC2B0.9-1.5
				17-NOV-2009 15:00	17-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00
				ES0917649-006	ES0917649-007	ES0917649-008	ES0917649-009	ES0917649-010
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	14	<4
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	<4	20	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	8	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	11	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	20	<4
Perylene	198-55-0	4	µg/kg	<4	<4	<4	5	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	14	<4
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	<4
Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	12	<4
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5
^ Sum of PAHs	----	4	µg/kg	6	5	9	216	<4
EP080-SD: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	----	----	108	----	----
Toluene-D8	2037-26-5	0.1	%	----	----	112	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	----	----	110	----	----
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	----	----	65.3	----	----
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	65.3	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	119	102	120	123	86.9
Anthracene-d10	1719-06-8	0.1	%	89.6	92.9	94.7	89.6	89.2
4-Terphenyl-d14	1718-51-0	0.1	%	85.1	83.0	84.3	97.6	90.5



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VC2B1.5-2.2	SS2D	SS1C	SS2A	SS1D
				18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00
				ES0917649-011	ES0917649-012	ES0917649-013	ES0917649-014	ES0917649-015
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	21.4	21.7	20.9	21.8	19.8
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	<1.00	<1.00	<1.00	<1.00	<1.00
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	1.0	1.8	1.2	1.6	1.2
Copper	7440-50-8	1.0	mg/kg	<1.0	1.9	3.9	<1.0	3.4
Cobalt	7440-48-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Lead	7439-92-1	1.0	mg/kg	<1.0	2.0	1.1	1.8	1.0
Manganese	7439-96-5	10	mg/kg	<10	<10	12	<10	<10
Nickel	7440-02-0	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	<2.0	2.8	<2.0	2.6	<2.0
Zinc	7440-66-6	1.0	mg/kg	1.7	6.8	2.3	4.8	2.1
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	6	5	<5	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	<4	11
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	<4	<4
Fluoranthene	206-44-0	4	µg/kg	<4	<4	<4	<4	15
Pyrene	129-00-0	4	µg/kg	<4	<4	<4	<4	12
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	<4	9
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	<4	6
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	<4	<4	9
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	<4	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	<4	5
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	<4	7
Perylene	198-55-0	4	µg/kg	<4	<4	<4	<4	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	<4	5
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	<4
Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	<4	<4
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				VC2B1.5-2.2	SS2D	SS1C	SS2A	SS1D
				18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00
Compound	CAS Number	LOR	Unit	ES0917649-011	ES0917649-012	ES0917649-013	ES0917649-014	ES0917649-015
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
^ Sum of PAHs	----	4	µg/kg	6	5	<4	<4	79
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	89.2	87.1	114	90.1	80.4
Anthracene-d10	1719-06-8	0.1	%	93.6	91.6	97.9	100	93.7
4-Terphenyl-d14	1718-51-0	0.1	%	80.4	91.8	83.8	99.5	81.0



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080-SD: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	74.7	127
Toluene-D8	2037-26-5	74.8	129
4-Bromofluorobenzene	460-00-4	75.3	127
EP131S: OC Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	136
EP131T: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	10	164
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	30	115
Anthracene-d10	1719-06-8	27	133
4-Terphenyl-d14	1718-51-0	18	137



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES0917649	Page	: 1 of 11
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 18-NOV-2009
C-O-C number	: ----	Issue Date	: 27-NOV-2009
Sampler	: NH	No. of samples received	: 27
Order number	: ----	No. of samples analysed	: 15
Quote number	: SY/503/09		

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Celine Conceicao	Spectroscopist	Inorganics
Edwandy Fadjar	Senior Organic Chemist	Organics
Hoa Nguyen	Inorganic Chemist	Inorganics

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
= Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 1168643)									
ES0917644-015	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	16.0	16.5	3.5	0% - 50%
ES0917649-006	VC3B0-0.5X	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	23.2	21.8	6.0	0% - 20%
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 1169247)									
ES0917649-001	SS3C	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	0.1	0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.5	0.6	0.0	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	0.1	0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	1.4	1.4	0.0	No Limit
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	19.1	19.2	0.0	0% - 50%
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	15.2	16.4	7.4	0% - 50%
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	19.9	21.6	8.0	0% - 20%
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	4.6	5.1	8.7	No Limit
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	64.2	68.8	7.1	0% - 20%
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	5.85	6.46	9.8	No Limit
		EG020-SD: Manganese	7439-96-5	10	mg/kg	33	35	6.0	No Limit
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	15.2	15.6	2.3	No Limit
ES0917649-011	VC2B1.5-2.2	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	1.0	<1.0	0.0	No Limit
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	<1.0	<1.0	0.0	No Limit
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	<1.0	<1.0	0.0	No Limit
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	<1.0	0.0	No Limit
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	1.7	1.8	0.0	No Limit
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	<1.00	<1.00	0.0	No Limit
		EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	<10	0.0	No Limit
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	<2.0	<2.0	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1169246)									
ES0917649-001	SS3C	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.15	0.16	0.0	0% - 50%
ES0917649-011	VC2B1.5-2.2	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QC Lot: 1168443)									
ES0917649-005	VC3B0-0.5	EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
		EP071-SD: C15 - C28 Fraction	----	3	mg/kg	3	<3	0.0	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QC Lot: 1168443) - continued									
ES0917649-005	VC3B0-0.5	EP071-SD: C29 - C36 Fraction	----	5	mg/kg	<5	<5	0.0	No Limit
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QC Lot: 1169136)									
ES0917541-008	Anonymous	EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
EP080-SD: BTEX (QC Lot: 1169136)									
ES0917541-008	Anonymous	EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP131A: Organochlorine Pesticides (QC Lot: 1168438)									
ES0917541-008	Anonymous	EP131A: Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: DDT (total)	----	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: gamma-BHC	58-89-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: cis-Chlordane	5103-71-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: trans-Chlordane	5103-74-2	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
EP131A: Total Chlordane (sum)	----	0.50	µg/kg	<0.50	<0.50	0.0	No Limit		
EP131B: Polychlorinated Biphenyls (as Aroclors) (QC Lot: 1168439)									
ES0917541-008	Anonymous	EP131B: Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1016	12974-11-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP131B: Polychlorinated Biphenyls (as Aroclors) (QC Lot: 1168439) - continued									
ES0917541-008	Anonymous	EP131B: Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1168442)									
ES0917649-005	VC3B0-0.5	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit		
ES0917649-011	VC2B1.5-2.2	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit

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 Work Order : ES0917649
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE
 Project : CALTEX MAINTENANCE DREDGING



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1168442) - continued									
ES0917649-011	VC2B1.5-2.2	EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	6	<4	47.5	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	6	<5	26.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: SOIL

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1169247)									
EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	----	----	----	----	
EG020-SD: Arsenic	7440-38-2	1.0	mg/kg	<1.00	13.1 mg/kg	111	70	130	
EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	2.76 mg/kg	102	70	130	
EG020-SD: Chromium	7440-47-3	1.0	mg/kg	<1.0	60.9 mg/kg	114	70	130	
EG020-SD: Copper	7440-50-8	1.0	mg/kg	<1.0	54.7 mg/kg	99.9	70	130	
EG020-SD: Cobalt	7440-48-4	10	mg/kg	<10.0	24.5 mg/kg	102	70	130	
EG020-SD: Lead	7439-92-1	1.0	mg/kg	<1.0	54.8 mg/kg	85.6	70	130	
EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	136 mg/kg	105	70	130	
EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	55.2 mg/kg	107	70	130	
EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----	
EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	5.6 mg/kg	89.3	70	130	
EG020-SD: Vanadium	7440-62-2	2	mg/kg	<2.0	34 mg/kg	104	70	130	
EG020-SD: Zinc	7440-66-6	1.0	mg/kg	<1.0	104 mg/kg	106	70	130	
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1169246)									
EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.090 mg/kg	93.3	74.2	126	
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1168443)									
EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	5 mg/kg	93.0	75.2	116	
EP071-SD: C15 - C28 Fraction	----	3	mg/kg	<3	5 mg/kg	96.0	75.3	113	
EP071-SD: C29 - C36 Fraction	----	5	mg/kg	<5	5 mg/kg	105	72.6	117	
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1169136)									
EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	26 mg/kg	114	68.4	128	
EP080-SD: BTEX (QCLot: 1169136)									
EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	120	67.5	125	
EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	1 mg/kg	87.6	69	122	
EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	1 mg/kg	104	65.3	126	
EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	2.0 mg/kg	81.8	66.5	124	
EP080-SD: ortho-Xylene	106-42-3								
EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	1 mg/kg	116	66.7	123	
EP131A: Organochlorine Pesticides (QCLot: 1168438)									
EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	5 µg/kg	110	31.7	140	
EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	5 µg/kg	124	24.5	150	
EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	5 µg/kg	110	36.9	139	
EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	5 µg/kg	111	38.2	137	
EP131A: 4,4'-DDD	72-54-8	0.5	µg/kg	<0.50	5 µg/kg	128	42.5	141	



Sub-Matrix: SOIL

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike	Spike Recovery (%)		Recovery Limits (%)	
					Concentration	LCS	Low	High	
EP131A: Organochlorine Pesticides (QCLot: 1168438) - continued									
EP131A: 4.4'-DDE	72-55-9	0.5	µg/kg	<0.50	5 µg/kg	65.9	34.8	140	
EP131A: 4.4'-DDT	50-29-3	0.5	µg/kg	<0.50	5 µg/kg	94.8	38	143	
EP131A: DDT (total)	----	0.5	µg/kg	<0.50	----	----	----	----	
EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	5 µg/kg	111	43.2	134	
EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	5 µg/kg	99.5	23.7	139	
EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	5 µg/kg	105	35.8	138	
EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	5 µg/kg	90.6	7.45	158	
EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	----	----	----	----	
EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	5 µg/kg	95.2	21.6	162	
EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	5 µg/kg	88.3	19.3	131	
EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	5 µg/kg	100	17.9	141	
EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	5 µg/kg	124	31	153	
EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	5 µg/kg	108	34.3	138	
EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	5 µg/kg	98.0	18.6	146	
EP131A: gamma-BHC	58-89-9	0.5	µg/kg	<0.50	5 µg/kg	118	30.7	145	
EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	5 µg/kg	95.7	15	157	
EP131A: cis-Chlordane	5103-71-9	0.5	µg/kg	<0.50	5 µg/kg	138	22.3	145	
EP131A: trans-Chlordane	5103-74-2	0.5	µg/kg	<0.50	5 µg/kg	107	42.4	139	
EP131A: Total Chlordane (sum)	----	0.5	µg/kg	<0.50	----	----	----	----	
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 1168439)									
EP131B: Total Polychlorinated biphenyls	----	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1016	12974-11-2	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1221	11104-28-2	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1232	11141-16-5	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1242	53469-21-9	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1248	12672-29-6	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1254	11097-69-1	5	µg/kg	<5.0	50 µg/kg	112	61.3	121	
EP131B: Aroclor 1260	11096-82-5	5	µg/kg	<5.0	----	----	----	----	
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1168442)									
EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	25 µg/kg	87.0	----	----	
EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	25 µg/kg	91.0	----	----	
EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	25 µg/kg	100	----	----	
EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	25 µg/kg	105	----	----	
EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	25 µg/kg	107	----	----	
EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	25 µg/kg	101	----	----	
EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	25 µg/kg	94.4	----	----	
EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	25 µg/kg	108	----	----	
EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	25 µg/kg	108	----	----	
EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	25 µg/kg	101	----	----	



Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1168442) - continued									
EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	25 µg/kg	94.9	----	----	
EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	25 µg/kg	91.5	----	----	
EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	25 µg/kg	96.7	----	----	
EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	25 µg/kg	78.8	----	----	
EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	25 µg/kg	96.2	----	----	
EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	25 µg/kg	67.4	----	----	
EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	25 µg/kg	96.0	----	----	
EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	25 µg/kg	96.7	----	----	
EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	25 µg/kg	97.2	----	----	
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	25 µg/kg	51.2	----	----	
EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	----	----	----	----	



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1169247)							
ES0917649-002	SS3D	EG020-SD: Arsenic	7440-38-2	50 mg/kg	105	70	130
		EG020-SD: Cadmium	7440-43-9	50 mg/kg	104	70	130
		EG020-SD: Chromium	7440-47-3	50 mg/kg	110	70	130
		EG020-SD: Copper	7440-50-8	250 mg/kg	92.7	70	130
		EG020-SD: Lead	7439-92-1	250 mg/kg	83.4	70	130
		EG020-SD: Nickel	7440-02-0	50 mg/kg	104	70	130
		EG020-SD: Zinc	7440-66-6	250 mg/kg	96.2	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1169246)							
ES0917649-001	SS3C	EG035T-LL: Mercury	7439-97-6	0.50 mg/kg	96.7	70	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1168443)							
ES0917649-005	VC3B0-0.5	EP071-SD: C10 - C14 Fraction	----	19.75 mg/kg	82.5	70	130
		EP071-SD: C15 - C28 Fraction	----	87.25 mg/kg	76.4	70	130
		EP071-SD: C29 - C36 Fraction	----	60 mg/kg	84.8	70	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1169136)							
ES0917541-008	Anonymous	EP080-SD: C6 - C9 Fraction	----	26 mg/kg	106	70	130
EP080-SD: BTEX (QCLot: 1169136)							
ES0917541-008	Anonymous	EP080-SD: Benzene	71-43-2	2.5 mg/kg	76.8	70	130
		EP080-SD: Toluene	108-88-3	2.5 mg/kg	95.6	70	130
		EP080-SD: Ethylbenzene	100-41-4	2.5 mg/kg	72.9	70	130
		EP080-SD: meta- & para-Xylene	108-38-3	2.5 mg/kg	77.8	70	130
		EP080-SD: ortho-Xylene	106-42-3	2.5 mg/kg	74.3	70	130
EP131A: Organochlorine Pesticides (QCLot: 1168438)							
ES0917541-008	Anonymous	EP131A: Aldrin	309-00-2	5 µg/kg	90.9	31.7	140
		EP131A: alpha-BHC	319-84-6	5 µg/kg	82.6	24.5	150
		EP131A: beta-BHC	319-85-7	5 µg/kg	88.2	36.9	139
		EP131A: delta-BHC	319-86-8	5 µg/kg	84.0	38.2	137
		EP131A: 4,4'-DDD	72-54-8	5 µg/kg	130	42.5	141
		EP131A: 4,4'-DDE	72-55-9	5 µg/kg	64.4	34.8	140
		EP131A: 4,4'-DDT	50-29-3	5 µg/kg	116	38	143
		EP131A: Dieldrin	60-57-1	5 µg/kg	88.9	43.2	134
		EP131A: alpha-Endosulfan	959-98-8	5 µg/kg	79.8	23.7	139
		EP131A: beta-Endosulfan	33213-65-9	5 µg/kg	94.4	35.8	138
		EP131A: Endosulfan sulfate	1031-07-8	5 µg/kg	108	7.45	158



Sub-Matrix: SOIL

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike	Spike Recovery (%)	Recovery Limits (%)	
				Concentration	MS	Low	High
EP131A: Organochlorine Pesticides (QCLot: 1168438) - continued							
ES0917541-008	Anonymous	EP131A: Endrin	72-20-8	5 µg/kg	73.1	21.6	162
		EP131A: Endrin aldehyde	7421-93-4	5 µg/kg	61.7	19.3	131
		EP131A: Endrin ketone	53494-70-5	5 µg/kg	101	17.9	141
		EP131A: Heptachlor	76-44-8	5 µg/kg	82.5	31	153
		EP131A: Heptachlor epoxide	1024-57-3	5 µg/kg	79.2	34.3	138
		EP131A: Hexachlorobenzene (HCB)	118-74-1	5 µg/kg	67.3	18.6	146
		EP131A: gamma-BHC	58-89-9	5 µg/kg	89.3	30.7	145
		EP131A: Methoxychlor	72-43-5	5 µg/kg	104	15	157
		EP131A: cis-Chlordane	5103-71-9	5 µg/kg	117	22.3	145
		EP131A: trans-Chlordane	5103-74-2	5 µg/kg	84.1	42.4	139
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 1168439)							
ES0917541-008	Anonymous	EP131B: Aroclor 1254	11097-69-1	50 µg/kg	65.8	61.3	121
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1168442)							
ES0917649-005	VC3B0-0.5	EP132B-SD: Naphthalene	91-20-3	25 µg/kg	# 62.9	70	130
		EP132B-SD: 2-Methylnaphthalene	91-57-6	25 µg/kg	76.7	70	130
		EP132B-SD: Acenaphthylene	208-96-8	25 µg/kg	86.6	70	130
		EP132B-SD: Acenaphthene	83-32-9	25 µg/kg	102	70	130
		EP132B-SD: Fluorene	86-73-7	25 µg/kg	# 68.4	70	130
		EP132B-SD: Phenanthrene	85-01-8	25 µg/kg	98.4	70	130
		EP132B-SD: Anthracene	120-12-7	25 µg/kg	91.9	70	130
		EP132B-SD: Fluoranthene	206-44-0	25 µg/kg	98.6	70	130
		EP132B-SD: Pyrene	129-00-0	25 µg/kg	96.8	70	130
		EP132B-SD: Benz(a)anthracene	56-55-3	25 µg/kg	96.0	70	130
		EP132B-SD: Chrysene	218-01-9	25 µg/kg	90.7	70	130
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	25 µg/kg	91.6	70	130
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	25 µg/kg	91.0	70	130
		EP132B-SD: Benzo(e)pyrene	192-97-2	25 µg/kg	74.6	70	130
		EP132B-SD: Benzo(a)pyrene	50-32-8	25 µg/kg	101	70	130
		EP132B-SD: Perylene	198-55-0	25 µg/kg	72.4	70	130
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	25 µg/kg	96.6	70	130
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	25 µg/kg	98.4	70	130
		EP132B-SD: Indeno(1,2,3.cd)pyrene	193-39-5	25 µg/kg	102	70	130
		EP132B-SD: Coronene	191-07-1	25 µg/kg	90.9	70	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES0917649	Page	: 1 of 7
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 18-NOV-2009
Sampler	: NH	Issue Date	: 27-NOV-2009
Order number	: ----		
Quote number	: SY/503/09	No. of samples received	: 27
		No. of samples analysed	: 15

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content								
Soil Glass Jar - Unpreserved SS3C, SS3B, VC3B0-0.5, VC3B0.5-0.9	SS3D, SS3A, VC3B0-0.5X, VC3B0.5-0.9	17-NOV-2009	----	----	----	19-NOV-2009	24-NOV-2009	✓
Soil Glass Jar - Unpreserved VC2B0-0.5, VC2B0.9-1.5, SS2D, SS2A,	VC2B0.5-0.9, VC2B1.5-2.2, SS1C, SS1D	18-NOV-2009	----	----	----	19-NOV-2009	25-NOV-2009	✓
EG020-SD: Total Metals in Sediments by ICPMS								
Soil Glass Jar - Unpreserved SS3C, SS3B, VC3B0-0.5, VC3B0.5-0.9	SS3D, SS3A, VC3B0-0.5X, VC3B0.5-0.9	17-NOV-2009	20-NOV-2009	15-DEC-2009	✓	20-NOV-2009	16-MAY-2010	✓
Soil Glass Jar - Unpreserved VC2B0-0.5, VC2B0.9-1.5, SS2D, SS2A,	VC2B0.5-0.9, VC2B1.5-2.2, SS1C, SS1D	18-NOV-2009	20-NOV-2009	16-DEC-2009	✓	20-NOV-2009	17-MAY-2010	✓



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved SS3C, SS3B, VC3B0-0.5, VC3B0.5-0.9	SS3D, SS3A, VC3B0-0.5X,	17-NOV-2009	20-NOV-2009	15-DEC-2009	✓	27-NOV-2009	15-DEC-2009	✓
Soil Glass Jar - Unpreserved VC2B0-0.5, VC2B0.9-1.5, SS2D, SS2A,	VC2B0.5-0.9, VC2B1.5-2.2, SS1C, SS1D	18-NOV-2009	20-NOV-2009	16-DEC-2009	✓	27-NOV-2009	16-DEC-2009	✓
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved VC3B0-0.5		17-NOV-2009	---	01-DEC-2009	----	20-NOV-2009	01-DEC-2009	✓
Soil Glass Jar - Unpreserved VC3B0-0.5		17-NOV-2009	20-NOV-2009	01-DEC-2009	✓	23-NOV-2009	01-DEC-2009	✓
Soil Glass Jar - Unpreserved VC2B0-0.5		18-NOV-2009	---	02-DEC-2009	----	20-NOV-2009	02-DEC-2009	✓
Soil Glass Jar - Unpreserved VC2B0-0.5		18-NOV-2009	20-NOV-2009	02-DEC-2009	✓	23-NOV-2009	02-DEC-2009	✓
EP080-SD: BTEX								
Soil Glass Jar - Unpreserved VC3B0-0.5		17-NOV-2009	20-NOV-2009	01-DEC-2009	✓	23-NOV-2009	01-DEC-2009	✓
Soil Glass Jar - Unpreserved VC2B0-0.5		18-NOV-2009	20-NOV-2009	02-DEC-2009	✓	23-NOV-2009	02-DEC-2009	✓
EP131A: Organochlorine Pesticides								
Soil Glass Jar - Unpreserved VC3B0-0.5		17-NOV-2009	19-NOV-2009	01-DEC-2009	✓	24-NOV-2009	29-DEC-2009	✓
Soil Glass Jar - Unpreserved VC2B0-0.5		18-NOV-2009	19-NOV-2009	02-DEC-2009	✓	24-NOV-2009	29-DEC-2009	✓
EP131B: Polychlorinated Biphenyls (as Aroclors)								
Soil Glass Jar - Unpreserved VC3B0-0.5		17-NOV-2009	19-NOV-2009	01-DEC-2009	✓	24-NOV-2009	29-DEC-2009	✓
Soil Glass Jar - Unpreserved VC2B0-0.5		18-NOV-2009	19-NOV-2009	02-DEC-2009	✓	24-NOV-2009	29-DEC-2009	✓



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP132B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved SS3C, SS3B, VC3B0-0.5, VC3B0.5-0.9	SS3D, SS3A, VC3B0-0.5X,	17-NOV-2009	---	01-DEC-2009	----	23-NOV-2009	01-DEC-2009	✓
Soil Glass Jar - Unpreserved VC2B0-0.5, VC2B0.9-1.5, SS2D, SS2A,	VC2B0.5-0.9, VC2B1.5-2.2, SS1C, SS1D	18-NOV-2009	---	02-DEC-2009	----	23-NOV-2009	02-DEC-2009	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	6	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	2	15	13.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	6	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	2	15	13.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	2	15	13.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	2	50.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	5	20.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	2	50.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	5	20.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	2	50.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	5	20.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	6	16.7	5.0	✓	ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	15	6.7	5.0	✓	ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	6	16.7	5.0	✓	ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	15	6.7	5.0	✓	ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	15	6.7	5.0	✓	ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	2	50.0	5.0	✓	ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	5	20.0	5.0	✓	ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Total Metals in Sediments by ICPMS	EG020-SD	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. Analyte list and LORs per NODG.
Total Mercury by FIMS (Low Level)	EG035T-LL	SOIL	AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3)
TPH - Semivolatile Fraction	EP071-SD	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 504)
TPH Volatiles/BTEX in Sediments	EP080-SD	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 501)
Organochlorine Pesticides (Ultra-trace)	EP131A	SOIL	USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PCB's (Ultra-trace)	EP131B	SOIL	USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PAHs in Sediments by GCMS(SIM)	EP132B-SD	SOIL	8270 GCMS Capillary column, SIM mode using large volume programmed temperature vaporisation injection.
Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (1999) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(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/ Sample Cleanup	ORG17A-UTP	SOIL	In-house, Mechanical agitation (tumbler). 20g of sample, Na ₂ SO ₄ and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. Samples are extracted, concentrated (by KD) and exchanged into an appropriate solvent for GPC and florisil cleanup as required.
Tumbler Extraction of Solids for LVI (Non-concentrating)	ORG17D	SOIL	In house: 10g of sample, Na ₂ SO ₄ and surrogate are extracted with 50mL 1:1 DCM/Acetone by end over end tumbling. An aliquot is concentrated by nitrogen blowdown to a reduced volume for analysis if required.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP132B: Polynuclear Aromatic Hydrocarbons	ES0917649-005	VC3B0-0.5	Naphthalene	91-20-3	62.9 %	70-130%	Recovery less than lower data quality objective
EP132B: Polynuclear Aromatic Hydrocarbons	ES0917649-005	VC3B0-0.5	Fluorene	86-73-7	68.4 %	70-130%	Recovery less than lower data quality objective

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.

Regular Sample Surrogates

Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP132T: Base/Neutral Extractable Surrogates	ES0917649-006	VC3B0-0.5X	2-Fluorobiphenyl	321-60-8	119 %	30-115 %	Recovery greater than upper data quality objective
EP132T: Base/Neutral Extractable Surrogates	ES0917649-008	VC2B0-0.5	2-Fluorobiphenyl	321-60-8	120 %	30-115 %	Recovery greater than upper data quality objective
EP132T: Base/Neutral Extractable Surrogates	ES0917649-005	VC3B0-0.5	2-Fluorobiphenyl	321-60-8	116 %	30-115 %	Recovery greater than upper data quality objective
EP132T: Base/Neutral Extractable Surrogates	ES0917649-009	VC2B0.5-0.9	2-Fluorobiphenyl	321-60-8	123 %	30-115 %	Recovery greater than upper data quality objective

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)
Comprehensive Report

Work Order : **ES0917649**

Client : **WORLEY PARSONS - INFRASTRUCTURE MWE** **Laboratory** : Environmental Division Sydney

Contact : Ms ALI WATTERS **Contact** : Charlie Pierce

Address : Level 10/141 Walker Street **Address** : 277-289 Woodpark Road Smithfield
NORTH SYDNEY NSW, AUSTRALIA NSW Australia 2164
2060

E-mail : ali.watters@worleyparsons.com **E-mail** : charlie.pierce@alsenviro.com

Telephone : +61 02 8907 2131 **Telephone** : +61-2-8784 8555

Facsimile : ---- **Facsimile** : +61-2-8784 8500

Project : CALTEX MAINTENANCE DREDGING **Page** : 1 of 3

Order number : ----

C-O-C number : ---- **Quote number** : ES2009WORPAR0232 (SY/503/09)

Site : ----

Sampler : NH **QC Level** : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received : 18-NOV-2009 **Issue Date** : 19-NOV-2009 14:34

Client Requested Due Date : 30-NOV-2009 **Scheduled Reporting Date** : **30-NOV-2009**

Delivery Details

Mode of Delivery : Carrier **Temperature** : 0.6'C - Ice present

No. of coolers/boxes : 1 HARD **No. of samples received** : 27

Security Seal : Not intact. **No. of samples analysed** : 15

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Requested Deliverables
- **Samples received in appropriately pretreated and preserved containers.**
- **Sample(s) have been received within recommended holding times.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- **This batch split into ES0917655 for TBT/TOC, ES0971657 for PHF/PHFOX , ES0917660 for PARTICULAR SIZE analysis.**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Jacob Waugh
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: SOIL

Laboratory sample ID Client sampling date / time Client sample ID

Laboratory sample ID	Client sampling date / time	Client sample ID	(On Hold) SOIL No analysis requested	SOIL - EA055-103 Moisture Content	SOIL - EG020-SD Total Metals in Sediments by ICPMS (NODG)	SOIL - EG035T-LL Total Mercury by FIMS - Low Level	SOIL - EP071 - SD TPH ultra trace in sediments	SOIL - EP080-SD TPH(V)/BTEX in Sediments	SOIL - EP131A OC Pesticides (Ultratrace)	SOIL - EP131B PCB's (Ultratrace)
ES0917649-001	17-NOV-2009 15:00	SS3C		✓	✓	✓				
ES0917649-002	17-NOV-2009 15:00	SS3D		✓	✓	✓				
ES0917649-003	17-NOV-2009 15:00	SS3B		✓	✓	✓				
ES0917649-004	17-NOV-2009 15:00	SS3A		✓	✓	✓				
ES0917649-005	17-NOV-2009 15:00	VC3B0-0.5		✓	✓	✓	✓	✓	✓	✓
ES0917649-006	17-NOV-2009 15:00	VC3B0-0.5X		✓	✓	✓				
ES0917649-007	17-NOV-2009 15:00	VC3B0.5-0.9		✓	✓	✓				
ES0917649-008	18-NOV-2009 15:00	VC2B0-0.5		✓	✓	✓	✓	✓	✓	✓
ES0917649-009	18-NOV-2009 15:00	VC2B0.5-0.9		✓	✓	✓				
ES0917649-010	18-NOV-2009 15:00	VC2B0.9-1.5		✓	✓	✓				
ES0917649-011	18-NOV-2009 15:00	VC2B1.5-2.2		✓	✓	✓				
ES0917649-012	18-NOV-2009 15:00	SS2D		✓	✓	✓				
ES0917649-013	18-NOV-2009 15:00	SS1C		✓	✓	✓				
ES0917649-014	18-NOV-2009 15:00	SS2A		✓	✓	✓				
ES0917649-015	18-NOV-2009 15:00	SS1D		✓	✓	✓				
ES0917649-016	17-NOV-2009 15:00	SS3CX	✓							
ES0917649-017	17-NOV-2009 15:00	SS3DX	✓							
ES0917649-018	17-NOV-2009 15:00	SS3BX	✓							
ES0917649-019	17-NOV-2009 15:00	SS3AX	✓							
ES0917649-020	18-NOV-2009 15:00	VC2B0-0.5X	✓							
ES0917649-021	18-NOV-2009 15:00	VC2B0.5-0.9X	✓							
ES0917649-022	18-NOV-2009 15:00	VC2B0.9-1.5X	✓							
ES0917649-023	18-NOV-2009 15:00	VC2B1.5-2.2X	✓							
ES0917649-024	18-NOV-2009 15:00	SS2DX	✓							
ES0917649-025	18-NOV-2009 15:00	SS1CX	✓							
ES0917649-026	18-NOV-2009 15:00	SS2AX	✓							
ES0917649-027	18-NOV-2009 15:00	SS1DX	✓							



Matrix: SOIL

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EP132B-SD Ultra-trace PAHs in Sediments
ES0917649-001	17-NOV-2009 15:00	SS3C	✓
ES0917649-002	17-NOV-2009 15:00	SS3D	✓
ES0917649-003	17-NOV-2009 15:00	SS3B	✓
ES0917649-004	17-NOV-2009 15:00	SS3A	✓
ES0917649-005	17-NOV-2009 15:00	VC3B0-0.5	✓
ES0917649-006	17-NOV-2009 15:00	VC3B0-0.5X	✓
ES0917649-007	17-NOV-2009 15:00	VC3B0.5-0.9	✓
ES0917649-008	18-NOV-2009 15:00	VC2B0-0.5	✓
ES0917649-009	18-NOV-2009 15:00	VC2B0.5-0.9	✓
ES0917649-010	18-NOV-2009 15:00	VC2B0.9-1.5	✓
ES0917649-011	18-NOV-2009 15:00	VC2B1.5-2.2	✓
ES0917649-012	18-NOV-2009 15:00	SS2D	✓
ES0917649-013	18-NOV-2009 15:00	SS1C	✓
ES0917649-014	18-NOV-2009 15:00	SS2A	✓
ES0917649-015	18-NOV-2009 15:00	SS1D	✓

Requested Deliverables

Ms ALI WATTERS

- | | | |
|---|-------|-------------------------------|
| - *AU Certificate of Analysis - NATA (COA) | Email | ali.watters@worleyparsons.com |
| - *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) | Email | ali.watters@worleyparsons.com |
| - *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) | Email | ali.watters@worleyparsons.com |
| - A4 - AU Sample Receipt Notification - Environmental (SRN) | Email | ali.watters@worleyparsons.com |
| - A4 - AU Tax Invoice (INV) | Email | ali.watters@worleyparsons.com |
| - Default - Chain of Custody (COC) | Email | ali.watters@worleyparsons.com |
| - EDI Format - ENMRG (ENMRG) | Email | ali.watters@worleyparsons.com |



CHAIN OF CUSTODY

ALS Laboratory please tick →

TBT / TOC

CLIENT: <i>Wolfe Bros</i>	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date): <small>(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)</small>	FOR LABORATORY USE ONLY (Circle): Custody Seal Intact? <input checked="" type="checkbox"/> (Free Ice / Frozen ice bricks present upon receipt)
OFFICE: <i>North Sydney</i>	<input type="checkbox"/> Non Standard or urgent TAT (List due date):	Random Sample Temperature on Receipt:
PROJECT: <i>Callie maintenance</i>	ALS QUOTE NO.:	Other comment:
ORDER NUMBER:	COC SEQUENCE NUMBER (Circle): COC: <input checked="" type="checkbox"/> 2 3 4 5 6 7 OR: 1 2 3 4 5 6 7	
PROJECT MANAGER: <i>Ali Williams</i>	CONTACT PH: <i>0427 763 386</i>	
SAMPLER: <i>Nick Hamilton</i>	SAMPLER MOBILE: <i>0402365738</i>	RECEIVED BY: <i>Frank ALS</i>
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	RELINQUISHED BY:
Email Reports to (will default to PM if no other addresses are listed):	DATE/TIME:	DATE/TIME: <i>18/11/09 5:15pm</i>
Email Invoice to (will default to PM if no other addresses are listed):		

Environmental Division
Sydney
Work Order
ES0917655

Yes No
Yes No
0.6 °C



Telephone : + 61-2-8784 8555

RECEIVED BY:

DATE/TIME:

Additional Information

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be list Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (filt)													Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.			
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE <small>(refer to codes below)</small>	TOTAL BOTTLES	EG020SD (trace metals)	EG035L (Mercury)	EP132SD (PAHs)	EP004 (TOC)	EP090 (TBT)	EP131A (OC Pesticides)	EP131B (PCBs)	EP080-UT (TPH C6-C9) / BTEX	EP071SD (TPH C10-C36)	EA150-H (Particle sizing)	EN020PR (dry/Bag/Label)	EA003 (pH & pffox)	EA033 (chromium)	(TC/PE/Intrate)		
1	SS3c		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	STORE remaining sample - will select following review of results
	SS3cx		s	Glass bottle/bags	2	Hold													STORE	STORE	
2	SS3d		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	SS3dx		s	Glass bottle/bags	2	Hold													STORE	STORE	
3	SS3b		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	SS3bx		s	Glass bottle/bags	2	Hold													STORE	STORE	
4	SS3a		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	SS3ax		s	Glass bottle/bags	2	Hold													STORE	STORE	
5	UC3b0-05		s	Glass bottle/bags	4	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
6	UC3b0-05x		s	Glass bottle/bags	2	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
7	UC3b0-05-09		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
8	UC2B0-05		s	Glass bottle/bags	6	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC2B0-05x		s	Glass bottle/bags	2	Hold													STORE	STORE	
9	UC2B05-09		s	Glass bottle/bags	4	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC2B05-09x		s	Glass bottle/bags	2	Hold													STORE	STORE	
10	UC2B09-15		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC2B09-15x		s	Glass bottle/bags	2	Hold													STORE	STORE	
11	UC2B15-22		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC2B15-22x		s	Glass bottle/bags	2	Hold													STORE	STORE	



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES0917655	Page	: 1 of 7
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 18-NOV-2009
C-O-C number	: ----	Issue Date	: 03-DEC-2009
Sampler	: NH	No. of samples received	: 15
Site	: ----	No. of samples analysed	: 15
Quote number	: SY/503/09		

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Cass Sealby	Senior Chemist - Acid Sulphate Soils	Inorganics
Cass Sealby	Senior Chemist - Acid Sulphate Soils	Stafford Minerals - AY
Matt Frost	Organic Instrument Chemist	Inorganics
Matt Frost	Organic Instrument Chemist	Organics

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company





General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **TBT: Samples SS2D and SS3B required dilution due to the presence of high level contaminants. LOR values have been adjusted accordingly. Surrogate recovery is not determined.**



Analytical Results

Sub-Matrix: SOIL

Client sample ID
 Client sampling date / time

				SS3C	SS3D	SS3B	SS3A	VC3B_0-0.5
				17-NOV-2009 15:00	17-NOV-2009 15:00	17-NOV-2009 15:00	17-NOV-2009 15:00	17-NOV-2009 15:00
Compound	CAS Number	LOR	Unit	ES0917655-001	ES0917655-002	ES0917655-003	ES0917655-004	ES0917655-005
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	43.2	21.1	42.0	25.6	18.6
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	1.30	1.16	3.08	0.14	0.41
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.2	141	0.5	1.5
EP090S: Organotin Surrogate								
Tripopyltin	----	0.1	%	106	99.6	Not Determined	77.4	82.7



Analytical Results

Sub-Matrix: SOIL

Client sample ID
 Client sampling date / time

Compound	CAS Number	LOR	Unit	VC3B_0-0.5X	VC3B_0.5-0.9	VC2B_0-0.5	VC2B_0.5-0.9	VC2B_0.9-1.5
				17-NOV-2009 15:00	17-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00
				ES0917655-006	ES0917655-007	ES0917655-008	ES0917655-009	ES0917655-010
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	----	----	18.9	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	0.30	0.22	0.14	0.58	0.19
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	----	----	3.4	----	----
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	----	----	71.2	----	----



Analytical Results

Sub-Matrix: SOIL

				Client sample ID	VC2B_1.5-2.2	SS2D	SS1C	SS2A	SS1D
				Client sampling date / time	18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00
Compound	CAS Number	LOR	Unit		ES0917655-011	ES0917655-012	ES0917655-013	ES0917655-014	ES0917655-015
EA055: Moisture Content									
^ Moisture Content (dried @ 103°C)	----	1.0	%		----	19.0	17.9	17.4	17.2
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	0.02	%		<0.02	0.32	<0.02	0.03	<0.02
EP090: Organotin Compounds									
Tributyltin	56573-85-4	0.5	µgSn/kg		----	82.9	6.4	<0.5	1.7
EP090S: Organotin Surrogate									
Tripopyltin	----	0.1	%		----	Not Determined	46.7	111	50.0



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP090S: Organotin Surrogate			
Tripopyltin	----	34	108



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES0917655	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 18-NOV-2009
C-O-C number	: ----	Issue Date	: 03-DEC-2009
Sampler	: NH	No. of samples received	: 15
Order number	: ----	No. of samples analysed	: 15
Quote number	: SY/503/09		

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Cass Sealby	Senior Chemist - Acid Sulphate Soils	Inorganics
Cass Sealby	Senior Chemist - Acid Sulphate Soils	Stafford Minerals - AY
Matt Frost	Organic Instrument Chemist	Inorganics
Matt Frost	Organic Instrument Chemist	Organics



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 1171420)									
ES0917544-008	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	20.1	20.0	0.0	0% - 20%
ES0917655-005	VC3B_0-0.5	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	18.6	19.0	2.2	0% - 50%
EA055: Moisture Content (QC Lot: 1172931)									
ES0917655-008	VC2B_0-0.5	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	18.9	17.9	5.1	0% - 50%
ES0917729-003	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	24.0	26.7	10.4	0% - 20%
EP005: Total Organic Carbon (TOC) (QC Lot: 1172946)									
ES0917655-001	SS3C	EP005: Total Organic Carbon	----	0.02	%	1.30	1.35	3.6	0% - 20%
ES0917655-011	VC2B_1.5-2.2	EP005: Total Organic Carbon	----	0.02	%	<0.02	<0.02	0.0	No Limit
EP090: Organotin Compounds (QC Lot: 1172492)									
EP0906633-001	Anonymous	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
ES0917655-002	SS3D	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	1.2	1.8	36.9	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
EP005: Total Organic Carbon (TOC) (QCLot: 1172946)								
EP005: Total Organic Carbon	----	0.02	%	<0.02	100 %	98.9	70	130
EP090: Organotin Compounds (QCLot: 1172492)								
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5 ----	---- 1.25 µgSn/kg	---- 97.2	---- 24.1	---- 129



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				<i>Matrix Spike (MS) Report</i>			
		<i>Spike</i>	<i>Spike Recovery (%)</i>		<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Concentration</i>	<i>MS</i>	<i>Low</i>	<i>High</i>
EP090: Organotin Compounds (QCLot: 1172492)							
EP0906633-002	Anonymous	EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	70.0	20	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES0917655	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 18-NOV-2009
Sampler	: NH	Issue Date	: 03-DEC-2009
Order number	: ----		
Quote number	: SY/503/09	No. of samples received	: 15
		No. of samples analysed	: 15

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Environmental Division Sydney

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A Campbell Brothers Limited Company



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content								
Soil Glass Jar - Unpreserved SS3C, SS3B, VC3B_0-0.5	SS3D, SS3A,	17-NOV-2009	----	----	----	23-NOV-2009	24-NOV-2009	✓
Soil Glass Jar - Unpreserved VC2B_0-0.5, SS1C, SS1D	SS2D, SS2A,	18-NOV-2009	----	----	----	24-NOV-2009	25-NOV-2009	✓
EP005: Total Organic Carbon (TOC)								
Pulp Bag SS3C, SS3B, VC3B_0-0.5, VC3B_0.5-0.9	SS3D, SS3A, VC3B_0-0.5X,	17-NOV-2009	24-NOV-2009	15-DEC-2009	✓	25-NOV-2009	15-DEC-2009	✓
Pulp Bag VC2B_0-0.5, VC2B_0.9-1.5, SS2D, SS2A,	VC2B_0.5-0.9, VC2B_1.5-2.2, SS1C, SS1D	18-NOV-2009	24-NOV-2009	16-DEC-2009	✓	25-NOV-2009	16-DEC-2009	✓
EP090: Organotin Compounds								
Soil Glass Jar - Unpreserved SS3C, SS3B, VC3B_0-0.5	SS3D, SS3A,	17-NOV-2009	24-NOV-2009	01-DEC-2009	✓	26-NOV-2009	03-JAN-2010	✓
Soil Glass Jar - Unpreserved VC2B_0-0.5, SS1C, SS1D	SS2D, SS2A,	18-NOV-2009	24-NOV-2009	02-DEC-2009	✓	26-NOV-2009	03-JAN-2010	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	4	22	18.2	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	2	14	14.3	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	15	13.3	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Organotin Analysis	EP090	1	14	7.1	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	15	6.7	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Organotin Analysis	EP090	1	14	7.1	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	15	6.7	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Organotin Analysis	EP090	1	14	7.1	5.0	✔	ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Total Organic Carbon	EP005	SOIL	In-house. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a LECO furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO ₂) is automatically measured by infra-red detector.
Organotin Analysis	EP090	SOIL	(USEPA SW 846 - 8270D) Prepared sample extracts are analysed by GC/MS coupled with high volume injection, and quantified against an established calibration curve.
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Organotin Sample Preparation	ORG35	SOIL	In house. 20g sample is spiked with surrogate and leached in a methanol:acetic acid:UHP water mix and vacuum filtered. Reagents and solvents are added to the sample and the mixture tumbled. The butyltin compounds are simultaneously derivatised and extracted. The extract is further extracted with petroleum ether. The resultant extracts are combined and concentrated for analysis.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP090S: Organotin Surrogate	ES0917655-003	SS3B	Tripropyltin	----	Not Determined	----	Surrogate recovery not determined due to (target or non-target) matrix interferences
EP090S: Organotin Surrogate	ES0917655-012	SS2D	Tripropyltin	----	Not Determined	----	Surrogate recovery not determined due to (target or non-target) matrix interferences

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)
Comprehensive Report

Work Order : **ES0917655**

Client : **WORLEY PARSONS - INFRASTRUCTURE MWE** **Laboratory** : Environmental Division Sydney

Contact : Ms ALI WATTERS **Contact** : Charlie Pierce

Address : Level 10/141 Walker Street **Address** : 277-289 Woodpark Road Smithfield
NORTH SYDNEY NSW, AUSTRALIA 2060 NSW Australia 2164

E-mail : ali.watters@worleyparsons.com **E-mail** : charlie.pierce@alsenviro.com

Telephone : +61 02 8907 2131 **Telephone** : +61-2-8784 8555

Facsimile : ---- **Facsimile** : +61-2-8784 8500

Project : CALTEX MAINTENANCE DREDGING **Page** : 1 of 2

Order number : ----

C-O-C number : ---- **Quote number** : ES2009WORPAR0223 (EN/034/09)

Site : ----

Sampler : NH **QC Level** : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received : 18-NOV-2009 **Issue Date** : 20-NOV-2009 12:33

Client Requested Due Date : 30-NOV-2009 **Scheduled Reporting Date** : **30-NOV-2009**

Delivery Details

Mode of Delivery : Carrier **Temperature** : 0.6'C - Ice present

No. of coolers/boxes : 1 HARD **No. of samples received** : 15

Security Seal : Not intact. **No. of samples analysed** : 15

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Requested Deliverables
- Samples received in appropriately pretreated and preserved containers.
- TBT added to samples 1-4 on 20/11/09 as per Nick Hannaford
- **Samples received in appropriately pretreated and preserved containers.**
- **TBT and TOC analysis will be conducted by ALS Brisbane.**
- **Sample(s) have been received within recommended holding times.**
- **This batch is for TBT and TOC only split from ES0917649.**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Jacob Waugh
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: SOIL

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EP005 (solids) Total Organic Carbon (TOC) soils	SOIL - EA055-103 Moisture Content	SOIL - EP090 (solids) Organotins
ES0917655-001	17-NOV-2009 15:00	SS3C	✓	✓	✓
ES0917655-002	17-NOV-2009 15:00	SS3D	✓	✓	✓
ES0917655-003	17-NOV-2009 15:00	SS3B	✓	✓	✓
ES0917655-004	17-NOV-2009 15:00	SS3A	✓	✓	✓
ES0917655-005	17-NOV-2009 15:00	VC3B_0-0.5	✓	✓	✓
ES0917655-006	17-NOV-2009 15:00	VC3B_0-0.5X	✓		
ES0917655-007	17-NOV-2009 15:00	VC3B_0.5-0.9	✓		
ES0917655-008	18-NOV-2009 15:00	VC2B_0-0.5	✓	✓	✓
ES0917655-009	18-NOV-2009 15:00	VC2B_0.5-0.9	✓		
ES0917655-010	18-NOV-2009 15:00	VC2B_0.9-1.5	✓		
ES0917655-011	18-NOV-2009 15:00	VC2B_1.5-2.2	✓		
ES0917655-012	18-NOV-2009 15:00	SS2D	✓	✓	✓
ES0917655-013	18-NOV-2009 15:00	SS1C	✓	✓	✓
ES0917655-014	18-NOV-2009 15:00	SS2A	✓	✓	✓
ES0917655-015	18-NOV-2009 15:00	SS1D	✓	✓	✓

Requested Deliverables

MR NICK HANNAFORD

- *AU Certificate of Analysis - NATA (COA)	Email	Nicholas.Hannaford@WorleyParsons.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Nicholas.Hannaford@WorleyParsons.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Nicholas.Hannaford@WorleyParsons.com
- A4 - AU Sample Receipt Notification - Environmental (SRN)	Email	Nicholas.Hannaford@WorleyParsons.com
- Default - Chain of Custody (COC)	Email	Nicholas.Hannaford@WorleyParsons.com
- EDI Format - ENMRG (ENMRG)	Email	Nicholas.Hannaford@WorleyParsons.com

Ms ALI WATTERS

- *AU Certificate of Analysis - NATA (COA)	Email	ali.watters@worleyparsons.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ali.watters@worleyparsons.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ali.watters@worleyparsons.com
- A4 - AU Sample Receipt Notification - Environmental (SRN)	Email	ali.watters@worleyparsons.com
- A4 - AU Tax Invoice (INV)	Email	ali.watters@worleyparsons.com
- Default - Chain of Custody (COC)	Email	ali.watters@worleyparsons.com
- EDI Format - ENMRG (ENMRG)	Email	ali.watters@worleyparsons.com



CHAIN OF CUSTODY

ALS Laboratory please tick →

pHE / pHfox only

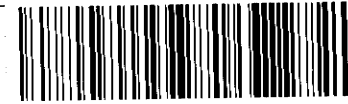
Environmental Division
Sydney

Work Order

ES0917657

Yes No N/A
Yes No N/A
0-6 C

CLIENT: <i>Wolke Bros</i>	TURNAROUND REQUIREMENTS : <input type="checkbox"/> Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)
OFFICE: <i>North Sydney</i>	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) <input type="checkbox"/> Non Standard or urgent TAT (List due date):	Custody Seal Intact?
PROJECT: <i>Collect maintenance site</i>	ALS QUOTE NO.:	Free Ice / Frozen ice bricks present upon receipt
ORDER NUMBER:	COC SEQUENCE NUMBER (Circle)	Random Sample Temperature on Receipt:
PROJECT MANAGER: <i>Ali Williams</i>	CONTACT PH: <i>0427 763 386</i>	Other comment:
SAMPLER: <i>Nick Hamilton</i>	SAMPLER MOBILE: <i>010362735</i>	RECEIVED BY: <i>Frank AS</i>
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	RELINQUISHED BY:
Email Reports to (will default to PM if no other addresses are listed):	DATE/TIME:	DATE/TIME: <i>18/10/09 5:15pm</i>
Email Invoice to (will default to PM if no other addresses are listed):		



Telephone : + 61-2-8784 8555

RECEIVED BY:

DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (filtered bottle required).														Additional Information			
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EG020SD (trace metals)	EG035L (Mercury)	EP132SD (PAHs)	EP004 (TOC)	EP090 (TBT)	EP131A (OC Pesticides)	EP131B (PCBs)	EP090-UT (TPH C6-C9) / BTEX	EP071SD (TPH C10-C16)	EA150-H (Particle sizing)	EN020PR (dry/Bag/L-abel)	EA0003 (pH & pHfox)	EA033 (chromium)	(TCLP/Elutriate)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.		
1	SS3c		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	STORE remaining sample - will select following review of results
	SS3cx		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
2	SS3d		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	SS3dx		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
3	SS3b		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	SS3bx		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
4	SS3a		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	SS3ax		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
5	UC3b0-05		s	Glass bottle/bags	4	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
6	UC3b0-05x		s	Glass bottle/bags	2	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
7	UC3b0-5-09		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
8	UC2B0-05		s	Glass bottle/bags	64	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC2B0-05x		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
9	UC2B05-09		s	Glass bottle/bags	4	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC2B05-09x		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
10	UC2B09-15		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC2B09-15x		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
11	UC2B15-22		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC2B15-22x		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	



CHAIN OF CUSTODY

ALS Laboratory please tick →

CLIENT: <i>Watersheds</i>	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)			
OFFICE: <i>N/Spry</i>	<input type="checkbox"/> Non Standard or urgent TAT (List due date):	Custody Seal Intact?	Yes	No	N/A
PROJECT: <i>Calle maintenance/dredging</i>	ALS QUOTE NO.:	Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
ORDER NUMBER:		Random Sample Temperature on Receipt:	°C		
PROJECT MANAGER: <i>Al. Witten</i>	CONTACT PH: <i>04 22 763 306</i>	COC SEQUENCE NUMBER (Circle)	Other comment:		
SAMPLER: <i>Nick Kennard</i>	SAMPLER MOBILE: <i>040 250 423</i>	RECEIVED BY: <i>Frank - ALS</i>	RECEIVED BY:		
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: <i>18/11/09 5:15pm</i>	DATE/TIME:		
Email Reports to (will default to PM if no other addresses are listed):			DATE/TIME:		
Email Invoice to (will default to PM if no other addresses are listed):			DATE/TIME:		

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).											Additional Information				
	LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EG020SD (trace metals)	EG03SL (Mercury)	EP132SD (PAHs)	EP004 (TOC)	EP090 (TBT)	EP131A (OC Pesticides)	EP131B (PCBs)	EP080JUT (TPH (C6-C9) / BTEX)	EP071SD (TPH C10-C36)	EA150-H (Particle sizing)		EN020PR (dry/Bag/Labe)	EA0003 (pH & pTffox)	EA033 (chromium)	(TCLP/Elutriate)
12	SS2D	18/11/09 am	S	Glass bottle/bags	3	/	/	/	/	/							/	/	STORE	STORE	
	SS2Dx	18/11/09 am	S	Glass bottle/bags	2	Hold													STORE	STORE	
13	SS1C	18/11/09 am	S	Glass bottle/bags	3	/	/	/	/	/							/	/	STORE	STORE	
	SS1Cx	18/11/09 am	S	Glass bottle/bags	2	Hold													STORE	STORE	
14	SS2A	18/11/09 am	S	Glass bottle/bags	3	/	/	/	/	/							/	/	STORE	STORE	
	SS2Ax	18/11/09 am	S	Glass bottle/bags	2	Hold													STORE	STORE	
15	SS1D	18/11/09 am	S	Glass bottle/bags	3	/	/	/	/	/							/	/	STORE	STORE	
	SS1Dx	18/11/09 am	S	Glass bottle/bags	2	Hold													STORE	STORE	
			S	Glass bottle/bags															STORE	STORE	
			S	Glass bottle/bags															STORE	STORE	
			S	Glass bottle/bags															STORE	STORE	
			S	Glass bottle/bags			30	30	30	30	18	6	6	6	6	6	30	30	?	?	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; S = Unpreserved Bag.



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES0917657	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 18-NOV-2009
C-O-C number	: ----	Issue Date	: 23-NOV-2009
Sampler	: NH	No. of samples received	: 14
Site	: ----	No. of samples analysed	: 14
Quote number	: EN/034/09		

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	Position	Accreditation Category
Kim McCabe	Senior Inorganic Chemist	Inorganics

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **Analysis conducted by ALS Brisbane, NATA Site No. 818.**
- **pH FOX Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Vigorous; 4 - Very Vigorous**



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				SS3C	SS3D	SS3B	SS3A	VC3B_0-0.5
				17-NOV-2009 15:00	17-NOV-2009 15:00	17-NOV-2009 15:00	17-NOV-2009 15:00	17-NOV-2009 15:00
Compound	CAS Number	LOR	Unit	ES0917657-001	ES0917657-002	ES0917657-003	ES0917657-004	ES0917657-005
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	8.4	8.7	8.4	8.8	8.7
pH (Fox)	----	0.1	pH Unit	6.4	6.4	6.5	6.4	6.3
Reaction Rate	----	1	Reaction Uni	3	2	3	2	2



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				VC3B_0.5-0.9	VC2B_0-0.5	VC2B_0.5-0.9	VC2B_0.9-1.5	VC2B_1.5-2.2
				17-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00
Compound	CAS Number	LOR	Unit	ES0917657-007	ES0917657-008	ES0917657-009	ES0917657-010	ES0917657-011
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	8.7	8.9	8.8	7.7	7.8
pH (Fox)	----	0.1	pH Unit	6.3	6.3	6.5	2.1	2.0
Reaction Rate	----	1	Reaction Uni	2	2	2	4	2



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				SS2D	SS1C	SS2A	SS1D	----
				18-NOV-2009 10:00	18-NOV-2009 10:00	18-NOV-2009 10:00	18-NOV-2009 10:00	----
Compound	CAS Number	LOR	Unit	ES0917657-012	ES0917657-013	ES0917657-014	ES0917657-015	----
EA003 :pH (field/fox)								
pH (F)	----	0.1	pH Unit	8.8	8.5	8.7	8.9	----
pH (Fox)	----	0.1	pH Unit	6.1	5.7	6.1	5.8	----
Reaction Rate	----	1	Reaction Uni	2	1	1	1	----



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES0917657	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 18-NOV-2009
C-O-C number	: ----	Issue Date	: 23-NOV-2009
Sampler	: NH	No. of samples received	: 14
Order number	: ----	No. of samples analysed	: 14
Quote number	: EN/034/09		

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Kim McCabe	Senior Inorganic Chemist	Inorganics



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
= Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA003 :pH (field/fox) (QC Lot: 1170769)									
ES0917657-001	SS3C	EA003: Reaction Rate	----	1	--	3	3	0.0	No Limit
		EA003: pH (F)	----	0.1	pH Unit	8.4	8.4	0.0	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	6.4	6.4	0.0	0% - 20%
ES0917657-011	VC2B_1.5-2.2	EA003: Reaction Rate	----	1	--	2	2	0.0	No Limit
		EA003: pH (F)	----	0.1	pH Unit	7.8	7.9	1.3	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	2.0	2.0	0.0	0% - 20%



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

- **No Method Blank (MB) or Laboratory Control Spike (SCS) Results are required to be reported.**



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES0917657	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 18-NOV-2009
Sampler	: NH	Issue Date	: 23-NOV-2009
Order number	: ----		
Quote number	: EN/034/09	No. of samples received	: 14
		No. of samples analysed	: 14

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA003 :pH (field/fox)								
Snap Lock Bag - frozen SS3C, SS3B, VC3B_0-0.5,	SS3D, SS3A, VC3B_0.5-0.9	17-NOV-2009	----	----	----	23-NOV-2009	17-NOV-2010	✓
Snap Lock Bag - frozen VC2B_0-0.5, VC2B_0.9-1.5, SS2D, SS2A,	VC2B_0.5-0.9, VC2B_1.5-2.2, SS1C, SS1D	18-NOV-2009	----	----	----	23-NOV-2009	18-NOV-2010	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
pH field/fox	EA003	2	14	14.3	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
pH field/fox	EA003	SOIL	Ahern et al 1998 - determined on a 1:5 soil/water extract designed to simulate field measured pH and pH after the extract has been oxidised with peroxide.

<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)
Comprehensive Report

Work Order : **ES0917657**

Client : **WORLEY PARSONS - INFRASTRUCTURE MWE** **Laboratory** : Environmental Division Sydney

Contact : Ms ALI WATTERS **Contact** : Charlie Pierce

Address : Level 10/141 Walker Street **Address** : 277-289 Woodpark Road Smithfield
NORTH SYDNEY NSW, AUSTRALIA NSW Australia 2164
2060

E-mail : ali.watters@worleyparsons.com **E-mail** : charlie.pierce@alsenviro.com

Telephone : +61 02 8907 2131 **Telephone** : +61-2-8784 8555

Facsimile : ---- **Facsimile** : +61-2-8784 8500

Project : CALTEX MAINTENANCE DREDGING **Page** : 1 of 2

Order number : ----

C-O-C number : ---- **Quote number** : ES2009WORPAR0223 (EN/034/09)

Site : ----

Sampler : NH **QC Level** : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received : 18-NOV-2009 **Issue Date** : 20-NOV-2009 12:35

Client Requested Due Date : 23-NOV-2009 **Scheduled Reporting Date** : **23-NOV-2009**

Delivery Details

Mode of Delivery : Carrier **Temperature** : 0.6 - Ice present

No. of coolers/boxes : 1 HARD **No. of samples received** : 14

Security Seal : Not intact. **No. of samples analysed** : 14

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Requested Deliverables
- **Samples received in appropriately pretreated and preserved containers.**
- **PH FOX analysis will be conducted by ALS Brisbane**
- **Sample(s) have been received within recommended holding times.**
- **Sample id VC3b0-0.5 was not received a bag for PH Fox analysis.**
- **This batch for PH Fox only and split from ES0917649**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Jacob Waugh
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: SOIL

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA003 pH field/fox
ES0917657-001	17-NOV-2009 15:00	SS3C	✓
ES0917657-002	17-NOV-2009 15:00	SS3D	✓
ES0917657-003	17-NOV-2009 15:00	SS3B	✓
ES0917657-004	17-NOV-2009 15:00	SS3A	✓
ES0917657-005	17-NOV-2009 15:00	VC3B_0-0.5	✓
ES0917657-007	17-NOV-2009 15:00	VC3B_0.5-0.9	✓
ES0917657-008	18-NOV-2009 15:00	VC2B_0-0.5	✓
ES0917657-009	18-NOV-2009 15:00	VC2B_0.5-0.9	✓
ES0917657-010	18-NOV-2009 15:00	VC2B_0.9-1.5	✓
ES0917657-011	18-NOV-2009 15:00	VC2B_1.5-2.2	✓
ES0917657-012	18-NOV-2009 10:00	SS2D	✓
ES0917657-013	18-NOV-2009 10:00	SS1C	✓
ES0917657-014	18-NOV-2009 10:00	SS2A	✓
ES0917657-015	18-NOV-2009 10:00	SS1D	✓

Requested Deliverables

MR NICK HANNAFORD

- *AU Certificate of Analysis - NATA (COA)	Email	Nicholas.Hannaford@WorleyParsons.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	Nicholas.Hannaford@WorleyParsons.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	Nicholas.Hannaford@WorleyParsons.com
- A4 - AU Sample Receipt Notification - Environmental (SRN)	Email	Nicholas.Hannaford@WorleyParsons.com
- Default - Chain of Custody (COC)	Email	Nicholas.Hannaford@WorleyParsons.com
- EDI Format - ENMRG (ENMRG)	Email	Nicholas.Hannaford@WorleyParsons.com

Ms ALI WATTERS

- *AU Certificate of Analysis - NATA (COA)	Email	ali.watters@worleyparsons.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ali.watters@worleyparsons.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ali.watters@worleyparsons.com
- A4 - AU Sample Receipt Notification - Environmental (SRN)	Email	ali.watters@worleyparsons.com
- A4 - AU Tax Invoice (INV)	Email	ali.watters@worleyparsons.com
- Default - Chain of Custody (COC)	Email	ali.watters@worleyparsons.com
- EDI Format - ENMRG (ENMRG)	Email	ali.watters@worleyparsons.com



CHAIN OF CUSTODY

ALS Laboratory please tick →

PSD only

CLIENT: Wolfe Bros
OFFICE: Waltham
PROJECT: Callen maintenance
ORDER NUMBER:
PROJECT MANAGER: Ali Williams CONTACT PH: 0127 763 386
SAMPLER: Nick Hamilton SAMPLER MOBILE: 012365725 RELINQUISHED BY:
COC emailed to ALS? (YES / NO) EDD FORMAT (or default):
Email Reports to (will default to PM if no other addresses are listed):
Email invoice to (will default to PM if no other addresses are listed):

TURNAROUND REQUIREMENTS : Standard TAT (List due date):
(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) Non Standard or urgent TAT (List due date):

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact?
Free ice / frozen ice bricks present upon receipt
Random Sample Temperature on Receipt:
Other comment:

COC SEQUENCE NUMBER (Circle)
COC: 1 2 3 4 5 6 7
GF: 1 2 3 4 5 6 7

RECEIVED BY: Frank ALS DATE/TIME: 18/10/09 5:15pm
RELINQUISHED BY: DATE/TIME:

Environmental Division
Sydney
Work Order
ES0917660

Yes No N/A
Yes No N/A
0-6 C



Telephone : +61-2-8784 8555

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB, Suite Codes must be 1 Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (lit													Additional Information				
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EG020SD (trace metals)	EG035L (Mercury)	EP132SD (PAHs)	EP004 (TOC)	EP080 (TBT)	EP131A (OC Pesticides)	EP131B (PCBs)	EP080-UT (TPH (CG-C9) / BTEX)	EP071SD (TPH C10-C36)	EA150-H (Particle sizing)	EN020PR (dryBag/Labe)	EA0003 (pH & pHfox)	EA033 (chromium)	(TCL/Elutriate)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.		
	SS3c		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	STORE remaining sample - will select following review of results
	SS3cx		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	SS3d		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	SS3dx		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	SS3b		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	SS3bx		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	SS3x		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	SS3-x		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
1	UC3b0-05		s	Glass bottle/bags	4	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC3b0-05x		s	Glass bottle/bags	2	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC3b0-05-09		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
2	UC2B0-05		s	Glass bottle/bags	64	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC2B0-05x		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
3	UC2B05-09		s	Glass bottle/bags	4	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC2B05-09x		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC2B09-15		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC2B09-15x		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC2B15-22		s	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	
	UC2B15-22x		s	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE	

CONTRACT WORK
WO: _____
LAB: ALS Newcastle
DATE: 19/10/09
SPLIT: _____



CHAIN OF CUSTODY

ALS Laboratory please tick →

CLIENT: <i>Waterless</i>	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date): <small>(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)</small>	FOR LABORATORY USE ONLY (Circle) Custody Seal Intact? Yes No N/A
OFFICE: <i>WTSpray</i>	<input type="checkbox"/> Non Standard or urgent TAT (List due date):	Free ice / frozen ice bricks present upon receipt? Yes No N/A
PROJECT: <i>Calla water remediation</i>	ALS QUOTE NO.:	Random Sample Temperature on Receipt: °C
ORDER NUMBER:	CDC SEQUENCE NUMBER (Circle) COC: <i>1</i> 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	Other comment:
PROJECT MANAGER: <i>Al. Miller</i>	CONTACT PH: <i>0422 763 336</i>	
SAMPLER: <i>Nick Hamilton</i>	SAMPLER MOBILE: <i>0422 230423</i>	RECEIVED BY: <i>Frank - ALS</i>
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	RECEIVED BY:
Email Reports to (will default to PM if no other addresses are listed):	DATE/TIME:	DATE/TIME: <i>18/11/09 5:15pm</i>
Email Invoice to (will default to PM if no other addresses are listed):		DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) <small>Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).</small>											Additional Information				
	LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE <small>(refer to codes below)</small>	TOTAL BOTTLES	EG02SD (trace metals)	EG03SL (Mercury)	EP132SD (PAHs)	EP004 (TOC)	EP090 (TBT)	EP131A (OC Pesticides)	EP131B (PCBs)	EP080-UT (TPH C8-C9) / BTEX	EP071SD (TPH C10-C36)	EA150-H (Particle sizing)		EN020PR (dry/Bag/Label)	EA0003 (pH & pHfox)	EA033 (chromium)	(TCLP/Elutriate)
	<i>SS2D</i>	<i>15/11/09 am</i>	<i>s</i>	<i>Glass bottle/bags</i>	<i>3</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>									<i>STORE</i>	<i>STORE</i>	
	<i>SS2Dx</i>	<i>15/11/09 am</i>	<i>s</i>	<i>Glass bottle/bags</i>	<i>2</i>	<i>Hold</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>									<i>STORE</i>	<i>STORE</i>	
	<i>SS1C</i>	<i>18/11/09 am</i>	<i>s</i>	<i>Glass bottle/bags</i>	<i>3</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>										<i>STORE</i>	<i>STORE</i>	
	<i>SS1Cx</i>	<i>18/11/09 am</i>	<i>s</i>	<i>Glass bottle/bags</i>	<i>2</i>	<i>Hold</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>									<i>STORE</i>	<i>STORE</i>	
	<i>SS2a</i>	<i>15/11/09 am</i>	<i>s</i>	<i>Glass bottle/bags</i>	<i>3</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>										<i>STORE</i>	<i>STORE</i>	
	<i>SS2ax</i>	<i>18/11/09 am</i>	<i>s</i>	<i>Glass bottle/bags</i>	<i>2</i>	<i>Hold</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>									<i>STORE</i>	<i>STORE</i>	
	<i>SS1D</i>	<i>18/11/09 am</i>	<i>s</i>	<i>Glass bottle/bags</i>	<i>3</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>										<i>STORE</i>	<i>STORE</i>	
	<i>SS1Dx</i>	<i>18/11/09 am</i>	<i>s</i>	<i>Glass bottle/bags</i>	<i>2</i>	<i>Hold</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>									<i>STORE</i>	<i>STORE</i>	
			<i>s</i>	<i>Glass bottle/bags</i>															<i>STORE</i>	<i>STORE</i>	
			<i>s</i>	<i>Glass bottle/bags</i>															<i>STORE</i>	<i>STORE</i>	
			<i>s</i>	<i>Glass bottle/bags</i>															<i>STORE</i>	<i>STORE</i>	
							<i>30</i>	<i>30</i>	<i>30</i>	<i>30</i>	<i>18</i>	<i>6</i>	<i>6</i>	<i>6</i>	<i>6</i>	<i>6</i>	<i>30</i>	<i>30</i>	<i>?</i>	<i>?</i>	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
 V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Specialion bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
 Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES0917660	Page	: 1 of 3
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 18-NOV-2009
C-O-C number	: ----	Issue Date	: 01-DEC-2009
Sampler	: NH	No. of samples received	: 3
Site	: ----	No. of samples analysed	: 3
Quote number	: SY/503/09		

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	Position	Accreditation Category
Dianne Blane		Newcastle

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company

Page : 2 of 3
Work Order : ES0917660
Client : WORLEY PARSONS - INFRASTRUCTURE MWE
Project : CALTEX MAINTENANCE DREDGING



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting



Analytical Results

Sub-Matrix: SOIL

Client sample ID
 Client sampling date / time

Compound	CAS Number	LOR	Unit	VC3B_0-0.5	VC2B_0-0.5	VC2B_0.5-0.9	----	----
				17-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	----	----
				ES0917660-001	ES0917660-002	ES0917660-003	----	----
EA150: Particle Sizing								
+75µm	----	1	%	95	96	89	----	----
+150µm	----	1	%	90	94	83	----	----
+300µm	----	1	%	39	51	44	----	----
+425µm	----	1	%	9	13	15	----	----
+600µm	----	1	%	2	2	5	----	----
+1180µm	----	1	%	1	1	1	----	----
+2.36mm	----	1	%	<1	1	<1	----	----
+4.75mm	----	1	%	<1	<1	<1	----	----
+9.5mm	----	1	%	<1	<1	<1	----	----
+19.0mm	----	1	%	<1	<1	<1	----	----
+37.5mm	----	1	%	<1	<1	<1	----	----
+75.0mm	----	1	%	<1	<1	<1	----	----
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	4	4	9	----	----
Silt (2-60 µm)	----	1	%	2	1	2	----	----
Sand (0.06-2.00 mm)	----	1	%	94	95	89	----	----
Gravel (>2mm)	----	1	%	<1	<1	<1	----	----
Cobbles (>6cm)	----	1	%	<1	<1	<1	----	----



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES0917660	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 18-NOV-2009
C-O-C number	: ----	Issue Date	: 01-DEC-2009
Sampler	: NH	No. of samples received	: 3
Order number	: ----	No. of samples analysed	: 3
Quote number	: SY/503/09		

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Dianne Blane		Newcastle



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
= Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

			----						No Limit
--	--	--	------	--	--	--	--	--	----------

- No Laboratory Duplicate (DUP) Results are required to be reported.



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

- **No Method Blank (MB) or Laboratory Control Spike (SCS) Results are required to be reported.**



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES0917660	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 18-NOV-2009
Sampler	: NH	Issue Date	: 01-DEC-2009
Order number	: ----		
Quote number	: SY/503/09	No. of samples received	: 3
		No. of samples analysed	: 3

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA150: Particle Sizing							
Snap Lock Bag VC3B_0-0.5	17-NOV-2009	---	---	----	30-NOV-2009	16-MAY-2010	✓
Snap Lock Bag VC2B_0-0.5, VC2B_0.5-0.9	18-NOV-2009	---	---	----	30-NOV-2009	17-MAY-2010	✓
EA150: Soil Classification based on Particle Size							
Snap Lock Bag VC3B_0-0.5	17-NOV-2009	---	---	----	30-NOV-2009	16-MAY-2010	✓
Snap Lock Bag VC2B_0-0.5, VC2B_0.5-0.9	18-NOV-2009	---	---	----	30-NOV-2009	17-MAY-2010	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix:

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Particle Size Analysis (Sieving)	EA150	SOIL	Particle Size Analysis by Sieving according to AS1289.3.6.1 - 1995
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3 - 2003



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)
Comprehensive Report

Work Order : **ES0917660**

Client : **WORLEY PARSONS - INFRASTRUCTURE MWE** **Laboratory** : Environmental Division Sydney

Contact : Ms ALI WATTERS **Contact** : Charlie Pierce

Address : Level 10/141 Walker Street **Address** : 277-289 Woodpark Road Smithfield
NORTH SYDNEY NSW, AUSTRALIA NSW Australia 2164
2060

E-mail : ali.watters@worleyparsons.com **E-mail** : charlie.pierce@alsenviro.com

Telephone : +61 02 8907 2131 **Telephone** : +61-2-8784 8555

Facsimile : ---- **Facsimile** : +61-2-8784 8500

Project : CALTEX MAINTENANCE DREDGING **Page** : 1 of 2

Order number : ----

C-O-C number : ---- **Quote number** : ES2009WORPAR0223 (EN/034/09)

Site : ----

Sampler : NH **QC Level** : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received : 18-NOV-2009 **Issue Date** : 26-NOV-2009 14:17

Client Requested Due Date : 30-NOV-2009 **Scheduled Reporting Date** : **30-NOV-2009**

Delivery Details

Mode of Delivery : Carrier **Temperature** : 0.6'C - Ice present

No. of coolers/boxes : 1 HARD **No. of samples received** : 3

Security Seal : Not intact. **No. of samples analysed** : 3

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Requested Deliverables
- **Samples received in appropriately pretreated and preserved containers.**
- **PSD analysis will be conducted by ALS Newcastle.**
- **Sample(s) have been received within recommended holding times.**
- **This batch for PSD only and split from ES0917649**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Jacob Waugh
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: SOIL

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA150H Particle Size Analysis by Hydrometer
ES0917660-001	17-NOV-2009 15:00	VC3B_0-0.5	✓
ES0917660-002	18-NOV-2009 15:00	VC2B_0-0.5	✓
ES0917660-003	18-NOV-2009 15:00	VC2B_0.5-0.9	✓

Requested Deliverables

MR NICK HANNAFORD

- | | | |
|---|-------|--------------------------------------|
| - *AU Certificate of Analysis - NATA (COA) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - A4 - AU Sample Receipt Notification - Environmental (SRN) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - Default - Chain of Custody (COC) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - EDI Format - ENMRG (ENMRG) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - Trigger - Subcontract Report (SUBCO) | Email | Nicholas.Hannaford@WorleyParsons.com |

Ms ALI WATTERS

- | | | |
|---|-------|-------------------------------|
| - *AU Certificate of Analysis - NATA (COA) | Email | ali.watters@worleyparsons.com |
| - *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) | Email | ali.watters@worleyparsons.com |
| - *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) | Email | ali.watters@worleyparsons.com |
| - A4 - AU Sample Receipt Notification - Environmental (SRN) | Email | ali.watters@worleyparsons.com |
| - A4 - AU Tax Invoice (INV) | Email | ali.watters@worleyparsons.com |
| - Default - Chain of Custody (COC) | Email | ali.watters@worleyparsons.com |
| - EDI Format - ENMRG (ENMRG) | Email | ali.watters@worleyparsons.com |
| - Trigger - Subcontract Report (SUBCO) | Email | ali.watters@worleyparsons.com |



CHAIN OF CUSTODY

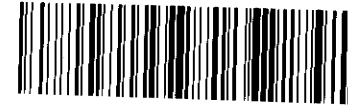
ALS Laboratory: please tick →

Environmental Division
Sydney

Work Order

ES0917728

CLIENT: <u>Worley Parsons</u>	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)
OFFICE: <u>NRA Sydney</u>	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) <input type="checkbox"/> Non Standard or urgent TAT (List due date):	Custody Seal Intact?
PROJECT: <u>Cattewater and dredging</u>	ALS QUOTE NO.:	<input checked="" type="checkbox"/> Free Ice / Prozer / Traps present upon receipt
ORDER NUMBER:	COC SEQUENCE NUMBER (Circle)	<input type="checkbox"/> Random Sample Temperature on Receipt:
PROJECT MANAGER: <u>Ali Walters</u>	CONTACT PH: <u>022 765 386</u>	OF: 1 2 3 4 5 6 7
SAMPLER: <u>Nick Kennard</u>	SAMPLER MOBILE: <u>060 236 5428</u>	Other comment:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	RECEIVED BY: <u>Frank ALS</u>
Email Reports to (will default to PM if no other addresses are listed):	DATE/TIME:	DATE/TIME: <u>19/1/09 4pm</u>
Email Invoice to (will default to PM if no other addresses are listed):		RECEIVED BY:



Telephone : +61-2-8784 8555

Yes No N/A

Yes No N/A

°

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).												Additional Information																
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EG02SD (trace metals)	EG03SL (Mercury)	EP132SD (PAHs)	EP004 (TOC)	EP000 (TBT)	EP131A (OC Pesticides)	EP131B (PCBs)	EP000-JT (TPH (C6-C9) / BTEX)	EP071SD (TPH C10-C36)	EA150-H (Particle sizing)	EN020PR (dry/Bag/L label)	EA0003 (pH & pHfox)	EA003 (chromium)	(TCLP/Elutriate)														
1	SS1a	18/1/09 am	S	Glass bottle/bags	3	/	/	/	/	/	CONTRACT WORK WO: <u>ES0917728</u> ALS Brisbane / Newcastle DATE: <u>19/1/09</u> SPLIT: <u>18/1/09: ES0917729</u> pH/pHfox: <u>0917731</u> PSD: <u>0917732</u>												STORE	STORE									
9	SS1ax	18/1/09 am	S	Glass bottle/bags	2	Hold	/	/	/	/													/	/	/	/	/	/	/	/	/	STORE	STORE
2	SS1B	18/1/09 am	S	Glass bottle/bags	3	/	/	/	/	/													/	/	/	/	/	/	/	/	/	STORE	STORE
10	SS1Bx	18/1/09 am	S	Glass bottle/bags	2	Hold	/	/	/	/													/	/	/	/	/	/	/	/	/	STORE	STORE
3	SS2B	18/1/09 am	S	Glass bottle/bags	3	/	/	/	/	/													/	/	/	/	/	/	/	/	/	STORE	STORE
11	SS2Bx	18/1/09 am	S	Glass bottle/bags	2	Hold	/	/	/	/													/	/	/	/	/	/	/	/	/	STORE	STORE
4	SS2C	18/1/09 am	S	Glass bottle/bags	3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE												
12	SS2Cx	18/1/09 am	S	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE												
5	VCI A10-06	18/1/09 pm	S	Glass bottle/bags	4	/	/	/	/	Yes	Yes	Yes	Yes	Yes	/	/	/	/	/	STORE	STORE												
13	VCI A10-06x	18/1/09 pm	S	Glass bottle/bags	2	Hold	/	/	/	/	/	/	/	/	/	/	/	/	/	STORE	STORE												
6	VCI A10-06-2	18/1/09 pm	S	Glass bottle/bags	4	/	/	/	/	No	No	No	No	No	/	/	/	/	/	STORE	STORE												
TOTAL						30	30	30	30	18	6	6	6	6	6	30	30	?	?														

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
 V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
 Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Solids; B = Unpreserved Bag.

ASS bag for SS2C received as SS2Cx but please assure it's SS2C as per Nick. 20/1/09



CHAIN OF CUSTODY

ALS Laboratory please tick →

CLIENT: <i>Worley Parsons</i>	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: <i>New Sydney</i>	<input type="checkbox"/> Standard TAT may be longer for some tests e.g. Ultra Trace Organics	Custody Seal intact?	Yes No N/A
PROJECT: <i>Celtic maintenance dredging</i>	ALS QUOTE NO.:	Free ice / frozen ice bricks present upon receipt?	Yes No N/A
ORDER NUMBER:	COC SEQUENCE NUMBER (Circle)	Random Sample Temperature on Receipt:	°C
PROJECT MANAGER: <i>Ali Walker</i>	CONTACT PH: <i>0422 765 386</i>	OF: 1 2 3 4 5 6 7	Other comment:
SAMPLER: <i>Nick Henderson</i>	SAMPLER MOBILE: <i>0418670377</i>	RECEIVED BY: <i>Frank ALC</i>	RECEIVED BY:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: <i>19/11/09 4pm</i>	DATE/TIME:
Email Reports to (will default to PM if no other addresses are listed):	DATE/TIME:		
Email Invoice to (will default to PM if no other addresses are listed):			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) <small>Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (filtered bottle required)</small>													Additional Information		
	LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE <small>(refer to codes below)</small>	TOTAL BOTTLES	EQ020SD (trace metals)	EQ035L (Mercury)	EP132SD (PAHs)	EP004 (TOC)	EP080 (TBT)	EP131A (OC Pesticides)	EP131B (PCBs)	EP080-UT (TPH (C6-C9) / BTEX)	EP071SD (TPH C10-C36)	EA150-H (Particle sizing)	END20PR (dry/Bag/Label)	EA0003 (pH & pH/ox)		EA033 (chromium)	(TCLP/Elutriate)
14	UC1A106-1.2	18/11/09 pm	S	Glass bottle/bags	2	Hold													STORE	STORE	
7	UC1A106-1.2DUP	18/11/09 pm	S	Glass bottle/bags	1														STORE	STORE	
8	UC1A1P2-1.7	18/11/09 pm	S	Glass bottle/bags	3														STORE	STORE	
15	UC1A112-1.7x	18/11/09 pm	S	Glass bottle/bags	2	Hold													STORE	STORE	
16	SS1A	18/11/09 pm	S	Glass bottle/bags	3														STORE	STORE	← All samples from here down are double ups of the first 8 samples listed. They can be ignored as per Nick. 20/11/2009.
17	SS1Ax	18/11/09 pm	S	Glass bottle/bags	2	Hold													STORE	STORE	
18	SS1B	18/11/09 pm	S	Glass bottle/bags	3														STORE	STORE	
19	SS1Bx	18/11/09 pm	S	Glass bottle/bags	2	Hold													STORE	STORE	
20	SS2B	18/11/09 pm	S	Glass bottle/bags	3														STORE	STORE	
21	SS2Bx	18/11/09 pm	S	Glass bottle/bags	2	Hold													STORE	STORE	
22	SS2C	18/11/09 pm	S	Glass bottle/bags	3														STORE	STORE	
TOTAL							30	30	30	30	18	6	6	6	6	6	30	30	7	7	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Solis; B = Unpreserved Bag

only analysis required on #7 is EQ020SP, EQ035L, EP132SD & TOC. As per Nick 20/11/2009.



CHAIN OF CUSTODY

ALS Laboratory please tick →

CLIENT: <u>Worley Parsons</u>		TURNAROUND REQUIREMENTS : <input type="checkbox"/> Standard TAT (List due date):		FOR LABORATORY USE ONLY (Circle)	
OFFICE: <u>Nth Sydney</u>		(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) <input type="checkbox"/> Non Standard or urgent TAT (List due date):		Custody Seal Intact? Yes No N/A	
PROJECT: <u>Catchment maintenance dredging</u>		ALS QUOTE NO.:		Free ice / frozen ice bricks present upon receipt? Yes No N/A	
ORDER NUMBER:		COC SEQUENCE NUMBER (Circle)		Random Sample Temperature on Receipt: °C	
PROJECT MANAGER: <u>Al. Walters</u>		CONTACT PH: <u>0422765536</u>		Other comment:	
SAMPLER: <u>Nick Hamaburg</u>		SAMPLER MOBILE: <u>0402365428</u>		RECEIVED BY: <u>Frank ALS</u>	
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):		RECEIVED BY:	
Email Reports to (will default to PM if no other addresses are listed):		DATE/TIME:		DATE/TIME:	
Email Invoice to (will default to PM if no other addresses are listed):		DATE/TIME: <u>19/11/09 4pm</u>		DATE/TIME:	

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) <small>Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (filtered bottle required).</small>												Additional Information				
	LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE <i>(refer to codes below)</i>	TOTAL BOTTLES	EG020SD (trace metals)	EG035L (Mercury)	EP13SD (PAHs)	EP004 (TOC)	EP080 (TBT)	EP131A (OC Pesticides)	EP131B (PCBs)	EP080-JT (TPH C6-C9) / BTEX	EP071SD (TPH C10-C36)	EA150-H (Particle sizing)	EN020PR (dry bag/Label)		EA0003 (pH & pHfox)	EA033 (chromium)	(TCLP/Elutriate)	
23	SS2C x	18/11/09 pm	S	Glass bottle/bags	2 Hold																	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
			S	Glass bottle/bags																		
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Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES0917728	Page	: 1 of 9
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 19-NOV-2009
C-O-C number	: ----	Issue Date	: 01-DEC-2009
Sampler	: NH	No. of samples received	: 15
Site	: ----	No. of samples analysed	: 8
Quote number	: SY/503/09		

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Celine Conceicao	Spectroscopist	Inorganics
Edwandy Fadjar	Senior Organic Chemist	Organics
Hoa Nguyen	Inorganic Chemist	Inorganics
Pabi Subba	Senior Organic Chemist (Semi-Volatile)	Organics

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	SS1a	SS1B	SS2B	SS2C	VC1A1 0-0.6
				18-NOV-2009 10:00	18-NOV-2009 10:00	18-NOV-2009 10:00	18-NOV-2009 10:00	18-NOV-2009 15:00
				ES0917728-001	ES0917728-002	ES0917728-003	ES0917728-004	ES0917728-005
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	20.2	21.8	38.1	20.1	23.5
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	<1.00	<1.00	7.46	<1.00	<1.00
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	0.4
Chromium	7440-47-3	1.0	mg/kg	<1.0	<1.0	10.8	1.6	<1.0
Copper	7440-50-8	1.0	mg/kg	1.6	2.0	5.7	1.2	3.2
Cobalt	7440-48-4	0.5	mg/kg	<0.5	<0.5	0.9	<0.5	<0.5
Lead	7439-92-1	1.0	mg/kg	1.5	2.2	9.5	2.2	1.2
Manganese	7439-96-5	10	mg/kg	<10	<10	18	<10	<10
Nickel	7440-02-0	1.0	mg/kg	<1.0	<1.0	3.2	<1.0	<1.0
Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.6	<0.1	<0.1
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	1.1
Vanadium	7440-62-2	2.0	mg/kg	<2.0	<2.0	11.1	2.1	<2.0
Zinc	7440-66-6	1.0	mg/kg	2.0	8.0	21.3	5.0	4.7
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	0.08	0.01	<0.01
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	----	----	----	----	<3
C10 - C14 Fraction	----	3	mg/kg	----	----	----	----	<3
C15 - C28 Fraction	----	3	mg/kg	----	----	----	----	12
C29 - C36 Fraction	----	5	mg/kg	----	----	----	----	12
^ C10 - C36 Fraction (sum)	----	3	mg/kg	----	----	----	----	24
EP080-SD: BTEX								
Benzene	71-43-2	0.2	mg/kg	----	----	----	----	<0.2
Toluene	108-88-3	0.2	mg/kg	----	----	----	----	<0.2
Ethylbenzene	100-41-4	0.2	mg/kg	----	----	----	----	<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	----	----	----	----	<0.2
ortho-Xylene	95-47-6	0.2	mg/kg	----	----	----	----	<0.2
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	----	----	----	----	<0.50
alpha-BHC	319-84-6	0.50	µg/kg	----	----	----	----	<0.50
beta-BHC	319-85-7	0.50	µg/kg	----	----	----	----	<0.50
delta-BHC	319-86-8	0.50	µg/kg	----	----	----	----	<0.50
4,4'-DDD	72-54-8	0.50	µg/kg	----	----	----	----	<0.50
4,4'-DDE	72-55-9	0.50	µg/kg	----	----	----	----	<0.50
4,4'-DDT	50-29-3	0.50	µg/kg	----	----	----	----	<0.50



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	SS1a	SS1B	SS2B	SS2C	VC1A1 0-0.6
				18-NOV-2009 10:00	18-NOV-2009 10:00	18-NOV-2009 10:00	18-NOV-2009 10:00	18-NOV-2009 15:00
				ES0917728-001	ES0917728-002	ES0917728-003	ES0917728-004	ES0917728-005
EP131A: Organochlorine Pesticides - Continued								
^ DDT (total)	----	0.50	µg/kg	----	----	----	----	<0.50
Dieldrin	60-57-1	0.50	µg/kg	----	----	----	----	<0.50
alpha-Endosulfan	959-98-8	0.50	µg/kg	----	----	----	----	<0.50
beta-Endosulfan	33213-65-9	0.50	µg/kg	----	----	----	----	<0.50
Endosulfan sulfate	1031-07-8	0.50	µg/kg	----	----	----	----	<0.50
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	----	----	----	----	<0.50
Endrin	72-20-8	0.50	µg/kg	----	----	----	----	<0.50
Endrin aldehyde	7421-93-4	0.50	µg/kg	----	----	----	----	<0.50
Endrin ketone	53494-70-5	0.50	µg/kg	----	----	----	----	<0.50
Heptachlor	76-44-8	0.50	µg/kg	----	----	----	----	<0.50
Heptachlor epoxide	1024-57-3	0.50	µg/kg	----	----	----	----	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	----	----	----	----	<0.50
gamma-BHC	58-89-9	0.50	µg/kg	----	----	----	----	<0.50
Methoxychlor	72-43-5	0.50	µg/kg	----	----	----	----	<0.50
cis-Chlordane	5103-71-9	0.50	µg/kg	----	----	----	----	<0.50
trans-Chlordane	5103-74-2	0.50	µg/kg	----	----	----	----	<0.50
^ Total Chlordane (sum)	----	0.50	µg/kg	----	----	----	----	<0.50
Oxychlordane	27304-13-8	0.50	µg/kg	----	----	----	----	<0.50
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	----	----	----	----	<5.0
Aroclor 1016	12974-11-2	5.0	µg/kg	----	----	----	----	<5.0
Aroclor 1221	11104-28-2	5.0	µg/kg	----	----	----	----	<5.0
Aroclor 1232	11141-16-5	5.0	µg/kg	----	----	----	----	<5.0
Aroclor 1242	53469-21-9	5.0	µg/kg	----	----	----	----	<5.0
Aroclor 1248	12672-29-6	5.0	µg/kg	----	----	----	----	<5.0
Aroclor 1254	11097-69-1	5.0	µg/kg	----	----	----	----	<5.0
Aroclor 1260	11096-82-5	5.0	µg/kg	----	----	----	----	<5.0
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	6	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	10	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	22	17	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	12	30	<4	<4
Phenanthrene	85-01-8	4	µg/kg	<4	32	169	<4	<4
Anthracene	120-12-7	4	µg/kg	<4	8	62	<4	<4
Fluoranthene	206-44-0	4	µg/kg	6	63	237	6	6
Pyrene	129-00-0	4	µg/kg	7	49	179	6	6
Benz(a)anthracene	56-55-3	4	µg/kg	<4	25	97	<4	<4



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	SS1a	SS1B	SS2B	SS2C	VC1A1 0-0.6
				18-NOV-2009 10:00	18-NOV-2009 10:00	18-NOV-2009 10:00	18-NOV-2009 10:00	18-NOV-2009 15:00
				ES0917728-001	ES0917728-002	ES0917728-003	ES0917728-004	ES0917728-005
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Chrysene	218-01-9	4	µg/kg	<4	24	94	<4	<4
Benzo(b)fluoranthene	205-99-2	4	µg/kg	6	30	95	4	6
Benzo(k)fluoranthene	207-08-9	4	µg/kg	5	16	50	<4	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	5	16	43	<4	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	7	24	89	<4	4
Perylene	198-55-0	4	µg/kg	<4	8	21	<4	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	5	17	47	<4	<4
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	8	14	<4	<4
Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	4	15	45	<4	<4
Coronene	191-07-1	5	µg/kg	<5	7	20	<5	<5
^ Sum of PAHs	----	4	µg/kg	45	374	1330	16	22
EP080-SD: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	----	----	----	----	104
Toluene-D8	2037-26-5	0.1	%	----	----	----	----	103
4-Bromofluorobenzene	460-00-4	0.1	%	----	----	----	----	96.2
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	----	----	----	----	69.6
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	----	----	65.4
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	94.9	107	111	119	107
Anthracene-d10	1719-06-8	0.1	%	91.9	89.2	94.5	94.3	104
4-Terphenyl-d14	1718-51-0	0.1	%	87.9	86.9	85.5	89.5	95.0



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				VC1A1 0.6-1.2	VC1A1 0.6-1.2DUP	VC1A1 1.2-1.7	----	----
				18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	----	----
Compound	CAS Number	LOR	Unit	ES0917728-006	ES0917728-007	ES0917728-008	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	18.9	18.3	22.9	----	----
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	----	----
Arsenic	7440-38-2	1.00	mg/kg	<1.00	<1.00	1.70	----	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
Chromium	7440-47-3	1.0	mg/kg	<1.0	<1.0	1.1	----	----
Copper	7440-50-8	1.0	mg/kg	2.4	2.4	3.7	----	----
Cobalt	7440-48-4	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Lead	7439-92-1	1.0	mg/kg	1.0	<1.0	<1.0	----	----
Manganese	7439-96-5	10	mg/kg	<10	<10	<10	----	----
Nickel	7440-02-0	1.0	mg/kg	<1.0	<1.0	<1.0	----	----
Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
Vanadium	7440-62-2	2.0	mg/kg	<2.0	<2.0	<2.0	----	----
Zinc	7440-66-6	1.0	mg/kg	2.5	2.6	3.0	----	----
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	<0.01	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	----	----
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	----	----
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	----	----
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	----	----
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	----	----
Phenanthrene	85-01-8	4	µg/kg	<4	5	<4	----	----
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	----	----
Fluoranthene	206-44-0	4	µg/kg	4	8	<4	----	----
Pyrene	129-00-0	4	µg/kg	4	7	<4	----	----
Benz(a)anthracene	56-55-3	4	µg/kg	<4	5	<4	----	----
Chrysene	218-01-9	4	µg/kg	<4	5	<4	----	----
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	5	<4	----	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	----	----
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	----	----
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	5	<4	----	----
Perylene	198-55-0	4	µg/kg	<4	<4	<4	----	----
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	4	<4	----	----
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	----	----
Coronene	191-07-1	5	µg/kg	<5	<5	<5	----	----



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

				VC1A1 0.6-1.2	VC1A1 0.6-1.2DUP	VC1A1 1.2-1.7	----	----
				18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	----	----
<i>Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	ES0917728-006	ES0917728-007	ES0917728-008	----	----
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
^ Sum of PAHs	----	4	µg/kg	9	44	<4	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	103	79.4	114	----	----
Anthracene-d10	1719-06-8	0.1	%	103	103	96.3	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	95.1	99.4	91.4	----	----



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080-SD: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	74.7	127
Toluene-D8	2037-26-5	74.8	129
4-Bromofluorobenzene	460-00-4	75.3	127
EP131S: OC Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	136
EP131T: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	10	164
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	30	115
Anthracene-d10	1719-06-8	27	133
4-Terphenyl-d14	1718-51-0	18	137



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES0917728	Page	: 1 of 10
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 19-NOV-2009
C-O-C number	: ----	Issue Date	: 01-DEC-2009
Sampler	: NH	No. of samples received	: 15
Order number	: ----	No. of samples analysed	: 8
Quote number	: SY/503/09		

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Celine Conceicao	Spectroscopist	Inorganics
Edwandy Fadjjar	Senior Organic Chemist	Organics
Hoa Nguyen	Inorganic Chemist	Inorganics
Pabi Subba	Senior Organic Chemist (Semi-Volatile)	Organics



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
= Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 1170098)									
ES0917724-041	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	11.8	11.3	4.6	0% - 50%
ES0917793-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	17.9	19.3	7.7	0% - 50%
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 1172083)									
ES0917728-001	SS1a	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	<1.0	<1.0	0.0	No Limit
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	1.6	1.4	13.7	No Limit
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	1.5	<1.0	41.4	No Limit
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	<1.0	0.0	No Limit
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	2.0	2.3	11.6	No Limit
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	<1.00	<1.00	0.0	No Limit
		EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	<10	0.0	No Limit
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	<2.0	<2.0	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1172082)									
ES0917728-001	SS1a	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QC Lot: 1174800)									
ES0917728-005	VC1A1 0-0.6	EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
		EP071-SD: C15 - C28 Fraction	----	3	mg/kg	12	10	9.5	No Limit
		EP071-SD: C29 - C36 Fraction	----	5	mg/kg	12	10	20.4	No Limit
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QC Lot: 1175145)									
ES0917728-005	VC1A1 0-0.6	EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
EP080-SD: BTEX (QC Lot: 1175145)									
ES0917728-005	VC1A1 0-0.6	EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: ortho-Xylene	106-42-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP131A: Organochlorine Pesticides (QC Lot: 1171557)									
ES0917728-005	VC1A1 0-0.6	EP131A: Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit



Sub-Matrix: **SOIL**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP131A: Organochlorine Pesticides (QC Lot: 1171557) - continued									
ES0917728-005	VC1A1 0-0.6	EP131A: delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4.4'-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4.4'-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4.4'-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: DDT (total)	----	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: gamma-BHC	58-89-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: cis-Chlordane	5103-71-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: trans-Chlordane	5103-74-2	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
EP131A: Total Chlordane (sum)	----	0.50	µg/kg	<0.50	<0.50	0.0	No Limit		
EP131B: Polychlorinated Biphenyls (as Aroclors) (QC Lot: 1171556)									
ES0917728-005	VC1A1 0-0.6	EP131B: Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1016	12974-11-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1174799)									
ES0917728-005	VC1A1 0-0.6	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	6	5	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	6	5	19.4	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit

Page : 5 of 10
 Work Order : ES0917728
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE
 Project : CALTEX MAINTENANCE DREDGING



Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1174799) - continued									
ES0917728-005	VC1A1 0-0.6	EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	6	<4	32.3	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	22	10	75.8	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1172083)									
EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	----	----	----	----	
EG020-SD: Arsenic	7440-38-2	1.0	mg/kg	<1.00	13.1 mg/kg	92.0	70	130	
EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	2.76 mg/kg	91.2	70	130	
EG020-SD: Chromium	7440-47-3	1.0	mg/kg	<1.0	60.9 mg/kg	82.1	70	130	
EG020-SD: Copper	7440-50-8	1.0	mg/kg	<1.0	54.7 mg/kg	86.6	70	130	
EG020-SD: Cobalt	7440-48-4	10	mg/kg	<10.0	24.5 mg/kg	86.4	70	130	
EG020-SD: Lead	7439-92-1	1.0	mg/kg	<1.0	54.8 mg/kg	86.0	70	130	
EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	136 mg/kg	81.5	70	130	
EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	55.2 mg/kg	86.2	70	130	
EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----	
EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	5.6 mg/kg	95.3	70	130	
EG020-SD: Vanadium	7440-62-2	2	mg/kg	<2.0	34 mg/kg	85.4	70	130	
EG020-SD: Zinc	7440-66-6	1.0	mg/kg	<1.0	104 mg/kg	87.1	70	130	
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1172082)									
EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.046 mg/kg	101	74.2	126	
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1174800)									
EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	5 mg/kg	99.0	75.2	116	
EP071-SD: C15 - C28 Fraction	----	3	mg/kg	<3	5 mg/kg	84.0	75.3	113	
EP071-SD: C29 - C36 Fraction	----	5	mg/kg	<5	5 mg/kg	92.0	72.6	117	
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1175145)									
EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	26 mg/kg	88.0	68.4	128	
EP080-SD: BTEX (QCLot: 1175145)									
EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	105	67.5	125	
EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	1 mg/kg	88.6	69	122	
EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	1 mg/kg	100	65.3	126	
EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	2 mg/kg	99.8	66.5	124	
EP080-SD: ortho-Xylene	106-42-3								
EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	1 mg/kg	105	66.7	123	
EP131A: Organochlorine Pesticides (QCLot: 1171557)									
EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	5 µg/kg	88.7	31.7	140	
EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	5 µg/kg	93.2	24.5	150	
EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	5 µg/kg	84.7	36.9	139	
EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	5 µg/kg	95.9	38.2	137	
EP131A: 4,4'-DDD	72-54-8	0.5	µg/kg	<0.50	5 µg/kg	106	42.5	141	



Sub-Matrix: SOIL

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP131A: Organochlorine Pesticides (QCLot: 1171557) - continued									
EP131A: 4.4'-DDE	72-55-9	0.5	µg/kg	<0.50	5 µg/kg	72.4	34.8	140	
EP131A: 4.4'-DDT	50-29-3	0.5	µg/kg	<0.50	5 µg/kg	93.3	38	143	
EP131A: DDT (total)	----	0.5	µg/kg	<0.50	----	----	----	----	
EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	5 µg/kg	96.2	43.2	134	
EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	5 µg/kg	86.0	23.7	139	
EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	5 µg/kg	67.6	35.8	138	
EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	5 µg/kg	90.6	7.45	158	
EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	----	----	----	----	
EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	5 µg/kg	91.2	21.6	162	
EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	5 µg/kg	69.0	19.3	131	
EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	5 µg/kg	85.7	17.9	141	
EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	5 µg/kg	88.4	31	153	
EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	5 µg/kg	88.4	34.3	138	
EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	5 µg/kg	76.8	18.6	146	
EP131A: gamma-BHC	58-89-9	0.5	µg/kg	<0.50	5 µg/kg	88.7	30.7	145	
EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	5 µg/kg	91.4	15	157	
EP131A: cis-Chlordane	5103-71-9	0.5	µg/kg	<0.50	5 µg/kg	95.1	22.3	145	
EP131A: trans-Chlordane	5103-74-2	0.5	µg/kg	<0.50	5 µg/kg	85.1	42.4	139	
EP131A: Total Chlordane (sum)	----	0.5	µg/kg	<0.50	----	----	----	----	
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 1171556)									
EP131B: Total Polychlorinated biphenyls	----	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1016	12974-11-2	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1221	11104-28-2	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1232	11141-16-5	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1242	53469-21-9	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1248	12672-29-6	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1254	11097-69-1	5	µg/kg	<5.0	50 µg/kg	84.0	61.3	121	
EP131B: Aroclor 1260	11096-82-5	5	µg/kg	<5.0	----	----	----	----	
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1174799)									
EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	25 µg/kg	97.7	----	----	
EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	25 µg/kg	96.2	----	----	
EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	25 µg/kg	84.5	----	----	
EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	25 µg/kg	106	----	----	
EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	25 µg/kg	89.5	----	----	
EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	25 µg/kg	89.6	----	----	
EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	25 µg/kg	88.7	----	----	
EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	25 µg/kg	90.2	----	----	
EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	25 µg/kg	89.9	----	----	
EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	25 µg/kg	75.4	----	----	



Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1174799) - continued									
EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	25 µg/kg	77.5	----	----	
EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	25 µg/kg	87.8	----	----	
EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	25 µg/kg	76.9	----	----	
EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	25 µg/kg	64.6	----	----	
EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	25 µg/kg	79.4	----	----	
EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	25 µg/kg	58.5	----	----	
EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	25 µg/kg	86.6	----	----	
EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	25 µg/kg	93.4	----	----	
EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	25 µg/kg	82.4	----	----	
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	25 µg/kg	50.0	----	----	
EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	----	----	----	----	



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1172083)							
ES0917728-002	SS1B	EG020-SD: Arsenic	7440-38-2	50 mg/kg	92.7	70	130
		EG020-SD: Cadmium	7440-43-9	50 mg/kg	96.4	70	130
		EG020-SD: Chromium	7440-47-3	50 mg/kg	87.0	70	130
		EG020-SD: Copper	7440-50-8	250 mg/kg	87.3	70	130
		EG020-SD: Lead	7439-92-1	250 mg/kg	84.0	70	130
		EG020-SD: Nickel	7440-02-0	50 mg/kg	90.2	70	130
		EG020-SD: Zinc	7440-66-6	250 mg/kg	87.3	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1172082)							
ES0917728-001	SS1a	EG035T-LL: Mercury	7439-97-6	0.50 mg/kg	120	70	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1174800)							
ES0917728-005	VC1A1 0-0.6	EP071-SD: C10 - C14 Fraction	----	19.75 mg/kg	82.0	70	130
		EP071-SD: C15 - C28 Fraction	----	87.25 mg/kg	78.6	70	130
		EP071-SD: C29 - C36 Fraction	----	60 mg/kg	96.3	70	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1175145)							
ES0917728-005	VC1A1 0-0.6	EP080-SD: C6 - C9 Fraction	----	26 mg/kg	119	70	130
EP080-SD: BTEX (QCLot: 1175145)							
ES0917728-005	VC1A1 0-0.6	EP080-SD: Benzene	71-43-2	2.5 mg/kg	83.7	70	130
		EP080-SD: Toluene	108-88-3	2.5 mg/kg	84.6	70	130
		EP080-SD: Ethylbenzene	100-41-4	2.5 mg/kg	87.6	70	130
		EP080-SD: meta- & para-Xylene	108-38-3	2.5 mg/kg	90.2	70	130
		EP080-SD: ortho-Xylene	106-42-3	2.5 mg/kg	91.1	70	130
EP131A: Organochlorine Pesticides (QCLot: 1171557)							
ES0917728-005	VC1A1 0-0.6	EP131A: Aldrin	309-00-2	5 µg/kg	55.0	31.7	140
		EP131A: alpha-BHC	319-84-6	5 µg/kg	55.1	24.5	150
		EP131A: beta-BHC	319-85-7	5 µg/kg	58.7	36.9	139
		EP131A: delta-BHC	319-86-8	5 µg/kg	67.4	38.2	137
		EP131A: 4,4'-DDD	72-54-8	5 µg/kg	82.9	42.5	141
		EP131A: 4,4'-DDE	72-55-9	5 µg/kg	55.5	34.8	140
		EP131A: 4,4'-DDT	50-29-3	5 µg/kg	73.3	38	143
		EP131A: Dieldrin	60-57-1	5 µg/kg	72.7	43.2	134
		EP131A: alpha-Endosulfan	959-98-8	5 µg/kg	63.9	23.7	139
		EP131A: beta-Endosulfan	33213-65-9	5 µg/kg	52.3	35.8	138
		EP131A: Endosulfan sulfate	1031-07-8	5 µg/kg	71.2	7.45	158



Sub-Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
					MS	Low	High	
EP131A: Organochlorine Pesticides (QCLot: 1171557) - continued								
ES0917728-005	VC1A1 0-0.6	EP131A: Endrin	72-20-8	5 µg/kg	53.3	21.6	162	
		EP131A: Endrin aldehyde	7421-93-4	5 µg/kg	53.9	19.3	131	
		EP131A: Endrin ketone	53494-70-5	5 µg/kg	80.1	17.9	141	
		EP131A: Heptachlor	76-44-8	5 µg/kg	64.6	31	153	
		EP131A: Heptachlor epoxide	1024-57-3	5 µg/kg	57.9	34.3	138	
		EP131A: Hexachlorobenzene (HCB)	118-74-1	5 µg/kg	44.7	18.6	146	
		EP131A: gamma-BHC	58-89-9	5 µg/kg	56.9	30.7	145	
		EP131A: Methoxychlor	72-43-5	5 µg/kg	76.9	15	157	
		EP131A: cis-Chlordane	5103-71-9	5 µg/kg	86.6	22.3	145	
		EP131A: trans-Chlordane	5103-74-2	5 µg/kg	61.9	42.4	139	
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 1171556)								
ES0917728-005	VC1A1 0-0.6	EP131B: Aroclor 1254	11097-69-1	50 µg/kg	62.0	61.3	121	
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1174799)								
ES0917728-005	VC1A1 0-0.6	EP132B-SD: Naphthalene	91-20-3	25 µg/kg	78.7	70	130	
		EP132B-SD: 2-Methylnaphthalene	91-57-6	25 µg/kg	108	70	130	
		EP132B-SD: Acenaphthylene	208-96-8	25 µg/kg	89.8	70	130	
		EP132B-SD: Acenaphthene	83-32-9	25 µg/kg	94.1	70	130	
		EP132B-SD: Fluorene	86-73-7	25 µg/kg	100	70	130	
		EP132B-SD: Phenanthrene	85-01-8	25 µg/kg	80.3	70	130	
		EP132B-SD: Anthracene	120-12-7	25 µg/kg	87.9	70	130	
		EP132B-SD: Fluoranthene	206-44-0	25 µg/kg	81.8	70	130	
		EP132B-SD: Pyrene	129-00-0	25 µg/kg	81.5	70	130	
		EP132B-SD: Benz(a)anthracene	56-55-3	25 µg/kg	74.4	70	130	
		EP132B-SD: Chrysene	218-01-9	25 µg/kg	74.9	70	130	
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	25 µg/kg	71.0	70	130	
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	25 µg/kg	73.6	70	130	
		EP132B-SD: Benzo(e)pyrene	192-97-2	25 µg/kg	70.8	70	130	
		EP132B-SD: Benzo(a)pyrene	50-32-8	25 µg/kg	75.0	70	130	
		EP132B-SD: Perylene	198-55-0	25 µg/kg	# 64.9	70	130	
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	25 µg/kg	75.0	70	130	
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	25 µg/kg	85.2	70	130	
		EP132B-SD: Indeno(1,2,3.cd)pyrene	193-39-5	25 µg/kg	81.7	70	130	
		EP132B-SD: Coronene	191-07-1	25 µg/kg	72.8	70	130	



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES0917728	Page	: 1 of 6
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 19-NOV-2009
Sampler	: NH	Issue Date	: 01-DEC-2009
Order number	: ----		
Quote number	: SY/503/09	No. of samples received	: 15
		No. of samples analysed	: 8

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content								
Soil Glass Jar - Unpreserved SS1a, SS2B, VC1A1 0-0.6, VC1A1 0.6-1.2DUP, SS1B, SS2C, VC1A1 0.6-1.2, VC1A1 1.2-1.7	18-NOV-2009	----	----	----	20-NOV-2009	25-NOV-2009	✓	
EG020-SD: Total Metals in Sediments by ICPMS								
Soil Glass Jar - Unpreserved SS1a, SS2B, VC1A1 0-0.6, VC1A1 0.6-1.2DUP, SS1B, SS2C, VC1A1 0.6-1.2, VC1A1 1.2-1.7	18-NOV-2009	24-NOV-2009	16-DEC-2009	✓	24-NOV-2009	17-MAY-2010	✓	
EG035T: Total Mercury by FIMS								
Soil Glass Jar - Unpreserved SS1a, SS2B, VC1A1 0-0.6, VC1A1 0.6-1.2DUP, SS1B, SS2C, VC1A1 0.6-1.2, VC1A1 1.2-1.7	18-NOV-2009	24-NOV-2009	16-DEC-2009	✓	27-NOV-2009	16-DEC-2009	✓	
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved VC1A1 0-0.6	18-NOV-2009	25-NOV-2009	02-DEC-2009	✓	26-NOV-2009	04-JAN-2010	✓	
Soil Glass Jar - Unpreserved VC1A1 0-0.6	18-NOV-2009	26-NOV-2009	02-DEC-2009	✓	26-NOV-2009	02-DEC-2009	✓	
EP080-SD: BTEX								
Soil Glass Jar - Unpreserved VC1A1 0-0.6	18-NOV-2009	26-NOV-2009	02-DEC-2009	✓	26-NOV-2009	02-DEC-2009	✓	
EP131A: Organochlorine Pesticides								
Soil Glass Jar - Unpreserved VC1A1 0-0.6	18-NOV-2009	23-NOV-2009	02-DEC-2009	✓	26-NOV-2009	02-JAN-2010	✓	



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP131B: Polychlorinated Biphenyls (as Aroclors)								
Soil Glass Jar - Unpreserved VC1A1 0-0.6	18-NOV-2009	23-NOV-2009	02-DEC-2009	✓	26-NOV-2009	02-JAN-2010	✓	
EP132B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved SS1a, SS2B, VC1A1 0-0.6, VC1A1 0.6-1.2DUP,	SS1B, SS2C, VC1A1 0.6-1.2, VC1A1 1.2-1.7	18-NOV-2009	25-NOV-2009	02-DEC-2009	✓	27-NOV-2009	04-JAN-2010	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	2	11	18.2	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	6	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	8	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	2	50.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	8	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	8	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	1	100.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	1	100.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	2	50.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	1	100.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	1	100.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	2	50.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	1	100.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	1	100.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	6	16.7	5.0	✓	ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	8	12.5	5.0	✓	ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	2	50.0	5.0	✓	ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	8	12.5	5.0	✓	ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	8	12.5	5.0	✓	ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	1	100.0	5.0	✓	ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	1	100.0	5.0	✓	ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Total Metals in Sediments by ICPMS	EG020-SD	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. Analyte list and LORs per NODG.
Total Mercury by FIMS (Low Level)	EG035T-LL	SOIL	AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3)
TPH - Semivolatile Fraction	EP071-SD	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 504)
TPH Volatiles/BTEX in Sediments	EP080-SD	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 501)
Organochlorine Pesticides (Ultra-trace)	EP131A	SOIL	USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PCB's (Ultra-trace)	EP131B	SOIL	USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PAHs in Sediments by GCMS(SIM)	EP132B-SD	SOIL	8270 GCMS Capillary column, SIM mode using large volume programmed temperature vaporisation injection.
Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (1999) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(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/ Sample Cleanup	ORG17A-UTP	SOIL	In-house, Mechanical agitation (tumbler). 20g of sample, Na ₂ SO ₄ and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. Samples are extracted, concentrated (by KD) and exchanged into an appropriate solvent for GPC and florisil cleanup as required.
Tumbler Extraction of Solids for LVI (Non-concentrating)	ORG17D	SOIL	In house: 10g of sample, Na ₂ SO ₄ and surrogate are extracted with 50mL 1:1 DCM/Acetone by end over end tumbling. An aliquot is concentrated by nitrogen blowdown to a reduced volume for analysis if required.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP132B: Polynuclear Aromatic Hydrocarbons	ES0917728-005	VC1A1 0-0.6	Perylene	198-55-0	64.9 %	70-130%	Recovery less than lower data quality objective

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.

Regular Sample Surrogates

Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP132T: Base/Neutral Extractable Surrogates	ES0917728-004	SS2C	2-Fluorobiphenyl	321-60-8	119 %	30-115 %	Recovery greater than upper data quality objective

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)
Comprehensive Report

Work Order : **ES0917728**

Client : **WORLEY PARSONS - INFRASTRUCTURE MWE** **Laboratory** : Environmental Division Sydney

Contact : Ms ALI WATTERS **Contact** : Charlie Pierce

Address : Level 10/141 Walker Street **Address** : 277-289 Woodpark Road Smithfield
NORTH SYDNEY NSW, AUSTRALIA 2060 NSW Australia 2164

E-mail : ali.watters@worleyparsons.com **E-mail** : charlie.pierce@alsenviro.com

Telephone : +61 02 8907 2131 **Telephone** : +61-2-8784 8555

Facsimile : ---- **Facsimile** : +61-2-8784 8500

Project : CALTEX MAINTENANCE DREDGING **Page** : 1 of 3

Order number : ----

C-O-C number : ---- **Quote number** : ES2009WORPAR0232 (SY/503/09)

Site : ----

Sampler : NH **QC Level** : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received : 19-NOV-2009 **Issue Date** : 20-NOV-2009 18:20

Client Requested Due Date : 01-DEC-2009 **Scheduled Reporting Date** : **01-DEC-2009**

Delivery Details

Mode of Delivery : Carrier **Temperature** : 1.4' C - Ice present

No. of coolers/boxes : 1 HARD **No. of samples received** : 15

Security Seal : Not intact. **No. of samples analysed** : 8

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Requested Deliverables
- **Samples received in appropriately pretreated and preserved containers.**
- **Sample(s) have been received within recommended holding times.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- **This batch split into ES0917729 for TBT/TOC, ES0917731 for PHFOX, ES0917732 for PSD**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Jacob Waugh
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: **SOIL**

Laboratory sample ID Client sampling date / time Client sample ID

Laboratory sample ID	Client sampling date / time	Client sample ID	(On Hold) SOIL No analysis requested	SOIL - EA055-103 Moisture Content	SOIL - EG020-SD Total Metals in Sediments by ICPMS (NODG)	SOIL - EG035T-LL Total Mercury by FIMS - Low Level	SOIL - EP071 - SD TPH ultra trace in sediments	SOIL - EP080-SD TPH(V)/BTEX in Sediments	SOIL - EP131A OC Pesticides (Ultratrace)	SOIL - EP131B PCB's (Ultratrace)
ES0917728-001	18-NOV-2009 10:00	SS1a		✓	✓	✓				
ES0917728-002	18-NOV-2009 10:00	SS1B		✓	✓	✓				
ES0917728-003	18-NOV-2009 10:00	SS2B		✓	✓	✓				
ES0917728-004	18-NOV-2009 10:00	SS2C		✓	✓	✓				
ES0917728-005	18-NOV-2009 15:00	VC1A1 0-0.6		✓	✓	✓	✓	✓	✓	✓
ES0917728-006	18-NOV-2009 15:00	VC1A1 0.6-1.2		✓	✓	✓				
ES0917728-007	18-NOV-2009 15:00	VC1A1 0.6-1.2DUP		✓	✓	✓				
ES0917728-008	18-NOV-2009 15:00	VC1A1 1.2-1.7		✓	✓	✓				
ES0917728-009	18-NOV-2009 15:00	SS1ax	✓							
ES0917728-010	18-NOV-2009 15:00	SS1Bx	✓							
ES0917728-011	18-NOV-2009 15:00	SS2Bx	✓							
ES0917728-012	18-NOV-2009 15:00	SS2Cx	✓							
ES0917728-013	18-NOV-2009 15:00	VC1A1 0-0.6x	✓							
ES0917728-014	18-NOV-2009 15:00	VC1A1 0.6-1.2x	✓							
ES0917728-015	18-NOV-2009 15:00	VC1A1 1.2-1.7x	✓							

Matrix: **SOIL**

Laboratory sample ID Client sampling date / time Client sample ID

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EP132B-SD Ultra-trace PAHs in Sediments
ES0917728-001	18-NOV-2009 10:00	SS1a	✓
ES0917728-002	18-NOV-2009 10:00	SS1B	✓
ES0917728-003	18-NOV-2009 10:00	SS2B	✓
ES0917728-004	18-NOV-2009 10:00	SS2C	✓
ES0917728-005	18-NOV-2009 15:00	VC1A1 0-0.6	✓
ES0917728-006	18-NOV-2009 15:00	VC1A1 0.6-1.2	✓
ES0917728-007	18-NOV-2009 15:00	VC1A1 0.6-1.2DUP	✓
ES0917728-008	18-NOV-2009 15:00	VC1A1 1.2-1.7	✓



Requested Deliverables

MR NICK HANNAFORD

- | | | |
|---|-------|--------------------------------------|
| - *AU Certificate of Analysis - NATA (COA) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - A4 - AU Sample Receipt Notification - Environmental (SRN) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - Default - Chain of Custody (COC) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - EDI Format - ENMRG (ENMRG) | Email | Nicholas.Hannaford@WorleyParsons.com |

Ms ALI WATTERS

- | | | |
|---|-------|-------------------------------|
| - *AU Certificate of Analysis - NATA (COA) | Email | ali.watters@worleyparsons.com |
| - *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) | Email | ali.watters@worleyparsons.com |
| - *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) | Email | ali.watters@worleyparsons.com |
| - A4 - AU Sample Receipt Notification - Environmental (SRN) | Email | ali.watters@worleyparsons.com |
| - A4 - AU Tax Invoice (INV) | Email | ali.watters@worleyparsons.com |
| - Default - Chain of Custody (COC) | Email | ali.watters@worleyparsons.com |
| - EDI Format - ENMRG (ENMRG) | Email | ali.watters@worleyparsons.com |



CHAIN OF CUSTODY

ALS Laboratory please tick →

TBT/TOC only

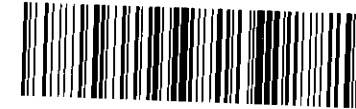
Environmental Division
Sydney

Work Order

ES0917729

Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A
Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A
RECEIVED BY:		
DATE/TIME:		

CLIENT: <i>City of Parramatta</i>	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date); <input type="checkbox"/> Non Standard or urgent TAT (List due date):	FOR LABORATORY USE ONLY (Circle) Custody Seal intact? <input checked="" type="checkbox"/>
OFFICE: <i>NRA Sydney</i>	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	Free ice / frozen samples present upon receipt: <input checked="" type="checkbox"/>
PROJECT: <i>Contaminated Site Investigation</i>	ALS QUOTE NO.:	COC SEQUENCE NUMBER (Circle) COC: <i>2</i> 3 4 5 6 7 OF: 1 2 3 4 5 6 7
ORDER NUMBER:	PROJECT MANAGER: <i>H. Walker</i>	Random Sample Temperature on Receipt:
	CONTACT PH: <i>022 765 336</i>	Other comment:
SAMPLER: <i>Neil Henderson</i>	SAMPLER MOBILE: <i>062307428</i>	RECEIVED BY: <i>Frank ALS</i>
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	RELINQUISHED BY:
Email Reports to (will default to PM if no other addresses are listed):		DATE/TIME: <i>19/11/09 4pm</i>
Email Invoice to (will default to PM if no other addresses are listed):		DATE/TIME:



Telephone : +61-2-8784 8555

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY		SAMPLE DETAILS MATRIX: Solid(S) Water(W)		CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB, Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (filtered bottle required).												Additional Information					
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EG020SD (trace metals)	EG036L (Mercury)	EP132SD (PAHs)	EP004 (TOC)	EP060 (TBT)	EP131A (OC Pesticides)	EP131B (PCBs)	EP060-UT (TPH (C6-C9) / BTEX)	EP071SD (TPH C10-C36)	EA150-H (Particle sizing)	EN020PR (dry/Bag/Label)	EA005 (pH & pHox)	EA033 (chromium)	(TCLP/Ethitate)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.			
1	SS1a	18/10/09 am	S	Glass bottle/bags	3	/	/	/	/	/	CONTRACT WORK										STORE	STORE	
2	SS1a	18/10/09 am	S	Glass bottle/bags	2	Hold					WO: ES0917729										STORE	STORE	
2	SS1B	18/10/09 am	S	Glass bottle/bags	3	/	/	/	/	/	LAB: ALS Brisbane										STORE	STORE	
3	SS1B	18/10/09 am	S	Glass bottle/bags	2	Hold					DATE: 19/11/09										STORE	STORE	
3	SS2B	18/10/09 am	S	Glass bottle/bags	3	/	/	/	/	/	SPLIT: from ES0917729										STORE	STORE	
4	SS2B	18/10/09 am	S	Glass bottle/bags	2	Hold															STORE	STORE	
4	SS2C	18/10/09 am	S	Glass bottle/bags	3	/	/	/	/	/											STORE	STORE	
4	SS2C	18/10/09 am	S	Glass bottle/bags	2	Hold															STORE	STORE	
5	VC1A10-06	18/10/09 pm	S	Glass bottle/bags	4	/	/	/	/	Yes	Yes	Yes	Yes	Yes	/	/	/	/	/	STORE	STORE		
6	VC1A10-06	18/10/09 pm	S	Glass bottle/bags	2	Hold															STORE	STORE	
6	VC1A10-06-12	18/10/09 pm	S	Glass bottle/bags	4	/	/	/	/	Yes	Yes	Yes	Yes	Yes	/	/	/	/	/	STORE	STORE		
						30	30	30	30	15	6	6	6	6	6	30	30	?	?				

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
E = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES0917729	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 19-NOV-2009
C-O-C number	: ----	Issue Date	: 04-DEC-2009
Sampler	: NH	No. of samples received	: 8
Site	: ----	No. of samples analysed	: 8
Quote number	: SY/503/09		

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Cass Sealby	Senior Chemist - Acid Sulphate Soils	Inorganics
Cass Sealby	Senior Chemist - Acid Sulphate Soils	Stafford Minerals - AY
Matt Frost	Organic Instrument Chemist	Organics

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **TBT: Sample shows poor duplicate results due to sample heterogeneity. Confirmed by re-extraction and re-analysis.**
- **TBT: Sample shows poor matrix spike recovery due to matrix interference. Confirmed by re-extraction and re-analysis.**
- **TBT: Samples SS2C and VC1A1 0-0.6 required dilution due to the presence of high level contaminants. Surrogate recovery not determined.**



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				SS1a	SS1B	SS2B	SS2C	VC1A1 0-0.6
				18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00
Compound	CAS Number	LOR	Unit	ES0917729-001	ES0917729-002	ES0917729-003	ES0917729-004	ES0917729-005
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	16.7	17.7	24.0	19.7	18.6
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	0.08	0.03	0.42	0.09	0.10
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	6.0	6.9	4.2	46.7	22.9
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	75.5	100	58.9	Not Determined	Not Determined

Page : 4 of 5
 Work Order : ES0917729
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE
 Project : CALTEX MAINTENANCE DREDGING



Analytical Results

Sub-Matrix: **SOIL**

				<i>Client sample ID</i>	<i>Client sample ID</i>	<i>Client sample ID</i>		
				<i>Client sampling date / time</i>	<i>Client sampling date / time</i>	<i>Client sampling date / time</i>		
<i>Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	VC1A1 0.6-1.2	VC1A1 0.6-1.2 DUP	VC1A1 1.2-1.7	----	----
				18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	----	----
				ES0917729-006	ES0917729-007	ES0917729-008	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	0.06	0.13	0.03	----	----



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP090S: Organotin Surrogate			
Tripropyltin	----	34	108



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES0917729	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 19-NOV-2009
C-O-C number	: ----	Issue Date	: 04-DEC-2009
Sampler	: NH	No. of samples received	: 8
Order number	: ----	No. of samples analysed	: 8
Quote number	: SY/503/09		

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Cass Sealby	Senior Chemist - Acid Sulphate Soils	Inorganics
Cass Sealby	Senior Chemist - Acid Sulphate Soils	Stafford Minerals - AY
Matt Frost	Organic Instrument Chemist	Organics

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
= Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 1172931)									
ES0917655-008	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	18.9	17.9	5.1	0% - 50%
ES0917729-003	SS2B	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	24.0	26.7	10.4	0% - 20%
EP005: Total Organic Carbon (TOC) (QC Lot: 1175364)									
ES0917729-001	SS1a	EP005: Total Organic Carbon	----	0.02	%	0.08	0.09	13.1	No Limit
EP090: Organotin Compounds (QC Lot: 1174086)									
EB0918409-001	Anonymous	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	73.6	47.1	# 44.0	0% - 20%
EP0906670-012	Anonymous	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: SOIL

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
EP005: Total Organic Carbon (TOC) (QCLot: 1175364)								
EP005: Total Organic Carbon	----	0.02	%	<0.02	100 %	100	70	130
EP090: Organotin Compounds (QCLot: 1174086)								
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5 ----	---- 1.25 µgSn/kg	---- 91.7	---- 24.1	---- 129



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				<i>Matrix Spike (MS) Report</i>			
		<i>Spike</i>	<i>Spike Recovery (%)</i>		<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Concentration</i>	<i>MS</i>	<i>Low</i>	<i>High</i>
EP090: Organotin Compounds (QCLot: 1174086)							
EB0918409-002	Anonymous	EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	# Not Determined	20	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES0917729	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 19-NOV-2009
Sampler	: NH	Issue Date	: 04-DEC-2009
Order number	: ----		
Quote number	: SY/503/09	No. of samples received	: 8
		No. of samples analysed	: 8

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content							
Soil Glass Jar - Unpreserved SS1a, SS2B, VC1A1 0-0.6	SS1B, SS2C, 18-NOV-2009	----	----	----	24-NOV-2009	25-NOV-2009	✓
EP005: Total Organic Carbon (TOC)							
Pulp Bag SS1a, SS2B, VC1A1 0-0.6, VC1A1 0.6-1.2 DUP,	SS1B, SS2C, VC1A1 0.6-1.2, VC1A1 1.2-1.7 18-NOV-2009	26-NOV-2009	---	----	26-NOV-2009	16-DEC-2009	✓
EP090: Organotin Compounds							
Soil Glass Jar - Unpreserved SS1a, SS2B, VC1A1 0-0.6	SS1B, SS2C, 18-NOV-2009	26-NOV-2009	02-DEC-2009	✓	02-DEC-2009	05-JAN-2010	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	2	11	18.2	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	2	17	11.8	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	8	12.5	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Organotin Analysis	EP090	1	17	5.9	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	8	12.5	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Organotin Analysis	EP090	1	17	5.9	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	8	12.5	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Organotin Analysis	EP090	1	17	5.9	5.0	✔	ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Total Organic Carbon	EP005	SOIL	In-house. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a LECO furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO ₂) is automatically measured by infra-red detector.
Organotin Analysis	EP090	SOIL	(USEPA SW 846 - 8270D) Prepared sample extracts are analysed by GC/MS coupled with high volume injection, and quantified against an established calibration curve.
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Organotin Sample Preparation	ORG35	SOIL	In house. 20g sample is spiked with surrogate and leached in a methanol:acetic acid:UHP water mix and vacuum filtered. Reagents and solvents are added to the sample and the mixture tumbled. The butyltin compounds are simultaneously derivatised and extracted. The extract is further extracted with petroleum ether. The resultant extracts are combined and concentrated for analysis.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EP090: Organotin Compounds	EB0918409-001	Anonymous	Tributyltin	56573-85-4	44.0 %	0-20%	RPD exceeds LOR based limits
Matrix Spike (MS) Recoveries							
EP090: Organotin Compounds	EB0918409-002	Anonymous	Tributyltin	56573-85-4	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Laboratory Control outliers occur.

Regular Sample Surrogates

Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP090S: Organotin Surrogate	ES0917729-004	SS2C	Tripopyltin	----	Not Determined	----	Surrogate recovery not determined due to (target or non-target) matrix interferences
EP090S: Organotin Surrogate	ES0917729-005	VC1A1 0-0.6	Tripopyltin	----	Not Determined	----	Surrogate recovery not determined due to (target or non-target) matrix interferences

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)
Comprehensive Report

Work Order : **ES0917729**

Client : **WORLEY PARSONS - INFRASTRUCTURE MWE** **Laboratory** : Environmental Division Sydney

Contact : Ms ALI WATTERS **Contact** : Charlie Pierce

Address : Level 10/141 Walker Street **Address** : 277-289 Woodpark Road Smithfield
NORTH SYDNEY NSW, AUSTRALIA NSW Australia 2164
2060

E-mail : ali.watters@worleyparsons.com **E-mail** : charlie.pierce@alsenviro.com

Telephone : +61 02 8907 2131 **Telephone** : +61-2-8784 8555

Facsimile : ---- **Facsimile** : +61-2-8784 8500

Project : CALTEX MAINTENANCE DREDGING **Page** : 1 of 2

Order number : ----

C-O-C number : ---- **Quote number** : ES2009WORPAR0232 (SY/503/09)

Site : ----

Sampler : NH **QC Level** : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received : 19-NOV-2009 **Issue Date** : 24-NOV-2009 15:10

Client Requested Due Date : 02-DEC-2009 **Scheduled Reporting Date** : **02-DEC-2009**

Delivery Details

Mode of Delivery : Carrier **Temperature** : 1.4'C - Ice present

No. of coolers/boxes : 1 HARD **No. of samples received** : 8

Security Seal : Not intact. **No. of samples analysed** : 8

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Requested Deliverables
- Samples received in appropriately pretreated and preserved containers.
- TBT and TOC analysis to be conducted by ALS Brisbane.
- **Samples received in appropriately pretreated and preserved containers.**
- **Sample(s) have been received within recommended holding times.**
- **This work order for TBT/TOC only and split from ES0917728.**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Jacob Waugh
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: SOIL

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EP005 (solids) Total Organic Carbon (TOC) soils	SOIL - EA055-103 Moisture Content	SOIL - EP090 (solids) Organotins
ES0917729-001	18-NOV-2009 15:00	SS1a	✓	✓	✓
ES0917729-002	18-NOV-2009 15:00	SS1B	✓	✓	✓
ES0917729-003	18-NOV-2009 15:00	SS2B	✓	✓	✓
ES0917729-004	18-NOV-2009 15:00	SS2C	✓	✓	✓
ES0917729-005	18-NOV-2009 15:00	VC1A1 0-0.6	✓	✓	✓
ES0917729-006	18-NOV-2009 15:00	VC1A1 0.6-1.2	✓		
ES0917729-007	18-NOV-2009 15:00	VC1A1 0.6-1.2 DUP	✓		
ES0917729-008	18-NOV-2009 15:00	VC1A1 1.2-1.7	✓		

Requested Deliverables

MR NICK HANNAFORD

- | | | |
|---|-------|--------------------------------------|
| - *AU Certificate of Analysis - NATA (COA) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - A4 - AU Sample Receipt Notification - Environmental (SRN) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - Default - Chain of Custody (COC) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - EDI Format - ENMRG (ENMRG) | Email | Nicholas.Hannaford@WorleyParsons.com |

Ms ALI WATTERS

- | | | |
|---|-------|-------------------------------|
| - *AU Certificate of Analysis - NATA (COA) | Email | ali.watters@worleyparsons.com |
| - *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) | Email | ali.watters@worleyparsons.com |
| - *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) | Email | ali.watters@worleyparsons.com |
| - A4 - AU Sample Receipt Notification - Environmental (SRN) | Email | ali.watters@worleyparsons.com |
| - A4 - AU Tax Invoice (INV) | Email | ali.watters@worleyparsons.com |
| - Default - Chain of Custody (COC) | Email | ali.watters@worleyparsons.com |
| - EDI Format - ENMRG (ENMRG) | Email | ali.watters@worleyparsons.com |



CHAIN OF CUSTODY

ALS Laboratory please tick →

pHE / pHox only

CLIENT: *Water Services NSW Sydney*

OFFICE: *Water Services NSW Sydney*

PROJECT: *Cattamarra environmental study*

ORDER NUMBER:

PROJECT MANAGER: *Hi Walter* CONTACT PH: *0122 765 586*

SAMPLER: *Neil Stamford* SAMPLER MOBILE: *0602307428*

COC emailed to ALS? (YES / NO) EDD FORMAT (or default):

Email Reports to (will default to PM if no other addresses are listed):

Email Invoice to (will default to PM if no other addresses are listed):

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS: Standard TAT (List due date); Non Standard or urgent TAT (List due date):

FOR LABORATORY USE ONLY (Circle)

COC SEQUENCE NUMBER (Circle): *2*

Free Ice / Freezer Packs present upon receipt:

Random Sample Temperature on Receipt: OF: 1 2 3 4 5 6 7

Environmental Division
Sydney
Work Order
ES0917731

RECEIVED BY: *Frank ALS*

DATE/TIME: *19/11/09 4pm*

Yes No N/A



Telephone : + 61-2-8784 8555

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be reviewed... Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (filtered bottle required).												Additional Information						
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EG020SD (trace metals)	EG035L (Mercury)	EP132SD (PAHs)	EP004 (TOC)	EP090 (TBT)	EP131A (OC Pesticides)	EP191B (PCBs)	EP080-LT (TPH (C6-C9) / BTEX)	EP071SD (TPH C10-C16)	EA190-H (Particle sizing)	EN020PR (dry/B ag/L, label)	EA0003 (pH & pHox)	EA033 (chromium)	(TCLP/Elutriate)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.			
1	SS1a	18/11/09 am	s	Glass bottle/bags	3	/	/	/	/	/	CONTRACT WORK										STORE	STORE	
2	SS1B	18/11/09 am	s	Glass bottle/bags	3	/	/	/	/	/	WO: ES0917731										STORE	STORE	
	SS1Bx	18/11/09 am	s	Glass bottle/bags	2	Hold					LAB: ALS Brisbane										STORE	STORE	
3	SS2B	18/11/09 am	s	Glass bottle/bags	3	/	/	/	/	/	DATE: 19/11/09										STORE	STORE	
	SS2Bx	18/11/09 am	s	Glass bottle/bags	2	Hold					SPLIT: from ES0917728										STORE	STORE	
4	SS2C	18/11/09 am	s	Glass bottle/bags	3	/	/	/	/	/											STORE	STORE	
	SS2Cx	18/11/09 am	s	Glass bottle/bags	2	Hold															STORE	STORE	
5	VCI A10-06	18/11/09 pm	s	Glass bottle/bags	4	-	-	-	-	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-	STORE	STORE		
	VCI A10-06x	18/11/09 pm	s	Glass bottle/bags	2	Hold															STORE	STORE	
6	VCI A10-06-12	18/11/09 pm	s	Glass bottle/bags	4	-	-	-	-	Yes	Yes	Yes	Yes	Yes	-	-	-	-	-	STORE	STORE		
						30	30	30	30	18	6	6	6	6	6	30	30	?	?				

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic; Y = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulfate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag



CHAIN OF CUSTODY

ALS Laboratory please tick →

CLIENT: <u>Wesley Parsons</u>	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date); <input type="checkbox"/> Non Standard or urgent TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: <u>NM Spiney</u>	(Standard TAT may be longer for some tests e.g Ultra Trace Organics)	Custody Seal Intact?	Yes No N/A
PROJECT: <u>Collect waterborne sediments</u>	ALS QUOTE NO.:	Free ice / frozen ice bricks present upon receipt?	Yes No N/A
ORDER NUMBER:		Random Sample Temperature on Receipt:	°C
PROJECT MANAGER: <u>Jim Walters</u>	CONTACT PH: <u>0422 763 386</u>	COC SEQUENCE NUMBER (Circle)	
SAMPLER: <u>Nick Hamilton</u>	SAMPLER MOBILE: <u>0418670577</u>	COC: <u>1</u> 2 3 4 5 6 7	
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	OF: 1 2 3 4 5 6 7	Other comment:
Email Reports to (will default to PM if no other addresses are listed):	RELINQUISHED BY:	RECEIVED BY: <u>Frank ALC</u>	RELINQUISHED BY:
Email Invoice to (will default to PM if no other addresses are listed):	DATE/TIME:	DATE/TIME: <u>19/11/09 4pm</u>	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) <small>Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (500 filtered bottle required)</small>												Additional Information			
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE <small>(refer to codes below)</small>	TOTAL BOTTLES	EG020SD (trace metals)	EG035L (Mercury)	EP132SD (PAHs)	EP004 (TOC)	EP090 (TBT)	EP131A (OC Pesticides)	EP131B (PCBs)	EP080-UT (TPH (C6-C9) / BTEX)	EP071SD (TPH C10-C16)	EA150-H (Particle sizing)	EN020PR (dry/B agL abel)	EA0003 (pH & pH/ox)	EA033 (chromium)	(TCLP/Elutriate)	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.	
	UC1A106-12	18/11/09 pm	S	Glass bottle/bags	2	Hold															
	UC1A106-12DUF	18/11/09 pm	S	Glass bottle/bags	1																
	UC1A112-17	18/11/09 pm	S	Glass bottle/bags	3																
	UC1A112-7	18/11/09 pm	S	Glass bottle/bags	2	Hold															
	SS1A	18/11/09 pm	S	Glass bottle/bags	3																
	SS1A x	18/11/09 pm	S	Glass bottle/bags	2	Hold															
	SS1B	18/11/09 pm	S	Glass bottle/bags	3																
	SS1B v	18/11/09 pm	S	Glass bottle/bags	2	Hold															
	SS2B	18/11/09 pm	S	Glass bottle/bags	3																
	SS2B x	18/11/09 pm	S	Glass bottle/bags	2	Hold															
	SS2C	18/11/09 pm	S	Glass bottle/bags	3																
						30	30	30	30	18	6	6	6	6	6	30	30	?	?		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES0917731	Page	: 1 of 4
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: SY 503 09 - Caltex Sediment Analysis	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 19-NOV-2009
C-O-C number	: ----	Issue Date	: 26-NOV-2009
Sampler	: NH	No. of samples received	: 7
Site	: ----	No. of samples analysed	: 7
Quote number	: SY/503/09		

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Kim McCabe	Senior Inorganic Chemist	Inorganics

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- Analysis conducted by ALS Brisbane, NATA Site No. 818.
- pH FOX Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Vigorous; 4 - Very Vigorous



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				SS1a	SS1B	SS2B	SS2C	VC1A1 0-0.6
				18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00	18-NOV-2009 15:00
Compound	CAS Number	LOR	Unit	ES0917731-001	ES0917731-002	ES0917731-003	ES0917731-004	ES0917731-005
EA003 :pH (field)								
pH (F)	----	0.1	pH Unit	8.6	8.6	8.6	8.8	9.0
pH (Fox)	----	0.1	pH Unit	6.1	5.9	6.3	6.3	6.1
Reaction Rate	----	1	Reaction Uni	1	1	1	1	1



Analytical Results

Sub-Matrix: **SOIL**

				<i>Client sample ID</i>	<i>Client sample ID</i>			
				<i>Client sampling date / time</i>	<i>Client sampling date / time</i>			
<i>Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	VC1A1 0.6-1.2	VC1A1 1.2-1.7			
				18-NOV-2009 15:00	18-NOV-2009 15:00	----	----	----
				ES0917731-006	ES0917731-007	----	----	----
EA003 :pH (field)								
pH (F)	----	0.1	pH Unit	9.0	8.9	----	----	----
pH (Fox)	----	0.1	pH Unit	6.2	4.2	----	----	----
Reaction Rate	----	1	Reaction Uni	1	2	----	----	----



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES0917731	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: SY 503 09 - Caltex Sediment Analysis	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 19-NOV-2009
C-O-C number	: ----	Issue Date	: 26-NOV-2009
Sampler	: NH	No. of samples received	: 7
Order number	: ----	No. of samples analysed	: 7
Quote number	: SY/503/09		

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Kim McCabe	Senior Inorganic Chemist	Inorganics

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
= Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA003 :pH (field/fox) (QC Lot: 1175242)									
EB0918486-001	Anonymous	EA003: Reaction Rate	----	1	--	1	1	0.0	No Limit
		EA003: pH (F)	----	0.1	pH Unit	8.0	7.7	3.8	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	3.1	2.9	6.7	0% - 20%
ES0917731-001	SS1a	EA003: Reaction Rate	----	1	--	1	1	0.0	No Limit
		EA003: pH (F)	----	0.1	pH Unit	8.6	8.8	2.3	0% - 20%
		EA003: pH (Fox)	----	0.1	pH Unit	6.1	6.2	1.6	0% - 20%



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

- **No Method Blank (MB) or Laboratory Control Spike (SCS) Results are required to be reported.**



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES0917731	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: SY 503 09 - Caltex Sediment Analysis	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 19-NOV-2009
Sampler	: NH	Issue Date	: 26-NOV-2009
Order number	: ----		
Quote number	: SY/503/09	No. of samples received	: 7
		No. of samples analysed	: 7

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA003 :pH (field)								
Snap Lock Bag - frozen SS1a, SS2B, VC1A1 0-0.6, VC1A1 1.2-1.7	SS1B, SS2C, VC1A1 0.6-1.2,	18-NOV-2009	----	----	----	26-NOV-2009	18-NOV-2010	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
pH field/fox	EA003	2	11	18.2	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
pH field/fox	EA003	SOIL	Ahern et al 1998 - determined on a 1:5 soil/water extract designed to simulate field measured pH and pH after the extract has been oxidised with peroxide.

<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: SOIL

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA003 pH field/fox
ES0917731-001	18-NOV-2009 15:00	SS1a	✓
ES0917731-002	18-NOV-2009 15:00	SS1B	✓
ES0917731-003	18-NOV-2009 15:00	SS2B	✓
ES0917731-004	18-NOV-2009 15:00	SS2C	✓
ES0917731-005	18-NOV-2009 15:00	VC1A1 0-0.6	✓
ES0917731-006	18-NOV-2009 15:00	VC1A1 0.6-1.2	✓
ES0917731-007	18-NOV-2009 15:00	VC1A1 1.2-1.7	✓

Requested Deliverables

MR NICK HANNAFORD

- | | | |
|---|-------|--------------------------------------|
| - *AU Certificate of Analysis - NATA (COA) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - A4 - AU Sample Receipt Notification - Environmental (SRN) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - Default - Chain of Custody (COC) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - EDI Format - ENMRG (ENMRG) | Email | Nicholas.Hannaford@WorleyParsons.com |

Ms ALI WATTERS

- | | | |
|---|-------|-------------------------------|
| - *AU Certificate of Analysis - NATA (COA) | Email | ali.watters@worleyparsons.com |
| - *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) | Email | ali.watters@worleyparsons.com |
| - *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) | Email | ali.watters@worleyparsons.com |
| - A4 - AU Sample Receipt Notification - Environmental (SRN) | Email | ali.watters@worleyparsons.com |
| - A4 - AU Tax Invoice (INV) | Email | ali.watters@worleyparsons.com |
| - Default - Chain of Custody (COC) | Email | ali.watters@worleyparsons.com |
| - EDI Format - ENMRG (ENMRG) | Email | ali.watters@worleyparsons.com |



CHAIN OF CUSTODY

ALS Laboratory please tick →

PSD only

Environmental Division Sydney

Work Order

ES0917732

Yes No N/A Yes No N/A



Telephone : +61-2-8784 8555

CLIENT: Wally Parsons, OFFICE: NSW Sydney, PROJECT: Callan International dredging, ORDER NUMBER: 0122 705 380, PROJECT MANAGER: AC Wally, CONTACT PH: 0122 705 380, SAMPLER: Nick Hammett, SAMPLER MOBILE: 060236728, COC emailed to ALS? (YES / NO), Email Reports to (will default to PM if no other addresses are listed), Email Invoice to (will default to PM if no other addresses are listed), TURNAROUND REQUIREMENTS: Standard TAT (List due date): Non Standard or urgent TAT (List due date): FOR LABORATORY USE ONLY (C) Custody Seal Intact? Free ice / frozen reagents present upon receipt Random Sample Temperature on Receipt Other comment: RECEIVED BY: Frank ALS, DATE/TIME: 19/11/09 4pm

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

Table with columns: LAB ID, SAMPLE ID, DATE / TIME, MATRIX, TYPE & PRESERVATIVE, TOTAL BOTTLES, ANALYSIS REQUIRED including SUITES (EG02SD, EG035L, EP132SD, EP004, EP090, EP131A, EP131B, EP080-JT, EP071SD, EA150-H, EN020PR, EA0003, EA0033, TC/LP/Eurinate), Additional Information. Includes handwritten notes like 'CONTRACT WORK', 'WO: ES0917732', 'LAB: ALS Newcastle', 'DATE: 19/11/09', 'SPLIT: from ES0917728'.

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES0917732	Page	: 1 of 3
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 19-NOV-2009
C-O-C number	: ----	Issue Date	: 01-DEC-2009
Sampler	: NH	No. of samples received	: 2
Site	: ----	No. of samples analysed	: 2
Quote number	: SY/503/09		

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.

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- General Comments
- Analytical Results



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Dianne Blane		Newcastle



General Comments

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When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting



Analytical Results

Sub-Matrix: SOIL

				Client sample ID	VC1A1 0-0.6	VC1A1 0.6-1.2	----	----	----
				Client sampling date / time	18-NOV-2009 15:00	18-NOV-2009 15:00	----	----	----
Compound	CAS Number	LOR	Unit	ES0917732-001	ES0917732-002	----	----	----	
EA150: Particle Sizing									
+75µm	----	1	%	98	97	----	----	----	
+150µm	----	1	%	97	96	----	----	----	
+300µm	----	1	%	64	62	----	----	----	
+425µm	----	1	%	24	22	----	----	----	
+600µm	----	1	%	4	9	----	----	----	
+1180µm	----	1	%	1	6	----	----	----	
+2.36mm	----	1	%	<1	6	----	----	----	
+4.75mm	----	1	%	<1	6	----	----	----	
+9.5mm	----	1	%	<1	6	----	----	----	
+19.0mm	----	1	%	<1	5	----	----	----	
+37.5mm	----	1	%	<1	<1	----	----	----	
+75.0mm	----	1	%	<1	<1	----	----	----	
EA150: Soil Classification based on Particle Size									
Clay (<2 µm)	----	1	%	2	2	----	----	----	
Silt (2-60 µm)	----	1	%	1	1	----	----	----	
Sand (0.06-2.00 mm)	----	1	%	97	91	----	----	----	
Gravel (>2mm)	----	1	%	<1	6	----	----	----	
Cobbles (>6cm)	----	1	%	<1	<1	----	----	----	



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES0917732	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 19-NOV-2009
C-O-C number	: ----	Issue Date	: 01-DEC-2009
Sampler	: NH	No. of samples received	: 2
Order number	: ----	No. of samples analysed	: 2
Quote number	: SY/503/09		

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Dianne Blane		Newcastle



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

- **No Method Blank (MB) or Laboratory Control Spike (SCS) Results are required to be reported.**



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES0917732	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 19-NOV-2009
Sampler	: NH	Issue Date	: 01-DEC-2009
Order number	: ----		
Quote number	: SY/503/09	No. of samples received	: 2
		No. of samples analysed	: 2

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA150: Particle Sizing								
Snap Lock Bag VC1A1 0-0.6,	VC1A1 0.6-1.2	18-NOV-2009	---	---	----	30-NOV-2009	17-MAY-2010	✓
EA150: Soil Classification based on Particle Size								
Snap Lock Bag VC1A1 0-0.6,	VC1A1 0.6-1.2	18-NOV-2009	---	---	----	30-NOV-2009	17-MAY-2010	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix:

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Particle Size Analysis (Sieving)	EA150	SOIL	Particle Size Analysis by Sieving according to AS1289.3.6.1 - 1995
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3 - 2003



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)
Comprehensive Report

Work Order : **ES0917732**

Client : **WORLEY PARSONS - INFRASTRUCTURE MWE** **Laboratory** : Environmental Division Sydney

Contact : Ms ALI WATTERS **Contact** : Charlie Pierce

Address : Level 10/141 Walker Street **Address** : 277-289 Woodpark Road Smithfield
NORTH SYDNEY NSW, AUSTRALIA NSW Australia 2164
2060

E-mail : ali.watters@worleyparsons.com **E-mail** : charlie.pierce@alsenviro.com

Telephone : +61 02 8907 2131 **Telephone** : +61-2-8784 8555

Facsimile : ---- **Facsimile** : +61-2-8784 8500

Project : CALTEX MAINTENANCE DREDGING **Page** : 1 of 2

Order number : ----

C-O-C number : ---- **Quote number** : ES2009WORPAR0232 (SY/503/09)

Site : ----

Sampler : NH **QC Level** : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received : 19-NOV-2009 **Issue Date** : 23-NOV-2009 12:17

Client Requested Due Date : 01-DEC-2009 **Scheduled Reporting Date** : **01-DEC-2009**

Delivery Details

Mode of Delivery : Carrier **Temperature** : 1.4' C - Ice present

No. of coolers/boxes : 1 HARD **No. of samples received** : 2

Security Seal : Intact. **No. of samples analysed** : 2

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Requested Deliverables
- **Samples received in appropriately pretreated and preserved containers.**
- **Particle Size analysis will be conducted by ALS Newcastle.**
- **Sample(s) have been received within recommended holding times.**
- **This work order for PSD only and split from ES0917728.**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Jacob Waugh
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: SOIL

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA150H Particle Size Analysis by Hydrometer
ES0917732-001	18-NOV-2009 15:00	VC1A1 0-0.6	✓
ES0917732-002	18-NOV-2009 15:00	VC1A1 0.6-1.2	✓

Requested Deliverables

MR NICK HANNAFORD

- | | | |
|---|-------|--------------------------------------|
| - *AU Certificate of Analysis - NATA (COA) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - A4 - AU Sample Receipt Notification - Environmental (SRN) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - Default - Chain of Custody (COC) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - EDI Format - ENMRG (ENMRG) | Email | Nicholas.Hannaford@WorleyParsons.com |
| - Trigger - Subcontract Report (SUBCO) | Email | Nicholas.Hannaford@WorleyParsons.com |

Ms ALI WATTERS

- | | | |
|---|-------|-------------------------------|
| - *AU Certificate of Analysis - NATA (COA) | Email | ali.watters@worleyparsons.com |
| - *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) | Email | ali.watters@worleyparsons.com |
| - *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) | Email | ali.watters@worleyparsons.com |
| - A4 - AU Sample Receipt Notification - Environmental (SRN) | Email | ali.watters@worleyparsons.com |
| - A4 - AU Tax Invoice (INV) | Email | ali.watters@worleyparsons.com |
| - Default - Chain of Custody (COC) | Email | ali.watters@worleyparsons.com |
| - EDI Format - ENMRG (ENMRG) | Email | ali.watters@worleyparsons.com |
| - Trigger - Subcontract Report (SUBCO) | Email | ali.watters@worleyparsons.com |



REPORT OF ANALYSIS

Laboratory Reference: A10/0733

Client: WorleyParsons Services Pty Ltd
Level 12, 141 Walker Street
North Sydney NSW 2060

Order No: 301015-01887/04
Project: Caltex Maintenance Dredging
Sample Type: Sediment
No. of Samples: 1
Date Received: 4/03/2010
Date Completed: 19/03/2010

Contact: Ali Watters

Laboratory Contact Details:

Client Services Manager: Lilian Wong
Technical Enquiries: Andrew Bradbury
Telephone: +61 7 3268 1228
Fax: +61 7 3268 1238
Email: brisbane@advancedanalytical.com.au
andrew.bradbury@advancedanalytical.com.au

Attached Results Approved By:

Ian Eckhard
Technical Director

Comments:

All samples tested as submitted by client. All attached results have been checked and approved for release. This is the Final Report and supersedes any reports previously issued with this batch number. This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



NATA Accredited Laboratory
Accreditation No: 15109

Issue Date: 19 March 2010

Advanced Analytical Australia Pty Ltd
ABN 20 105 644 979
11 Julius Avenue,
North Ryde NSW 2113 Australia

Page 1 of 7

Ph: + 61 2 9888 9077
Fax: + 61 2 9888 9577
contact@advancedanalytical.com.au
www.advancedanalytical.com.au



Batch Number: A10/0733
Project Reference: Caltex Maintenance Dredging

Laboratory Reference:	-	-	/1
Client Reference:	-	-	SST2
Date Sampled:	-	-	04/03/2010
Analysis Description	Method	Units	
Moisture Content			
Moisture Content	04-004	%	19.4
Trace Elements			
Silver	04-001	mg/kg	<0.1
Arsenic	04-001	mg/kg	1.1
Cadmium	04-001	mg/kg	<0.1
Cobalt	04-001	mg/kg	<0.5
Chromium	04-001	mg/kg	1.8
Copper	04-001	mg/kg	0.98
Mercury	04-002	mg/kg	0.01
Manganese	04-001	mg/kg	4.7
Nickel	04-001	mg/kg	0.54
Lead	04-001	mg/kg	2.4
Selenium*	04-001	mg/kg	<0.1
Antimony	04-001	mg/kg	<0.5
Vanadium	04-001	mg/kg	2.0
Zinc	04-001	mg/kg	6.4
Poly Aromatic Hydrocarbons			
Naphthalene	04-022	µg/kg	<5
1-Methylnaphthalene	04-022	µg/kg	<5
2-Methylnaphthalene	04-022	µg/kg	<5
Acenaphthylene	04-022	µg/kg	<5
Acenaphthene	04-022	µg/kg	<5
Fluorene	04-022	µg/kg	<5
Phenanthrene	04-022	µg/kg	<5
Anthracene	04-022	µg/kg	<5
Fluoranthene	04-022	µg/kg	<5
Pyrene	04-022	µg/kg	<5
Benz(a)anthracene	04-022	µg/kg	<5
Chrysene	04-022	µg/kg	<5
Benzo(b)&(k)fluoranthene	04-022	µg/kg	<10
Benzo(a)pyrene	04-022	µg/kg	<5

Issue Date: 19 March 2010

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www.advancedanalytical.com.au



Batch Number: A10/0733
Project Reference: Caltex Maintenance Dredging

Laboratory Reference:	-	-	/1
Client Reference:	-	-	SST2
Date Sampled:	-	-	04/03/2010
Analysis Description	Method	Units	
Indeno(1,2,3-cd)pyrene	04-022	µg/kg	5
Dibenz(a,h)anthracene	04-022	µg/kg	<5
Benzo(g,h,i)perylene	04-022	µg/kg	<5
Coronene	04-022	µg/kg	<10
Benzo(e)pyrene	04-022	µg/kg	<5
Perylene	04-022	µg/kg	<5
Total PAHs (as above)	04-022	µg/kg	<100
Surrogate 1 Recovery	04-022	%	887
Surrogate 2 Recovery	04-022	%	91
Surrogate 3 Recovery	04-022	%	100
Date Extracted	04-022	-	12/03/2010
Date Analysed	04-022	-	15/03/2010
Organotins			
Monobutyl tin	04-026	µgSn/kg	<0.50
Dibutyl tin	04-026	µgSn/kg	<0.50
Tributyl tin	04-026	µgSn/kg	<0.50
Surrogate 1 Recovery	04-026	%	101
Date Extracted	04-026	-	15/03/2010
Date Analysed	04-026	-	15/03/2010
Subcontract Analysis			
Total Organic Carbon	SUB	%	0.09

Method	Method Description
04-004	Moisture by gravimetric, %
04-001	Metals by ICP-OES, mg/kg
04-002	Mercury by CVAAS, mg/kg
04-022	Low level PAHs & Phenols by GCMS, µg/kg
04-026	Organotins by GCMS, µgSn/kg
SUB	Subcontracted Analyses



Batch Number: A10/0733
Project Reference: Caltex Maintenance Dredging

Result Comments

[<] Less than

[INS] Insufficient sample for this test

[NA] Test not required

Solid sample results are reported on a dry weight basis.

TOC analysis was subcontracted to Sydney Analytical Laboratories (NATA Number 1884);
reference SAL report number SAL2264-B.

* Se has been analysed by ICP-MS. This is not NATA accredited



Batch Number: A10/0733
Project Reference: Caltex Maintenance Dredging

QUALITY ASSURANCE REPORT

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results
Moisture Content	%	N/A	A10/0733-1	19.4 19.4 RPD: 0

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Silver	mg/kg	<0.1	A10/0733-1	<0.1 <0.1	A10/0733-1	100%
Arsenic	mg/kg	<0.4	A10/0733-1	1.1 1.0 RPD: 10	A10/0733-1	103%
Cadmium	mg/kg	<0.1	A10/0733-1	<0.1 <0.1	A10/0733-1	99%
Cobalt	mg/kg	<0.5	A10/0733-1	<0.5 <0.5	A10/0733-1	94%
Chromium	mg/kg	<0.1	A10/0733-1	1.8 1.8 RPD: 0	A10/0733-1	99%
Copper	mg/kg	<0.1	A10/0733-1	0.98 0.86 RPD: 13	A10/0733-1	99%
Mercury	mg/kg	<0.01	A10/0733-1	0.01 0.01 RPD: 0	A10/0733-1	95%
Manganese	mg/kg	<0.5	A10/0733-1	4.7 5.1 RPD: 8	A10/0733-1	100%
Nickel	mg/kg	<0.1	A10/0733-1	0.54 0.57 RPD: 5	A10/0733-1	93%
Lead	mg/kg	<0.5	A10/0733-1	2.4 2.0 RPD: 18	A10/0733-1	91%
Selenium	mg/kg	<0.1	A10/0733-1	<0.1 <0.1	A10/0733-1	102%
Antimony	mg/kg	<0.5	A10/0733-1	<0.5 <0.5	A10/0733-1	96%
Vanadium	mg/kg	<0.1	A10/0733-1	2.0 2.1 RPD: 5	A10/0733-1	98%
Zinc	mg/kg	<0.5	A10/0733-1	6.4 4.3 RPD: 39	A10/0733-1	93%

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Naphthalene	µg/kg	<5	A10/0733-1	<5 <5	A10/0733-1	93%
1-Methylnaphthalene	µg/kg	<5	A10/0733-1	<5 <5	A10/0733-1	90%
2-Methylnaphthalene	µg/kg	<5	A10/0733-1	<5 <5	A10/0733-1	93%
Acenaphthylene	µg/kg	<5	A10/0733-1	<5 <5	A10/0733-1	96%
Acenaphthene	µg/kg	<5	A10/0733-1	<5 <5	A10/0733-1	98%
Fluorene	µg/kg	<5	A10/0733-1	<5 <5	A10/0733-1	93%
Phenanthrene	µg/kg	<5	A10/0733-1	<5 <5	A10/0733-1	74%
Anthracene	µg/kg	<5	A10/0733-1	<5 <5	A10/0733-1	68%
Fluoranthene	µg/kg	<5	A10/0733-1	<5 <5	A10/0733-1	114%
Pyrene	µg/kg	<5	A10/0733-1	<5 <5	A10/0733-1	112%
Benz(a)anthracene	µg/kg	<5	A10/0733-1	<5 <5	A10/0733-1	102%
Chrysene	µg/kg	<5	A10/0733-1	<5 <5	A10/0733-1	96%
Benzo(b)&(k)fluoranthene	µg/kg	<10	A10/0733-1	<10 <10	A10/0733-1	101%
Benzo(a)pyrene	µg/kg	<5	A10/0733-1	<5 <5	A10/0733-1	95%
Indeno(1,2,3-cd)pyrene	µg/kg	<5	A10/0733-1	5 <5	A10/0733-1	101%
Dibenz(a,h)anthracene	µg/kg	<5	A10/0733-1	<5 <5	A10/0733-1	94%
Benzo(g,h,i)perylene	µg/kg	<5	A10/0733-1	<5 <5	A10/0733-1	93%
Coronene	µg/kg	<10	A10/0733-1	<10 <10	A10/0733-1	104%



Batch Number: A10/0733
Project Reference: Caltex Maintenance Dredging

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Benzo(e)pyrene	µg/kg	<5	A10/0733-1	<5 <5	A10/0733-1	85%
Perylene	µg/kg	<5	A10/0733-1	<5 <5	A10/0733-1	90%
Total PAHs (as above)	µg/kg	<100	A10/0733-1	<100 <100	A10/0733-1	N/A
Surrogate 1 Recovery	%	80	A10/0733-1	887 87 RPD: 164	A10/0733-1	90%
Surrogate 2 Recovery	%	92	A10/0733-1	91 90 RPD: 1	A10/0733-1	69%
Surrogate 3 Recovery	%	99	A10/0733-1	100 96 RPD: 4	A10/0733-1	107%

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Monobutyl tin	µgSn/kg	<0.50	A10/0733-1	<0.50 <0.50	A10/0733-1	34%
Dibutyl tin	µgSn/kg	<0.50	A10/0733-1	<0.50 <0.50	A10/0733-1	86%
Tributyl tin	µgSn/kg	<0.50	A10/0733-1	<0.50 <0.50	A10/0733-1	79%
Surrogate 1 Recovery	%	119	A10/0733-1	101 102 RPD: 1	A10/0733-1	91%

TEST	UNITS	Blank
Total Organic Carbon	%	<0.02



Batch Number: A10/0733
Project Reference: Caltex Maintenance Dredging

Comments:

RPD = Relative Percent Deviation

[NT] = Not Tested

[N/A] = Not Applicable

= Spike recovery data could not be calculated due to high levels of contaminants

Acceptable replicate reproducibility limit or RPD: Results < 10 times LOR: no limits

Results >10 times LOR: 0% - 50%

Acceptable matrix spike & LCS recovery limits:

Trace elements 70-130%

Organic analyses 50-150%

SVOC & speciated phenols 10-140%

Surrogates 10-140%

When levels outside these limits are obtained, an investigation into the cause of the deviation is performed before the batch is accepted or rejected, and results are released.

A10/0233

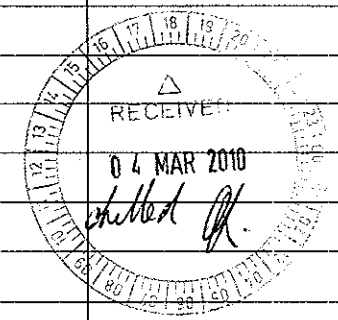
CHAIN OF CUSTODY



ATTENTION: Attila Tottszer	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7	RELINQUISHED BY: O.M. JARA DATE/TIME: 4/3/10 18:00	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DELIVERY ADDRESS: Advanced Analytical 11 Julius Ave, North Ryde NSW 2113			DATE/TIME:	DATE/TIME:	DATE/TIME:
CLIENT: WorleyParsons	PROJECT: Caltex Maintenance Dredging	PROJECT NUMBER: 301015-01987/04			
OFFICE: Lv12, 141 Walker ST, North Sydney NSW 2060					
PROJECT MANAGER: Ali Watters	CONTACT PH: (02) 8456 7251	EMAIL RESULTS AND INVOICE TO: ali.watters@worleyparsons.com			
SAMPLER: Orla Murray	CONTACT PH: 8456 7251/ 0408207481	EMAIL COPY OF RESULTS AND INVOICE TO: orla.murray@worleyparsons.com			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: As per Andrew Bradbury's email dated 3 March 2010

LAB USE ONLY	SAMPLE DETAILS			CONTAINER INFORMATION	ANALYSIS REQUIRED					Additional Information			
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE	TOTAL BAGS	TBT (LOR 0.5µgSn/kg)	TOC High temp furnace (LOR 0.01%)	Metals Ag, Cd, Se, Co, Sb, Cu, Pb, Zn, Cr, Ni, As, V, Mn, Hg (low level) (LORs 0.01 - 0.5 mg/kg)	Super Ultra trace PAHs (LOR 0.005 mg/kg)				
A10/0233/1	BSTR	4/3/10	Sediment	Glass Unpreserved	2	✓	✓	✓	✓				
					TOTAL	2	1	1	1				



SAMPLE RECEIPT NOTIFICATION



Attention : Ali Watters

Client : WorleyParsons Services Pty Ltd
Level 12, 141 Walker Street
North Sydney NSW 2060

Telephone : 02 8456 7251

Facsimile :

Project : Caltex Maintenance Dredging

Order Number :

Laboratory Reference : **A10/0733**

Completed Chain of Custody accompanied samples.	YES
Samples were received in good condition and correctly preserved for all tests.	YES
Samples were received in sufficient time to allow laboratory to meet holding times.	YES
Samples were received chilled/chilling (if required).	YES

Date samples received : **4/03/2010**
Matrix : **Sediment**
No. of samples : **1**
Scheduled reporting date : **18/03/10**

Customer Services Officer : **Andrew Bradbury**

Telephone : 07 3268 1228
Email : brisbane@advancedanalytical.com.au

Contact your Customer Services Officer for all queries and issues regarding this sample batch.

Note: Turnaround time begins at time of receipt at laboratory, surcharges may apply for fast turnaround.

Water samples will be appropriately stored for 1 month from date of receipt of samples.
Soil / Sediment samples will be appropriately stored for 3 months from date of receipt of samples.

COMMENTS:



CHAIN OF CUSTODY

ALS Laboratory, please tick →

□ Sydney: 277 Woodpark Rd, Smithfield NSW 2176
Ph: 02 8784 8555 E:samples.sydney@alsenviro.com
□ Newcastle: 5 Rosegum Rd, Wararook NSW 2304
Ph: 02 4968 9433 E:samples.newcastle@alsenviro.com

□ Brisbane: 32 Shand St, Stafford QLD 4053
Ph: 07 3243 7222 E:samples.brisbane@alsenviro.com
□ Townsville: 14-15 Desma Ct, Bohle QLD 4818
Ph: 07 4796 0600 E:townsville.environmental@alsenviro.com

□ Melbourne: 2-4 Westall Rd, Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsenviro.com
□ Adelaide: 2-1 Burma Rd, Pooraka SA 5095
Ph: 08 8359 0890 E:adelaide@alsenviro.com

□ Perth: 10 Hod Way, Malaga WA 6090
Ph: 08 9209 7655 E: samples.perth@alsenviro.com
□ Launceston: 27 Wellington St, Launceston TAS 7250
Ph: 03 6331 2158 E: launceston@alsenviro.com

ES 100 4085

17/3/10

Super UT.

CLIENT: WorleyParsons		TURNAROUND REQUIREMENTS : <input checked="" type="checkbox"/> Standard TAT (List due date):		FOR LABORATORY USE ONLY (Circle)	
OFFICE: 141 Walker ST, North Sydney NSW 2060		(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)		Custody Seal intact? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
PROJECT: Caltex Maintenance Dredging		ALS QUOTE NO.: SY-503-09 V3		Free ice / frozen ice bricks present upon receipt? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
ORDER NUMBER: 301015-01887/04		CONTACT PH: (02) 8456 7251		Random Sample Temperature on Receipt: 36 °C	
PROJECT MANAGER: Ali Watters		SAMPLER MOBILE: 0408207481		Other comment: 36	
SAMPLER: Oria Murray		RELINQUISHED BY: O. MURRAY		RECEIVED BY: [Signature]	
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):		DATE/TIME: 4/3/10 15:00	
Email Reports to (will default to PM if no other addresses are listed): Oria Murray		DATE/TIME: 4/3/10 15:00		DATE/TIME: 4/3/10 4:55pm	
Email Invoice to (will default to PM if no other addresses are listed): Oria Murray		DATE/TIME: 4/3/10 15:00		DATE/TIME: 4/3/10 4:55pm	
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: 5 day TAT req'd for TBT & TOC					

Environmental Division
Sydney
Work Order
ES1004085



LAB ID	SAMPLE ID	DATE / TIME	MATRIX	CONTAINER INFORMATION	TOTAL BOTTLES	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to a Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered) T)																
						TBT (EP090)	TOC (Leco) (EP004)	Trace Metals - Ag, Cd, Se, Co, Sb, Cu, Pb, An, Cr, No, As, V, Mn (EG020SD)	Hg - Total Low level (EG035L)	PAHs - Super Ultra Trace (20 PAHs plus Sum of PAHs)	OCs - Ultratrace (21 analytes) (EP131A)	PCBs Total - Ultratrace (EP131B)	TPH (C6-C9)/BTEX - low level (EP080-UT)	TPH (C10-C38) - ultratrace (EP071SD)	Hold for Elutriate TBT							
1	VC4C(0-0.5m)	4/3/10	S	Unpreserved glass	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2	VC4C(0.5-1m)	"	"	"	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
3	VC4C(1-1.5m)	"	"	"	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
4	VC4C(1.5-2)	"	"	"	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
5	VC4D(0-0.5m)	"	"	"	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
6	VC4D(0.5-1m)	"	"	"	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
7	VC4D(1-1.5m)	"	"	"	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
8	VC4D(1.5-2m)	"	"	"	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
9	TWP Blank	"	"	"	1																✓	
10	SS4J	"	"	"	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
11	ST1	"	"	"	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
12	SSH	"	"	"	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
TOTAL					43																	

Not homogenised: Please homogenised non-volatile samples in lab.

Subcon / Forward Lab (Split WO) Lab / Analysis: _____

Organised By / Date: _____

Relinquished By / Date: _____

Connote / Courier: _____

WO No: ES 100 4085

Attach By PO / Internal Sheet: _____

Split ES 100 4088 For TBT and TOC

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
 V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
 Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag



CHAIN OF CUSTODY

ALS Laboratory: please tick →

□ Sydney: 277 Woodpark Rd, Smithfield NSW 2176
Ph: 02 8784 8555 E:samples.sydney@alsenviro.com
□ Newcastle: 5 Rosegum Rd, Warabrook NSW 2304
Ph: 02 4968 9433 E:samples.newcastle@alsenviro.com

□ Brisbane: 32 Shand St, Stafford QLD 4053
Ph: 07 3243 7222 E:samples.brisbane@alsenviro.com
□ Townsville: 14-15 Desma Ct, Bohle QLD 4818
Ph: 07 4796 0600 E:townsville.environmental@alsenviro.com

□ Melbourne: 2-4 Westall Rd, Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsenviro.com
□ Adelaide: 2-1 Burma Rd, Pooraka SA 5095
Ph: 08 8358 0860 E:adelaide@alsenviro.com

□ Perth: 10 Had Way, Malaga WA 6090
Ph: 08 9209 7655 E: samples.perth@alsenviro.com
□ Launceston: 27 Wellington St, Launceston TAS 7250
Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT: WorleyParsons		TURNAROUND REQUIREMENTS : <input checked="" type="checkbox"/> Standard TAT (List due date):		FOR LABORATORY USE ONLY (Circle)	
OFFICE: 141 Walker ST, North Sydney NSW 2060		(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)		Custody Seal Intact? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
PROJECT: Caltex Maintenance Dredging		ALS QUOTE NO.: SY-503-09 V3		Free ice / frozen ice bricks present upon receipt? Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
ORDER NUMBER: 301015-01887/04				Random Sample Temperature on Receipt: C	
PROJECT MANAGER: Ali Watters		CONTACT PH: (02) 8456 7251		Other comment: 36	
SAMPLER: Orla Murray		SAMPLER MOBILE: 0408207481		RECEIVED BY: <i>[Signature]</i>	
COC emailed to ALS? (YES / NO)		EDD FORMAT (or default):		RECEIVED BY: <i>[Signature]</i>	
Email Reports to (will default to PM if no other addresses are listed): Orla Murray		RELINQUISHED BY: <i>O. MURRAY</i>		DATE/TIME: 4/3/10 15:00	
Email Invoice to (will default to PM if no other addresses are listed): Orla Murray		DATE/TIME: 4/3/10 15:00		DATE/TIME: 4/3/10 15:00	
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: 5 day TAT req'd for TBT & TOC					

ALS USE ONLY	SAMPLE DETAILS			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price)											Additional Information
	MATRIX	DATE / TIME	TYPE & PRESERVATIVE		Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).											
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE	TOTAL BOTTLES	TBT (EP090)	TOC (Leco) (EP004)	Trace Metals - Ag, Cd, Se, Co, Sb, Cu, Pb, An, Cr, Ni, As, V, Mn (EG020SD)	Hg - Total Low level (EG035L)	PAHs - Super Ultra Trace (20 PAHs plus Sum of PAHs)	OCPS - Ultratrace (21 analytes) (EP131A)	PCBs Total - Ultratrace (EP131B)	TPH (C6-C9)/BTEX - low level (EP080-UT)	TPH (C10-C36) - ultratrace (EP071SD)	Hold for Elutriate TBT	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
13	SB4I	4/3/10	S	Unpreserved jars	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Sample not homogenised. Please homogenise for non-volatiles in lab.
					TOTAL	47	2	2	2	2	2	2	3	2	11	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airtight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1004085	Page	: 1 of 11
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: 301015-01887/04	Date Samples Received	: 04-MAR-2010
C-O-C number	: ----	Issue Date	: 17-MAR-2010
Sampler	: OM	No. of samples received	: 13
Site	: ----	No. of samples analysed	: 13
Quote number	: SY/503/09		

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Alex Rossi	Organic Chemist	Organics
Celine Conceicao	Spectroscopist	Inorganics
Hoa Nguyen	Inorganic Chemist	Inorganics

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **EP131B and EP132B-SD : Poor matrix spike recovery due to sample heterogeneity. Confirmed by re-extraction and re-analysis .**



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VC4C(0-0.5M)	VC4C(0.5-1M)	VC4C(1-1.5M)	VC4C(1.5-2)	VC4C(0-0.5M)
				04-MAR-2010 15:00	04-MAR-2010 15:00	04-MAR-2010 15:00	04-MAR-2010 15:00	04-MAR-2010 15:00
				ES1004085-001	ES1004085-002	ES1004085-003	ES1004085-004	ES1004085-005
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	21.0	17.3	17.1	22.7	14.4
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	1.34	<1.00	1.20	<1.00	<1.00
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	3.2	2.9	2.7	3.7	3.8
Copper	7440-50-8	1.0	mg/kg	2.6	2.8	6.2	<1.0	1.5
Cobalt	7440-48-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Lead	7439-92-1	1.0	mg/kg	4.1	3.8	2.7	2.1	3.2
Manganese	7439-96-5	10	mg/kg	<10	<10	<10	<10	<10
Nickel	7440-02-0	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	3.6	2.9	2.8	4.8	2.3
Zinc	7440-66-6	1.0	mg/kg	9.5	9.2	6.1	2.8	7.2
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.02	0.02	0.04	0.02	0.09
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	----	<3	----	----	----
C10 - C14 Fraction	----	3	mg/kg	----	<3	----	----	----
C15 - C28 Fraction	----	3	mg/kg	----	19	----	----	----
C29 - C36 Fraction	----	5	mg/kg	----	10	----	----	----
^ C10 - C36 Fraction (sum)	----	3	mg/kg	----	29	----	----	----
EP080-SD: BTEX								
Benzene	71-43-2	0.2	mg/kg	----	<0.2	----	----	----
Toluene	108-88-3	0.2	mg/kg	----	<0.2	----	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	----	<0.2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	----	<0.2	----	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	----	<0.2	----	----	----
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	----	<0.50	----	----	----
alpha-BHC	319-84-6	0.50	µg/kg	----	<0.50	----	----	----
beta-BHC	319-85-7	0.50	µg/kg	----	<0.50	----	----	----
delta-BHC	319-86-8	0.50	µg/kg	----	<0.50	----	----	----
4,4'-DDD	72-54-8	0.50	µg/kg	----	<0.50	----	----	----
4,4'-DDE	72-55-9	0.50	µg/kg	----	<0.50	----	----	----
4,4'-DDT	50-29-3	0.50	µg/kg	----	<0.50	----	----	----



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VC4C(0-0.5M)	VC4C(0.5-1M)	VC4C(1-1.5M)	VC4C(1.5-2)	VC4C(0-0.5M)
				04-MAR-2010 15:00	04-MAR-2010 15:00	04-MAR-2010 15:00	04-MAR-2010 15:00	04-MAR-2010 15:00
				ES1004085-001	ES1004085-002	ES1004085-003	ES1004085-004	ES1004085-005
EP131A: Organochlorine Pesticides - Continued								
^ DDT (total)	----	0.50	µg/kg	----	<0.50	----	----	----
Dieldrin	60-57-1	0.50	µg/kg	----	<0.50	----	----	----
alpha-Endosulfan	959-98-8	0.50	µg/kg	----	<0.50	----	----	----
beta-Endosulfan	33213-65-9	0.50	µg/kg	----	<0.50	----	----	----
Endosulfan sulfate	1031-07-8	0.50	µg/kg	----	<0.50	----	----	----
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	----	<0.50	----	----	----
Endrin	72-20-8	0.50	µg/kg	----	<0.50	----	----	----
Endrin aldehyde	7421-93-4	0.50	µg/kg	----	<0.50	----	----	----
Endrin ketone	53494-70-5	0.50	µg/kg	----	<0.50	----	----	----
Heptachlor	76-44-8	0.50	µg/kg	----	<0.50	----	----	----
Heptachlor epoxide	1024-57-3	0.50	µg/kg	----	<0.50	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	----	<0.50	----	----	----
gamma-BHC	58-89-9	0.50	µg/kg	----	<0.50	----	----	----
Methoxychlor	72-43-5	0.50	µg/kg	----	<0.50	----	----	----
cis-Chlordane	5103-71-9	0.50	µg/kg	----	<0.50	----	----	----
trans-Chlordane	5103-74-2	0.50	µg/kg	----	<0.50	----	----	----
^ Total Chlordane (sum)	----	0.50	µg/kg	----	<0.50	----	----	----
Oxychlordane	27304-13-8	0.50	µg/kg	----	<0.50	----	----	----
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	----	<5.0	----	----	----
Aroclor 1016	12974-11-2	5.0	µg/kg	----	<5.0	----	----	----
Aroclor 1221	11104-28-2	5.0	µg/kg	----	<5.0	----	----	----
Aroclor 1232	11141-16-5	5.0	µg/kg	----	<5.0	----	----	----
Aroclor 1242	53469-21-9	5.0	µg/kg	----	<5.0	----	----	----
Aroclor 1248	12672-29-6	5.0	µg/kg	----	<5.0	----	----	----
Aroclor 1254	11097-69-1	5.0	µg/kg	----	<5.0	----	----	----
Aroclor 1260	11096-82-5	5.0	µg/kg	----	<5.0	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	14	16	15	8	9
2-Methylnaphthalene	91-57-6	5	µg/kg	6	6	<5	6	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	12	31	6	4	8
Anthracene	120-12-7	4	µg/kg	<4	9	<4	<4	<4
Fluoranthene	206-44-0	4	µg/kg	21	59	6	4	12
Pyrene	129-00-0	4	µg/kg	19	47	6	4	12
Benz(a)anthracene	56-55-3	4	µg/kg	11	31	<4	<4	7



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VC4C(0-0.5M)	VC4C(0.5-1M)	VC4C(1-1.5M)	VC4C(1.5-2)	VC4C(0-0.5M)
				04-MAR-2010 15:00	04-MAR-2010 15:00	04-MAR-2010 15:00	04-MAR-2010 15:00	04-MAR-2010 15:00
				ES1004085-001	ES1004085-002	ES1004085-003	ES1004085-004	ES1004085-005
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Chrysene	218-01-9	4	µg/kg	10	27	4	<4	6
Benzo(b)fluoranthene	205-99-2	4	µg/kg	16	34	7	4	11
Benzo(k)fluoranthene	207-08-9	4	µg/kg	7	18	<4	<4	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	9	19	<4	<4	6
Benzo(a)pyrene	50-32-8	4	µg/kg	13	33	6	<4	9
Perylene	198-55-0	4	µg/kg	14	11	<4	<4	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	10	23	4	5	7
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	5	<4	<4	<4
Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	8	19	<4	4	5
Coronene	191-07-1	5	µg/kg	<5	7	<5	<5	<5
^ Sum of PAHs	----	4	µg/kg	170	395	54	39	92
EP080-SD: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	----	109	----	----	----
Toluene-D8	2037-26-5	0.1	%	----	109	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	----	113	----	----	----
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	----	38.6	----	----	----
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	36.7	----	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	85.6	92.9	89.3	84.9	86.6
Anthracene-d10	1719-06-8	0.1	%	101	105	102	99.0	99.3
4-Terphenyl-d14	1718-51-0	0.1	%	91.5	96.7	94.8	88.9	91.6



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VC4D(0.5-1M)	VC4D(1-1.5M)	VC4D(1.5-2M)	TRIP BLANK	SS4J
				04-MAR-2010 15:00	04-MAR-2010 15:00	04-MAR-2010 15:00	04-MAR-2010 15:00	04-MAR-2010 15:00
				ES1004085-006	ES1004085-007	ES1004085-008	ES1004085-009	ES1004085-010
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	15.2	15.8	19.6	----	20.5
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	----	<0.50
Arsenic	7440-38-2	1.00	mg/kg	1.97	<1.00	<1.00	----	<1.00
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	----	<0.1
Chromium	7440-47-3	1.0	mg/kg	2.2	<1.0	<1.0	----	1.6
Copper	7440-50-8	1.0	mg/kg	<1.0	<1.0	<1.0	----	<1.0
Cobalt	7440-48-4	0.5	mg/kg	<0.5	<0.5	<0.5	----	<0.5
Lead	7439-92-1	1.0	mg/kg	1.6	<1.0	<1.0	----	1.9
Manganese	7439-96-5	10	mg/kg	<10	<10	<10	----	<10
Nickel	7440-02-0	1.0	mg/kg	<1.0	<1.0	<1.0	----	<1.0
Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.1	----	<0.1
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	----	<0.1
Vanadium	7440-62-2	2.0	mg/kg	<2.0	<2.0	<2.0	----	2.3
Zinc	7440-66-6	1.0	mg/kg	3.0	<1.0	<1.0	----	3.5
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.04	<0.01	<0.01	----	<0.01
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	----	----	----	<3	----
EP080-SD: BTEX								
Benzene	71-43-2	0.2	mg/kg	----	----	----	<0.2	----
Toluene	108-88-3	0.2	mg/kg	----	----	----	<0.2	----
Ethylbenzene	100-41-4	0.2	mg/kg	----	----	----	<0.2	----
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	----	----	----	<0.2	----
ortho-Xylene	95-47-6	0.2	mg/kg	----	----	----	<0.2	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	5	----	6
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	----	6
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	----	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	----	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	----	<4
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	----	<4
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	----	<4
Fluoranthene	206-44-0	4	µg/kg	<4	<4	<4	----	<4
Pyrene	129-00-0	4	µg/kg	<4	<4	<4	----	<4
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	----	<4
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	----	<4



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VC4D(0.5-1M)	VC4D(1-1.5M)	VC4D(1.5-2M)	TRIP BLANK	SS4J
				04-MAR-2010 15:00	04-MAR-2010 15:00	04-MAR-2010 15:00	04-MAR-2010 15:00	04-MAR-2010 15:00
				ES1004085-006	ES1004085-007	ES1004085-008	ES1004085-009	ES1004085-010
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	<4	<4	----	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	----	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	----	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	<4	<4	----	<4
Perylene	198-55-0	4	µg/kg	<4	<4	<4	----	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	----	<4
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	----	<4
Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	----	<4
Coronene	191-07-1	5	µg/kg	<5	<5	<5	----	<5
^ Sum of PAHs	----	4	µg/kg	<4	<4	5	----	12
EP080-SD: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	----	----	----	102	----
Toluene-D8	2037-26-5	0.1	%	----	----	----	106	----
4-Bromofluorobenzene	460-00-4	0.1	%	----	----	----	109	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	77.4	88.2	78.7	----	76.7
Anthracene-d10	1719-06-8	0.1	%	93.1	105	102	----	102
4-Terphenyl-d14	1718-51-0	0.1	%	86.4	94.8	97.9	----	93.2



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

				ST1	SSH	SS4I	----	----
				04-MAR-2010 15:00	04-MAR-2010 15:00	04-MAR-2010 15:00	----	----
Compound	CAS Number	LOR	Unit	ES1004085-011	ES1004085-012	ES1004085-013	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	21.2	18.7	21.1	----	----
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	----	----
Arsenic	7440-38-2	1.00	mg/kg	1.02	1.19	<1.00	----	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
Chromium	7440-47-3	1.0	mg/kg	1.8	2.5	1.0	----	----
Copper	7440-50-8	1.0	mg/kg	<1.0	1.6	<1.0	----	----
Cobalt	7440-48-4	0.5	mg/kg	<0.5	<0.5	<0.5	----	----
Lead	7439-92-1	1.0	mg/kg	2.2	3.2	1.4	----	----
Manganese	7439-96-5	10	mg/kg	<10	<10	<10	----	----
Nickel	7440-02-0	1.0	mg/kg	<1.0	<1.0	<1.0	----	----
Selenium	7782-49-2	0.1	mg/kg	0.1	<0.1	<0.1	----	----
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
Vanadium	7440-62-2	2.0	mg/kg	2.2	2.4	14.3	----	----
Zinc	7440-66-6	1.0	mg/kg	4.3	8.6	2.2	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.01	0.02	<0.01	----	----
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	----	----	<3	----	----
C10 - C14 Fraction	----	3	mg/kg	----	----	5	----	----
C15 - C28 Fraction	----	3	mg/kg	----	----	36	----	----
C29 - C36 Fraction	----	5	mg/kg	----	----	27	----	----
^ C10 - C36 Fraction (sum)	----	3	mg/kg	----	----	68	----	----
EP080-SD: BTEX								
Benzene	71-43-2	0.2	mg/kg	----	----	<0.2	----	----
Toluene	108-88-3	0.2	mg/kg	----	----	<0.2	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	----	----	<0.2	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	----	----	<0.2	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	----	----	<0.2	----	----
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	----	----	<0.50	----	----
alpha-BHC	319-84-6	0.50	µg/kg	----	----	<0.50	----	----
beta-BHC	319-85-7	0.50	µg/kg	----	----	<0.50	----	----
delta-BHC	319-86-8	0.50	µg/kg	----	----	<0.50	----	----
4,4'-DDD	72-54-8	0.50	µg/kg	----	----	<0.50	----	----
4,4'-DDE	72-55-9	0.50	µg/kg	----	----	<0.50	----	----
4,4'-DDT	50-29-3	0.50	µg/kg	----	----	<0.50	----	----



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				ST1	SSH	SS4I	----	----
				04-MAR-2010 15:00	04-MAR-2010 15:00	04-MAR-2010 15:00	----	----
Compound	CAS Number	LOR	Unit	ES1004085-011	ES1004085-012	ES1004085-013	----	----
EP131A: Organochlorine Pesticides - Continued								
^ DDT (total)	----	0.50	µg/kg	----	----	<0.50	----	----
Dieldrin	60-57-1	0.50	µg/kg	----	----	<0.50	----	----
alpha-Endosulfan	959-98-8	0.50	µg/kg	----	----	<0.50	----	----
beta-Endosulfan	33213-65-9	0.50	µg/kg	----	----	<0.50	----	----
Endosulfan sulfate	1031-07-8	0.50	µg/kg	----	----	<0.50	----	----
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	----	----	<0.50	----	----
Endrin	72-20-8	0.50	µg/kg	----	----	<0.50	----	----
Endrin aldehyde	7421-93-4	0.50	µg/kg	----	----	<0.50	----	----
Endrin ketone	53494-70-5	0.50	µg/kg	----	----	<0.50	----	----
Heptachlor	76-44-8	0.50	µg/kg	----	----	<0.50	----	----
Heptachlor epoxide	1024-57-3	0.50	µg/kg	----	----	<0.50	----	----
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	----	----	<0.50	----	----
gamma-BHC	58-89-9	0.50	µg/kg	----	----	<0.50	----	----
Methoxychlor	72-43-5	0.50	µg/kg	----	----	<0.50	----	----
cis-Chlordane	5103-71-9	0.50	µg/kg	----	----	<0.50	----	----
trans-Chlordane	5103-74-2	0.50	µg/kg	----	----	<0.50	----	----
^ Total Chlordane (sum)	----	0.50	µg/kg	----	----	<0.50	----	----
Oxychlordane	27304-13-8	0.50	µg/kg	----	----	<0.50	----	----
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	----	----	<5.0	----	----
Aroclor 1016	12974-11-2	5.0	µg/kg	----	----	<5.0	----	----
Aroclor 1221	11104-28-2	5.0	µg/kg	----	----	<5.0	----	----
Aroclor 1232	11141-16-5	5.0	µg/kg	----	----	<5.0	----	----
Aroclor 1242	53469-21-9	5.0	µg/kg	----	----	<5.0	----	----
Aroclor 1248	12672-29-6	5.0	µg/kg	----	----	<5.0	----	----
Aroclor 1254	11097-69-1	5.0	µg/kg	----	----	<5.0	----	----
Aroclor 1260	11096-82-5	5.0	µg/kg	----	----	<5.0	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	5	6	5	----	----
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	----	----
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	----	----
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	----	----
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	----	----
Phenanthrene	85-01-8	4	µg/kg	<4	<4	<4	----	----
Anthracene	120-12-7	4	µg/kg	<4	<4	<4	----	----
Fluoranthene	206-44-0	4	µg/kg	<4	5	<4	----	----
Pyrene	129-00-0	4	µg/kg	<4	5	<4	----	----
Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	<4	----	----



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	ST1	SSH	SS4I		
				04-MAR-2010 15:00	04-MAR-2010 15:00	04-MAR-2010 15:00	----	----
				ES1004085-011	ES1004085-012	ES1004085-013	----	----
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Chrysene	218-01-9	4	µg/kg	<4	<4	<4	----	----
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	5	<4	----	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	<4	----	----
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	<4	----	----
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	4	<4	----	----
Perylene	198-55-0	4	µg/kg	<4	<4	<4	----	----
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	<4	----	----
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	----	----
Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	<4	<4	<4	----	----
Coronene	191-07-1	5	µg/kg	<5	<5	<5	----	----
^ Sum of PAHs	----	4	µg/kg	5	25	5	----	----
EP080-SD: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	----	----	92.0	----	----
Toluene-D8	2037-26-5	0.1	%	----	----	98.4	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	----	----	104	----	----
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	----	----	37.7	----	----
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	44.6	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	79.2	76.6	89.0	----	----
Anthracene-d10	1719-06-8	0.1	%	100	93.9	72.1	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	93.1	85.6	79.6	----	----



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080-SD: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	74.7	127
Toluene-D8	2037-26-5	74.8	129
4-Bromofluorobenzene	460-00-4	75.3	127
EP131S: OC Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	136
EP131T: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	10	164
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	30	115
Anthracene-d10	1719-06-8	27	133
4-Terphenyl-d14	1718-51-0	18	137



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1004085	Page	: 1 of 11
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 04-MAR-2010
C-O-C number	: ----	Issue Date	: 17-MAR-2010
Sampler	: OM	No. of samples received	: 13
Order number	: 301015-01887/04	No. of samples analysed	: 13
Quote number	: SY/503/09		

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Alex Rossi	Organic Chemist	Organics
Celine Conceicao	Spectroscopist	Inorganics
Hoa Nguyen	Inorganic Chemist	Inorganics

Environmental Division Sydney

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 1271895)									
ES1003900-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	21.2	20.8	2.0	0% - 20%
ES1004081-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	10.6	11.2	5.6	0% - 50%
EA055: Moisture Content (QC Lot: 1271896)									
ES1004085-007	VC4D(1-1.5M)	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	15.8	16.0	1.6	0% - 50%
ES1004099-012	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	25.5	23.2	9.2	0% - 20%
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 1274014)									
ES1004085-001	VC4C(0-0.5M)	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	3.2	2.9	10.2	No Limit
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	2.6	2.4	9.8	No Limit
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	4.1	3.8	8.0	No Limit
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	<1.0	0.0	No Limit
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	9.5	8.6	9.6	No Limit
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	1.34	<1.00	29.4	No Limit
		EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	<10	0.0	No Limit
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	3.6	4.0	12.1	No Limit
		ES1004085-012	SSH	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1
EG020-SD: Selenium	7782-49-2			0.1	mg/kg	<0.1	0.1	0.0	No Limit
EG020-SD: Silver	7440-22-4			0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG020-SD: Cobalt	7440-48-4			0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EG020-SD: Antimony	7440-36-0			0.50	mg/kg	<0.50	<0.50	0.0	No Limit
EG020-SD: Chromium	7440-47-3			1.0	mg/kg	2.5	2.2	9.8	No Limit
EG020-SD: Copper	7440-50-8			1.0	mg/kg	1.6	1.4	16.9	No Limit
EG020-SD: Lead	7439-92-1			1.0	mg/kg	3.2	2.8	13.3	No Limit
EG020-SD: Nickel	7440-02-0			1.0	mg/kg	<1.0	<1.0	0.0	No Limit
EG020-SD: Zinc	7440-66-6			1.0	mg/kg	8.6	5.5	43.3	No Limit
EG020-SD: Arsenic	7440-38-2			1.00	mg/kg	1.19	<1.00	17.7	No Limit
EG020-SD: Manganese	7439-96-5			10	mg/kg	<10	<10	0.0	No Limit
EG020-SD: Vanadium	7440-62-2			2.0	mg/kg	2.4	<2.0	18.2	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1274013)									
ES1004085-001	VC4C(0-0.5M)	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.02	0.02	0.0	No Limit
ES1004085-012	SSH	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.02	0.01	0.0	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QC Lot: 1270997)									
ES1004085-002	VC4C(0.5-1M)	EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
		EP071-SD: C15 - C28 Fraction	----	3	mg/kg	19	15	24.4	No Limit
		EP071-SD: C29 - C36 Fraction	----	5	mg/kg	10	10	0.0	No Limit
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QC Lot: 1271021)									
ES1004085-002	VC4C(0.5-1M)	EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
EP080-SD: BTEX (QC Lot: 1271021)									
ES1004085-002	VC4C(0.5-1M)	EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: ortho-Xylene	106-42-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP131A: Organochlorine Pesticides (QC Lot: 1272182)									
ES1004085-002	VC4C(0.5-1M)	EP131A: Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: DDT (total)	----	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: gamma-BHC	58-89-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
EP131A: Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit		
EP131A: cis-Chlordane	5103-71-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit		
EP131A: trans-Chlordane	5103-74-2	0.50	µg/kg	<0.50	<0.50	0.0	No Limit		
EP131A: Total Chlordane (sum)	----	0.50	µg/kg	<0.50	<0.50	0.0	No Limit		
EP131B: Polychlorinated Biphenyls (as Aroclors) (QC Lot: 1272183)									
ES1004085-002	VC4C(0.5-1M)	EP131B: Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	0.0	No Limit



Sub-Matrix: **SOIL**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP131B: Polychlorinated Biphenyls (as Aroclors) (QC Lot: 1272183) - continued									
ES1004085-002	VC4C(0.5-1M)	EP131B: Aroclor 1016	12974-11-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1270996)									
ES1004085-001	VC4C(0-0.5M)	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	12	7	57.8	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	21	12	51.3	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	19	16	16.8	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	11	8	37.2	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	10	7	33.5	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	16	12	29.6	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	7	4	43.6	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	9	7	24.9	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	13	8	43.8	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	14	<4	113	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	10	11	15.1	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	8	7	13.1	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	170	105	# 47.3	0% - 20%
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	14	6	76.3	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	6	<5	26.3	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit
ES1004085-012	SSH	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	5	<4	0.0	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	5	<4	22.3	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	5	4	0.0	No Limit

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 Work Order : ES1004085
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE
 Project : CALTEX MAINTENANCE DREDGING



Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1270996) - continued									
ES1004085-012	SSH	EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	4	<4	0.0	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	25	11	77.8	No Limit
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	6	7	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: SOIL

				Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)
Method: Compound	CAS Number	LOR	Unit				LCS	Low
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1274014)								
EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	----	----	----	----
EG020-SD: Arsenic	7440-38-2	1.0	mg/kg	<1.00	13.1 mg/kg	102	70	130
EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	2.76 mg/kg	91.8	70	130
EG020-SD: Chromium	7440-47-3	1.0	mg/kg	<1.0	60.9 mg/kg	90.6	70	130
EG020-SD: Copper	7440-50-8	1.0	mg/kg	<1.0	54.7 mg/kg	88.8	70	130
EG020-SD: Cobalt	7440-48-4	10	mg/kg	<10.0	24.5 mg/kg	98.0	70	130
EG020-SD: Lead	7439-92-1	1.0	mg/kg	<1.0	54.8 mg/kg	85.0	70	130
EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	136 mg/kg	89.2	70	130
EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	55.2 mg/kg	96.1	70	130
EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	5.6 mg/kg	114	70	130
EG020-SD: Vanadium	7440-62-2	2	mg/kg	<2.0	34 mg/kg	101	70	130
EG020-SD: Zinc	7440-66-6	1.0	mg/kg	<1.0	104 mg/kg	92.9	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1274013)								
EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.090 mg/kg	80.7	74.2	126
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1270997)								
EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	5 mg/kg	85.0	75.2	116
EP071-SD: C15 - C28 Fraction	----	3	mg/kg	<3	5 mg/kg	87.0	75.3	113
EP071-SD: C29 - C36 Fraction	----	5	mg/kg	<5	5 mg/kg	97.0	72.6	117
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1271021)								
EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	26 mg/kg	93.9	68.4	128
EP080-SD: BTEX (QCLot: 1271021)								
EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	102	67.5	125
EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	1 mg/kg	118	69	122
EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	1 mg/kg	98.6	65.3	126
EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	2 mg/kg	96.8	66.5	124
EP080-SD: ortho-Xylene	106-42-3							
EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	1 mg/kg	104	66.7	123
EP131A: Organochlorine Pesticides (QCLot: 1272182)								
EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	5 µg/kg	84.5	31.7	140
EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	5 µg/kg	71.8	24.5	150
EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	5 µg/kg	79.4	36.9	139
EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	5 µg/kg	88.0	38.2	137
EP131A: 4,4'-DDD	72-54-8	0.5	µg/kg	<0.50	5 µg/kg	96.6	42.5	141



Sub-Matrix: SOIL

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike	Spike Recovery (%)		Recovery Limits (%)	
					Concentration	LCS	Low	High	
EP131A: Organochlorine Pesticides (QCLot: 1272182) - continued									
EP131A: 4.4'-DDE	72-55-9	0.5	µg/kg	<0.50	5 µg/kg	78.3	34.8	140	
EP131A: 4.4'-DDT	50-29-3	0.5	µg/kg	<0.50	5 µg/kg	65.3	38	143	
EP131A: DDT (total)	----	0.5	µg/kg	<0.50	----	----	----	----	
EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	5 µg/kg	92.0	43.2	134	
EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	5 µg/kg	81.0	23.7	139	
EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	5 µg/kg	85.1	35.8	138	
EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	5 µg/kg	101	7.45	158	
EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	----	----	----	----	
EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	5 µg/kg	92.1	21.6	162	
EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	5 µg/kg	74.8	19.3	131	
EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	5 µg/kg	89.1	17.9	141	
EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	5 µg/kg	89.0	31	153	
EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	5 µg/kg	83.1	34.3	138	
EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	5 µg/kg	62.3	18.6	146	
EP131A: gamma-BHC	58-89-9	0.5	µg/kg	<0.50	5 µg/kg	80.2	30.7	145	
EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	5 µg/kg	73.1	15	157	
EP131A: cis-Chlordane	5103-71-9	0.5	µg/kg	<0.50	5 µg/kg	79.8	22.3	145	
EP131A: trans-Chlordane	5103-74-2	0.5	µg/kg	<0.50	5 µg/kg	75.9	42.4	139	
EP131A: Total Chlordane (sum)	----	0.5	µg/kg	<0.50	----	----	----	----	
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 1272183)									
EP131B: Total Polychlorinated biphenyls	----	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1016	12974-11-2	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1221	11104-28-2	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1232	11141-16-5	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1242	53469-21-9	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1248	12672-29-6	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1254	11097-69-1	5	µg/kg	<5.0	50 µg/kg	85.6	61.3	121	
EP131B: Aroclor 1260	11096-82-5	5	µg/kg	<5.0	----	----	----	----	
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1270996)									
EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	25 µg/kg	117	----	----	
EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	25 µg/kg	112	----	----	
EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	25 µg/kg	111	----	----	
EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	25 µg/kg	115	----	----	
EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	25 µg/kg	116	----	----	
EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	25 µg/kg	113	----	----	
EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	25 µg/kg	116	----	----	
EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	25 µg/kg	114	----	----	
EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	25 µg/kg	110	----	----	
EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	25 µg/kg	112	----	----	



Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1270996) - continued									
EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	25 µg/kg	108	----	----	
EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	25 µg/kg	101	----	----	
EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	25 µg/kg	114	----	----	
EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	25 µg/kg	86.4	----	----	
EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	25 µg/kg	108	----	----	
EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	25 µg/kg	116	----	----	
EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	25 µg/kg	104	----	----	
EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	25 µg/kg	106	----	----	
EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	25 µg/kg	104	----	----	
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	25 µg/kg	104	----	----	
EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	----	----	----	----	



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1274014)							
ES1004085-002	VC4C(0.5-1M)	EG020-SD: Arsenic	7440-38-2	50 mg/kg	96.1	70	130
		EG020-SD: Cadmium	7440-43-9	50 mg/kg	96.0	70	130
		EG020-SD: Chromium	7440-47-3	50 mg/kg	91.8	70	130
		EG020-SD: Copper	7440-50-8	250 mg/kg	83.3	70	130
		EG020-SD: Lead	7439-92-1	250 mg/kg	86.3	70	130
		EG020-SD: Nickel	7440-02-0	50 mg/kg	95.8	70	130
		EG020-SD: Zinc	7440-66-6	250 mg/kg	93.5	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1274013)							
ES1004085-001	VC4C(0-0.5M)	EG035T-LL: Mercury	7439-97-6	0.50 mg/kg	87.1	70	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1270997)							
ES1004085-002	VC4C(0.5-1M)	EP071-SD: C10 - C14 Fraction	----	19.25 mg/kg	76.1	70	130
		EP071-SD: C15 - C28 Fraction	----	87.25 mg/kg	76.7	70	130
		EP071-SD: C29 - C36 Fraction	----	60 mg/kg	87.4	70	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1271021)							
ES1004085-002	VC4C(0.5-1M)	EP080-SD: C6 - C9 Fraction	----	26 mg/kg	104	70	130
EP080-SD: BTEX (QCLot: 1271021)							
ES1004085-002	VC4C(0.5-1M)	EP080-SD: Benzene	71-43-2	2.5 mg/kg	76.2	70	130
		EP080-SD: Toluene	108-88-3	2.5 mg/kg	98.8	70	130
		EP080-SD: Ethylbenzene	100-41-4	2.5 mg/kg	83.5	70	130
		EP080-SD: meta- & para-Xylene	108-38-3	2.5 mg/kg	86.9	70	130
		EP080-SD: ortho-Xylene	106-42-3	2.5 mg/kg	84.8	70	130
EP131A: Organochlorine Pesticides (QCLot: 1272182)							
ES1004085-013	SS4I	EP131A: Aldrin	309-00-2	5 µg/kg	78.4	31.7	140
		EP131A: alpha-BHC	319-84-6	5 µg/kg	57.6	24.5	150
		EP131A: beta-BHC	319-85-7	5 µg/kg	65.4	36.9	139
		EP131A: delta-BHC	319-86-8	5 µg/kg	72.8	38.2	137
		EP131A: 4,4'-DDD	72-54-8	5 µg/kg	69.7	42.5	141
		EP131A: 4,4'-DDE	72-55-9	5 µg/kg	72.6	34.8	140
		EP131A: 4,4'-DDT	50-29-3	5 µg/kg	70.2	38	143
		EP131A: Dieldrin	60-57-1	5 µg/kg	64.9	43.2	134
		EP131A: alpha-Endosulfan	959-98-8	5 µg/kg	70.8	23.7	139
		EP131A: beta-Endosulfan	33213-65-9	5 µg/kg	66.6	35.8	138
		EP131A: Endosulfan sulfate	1031-07-8	5 µg/kg	86.8	7.45	158



Sub-Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
EP131A: Organochlorine Pesticides (QCLot: 1272182) - continued							
ES1004085-013	SS4I	EP131A: Endrin	72-20-8	5 µg/kg	81.8	21.6	162
		EP131A: Endrin aldehyde	7421-93-4	5 µg/kg	45.4	19.3	131
		EP131A: Endrin ketone	53494-70-5	5 µg/kg	71.3	17.9	141
		EP131A: Heptachlor	76-44-8	5 µg/kg	69.0	31	153
		EP131A: Heptachlor epoxide	1024-57-3	5 µg/kg	66.0	34.3	138
		EP131A: Hexachlorobenzene (HCB)	118-74-1	5 µg/kg	46.8	18.6	146
		EP131A: gamma-BHC	58-89-9	5 µg/kg	65.4	30.7	145
		EP131A: Methoxychlor	72-43-5	5 µg/kg	71.8	15	157
		EP131A: cis-Chlordane	5103-71-9	5 µg/kg	67.4	22.3	145
		EP131A: trans-Chlordane	5103-74-2	5 µg/kg	62.0	42.4	139
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 1272183)							
ES1004085-013	SS4I	EP131B: Aroclor 1254	11097-69-1	50 µg/kg	# 58.3	61.3	121
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1270996)							
ES1004085-001	VC4C(0-0.5M)	EP132B-SD: Naphthalene	91-20-3	25 µg/kg	110	70	130
		EP132B-SD: 2-Methylnaphthalene	91-57-6	25 µg/kg	123	70	130
		EP132B-SD: Acenaphthylene	208-96-8	25 µg/kg	110	70	130
		EP132B-SD: Acenaphthene	83-32-9	25 µg/kg	110	70	130
		EP132B-SD: Fluorene	86-73-7	25 µg/kg	108	70	130
		EP132B-SD: Phenanthrene	85-01-8	25 µg/kg	100	70	130
		EP132B-SD: Anthracene	120-12-7	25 µg/kg	119	70	130
		EP132B-SD: Fluoranthene	206-44-0	25 µg/kg	88.2	70	130
		EP132B-SD: Pyrene	129-00-0	25 µg/kg	103	70	130
		EP132B-SD: Benz(a)anthracene	56-55-3	25 µg/kg	115	70	130
		EP132B-SD: Chrysene	218-01-9	25 µg/kg	111	70	130
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	25 µg/kg	70.6	70	130
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	25 µg/kg	84.8	70	130
		EP132B-SD: Benzo(e)pyrene	192-97-2	25 µg/kg	# 66.1	70	130
		EP132B-SD: Benzo(a)pyrene	50-32-8	25 µg/kg	# 68.3	70	130
		EP132B-SD: Perylene	198-55-0	25 µg/kg	# 50.1	70	130
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	25 µg/kg	84.8	70	130
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	25 µg/kg	84.9	70	130
		EP132B-SD: Indeno(1,2,3.cd)pyrene	193-39-5	25 µg/kg	# 68.3	70	130
		EP132B-SD: Coronene	191-07-1	25 µg/kg	82.8	70	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1004085	Page	: 1 of 6
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 04-MAR-2010
Sampler	: OM	Issue Date	: 17-MAR-2010
Order number	: 301015-01887/04		
Quote number	: SY/503/09	No. of samples received	: 13
		No. of samples analysed	: 13

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content								
Soil Glass Jar - Unpreserved VC4C(0-0.5M), VC4C(1-1.5M), VC4C(0-0.5M), VC4D(1-1.5M), SS4J, SSH,	VC4C(0.5-1M), VC4C(1.5-2), VC4D(0.5-1M), VC4D(1.5-2M), ST1, SS4I	04-MAR-2010	----	----	----	08-MAR-2010	11-MAR-2010	✓
EG020-SD: Total Metals in Sediments by ICPMS								
Soil Glass Jar - Unpreserved VC4C(0-0.5M), VC4C(1-1.5M), VC4C(0-0.5M), VC4D(1-1.5M), SS4J, SSH,	VC4C(0.5-1M), VC4C(1.5-2), VC4D(0.5-1M), VC4D(1.5-2M), ST1, SS4I	04-MAR-2010	10-MAR-2010	01-APR-2010	✓	11-MAR-2010	31-AUG-2010	✓
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved VC4C(0-0.5M), VC4C(1-1.5M), VC4C(0-0.5M), VC4D(1-1.5M), SS4J, SSH,	VC4C(0.5-1M), VC4C(1.5-2), VC4D(0.5-1M), VC4D(1.5-2M), ST1, SS4I	04-MAR-2010	10-MAR-2010	01-APR-2010	✓	15-MAR-2010	01-APR-2010	✓
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved VC4C(0.5-1M),	SS4I	04-MAR-2010	08-MAR-2010	18-MAR-2010	✓	09-MAR-2010	17-APR-2010	✓
Soil Glass Jar - Unpreserved VC4C(0.5-1M), SS4I	TRIP BLANK,	04-MAR-2010	08-MAR-2010	18-MAR-2010	✓	10-MAR-2010	18-MAR-2010	✓



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080-SD: BTEX								
Soil Glass Jar - Unpreserved VC4C(0.5-1M), SS4I	TRIP BLANK,	04-MAR-2010	08-MAR-2010	18-MAR-2010	✓	10-MAR-2010	18-MAR-2010	✓
EP131A: Organochlorine Pesticides								
Soil Glass Jar - Unpreserved VC4C(0.5-1M),	SS4I	04-MAR-2010	09-MAR-2010	18-MAR-2010	✓	11-MAR-2010	18-APR-2010	✓
EP131B: Polychlorinated Biphenyls (as Aroclors)								
Soil Glass Jar - Unpreserved VC4C(0.5-1M),	SS4I	04-MAR-2010	09-MAR-2010	18-MAR-2010	✓	11-MAR-2010	18-APR-2010	✓
EP132B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved VC4C(0-0.5M), VC4C(1-1.5M), VC4C(0-0.5M), VC4D(1-1.5M), SS4J, SSH,	VC4C(0.5-1M), VC4C(1.5-2), VC4D(0.5-1M), VC4D(1.5-2M), ST1, SS4I	04-MAR-2010	08-MAR-2010	18-MAR-2010	✓	09-MAR-2010	17-APR-2010	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	4	40	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	2	50.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	2	12	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	2	50.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	2	17	11.8	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	2	17	11.8	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	2	50.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	3	33.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	2	50.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	12	8.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	2	50.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	17	5.9	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	17	5.9	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	2	50.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	3	33.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	2	50.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	12	8.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	2	50.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	17	5.9	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	17	5.9	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	2	50.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	3	33.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	2	50.0	5.0	✓	ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	12	8.3	5.0	✓	ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	2	50.0	5.0	✓	ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	17	5.9	5.0	✓	ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	17	5.9	5.0	✓	ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	2	50.0	5.0	✓	ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	3	33.3	5.0	✓	ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Total Metals in Sediments by ICPMS	EG020-SD	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. Analyte list and LORs per NODG.
Total Mercury by FIMS (Low Level)	EG035T-LL	SOIL	AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3)
TPH - Semivolatile Fraction	EP071-SD	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 504)
TPH Volatiles/BTEX in Sediments	EP080-SD	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 501)
Organochlorine Pesticides (Ultra-trace)	EP131A	SOIL	USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PCB's (Ultra-trace)	EP131B	SOIL	USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PAHs in Sediments by GCMS(SIM)	EP132B-SD	SOIL	8270 GCMS Capillary column, SIM mode using large volume programmed temperature vaporisation injection.
Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (1999) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(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/ Sample Cleanup	ORG17A-UTP	SOIL	In-house, Mechanical agitation (tumbler). 20g of sample, Na ₂ SO ₄ and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. Samples are extracted, concentrated (by KD) and exchanged into an appropriate solvent for GPC and florisil cleanup as required.
Tumbler Extraction of Solids for LVI (Non-concentrating)	ORG17D	SOIL	In house: 10g of sample, Na ₂ SO ₄ and surrogate are extracted with 50mL 1:1 DCM/Acetone by end over end tumbling. An aliquot is concentrated by nitrogen blowdown to a reduced volume for analysis if required.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EP132B: Polynuclear Aromatic Hydrocarbons	ES1004085-001	VC4C(0-0.5M)	Sum of PAHs	----	47.3 %	0-20%	RPD exceeds LOR based limits
Matrix Spike (MS) Recoveries							
EP131B: Polychlorinated Biphenyls (as Aroclors)	ES1004085-013	SS4I	Aroclor 1254	11097-69-1	58.3 %	61.3-121%	Recovery less than lower data quality objective
EP132B: Polynuclear Aromatic Hydrocarbons	ES1004085-001	VC4C(0-0.5M)	Benzo(e)pyrene	192-97-2	66.1 %	70-130%	Recovery less than lower data quality objective
EP132B: Polynuclear Aromatic Hydrocarbons	ES1004085-001	VC4C(0-0.5M)	Benzo(a)pyrene	50-32-8	68.3 %	70-130%	Recovery less than lower data quality objective
EP132B: Polynuclear Aromatic Hydrocarbons	ES1004085-001	VC4C(0-0.5M)	Perylene	198-55-0	50.1 %	70-130%	Recovery less than lower data quality objective
EP132B: Polynuclear Aromatic Hydrocarbons	ES1004085-001	VC4C(0-0.5M)	Indeno(1.2.3.cd)pyrene	193-39-5	68.3 %	70-130%	Recovery less than lower data quality objective

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Laboratory Control outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)
Comprehensive Report

Work Order : **ES1004085**

Client : **WORLEY PARSONS - INFRASTRUCTURE MWE** **Laboratory** : Environmental Division Sydney

Contact : MS ORLA MURRAY **Contact** : Charlie Pierce

Address : Level 10/141 Walker Street **Address** : 277-289 Woodpark Road Smithfield
NORTH SYDNEY NSW, AUSTRALIA NSW Australia 2164
2060

E-mail : orla.murray@worleyparsons.com **E-mail** : charlie.pierce@alsenviro.com

Telephone : 8907 2131 **Telephone** : +61-2-8784 8555

Facsimile : ---- **Facsimile** : +61-2-8784 8500

Project : CALTEX MAINTENANCE DREDGING **Page** : 1 of 2

Order number : 301015-01887/04

C-O-C number : ---- **Quote number** : ES2009WORPAR0232 (SY/503/09)

Site : ----

Sampler : OM **QC Level** : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received : 04-MAR-2010 **Issue Date** : 06-MAR-2010 09:59

Client Requested Due Date : 17-MAR-2010 **Scheduled Reporting Date** : **17-MAR-2010**

Delivery Details

Mode of Delivery : Carrier **Temperature** : 3.6'C - Ice present

No. of coolers/boxes : 2 HARD **No. of samples received** : 13

Security Seal : Not intact. **No. of samples analysed** : 13

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Requested Deliverables
- **Samples received in appropriately pretreated and preserved containers.**
- **Sample(s) have been received within recommended holding times.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- **TBT and TOC have been split into ES1004088.**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Jacob Waugh
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: **SOIL**

Laboratory sample ID Client sampling date / time Client sample ID

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA055-103 Moisture Content	SOIL - EG020-SD Total Metals in Sediments by ICPMS (NODG)	SOIL - EG035T-LL Total Mercury by FIMS - Low Level	SOIL - EP071 - SD TPH ultra trace in sediments	SOIL - EP080-SD TPH(V)/BTEX in Sediments	SOIL - EP131A OC Pesticides (Ultratrace)	SOIL - EP131B PCB's (Ultratrace)	SOIL - EP132B-SD Ultra-trace PAHs in Sediments
ES1004085-001	04-MAR-2010 15:00	VC4C(0-0.5M)	✓	✓	✓					✓
ES1004085-002	04-MAR-2010 15:00	VC4C(0.5-1M)	✓	✓	✓	✓	✓	✓	✓	✓
ES1004085-003	04-MAR-2010 15:00	VC4C(1-1.5M)	✓	✓	✓					✓
ES1004085-004	04-MAR-2010 15:00	VC4C(1.5-2)	✓	✓	✓					✓
ES1004085-005	04-MAR-2010 15:00	VC4C(0-0.5M)	✓	✓	✓					✓
ES1004085-006	04-MAR-2010 15:00	VC4D(0.5-1M)	✓	✓	✓					✓
ES1004085-007	04-MAR-2010 15:00	VC4D(1-1.5M)	✓	✓	✓					✓
ES1004085-008	04-MAR-2010 15:00	VC4D(1.5-2M)	✓	✓	✓					✓
ES1004085-009	04-MAR-2010 15:00	TRIP BLANK					✓			
ES1004085-010	04-MAR-2010 15:00	SS4J	✓	✓	✓					✓
ES1004085-011	04-MAR-2010 15:00	ST1	✓	✓	✓					✓
ES1004085-012	04-MAR-2010 15:00	SSH	✓	✓	✓					✓
ES1004085-013	04-MAR-2010 15:00	SS4I	✓	✓	✓	✓	✓	✓	✓	✓

Requested Deliverables

MS ORLA MURRAY

- *AU Certificate of Analysis - NATA (COA)	Email	orla.murray@worleyparsons.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	orla.murray@worleyparsons.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	orla.murray@worleyparsons.com
- A4 - AU Sample Receipt Notification - Environmental (SRN)	Email	orla.murray@worleyparsons.com
- A4 - AU Tax Invoice (INV)	Email	orla.murray@worleyparsons.com
- Default - Chain of Custody (COC)	Email	orla.murray@worleyparsons.com
- EDI Format - ENMRG (ENMRG)	Email	orla.murray@worleyparsons.com



CHAIN OF CUSTODY

ALS Laboratory: please tick →

□ Sydney: 277 Woodpark Rd, Smithfield NSW 2176
Ph: 02 8784 8555 E: samples.sydney@alsenviro.com
□ Newcastle: 5 Rosegum Rd, Wararook NSW 2304
Ph: 02 4968 9433 E: samples.newcastle@alsenviro.com

□ Brisbane: 32 Shand St, Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com
□ Townsville: 14-15 Desma Ct, Bohle QLD 4818
Ph: 07 4796 0600 E: townsville.environmental@alsenviro.com

□ Melbourne: 2-4 Westall Rd, Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsenviro.com
□ Adelaide: 2-1 Burma Rd, Pooraka SA 5095
Ph: 08 8359 0890 E: adelaide@alsenviro.com

□ Perth: 10 Mod Way, Malaga WA 6090
Ph: 08 9209 7655 E: samples.perth@alsenviro.com
□ Launceston: 27 Wellington St, Launceston TAS 7250
Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT: WorleyParsons	TURNAROUND REQUIREMENTS : <input checked="" type="checkbox"/> Standard TAT (List due date):	FOR LABORATORY USE ONLY (Circle)	
OFFICE: 141 Walker ST, North Sydney NSW 2060	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	<input checked="" type="checkbox"/> Non Standard or urgent TAT (List due date): 5 day + for TBT & TOC	Custody Seal intact? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Free Ice / frozen ice bricks present upon receipt? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Random Sample Temperature on Receipt: 36 °C Other comment:
PROJECT: Caltex Maintenance Dredging	ALS QUOTE NO.: SY-503-09 V3	COC SEQUENCE NUMBER (Circle)	
ORDER NUMBER: 301015-01887/04		COC: ① 2 3 4 5 6 7 OF: 1 ② 3 4 5 6 7	
PROJECT MANAGER: Ali Watters	CONTACT PH: (02) 8456 7251	RECEIVED BY: FAS	RECEIVED BY:
SAMPLER: Oria Murray	SAMPLER MOBILE: 0408207481	DATE/TIME: 4/3/10 15:00	DATE/TIME:
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default):	DATE/TIME: 4/3/10 4:55pm	DATE/TIME:
Email Reports to (will default to PM if no other addresses are listed): Oria Murray			
Email Invoice to (will default to PM if no other addresses are listed): Oria Murray			
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: 5 day TAT req'd for TBT & TOC			

Environmental Division
Sydney
Work Order
ES1004088



Telephone : +61-2-8784 8555

ALS USE ONLY	SAMPLE DETAILS			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed below)												
	LAB ID	SAMPLE ID	DATE / TIME		MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	TBT (EP090)	TOC (Leco) (EP004)	Trace Metals - Ag, Cd, Se, Co, Sb, Cu, Pb, An, Cr, Ni, As, V, Mn (EG02/USD)	Hg - Total Low level (EG03BL)	PAHs - Super Ultra Trace (20 PAHs plus Sum of PAHs)	OCs - Ultratrace (21 analytes) (EP131A)	PCBs Total - Ultratrace (EP131B)	TPH (C6-C9)/BTEX - low level (EP080-UT)	TPH (C10-C36) - ultratrace (EP071SD)	Hold for Elutriate TBT
	1	VC4C(0-0.5m)	4/3/10	H	Unpreserved glass	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	2	VC4C(0.5-1m)	"	"	"	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	3	VC4C(1-1.5m)	"	"	"	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4	VC4C(1.5-2)	"	"	"	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	5	VC4D(0-0.5m)	"	"	"	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	6	VC4D(0.5-1m)	"	"	"	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	7	VC4D(1-1.5m)	"	"	"	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	8	VC4D(1.5-2m)	"	"	"	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	9	TWP Blank	"	"	"	1								✓			
	9	SS4J	"	"	"	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	10	ST1	"	"	"	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	11	SSH	"	"	"	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TOTAL						43											

Not homogenized. Please homogenised non-volatile samples in lab

TBT/TOC Leco

Subcon / Forward Lab (Split WO)

Lab / Analysis: ALS BRISBANE

Organised By / Date: _____

Relinquished By / Date: _____

Connote / Courier: _____

WO No: ES 1004088

Attach By PO / Internal Sheet: _____

Split from ES 1004088

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
 V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
 Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag

ES 1004088



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1004088	Page	: 1 of 7
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: 301015-01887/04	Date Samples Received	: 04-MAR-2010
C-O-C number	: ----	Issue Date	: 15-MAR-2010
Sampler	: OM	No. of samples received	: 12
Site	: ----	No. of samples analysed	: 12
Quote number	: SY/503/09		

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Kim McCabe	Senior Inorganic Chemist	Inorganics
Matt Frost	Organic Instrument Chemist	Organics
Stephen Hislop	Senior Inorganic Chemist	Inorganics
Stephen Hislop	Senior Inorganic Chemist	Stafford Minerals - AY

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. **+61-2-8784 8555** Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VC4C(0-0.5M)	VC4C(0.5-1M)	VC4C(1-1.5M)	VC4C(1.5-2)	VC4D(0-0.5M)
				04-MAR-2010 10:59	04-MAR-2010 10:59	04-MAR-2010 10:59	04-MAR-2010 10:59	04-MAR-2010 10:59
				ES1004088-001	ES1004088-002	ES1004088-003	ES1004088-004	ES1004088-005
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	20.2	20.8	18.5	19.6	17.2
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	0.46	0.29	0.13	0.25	0.11
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	22.5	66.9	10.6	1.6	<0.5
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	69.1	92.7	71.1	107	92.1



Analytical Results

Sub-Matrix: SOIL

				Client sample ID	VC4D(0.5-1M)	VC4D(1-1.5M)	VC4D(1.5-2M)	SS4J	ST1
				Client sampling date / time	04-MAR-2010 10:59	04-MAR-2010 10:59	04-MAR-2010 10:59	04-MAR-2010 10:59	04-MAR-2010 10:59
Compound	CAS Number	LOR	Unit		ES1004088-006	ES1004088-007	ES1004088-008	ES1004088-009	ES1004088-010
EA055: Moisture Content									
^ Moisture Content (dried @ 103°C)	----	1.0	%		19.1	18.7	18.7	19.1	20.4
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	0.02	%		0.06	0.03	0.09	0.07	0.08
EP090: Organotin Compounds									
Tributyltin	56573-85-4	0.5	µgSn/kg		<0.5	<0.5	<0.5	0.8	0.7
EP090S: Organotin Surrogate									
Tripropyltin	----	0.1	%		104	75.2	75.4	69.3	86.8



Analytical Results

Sub-Matrix: **SOIL**

				Client sample ID	SSH	SS4I			
				Client sampling date / time	04-MAR-2010 10:59	04-MAR-2010 10:59	----	----	----
Compound	CAS Number	LOR	Unit	ES1004088-011	ES1004088-012	----	----	----	
EA055: Moisture Content									
^ Moisture Content (dried @ 103°C)	----	1.0	%	20.7	21.1	----	----	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	0.02	%	0.16	0.05	----	----	----	
EP090: Organotin Compounds									
Tributyltin	56573-85-4	0.5	µgSn/kg	3.2	0.9	----	----	----	
EP090S: Organotin Surrogate									
Tripropyltin	----	0.1	%	59.7	54.2	----	----	----	



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP090S: Organotin Surrogate			
Tripropyltin	----	34	108



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1004088	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 04-MAR-2010
C-O-C number	: ----	Issue Date	: 15-MAR-2010
Sampler	: OM	No. of samples received	: 12
Order number	: 301015-01887/04	No. of samples analysed	: 12
Quote number	: SY/503/09		

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Kim McCabe	Senior Inorganic Chemist	Inorganics
Matt Frost	Organic Instrument Chemist	Organics
Stephen Hislop	Senior Inorganic Chemist	Inorganics
Stephen Hislop	Senior Inorganic Chemist	Stafford Minerals - AY



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 1273001)									
EB1004138-004	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	22.6	24.1	6.0	0% - 20%
ES1004088-006	VC4D(0.5-1M)	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	19.1	18.8	1.8	0% - 50%
EP005: Total Organic Carbon (TOC) (QC Lot: 1274504)									
ES1004088-001	VC4C(0-0.5M)	EP005: Total Organic Carbon	----	0.02	%	0.46	0.46	0.0	0% - 20%
ES1004088-011	SSH	EP005: Total Organic Carbon	----	0.02	%	0.16	0.16	0.0	No Limit
EP090: Organotin Compounds (QC Lot: 1272727)									
ES1004088-001	VC4C(0-0.5M)	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	22.5	23.1	2.6	0% - 20%
ES1004088-011	SSH	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	3.2	2.6	20.7	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: SOIL

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
EP005: Total Organic Carbon (TOC) (QCLot: 1274504)								
EP005: Total Organic Carbon	----	0.02	%	<0.02	100 %	100	70	130
EP090: Organotin Compounds (QCLot: 1272727)								
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	103	19.5	129



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				<i>Matrix Spike (MS) Report</i>			
		<i>Spike</i>	<i>Spike Recovery (%)</i>		<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Concentration</i>	<i>MS</i>	<i>Low</i>	<i>High</i>
EP090: Organotin Compounds (QCLot: 1272727)							
ES1004088-002	VC4C(0.5-1M)	EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	# Not Determined	20	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1004088	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 04-MAR-2010
Sampler	: OM	Issue Date	: 15-MAR-2010
Order number	: 301015-01887/04		
Quote number	: SY/503/09	No. of samples received	: 12
		No. of samples analysed	: 12

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content								
Soil Glass Jar - Unpreserved								
VC4C(0-0.5M), VC4C(1-1.5M), VC4D(0-0.5M), VC4D(1-1.5M), SS4J, SSH,	VC4C(0.5-1M), VC4C(1.5-2), VC4D(0.5-1M), VC4D(1.5-2M), ST1, SS4I	04-MAR-2010	----	----	----	09-MAR-2010	11-MAR-2010	✓
EP005: Total Organic Carbon (TOC)								
Pulp Bag								
VC4C(0-0.5M), VC4C(1-1.5M), VC4D(0-0.5M), VC4D(1-1.5M), SS4J, SSH,	VC4C(0.5-1M), VC4C(1.5-2), VC4D(0.5-1M), VC4D(1.5-2M), ST1, SS4I	04-MAR-2010	10-MAR-2010	01-APR-2010	✓	11-MAR-2010	01-APR-2010	✓
EP090: Organotin Compounds								
Soil Glass Jar - Unpreserved								
VC4C(0-0.5M), VC4C(1-1.5M), VC4D(0-0.5M), VC4D(1-1.5M), SS4J, SSH,	VC4C(0.5-1M), VC4C(1.5-2), VC4D(0.5-1M), VC4D(1.5-2M), ST1, SS4I	04-MAR-2010	11-MAR-2010	18-MAR-2010	✓	13-MAR-2010	20-APR-2010	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	2	20	10.0	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	2	12	16.7	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	12	16.7	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Organotin Analysis	EP090	1	12	8.3	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	12	8.3	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Organotin Analysis	EP090	1	12	8.3	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	12	8.3	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Organotin Analysis	EP090	1	12	8.3	5.0	✔	ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Total Organic Carbon	EP005	SOIL	In-house. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a LECO furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO ₂) is automatically measured by infra-red detector.
Organotin Analysis	EP090	SOIL	(USEPA SW 846 - 8270D) Prepared sample extracts are analysed by GC/MS coupled with high volume injection, and quantified against an established calibration curve.
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Organotin Sample Preparation	ORG35	SOIL	In house. 20g sample is spiked with surrogate and leached in a methanol:acetic acid:UHP water mix and vacuum filtered. Reagents and solvents are added to the sample and the mixture tumbled. The butyltin compounds are simultaneously derivatised and extracted. The extract is further extracted with petroleum ether. The resultant extracts are combined and concentrated for analysis.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP090: Organotin Compounds	ES1004088-002	VC4C(0.5-1M)	Tributyltin	56573-85-4	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)
Comprehensive Report

Work Order : **ES1004088**

Client : **WORLEY PARSONS - INFRASTRUCTURE MWE** **Laboratory** : Environmental Division Sydney

Contact : MS ORLA MURRAY **Contact** : Charlie Pierce

Address : Level 10/141 Walker Street **Address** : 277-289 Woodpark Road Smithfield
NORTH SYDNEY NSW, AUSTRALIA NSW Australia 2164
2060

E-mail : orla.murray@worleyparsons.com **E-mail** : charlie.pierce@alsenviro.com

Telephone : 8907 2131 **Telephone** : +61-2-8784 8555

Facsimile : ---- **Facsimile** : +61-2-8784 8500

Project : CALTEX MAINTENANCE DREDGING **Page** : 1 of 2

Order number : 301015-01887/04

C-O-C number : ---- **Quote number** : ES2009WORPAR0232 (SY/503/09)

Site : ----

Sampler : OM **QC Level** : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received : 04-MAR-2010 **Issue Date** : 09-MAR-2010 12:31

Client Requested Due Date : 15-MAR-2010 **Scheduled Reporting Date** : **15-MAR-2010**

Delivery Details

Mode of Delivery : Carrier **Temperature** : 3.6'C - Ice present

No. of coolers/boxes : 2 HARD **No. of samples received** : 12

Security Seal : Not intact. **No. of samples analysed** : 12

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Requested Deliverables
- Samples received in appropriately pretreated and preserved containers.
- The results for this work order will be released on 15/3/10 as per Charlie Pierce.
- **Samples received in appropriately pretreated and preserved containers.**
- **TBT and TOC analysis will be conducted by ALS Brisbane.**
- **Sample(s) have been received within recommended holding times.**
- **TBT and TOC analysis have been split from ES1004085.**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Jacob Waugh
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EP005 (solids) Total Organic Carbon (TOC) soils	SOIL - EA055-103 Moisture Content	SOIL - EP090 (solids) Organotins
ES1004088-001	04-MAR-2010 10:59	VC4C(0-0.5M)	✓	✓	✓
ES1004088-002	04-MAR-2010 10:59	VC4C(0.5-1M)	✓	✓	✓
ES1004088-003	04-MAR-2010 10:59	VC4C(1-1.5M)	✓	✓	✓
ES1004088-004	04-MAR-2010 10:59	VC4C(1.5-2)	✓	✓	✓
ES1004088-005	04-MAR-2010 10:59	VC4D(0-0.5M)	✓	✓	✓
ES1004088-006	04-MAR-2010 10:59	VC4D(0.5-1M)	✓	✓	✓
ES1004088-007	04-MAR-2010 10:59	VC4D(1-1.5M)	✓	✓	✓
ES1004088-008	04-MAR-2010 10:59	VC4D(1.5-2M)	✓	✓	✓
ES1004088-009	04-MAR-2010 10:59	SS4J	✓	✓	✓
ES1004088-010	04-MAR-2010 10:59	ST1	✓	✓	✓
ES1004088-011	04-MAR-2010 10:59	SSH	✓	✓	✓
ES1004088-012	04-MAR-2010 10:59	SS4I	✓	✓	✓

Requested Deliverables

MS ORLA MURRAY

- *AU Certificate of Analysis - NATA (COA)	Email	orla.murray@worleyparsons.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	orla.murray@worleyparsons.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	orla.murray@worleyparsons.com
- A4 - AU Sample Receipt Notification - Environmental (SRN)	Email	orla.murray@worleyparsons.com
- A4 - AU Tax Invoice (INV)	Email	orla.murray@worleyparsons.com
- Default - Chain of Custody (COC)	Email	orla.murray@worleyparsons.com
- EDI Format - ENMRG (ENMRG)	Email	orla.murray@worleyparsons.com



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1004214	Page	: 1 of 6
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENENCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: 301015-01887/04	Date Samples Received	: 05-MAR-2010
C-O-C number	: ----	Issue Date	: 15-MAR-2010
Sampler	: OM	No. of samples received	: 18
Site	: ----	No. of samples analysed	: 5
Quote number	: SY/503/09		

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Alex Rossi	Organic Chemist	Organics
Celine Conceicao	Spectroscopist	Inorganics
Hoa Nguyen	Inorganic Chemist	Inorganics

Environmental Division Sydney

Part of the **ALS Laboratory Group**

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A Campbell Brothers Limited Company



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	SS4A	SS4F	SS4G	FT1	FT2
				05-MAR-2010 15:00	05-MAR-2010 14:00	05-MAR-2010 14:00	05-MAR-2010 14:00	05-MAR-2010 14:00
				ES1004214-010	ES1004214-015	ES1004214-016	ES1004214-017	ES1004214-018
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	21.9	21.3	16.3	17.4	17.6
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	<1.00	1.87	<1.00	<1.00	<1.00
Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	1.2	3.5	1.2	1.4	1.5
Copper	7440-50-8	1.0	mg/kg	<1.0	3.9	1.0	6.3	1.3
Cobalt	7440-48-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Lead	7439-92-1	1.0	mg/kg	1.8	3.8	1.6	1.8	2.0
Manganese	7439-96-5	10	mg/kg	<10	<10	<10	<10	<10
Nickel	7440-02-0	1.0	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
Selenium	7782-49-2	0.1	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	88.8	32.9	56.3	44.6	<2.0
Zinc	7440-66-6	1.0	mg/kg	2.8	8.6	2.5	7.9	4.8
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	<0.01	0.02	<0.01	<0.01	<0.01
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	----	----	----
EP080: BTEX								
Benzene	71-43-2	0.1	mg/kg	<0.1	----	----	----	----
Toluene	108-88-3	0.1	mg/kg	<0.1	----	----	----	----
Ethylbenzene	100-41-4	0.1	mg/kg	<0.1	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.1	mg/kg	<0.1	----	----	----	----
ortho-Xylene	95-47-6	0.1	mg/kg	<0.1	----	----	----	----
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C10 - C14 Fraction	----	3	mg/kg	<3	----	----	----	----
C15 - C28 Fraction	----	3	mg/kg	4	----	----	----	----
C29 - C36 Fraction	----	5	mg/kg	<5	----	----	----	----
^ C10 - C36 Fraction (sum)	----	3	mg/kg	4	----	----	----	----
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	----	----	----	----
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	----	----	----	----
beta-BHC	319-85-7	0.50	µg/kg	<0.50	----	----	----	----
delta-BHC	319-86-8	0.50	µg/kg	<0.50	----	----	----	----
4,4'-DDD	72-54-8	0.50	µg/kg	<0.50	----	----	----	----
4,4'-DDE	72-55-9	0.50	µg/kg	<0.50	----	----	----	----



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	SS4A	SS4F	SS4G	FT1	FT2
				05-MAR-2010 15:00	05-MAR-2010 14:00	05-MAR-2010 14:00	05-MAR-2010 14:00	05-MAR-2010 14:00
				ES1004214-010	ES1004214-015	ES1004214-016	ES1004214-017	ES1004214-018
EP131A: Organochlorine Pesticides - Continued								
4,4'-DDT	50-29-3	0.50	µg/kg	<0.50	----	----	----	----
^ DDT (total)	----	0.50	µg/kg	<0.50	----	----	----	----
Dieldrin	60-57-1	0.50	µg/kg	<0.50	----	----	----	----
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	----	----	----	----
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	----	----	----	----
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	----	----	----	----
Endrin	72-20-8	0.50	µg/kg	<0.50	----	----	----	----
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	----	----	----	----
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	----	----	----	----
Heptachlor	76-44-8	0.50	µg/kg	<0.50	----	----	----	----
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	----	----	----	----
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	----	----	----	----
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	----	----	----	----
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	----	----	----	----
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	----	----	----	----
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	----	----	----	----
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	----	----	----	----
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1016	12974-11-2	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	----	----	----	----
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	----	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	<5	<5	<5	<5	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	<5	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	<4	<4	<4	<4	<4
Acenaphthene	83-32-9	4	µg/kg	<4	<4	<4	<4	<4
Fluorene	86-73-7	4	µg/kg	<4	<4	<4	<4	<4
Phenanthrene	85-01-8	4	µg/kg	<4	14	<4	6	<4
Anthracene	120-12-7	4	µg/kg	<4	5	<4	<4	<4
Fluoranthene	206-44-0	4	µg/kg	<4	27	4	12	5
Pyrene	129-00-0	4	µg/kg	<4	29	6	18	7



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	SS4A	SS4F	SS4G	FT1	FT2
				05-MAR-2010 15:00	05-MAR-2010 14:00	05-MAR-2010 14:00	05-MAR-2010 14:00	05-MAR-2010 14:00
				ES1004214-010	ES1004214-015	ES1004214-016	ES1004214-017	ES1004214-018
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Benz(a)anthracene	56-55-3	4	µg/kg	<4	18	<4	9	<4
Chrysene	218-01-9	4	µg/kg	<4	15	<4	11	<4
Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	20	<4	14	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	10	<4	5	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	<4	13	<4	10	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	<4	19	<4	12	<4
Perylene	198-55-0	4	µg/kg	<4	6	<4	<4	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	19	<4	10	<4
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	<4	<4	<4	<4
Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	<4	14	<4	6	<4
Coronene	191-07-1	5	µg/kg	<5	<5	<5	<5	<5
^ Sum of PAHs	----	4	µg/kg	<4	209	10	113	12
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	88.5	----	----	----	----
Toluene-D8	2037-26-5	0.1	%	88.0	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	96.5	----	----	----	----
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	44.5	----	----	----	----
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	47.8	----	----	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	76.5	93.8	89.6	88.7	82.6
Anthracene-d10	1719-06-8	0.1	%	84.7	89.2	92.8	95.8	87.5
4-Terphenyl-d14	1718-51-0	0.1	%	91.2	95.9	88.6	100	89.7



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121
EP131S: OC Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	136
EP131T: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	10	164
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	30	115
Anthracene-d10	1719-06-8	27	133
4-Terphenyl-d14	1718-51-0	18	137



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1004214	Page	: 1 of 10
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENENCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 05-MAR-2010
C-O-C number	: ----	Issue Date	: 15-MAR-2010
Sampler	: OM	No. of samples received	: 18
Order number	: 301015-01887/04	No. of samples analysed	: 5
Quote number	: SY/503/09		

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Alex Rossi	Organic Chemist	Organics
Celine Conceicao	Spectroscopist	Inorganics
Hoa Nguyen	Inorganic Chemist	Inorganics

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 1275130)									
ES1004214-015	SS4F	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	21.3	20.6	3.5	0% - 20%
ES1004218-012	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	18.4	18.8	2.2	0% - 50%
EA055: Moisture Content (QC Lot: 1276036)									
ES1004151-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	28.7	30.5	6.2	0% - 20%
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 1274014)									
ES1004085-001	Anonymous	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	3.2	2.9	10.2	No Limit
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	2.6	2.4	9.8	No Limit
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	4.1	3.8	8.0	No Limit
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	<1.0	0.0	No Limit
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	9.5	8.6	9.6	No Limit
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	1.34	<1.00	29.4	No Limit
		EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	<10	0.0	No Limit
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	3.6	4.0	12.1	No Limit
		ES1004085-012	Anonymous	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1
EG020-SD: Selenium	7782-49-2			0.1	mg/kg	<0.1	0.1	0.0	No Limit
EG020-SD: Silver	7440-22-4			0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG020-SD: Cobalt	7440-48-4			0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EG020-SD: Antimony	7440-36-0			0.50	mg/kg	<0.50	<0.50	0.0	No Limit
EG020-SD: Chromium	7440-47-3			1.0	mg/kg	2.5	2.2	9.8	No Limit
EG020-SD: Copper	7440-50-8			1.0	mg/kg	1.6	1.4	16.9	No Limit
EG020-SD: Lead	7439-92-1			1.0	mg/kg	3.2	2.8	13.3	No Limit
EG020-SD: Nickel	7440-02-0			1.0	mg/kg	<1.0	<1.0	0.0	No Limit
EG020-SD: Zinc	7440-66-6			1.0	mg/kg	8.6	5.5	43.3	No Limit
EG020-SD: Arsenic	7440-38-2			1.00	mg/kg	1.19	<1.00	17.7	No Limit
EG020-SD: Manganese	7439-96-5			10	mg/kg	<10	<10	0.0	No Limit
EG020-SD: Vanadium	7440-62-2			2.0	mg/kg	2.4	<2.0	18.2	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1274013)									
ES1004085-001	Anonymous	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.02	0.02	0.0	No Limit
ES1004085-012	Anonymous	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.02	0.01	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1273018)									



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1273018) - continued									
ES1004308-003	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	3000	3020	0.9	0% - 20%
ES1004308-009	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	75	63	18.0	No Limit
EP080: BTEX (QC Lot: 1273018)									
ES1004308-003	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	677	757	11.2	0% - 20%
		EP080: Toluene	108-88-3	0.5	mg/kg	616	640	3.8	0% - 20%
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	56.4	54.1	4.1	0% - 20%
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	429	414	3.6	0% - 20%
			106-42-3						
ES1004308-009	Anonymous	EP080: ortho-Xylene	95-47-6	0.5	mg/kg	177	166	6.7	0% - 20%
		EP080: Benzene	71-43-2	0.2	mg/kg	11.1	11.2	0.0	0% - 20%
		EP080: Toluene	108-88-3	0.5	mg/kg	13.9	13.3	4.4	0% - 20%
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	6.2	6.3	0.0	0% - 50%
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	15.6	15.6	0.0	0% - 20%
	106-42-3								
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	6.2	5.9	4.1	0% - 50%
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QC Lot: 1272575)									
ES1004214-010	SS4A	EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
		EP071-SD: C15 - C28 Fraction	----	3	mg/kg	4	4	0.0	No Limit
		EP071-SD: C29 - C36 Fraction	----	5	mg/kg	<5	<5	0.0	No Limit
EP131A: Organochlorine Pesticides (QC Lot: 1273148)									
ES1004309-034	Anonymous	EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: DDT (total)	----	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	0.0	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP131A: Organochlorine Pesticides (QC Lot: 1273148) - continued									
ES1004309-034	Anonymous	EP131A: Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
EP131B: Polychlorinated Biphenyls (as Aroclors) (QC Lot: 1273149)									
ES1004309-034	Anonymous	EP131B: Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1016	12974-11-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
EP131B: Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit		
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1272574)									
ES1004214-015	SS4F	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	<4	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	14	18	20.4	No Limit
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	5	6	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	27	34	23.2	No Limit
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	29	36	21.5	No Limit
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	18	19	7.9	No Limit
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	15	19	24.5	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	20	28	30.6	No Limit
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	10	13	26.9	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	13	17	30.3	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	19	22	17.8	No Limit
		EP132B-SD: Perylene	198-55-0	4	µg/kg	6	8	32.7	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	19	25	24.2	No Limit
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	5	0.0	No Limit
		EP132B-SD: Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	14	18	27.1	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	209	274	# 26.9	0% - 20%
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	6	0.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	<5	0.0	No Limit		



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1274014)									
EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	----	----	----	----	
EG020-SD: Arsenic	7440-38-2	1.0	mg/kg	<1.00	13.1 mg/kg	102	70	130	
EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	2.76 mg/kg	91.8	70	130	
EG020-SD: Chromium	7440-47-3	1.0	mg/kg	<1.0	60.9 mg/kg	90.6	70	130	
EG020-SD: Copper	7440-50-8	1.0	mg/kg	<1.0	54.7 mg/kg	88.8	70	130	
EG020-SD: Cobalt	7440-48-4	10	mg/kg	<10.0	24.5 mg/kg	98.0	70	130	
EG020-SD: Lead	7439-92-1	1.0	mg/kg	<1.0	54.8 mg/kg	85.0	70	130	
EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	136 mg/kg	89.2	70	130	
EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	55.2 mg/kg	96.1	70	130	
EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----	
EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	5.6 mg/kg	114	70	130	
EG020-SD: Vanadium	7440-62-2	2	mg/kg	<2.0	34 mg/kg	101	70	130	
EG020-SD: Zinc	7440-66-6	1.0	mg/kg	<1.0	104 mg/kg	92.9	70	130	
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1274013)									
EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.090 mg/kg	80.7	74.2	126	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1273018)									
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	88.3	68.4	128	
EP080: BTEX (QCLot: 1273018)									
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	83.8	67.5	125	
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	99.0	69	122	
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	87.1	65.3	126	
EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	2 mg/kg	90.4	66.5	124	
EP080: ortho-Xylene	106-42-3								
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	89.1	66.7	123	
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1272575)									
EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	5 mg/kg	87.0	75.2	116	
EP071-SD: C15 - C28 Fraction	----	3	mg/kg	<3	5 mg/kg	97.0	75.3	113	
EP071-SD: C29 - C36 Fraction	----	5	mg/kg	<5	5 mg/kg	107	72.6	117	
EP131A: Organochlorine Pesticides (QCLot: 1273148)									
EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	5 µg/kg	92.0	31.7	140	
EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	5 µg/kg	92.1	24.5	150	
EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	5 µg/kg	95.6	36.9	139	
EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	5 µg/kg	112	38.2	137	
EP131A: 4,4'-DDD	72-54-8	0.5	µg/kg	<0.50	5 µg/kg	118	42.5	141	



Sub-Matrix: SOIL

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					LCS	Low	High	
EP131A: Organochlorine Pesticides (QCLot: 1273148) - continued								
EP131A: 4.4'-DDE	72-55-9	0.5	µg/kg	<0.50	5 µg/kg	105	34.8	140
EP131A: 4.4'-DDT	50-29-3	0.5	µg/kg	<0.50	5 µg/kg	99.7	38	143
EP131A: DDT (total)	----	0.5	µg/kg	<0.50	----	----	----	----
EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	5 µg/kg	108	43.2	134
EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	5 µg/kg	99.0	23.7	139
EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	5 µg/kg	109	35.8	138
EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	5 µg/kg	138	7.45	158
EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	----	----	----	----
EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	5 µg/kg	117	21.6	162
EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	5 µg/kg	88.5	19.3	131
EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	5 µg/kg	112	17.9	141
EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	5 µg/kg	105	31	153
EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	5 µg/kg	109	34.3	138
EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	5 µg/kg	86.5	18.6	146
EP131A: gamma-BHC	58-89-9	0.5	µg/kg	<0.50	5 µg/kg	99.6	30.7	145
EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	5 µg/kg	119	15	157
EP131A: cis-Chlordane	5103-71-9	0.5	µg/kg	<0.50	5 µg/kg	98.2	22.3	145
EP131A: trans-Chlordane	5103-74-2	0.5	µg/kg	<0.50	5 µg/kg	93.5	42.4	139
EP131A: Total Chlordane (sum)	----	0.5	µg/kg	<0.50	----	----	----	----
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 1273149)								
EP131B: Total Polychlorinated biphenyls	----	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1016	12974-11-2	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1221	11104-28-2	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1232	11141-16-5	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1242	53469-21-9	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1248	12672-29-6	5	µg/kg	<5.0	----	----	----	----
EP131B: Aroclor 1254	11097-69-1	5	µg/kg	<5.0	50 µg/kg	73.4	61.3	121
EP131B: Aroclor 1260	11096-82-5	5	µg/kg	<5.0	----	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1272574)								
EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	25 µg/kg	110	----	----
EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	25 µg/kg	116	----	----
EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	25 µg/kg	97.6	----	----
EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	25 µg/kg	116	----	----
EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	25 µg/kg	114	----	----
EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	25 µg/kg	119	----	----
EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	25 µg/kg	87.4	----	----
EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	25 µg/kg	90.1	----	----
EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	25 µg/kg	114	----	----
EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	25 µg/kg	115	----	----



Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1272574) - continued									
EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	25 µg/kg	111	----	----	
EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	25 µg/kg	95.4	----	----	
EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	25 µg/kg	99.4	----	----	
EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	25 µg/kg	83.9	----	----	
EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	25 µg/kg	94.9	----	----	
EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	25 µg/kg	99.2	----	----	
EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	25 µg/kg	96.3	----	----	
EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	25 µg/kg	95.9	----	----	
EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	<4	25 µg/kg	98.0	----	----	
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	25 µg/kg	111	----	----	
EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	----	----	----	----	



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 1274014)							
ES1004085-002	Anonymous	EG020-SD: Arsenic	7440-38-2	50 mg/kg	96.1	70	130
		EG020-SD: Cadmium	7440-43-9	50 mg/kg	96.0	70	130
		EG020-SD: Chromium	7440-47-3	50 mg/kg	91.8	70	130
		EG020-SD: Copper	7440-50-8	250 mg/kg	83.3	70	130
		EG020-SD: Lead	7439-92-1	250 mg/kg	86.3	70	130
		EG020-SD: Nickel	7440-02-0	50 mg/kg	95.8	70	130
		EG020-SD: Zinc	7440-66-6	250 mg/kg	93.5	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1274013)							
ES1004085-001	Anonymous	EG035T-LL: Mercury	7439-97-6	0.50 mg/kg	87.1	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1273018)							
ES1004308-003	Anonymous	EP080: C6 - C9 Fraction	----	26 mg/kg	# Not Determined	70	130
EP080: BTEX (QCLot: 1273018)							
ES1004308-003	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	# Not Determined	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	# Not Determined	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	# Not Determined	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	# Not Determined	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	# Not Determined	70	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 1272575)							
ES1004214-010	SS4A	EP071-SD: C10 - C14 Fraction	----	19.75 mg/kg	80.0	70	130
		EP071-SD: C15 - C28 Fraction	----	87.25 mg/kg	81.7	70	130
		EP071-SD: C29 - C36 Fraction	----	60 mg/kg	97.1	70	130
EP131A: Organochlorine Pesticides (QCLot: 1273148)							
ES1004309-034	Anonymous	EP131A: Aldrin	309-00-2	5 µg/kg	88.4	31.7	140
		EP131A: alpha-BHC	319-84-6	5 µg/kg	63.7	24.5	150
		EP131A: beta-BHC	319-85-7	5 µg/kg	98.6	36.9	139
		EP131A: delta-BHC	319-86-8	5 µg/kg	70.2	38.2	137
		EP131A: 4,4'-DDD	72-54-8	5 µg/kg	72.4	42.5	141
		EP131A: 4,4'-DDE	72-55-9	5 µg/kg	96.5	34.8	140
		EP131A: 4,4'-DDT	50-29-3	5 µg/kg	42.5	38	143
		EP131A: Dieldrin	60-57-1	5 µg/kg	82.5	43.2	134
		EP131A: alpha-Endosulfan	959-98-8	5 µg/kg	68.3	23.7	139
		EP131A: beta-Endosulfan	33213-65-9	5 µg/kg	62.6	35.8	138
		EP131A: Endosulfan sulfate	1031-07-8	5 µg/kg	85.8	7.45	158



Sub-Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
EP131A: Organochlorine Pesticides (QCLot: 1273148) - continued							
ES1004309-034	Anonymous	EP131A: Endrin	72-20-8	5 µg/kg	79.7	21.6	162
		EP131A: Endrin aldehyde	7421-93-4	5 µg/kg	43.7	19.3	131
		EP131A: Endrin ketone	53494-70-5	5 µg/kg	60.8	17.9	141
		EP131A: Heptachlor	76-44-8	5 µg/kg	95.5	31	153
		EP131A: Heptachlor epoxide	1024-57-3	5 µg/kg	74.5	34.3	138
		EP131A: Hexachlorobenzene (HCB)	118-74-1	5 µg/kg	64.6	18.6	146
		EP131A: gamma-BHC	58-89-9	5 µg/kg	56.6	30.7	145
		EP131A: Methoxychlor	72-43-5	5 µg/kg	46.6	15	157
		EP131A: cis-Chlordane	5103-71-9	5 µg/kg	68.9	22.3	145
		EP131A: trans-Chlordane	5103-74-2	5 µg/kg	83.4	42.4	139
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 1273149)							
ES1004309-034	Anonymous	EP131B: Aroclor 1254	11097-69-1	50 µg/kg	66.7	61.3	121
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 1272574)							
ES1004214-015	SS4F	EP132B-SD: Naphthalene	91-20-3	25 µg/kg	88.7	70	130
		EP132B-SD: 2-Methylnaphthalene	91-57-6	25 µg/kg	112	70	130
		EP132B-SD: Acenaphthylene	208-96-8	25 µg/kg	104	70	130
		EP132B-SD: Acenaphthene	83-32-9	25 µg/kg	109	70	130
		EP132B-SD: Fluorene	86-73-7	25 µg/kg	106	70	130
		EP132B-SD: Phenanthrene	85-01-8	25 µg/kg	118	70	130
		EP132B-SD: Anthracene	120-12-7	25 µg/kg	98.8	70	130
		EP132B-SD: Fluoranthene	206-44-0	25 µg/kg	122	70	130
		EP132B-SD: Pyrene	129-00-0	25 µg/kg	# 132	70	130
		EP132B-SD: Benz(a)anthracene	56-55-3	25 µg/kg	114	70	130
		EP132B-SD: Chrysene	218-01-9	25 µg/kg	126	70	130
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	25 µg/kg	124	70	130
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	25 µg/kg	89.2	70	130
		EP132B-SD: Benzo(e)pyrene	192-97-2	25 µg/kg	104	70	130
		EP132B-SD: Benzo(a)pyrene	50-32-8	25 µg/kg	106	70	130
		EP132B-SD: Perylene	198-55-0	25 µg/kg	106	70	130
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	25 µg/kg	118	70	130
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	25 µg/kg	101	70	130
		EP132B-SD: Indeno(1,2,3.cd)pyrene	193-39-5	25 µg/kg	112	70	130
		EP132B-SD: Coronene	191-07-1	25 µg/kg	95.7	70	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1004214	Page	: 1 of 7
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENENCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 05-MAR-2010
Sampler	: OM	Issue Date	: 15-MAR-2010
Order number	: 301015-01887/04		
Quote number	: SY/503/09	No. of samples received	: 18
		No. of samples analysed	: 5

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content								
Soil Glass Jar - Unpreserved SS4A, SS4G, FT2	SS4F, FT1,	05-MAR-2010	----	----	----	11-MAR-2010	12-MAR-2010	✓
EG020-SD: Total Metals in Sediments by ICPMS								
Soil Glass Jar - Unpreserved SS4A, SS4G, FT2	SS4F, FT1,	05-MAR-2010	10-MAR-2010	02-APR-2010	✓	11-MAR-2010	01-SEP-2010	✓
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved SS4A, SS4G, FT2	SS4F, FT1,	05-MAR-2010	10-MAR-2010	02-APR-2010	✓	15-MAR-2010	02-APR-2010	✓
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved SS4A		05-MAR-2010	09-MAR-2010	19-MAR-2010	✓	10-MAR-2010	19-MAR-2010	✓
EP080: BTEX								
Soil Glass Jar - Unpreserved SS4A		05-MAR-2010	09-MAR-2010	19-MAR-2010	✓	10-MAR-2010	19-MAR-2010	✓
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved SS4A		05-MAR-2010	09-MAR-2010	19-MAR-2010	✓	10-MAR-2010	18-APR-2010	✓
EP131A: Organochlorine Pesticides								
Soil Glass Jar - Unpreserved SS4A		05-MAR-2010	09-MAR-2010	19-MAR-2010	✓	12-MAR-2010	18-APR-2010	✓
EP131B: Polychlorinated Biphenyls (as Aroclors)								
Soil Glass Jar - Unpreserved SS4A		05-MAR-2010	09-MAR-2010	19-MAR-2010	✓	12-MAR-2010	18-APR-2010	✓

Page : 3 of 7
 Work Order : ES1004214
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE
 Project : CALTEX MAINTENENCE DREDGING



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP132B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved								
SS4A, SS4G, FT2	SS4F, FT1,	05-MAR-2010	09-MAR-2010	19-MAR-2010	✓	10-MAR-2010	18-APR-2010	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	3	25	12.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	8	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	5	20.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	8	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	2	17	11.8	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	2	17	11.8	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	1	100.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	2	15	13.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	5	20.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	17	5.9	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	17	5.9	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	1	100.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	5	20.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	17	5.9	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	17	5.9	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	1	100.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	8	12.5	5.0	✓	ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	5	20.0	5.0	✓	ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	8	12.5	5.0	✓	ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	17	5.9	5.0	✓	ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	17	5.9	5.0	✓	ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	1	100.0	5.0	✓	ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	15	6.7	5.0	✓	ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Total Metals in Sediments by ICPMS	EG020-SD	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. Analyte list and LORs per NODG.
Total Mercury by FIMS (Low Level)	EG035T-LL	SOIL	AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3)
TPH - Semivolatile Fraction	EP071-SD	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 504)
TPH Volatiles/BTEX	EP080	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 501)
Organochlorine Pesticides (Ultra-trace)	EP131A	SOIL	USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PCB's (Ultra-trace)	EP131B	SOIL	USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PAHs in Sediments by GCMS(SIM)	EP132B-SD	SOIL	8270 GCMS Capillary column, SIM mode using large volume programmed temperature vaporisation injection.
Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (1999) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(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/ Sample Cleanup	ORG17A-UTP	SOIL	In-house, Mechanical agitation (tumbler). 20g of sample, Na ₂ SO ₄ and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. Samples are extracted, concentrated (by KD) and exchanged into an appropriate solvent for GPC and florisil cleanup as required.
Tumbler Extraction of Solids for LVI (Non-concentrating)	ORG17D	SOIL	In house: 10g of sample, Na ₂ SO ₄ and surrogate are extracted with 50mL 1:1 DCM/Acetone by end over end tumbling. An aliquot is concentrated by nitrogen blowdown to a reduced volume for analysis if required.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EP132B: Polynuclear Aromatic Hydrocarbons	ES1004214-015	SS4F	Sum of PAHs	----	26.9 %	0-20%	RPD exceeds LOR based limits
Matrix Spike (MS) Recoveries							
EP080/071: Total Petroleum Hydrocarbons	ES1004308-003	Anonymous	C6 - C9 Fraction	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP080: BTEX	ES1004308-003	Anonymous	Benzene	71-43-2	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP080: BTEX	ES1004308-003	Anonymous	Toluene	108-88-3	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP080: BTEX	ES1004308-003	Anonymous	Ethylbenzene	100-41-4	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP080: BTEX	ES1004308-003	Anonymous	meta- & para-Xylene	108-38-3 106-42-3	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP080: BTEX	ES1004308-003	Anonymous	ortho-Xylene	95-47-6	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP132B: Polynuclear Aromatic Hydrocarbons	ES1004214-015	SS4F	Pyrene	129-00-0	132 %	70-130%	Recovery greater than upper data quality objective

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Laboratory Control outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.



Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**



Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)
Comprehensive Report

Work Order : **ES1004214**

Client : **WORLEY PARSONS - INFRASTRUCTURE MWE** **Laboratory** : Environmental Division Sydney

Contact : MS ORLA MURRAY **Contact** : Charlie Pierce

Address : Level 10/141 Walker Street **Address** : 277-289 Woodpark Road Smithfield
NORTH SYDNEY NSW, AUSTRALIA NSW Australia 2164
2060

E-mail : orla.murray@worleyparsons.com **E-mail** : charlie.pierce@alsenviro.com

Telephone : 8907 2131 **Telephone** : +61-2-8784 8555

Facsimile : ---- **Facsimile** : +61-2-8784 8500

Project : CALTEX MAINTENENCE DREDGING **Page** : 1 of 3

Order number : 301015-01887/04

C-O-C number : ---- **Quote number** : ES2009WORPAR0232 (SY/503/09)

Site : ----

Sampler : OM **QC Level** : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received : 05-MAR-2010 **Issue Date** : 09-MAR-2010 12:07

Client Requested Due Date : 15-MAR-2010 **Scheduled Reporting Date** : **15-MAR-2010**

Delivery Details

Mode of Delivery : Carrier **Temperature** : 5.6'C - Ice present

No. of coolers/boxes : 2 HARD, 1 BUCKET **No. of samples received** : 18

Security Seal : Intact. **No. of samples analysed** : 5

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Requested Deliverables
- **Samples received in appropriately pretreated and preserved containers.**
- **Sample(s) have been received within recommended holding times.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- **This batch is split into ES1004273 for TBT and TOC.**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Jacob Waugh
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: **SOIL**

Laboratory sample ID Client sampling date / time Client sample ID

Laboratory sample ID	Client sampling date / time	Client sample ID	(On Hold) SOIL No analysis requested	SOIL - EA055-103 Moisture Content	SOIL - EG020-SD Total Metals in Sediments by ICPMS (NODG)	SOIL - EG035T-LL Total Mercury by FIMS - Low Level	SOIL - EP071 - SD TPH ultra trace in sediments	SOIL - EP071/080 SB TPH(V)/BTEX Low Level	SOIL - EP132B-SD Ultra-trace PAHs in Sediments	SOIL - UTO-2S Ultratrace OC PCB Pesticides
ES1004214-002	05-MAR-2010 15:00	VC4B(0-0.5M)	✓							
ES1004214-003	05-MAR-2010 15:00	VC4B(0.5-1M)	✓							
ES1004214-004	05-MAR-2010 15:00	VC4B(1-1.5M)	✓							
ES1004214-005	05-MAR-2010 15:00	VC4B(1.5-2M)	✓							
ES1004214-006	05-MAR-2010 15:00	VC4A(0-0.5M)	✓							
ES1004214-007	05-MAR-2010 15:00	VC4A(0.5-1M)	✓							
ES1004214-008	05-MAR-2010 15:00	VC4A(1-1.5M)	✓							
ES1004214-009	05-MAR-2010 15:00	VC4A(1.5-2M)	✓							
ES1004214-010	05-MAR-2010 15:00	SS4A		✓	✓	✓	✓	✓	✓	✓
ES1004214-011	05-MAR-2010 15:00	SS4B	✓							
ES1004214-012	05-MAR-2010 14:00	SS4C	✓							
ES1004214-013	05-MAR-2010 14:00	SS4D	✓							
ES1004214-014	05-MAR-2010 14:00	SS4E	✓							
ES1004214-015	05-MAR-2010 14:00	SS4F		✓	✓	✓			✓	
ES1004214-016	05-MAR-2010 14:00	SS4G		✓	✓	✓			✓	
ES1004214-017	05-MAR-2010 14:00	FT1		✓	✓	✓			✓	
ES1004214-018	05-MAR-2010 14:00	FT2		✓	✓	✓			✓	

Matrix: **WATER**

Laboratory sample ID Client sampling date / time Client sample ID

Laboratory sample ID	Client sampling date / time	Client sample ID	(On Hold) WATER No analysis requested
ES1004214-001	05-MAR-2010 15:00	SITE WATER	✓



Requested Deliverables

MS ORLA MURRAY

- *AU Certificate of Analysis - NATA (COA)	Email	orla.murray@worleyparsons.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	orla.murray@worleyparsons.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	orla.murray@worleyparsons.com
- A4 - AU Sample Receipt Notification - Environmental (SRN)	Email	orla.murray@worleyparsons.com
- A4 - AU Tax Invoice (INV)	Email	orla.murray@worleyparsons.com
- Default - Chain of Custody (COC)	Email	orla.murray@worleyparsons.com
- EDI Format - ENMRG (ENMRG)	Email	orla.murray@worleyparsons.com



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1004273	Page	: 1 of 8
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENENCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: 301015-01887/04	Date Samples Received	: 05-MAR-2010
C-O-C number	: ----	Issue Date	: 18-MAR-2010
Sampler	: OM	No. of samples received	: 18
Site	: ----	No. of samples analysed	: 18
Quote number	: SY/503/09		

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	Position	Accreditation Category
Kim McCabe	Senior Inorganic Chemist	Inorganics
Kim McCabe	Senior Inorganic Chemist	Stafford Minerals - AY
Matt Frost	Organic Instrument Chemist	Organics

Environmental Division Sydney

Part of the **ALS Laboratory Group**

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A Campbell Brothers Limited Company



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **TBT: Samples VC4B(0-0.5M), VC4B(0.5-1M), VC4B(1-1.5M), VC4B(1.5-2M), VC4A(0-0.5M), SS4B, SS4D, SS4E, and SS4F required dilution due to the presence of high level contaminants. Matrix spike and surrogate recoveries have not been reported due to primary dilution.**



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VC4B(0-0.5M)	VC4B(0.5-1M)	VC4B(1-1.5M)	VC4B(1.5-2M)	VC4A(0-0.5M)
				05-MAR-2010 14:47	05-MAR-2010 14:47	05-MAR-2010 14:47	05-MAR-2010 14:47	05-MAR-2010 14:47
				ES1004273-002	ES1004273-003	ES1004273-004	ES1004273-005	ES1004273-006
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	10.0	17.0	22.8	22.3	16.6
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	0.04	0.12	0.04	0.07	0.06
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	27.1	168	138	101	113
EP090S: Organotin Surrogate								
Tripopyltin	----	0.1	%	Not Determined	Not Determined	Not Determined	Not Determined	Not Determined



Analytical Results

Sub-Matrix: SOIL

Client sample ID
 Client sampling date / time

Compound	CAS Number	LOR	Unit	VC4A(0.5-1M)	VC4A(1-1.5M)	VC4A (1.5-2M)	SS4A	SS4B
				05-MAR-2010 14:47	05-MAR-2010 14:47	05-MAR-2010 14:47	05-MAR-2010 14:00	05-MAR-2010 14:00
				ES1004273-007	ES1004273-008	ES1004273-009	ES1004273-010	ES1004273-011
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	14.1	17.9	21.4	18.8	17.4
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	0.08	0.03	0.05	0.12	0.05
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	5.8	<0.5	<0.5	0.8	12.8
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	93.0	129	142	86.7	Not Determined



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				SS4C	SS4D	SS4E	SS4F	SS4G
				05-MAR-2010 14:00	05-MAR-2010 14:00	05-MAR-2010 14:00	05-MAR-2010 14:00	05-MAR-2010 14:00
Compound	CAS Number	LOR	Unit	ES1004273-012	ES1004273-013	ES1004273-014	ES1004273-015	ES1004273-016
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	19.0	25.5	17.8	22.4	16.9
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	0.05	0.06	<0.02	0.40	0.13
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	4.0	208	748	51.6	3.2
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	92.3	Not Determined	Not Determined	Not Determined	97.6



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

				FT1	FT2	----	----	----
				05-MAR-2010 14:00	05-MAR-2010 14:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1004273-017	ES1004273-018	----	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	17.4	17.5	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	0.07	0.08	----	----	----
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	4.1	6.3	----	----	----
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	73.4	89.4	----	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

W1

Client sampling date / time

05-MAR-2010 14:47

Compound	CAS Number	LOR	Unit	ES1004273-001	----	----	----	----
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	<2	----	----	----	----
EP090S: Organotin Surrogate								
Tripopyltin	----	0.1	%	113	----	----	----	----



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP090S: Organotin Surrogate			
Tripropyltin	----	34	108

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP090S: Organotin Surrogate			
Tripropyltin	----	10	108



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1004273	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENENCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 05-MAR-2010
C-O-C number	: ----	Issue Date	: 18-MAR-2010
Sampler	: OM	No. of samples received	: 18
Order number	: 301015-01887/04	No. of samples analysed	: 18
Quote number	: SY/503/09		

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Kim McCabe	Senior Inorganic Chemist	Inorganics
Kim McCabe	Senior Inorganic Chemist	Stafford Minerals - AY
Matt Frost	Organic Instrument Chemist	Organics

Environmental Division Sydney

Part of the **ALS Laboratory Group**

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 1273001)									
EB1004138-004	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	22.6	24.1	6.0	0% - 20%
ES1004088-006	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	19.1	18.8	1.8	0% - 50%
EA055: Moisture Content (QC Lot: 1273002)									
ES1004273-008	VC4A(1-1.5M)	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	17.9	18.1	0.7	0% - 50%
ES1004273-015	SS4F	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	22.4	21.4	4.6	0% - 20%
EP005: Total Organic Carbon (TOC) (QC Lot: 1274509)									
ES1004273-002	VC4B(0-0.5M)	EP005: Total Organic Carbon	----	0.02	%	0.04	0.04	0.0	No Limit
ES1004273-012	SS4C	EP005: Total Organic Carbon	----	0.02	%	0.05	0.04	0.0	No Limit
EP090: Organotin Compounds (QC Lot: 1272728)									
ES1004273-002	VC4B(0-0.5M)	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	27.1	27.4	1.0	0% - 20%
ES1004273-012	SS4C	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	4.0	3.9	0.0	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)
Method: Compound	CAS Number	LOR	Unit			LCS	Low	High
EP005: Total Organic Carbon (TOC) (QCLot: 1274509)								
EP005: Total Organic Carbon	----	0.02	%	<0.02	100 %	100	70	130
EP090: Organotin Compounds (QCLot: 1272728)								
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	97.8	19.5	129

Sub-Matrix: **WATER**

				Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)
Method: Compound	CAS Number	LOR	Unit			LCS	Low	High
EP090: Organotin Compounds (Soluble) (QCLot: 1273877)								
EP090S: Tributyltin	56573-85-4	2	ngSn/L	<2	147 ngSn/L	94.9	29	100



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				<i>Matrix Spike (MS) Report</i>			
		<i>Spike</i>	<i>Spike Recovery (%)</i>		<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Concentration</i>	<i>MS</i>	<i>Low</i>	<i>High</i>
EP090: Organotin Compounds (QCLot: 1272728)							
ES1004273-003	VC4B(0.5-1M)	EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	# Not Determined	20	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1004273	Page	: 1 of 7
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENENCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 05-MAR-2010
Sampler	: OM	Issue Date	: 18-MAR-2010
Order number	: 301015-01887/04		
Quote number	: SY/503/09	No. of samples received	: 18
		No. of samples analysed	: 18

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content								
Soil Glass Jar - Unpreserved								
VC4B(0-0.5M), VC4B(1-1.5M), VC4A(0-0.5M), VC4A(1-1.5M), SS4A, SS4C, SS4E, SS4G, FT2	VC4B(0.5-1M), VC4B(1.5-2M), VC4A(0.5-1M), VC4A (1.5-2M), SS4B, SS4D, SS4F, FT1,	05-MAR-2010	----	----	----	09-MAR-2010	12-MAR-2010	✓
EP005: Total Organic Carbon (TOC)								
Soil Glass Jar - Unpreserved								
VC4B(0-0.5M), VC4B(1-1.5M), VC4A(0-0.5M), VC4A(1-1.5M), SS4A, SS4C, SS4E, SS4G, FT2	VC4B(0.5-1M), VC4B(1.5-2M), VC4A(0.5-1M), VC4A (1.5-2M), SS4B, SS4D, SS4F, FT1,	05-MAR-2010	10-MAR-2010	02-APR-2010	✓	11-MAR-2010	02-APR-2010	✓



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP090: Organotin Compounds								
Soil Glass Jar - Unpreserved								
VC4B(0-0.5M), VC4B(1-1.5M), VC4A(0-0.5M), VC4A(1-1.5M), SS4A, SS4C, SS4E, SS4G, FT2	VC4B(0.5-1M), VC4B(1.5-2M), VC4A(0.5-1M), VC4A (1.5-2M), SS4B, SS4D, SS4F, FT1,	05-MAR-2010	11-MAR-2010	19-MAR-2010	✓	15-MAR-2010	20-APR-2010	✓

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP090: Organotin Compounds (Soluble)								
Amber Glass Bottle - Unpreserved								
W1		05-MAR-2010	11-MAR-2010	12-MAR-2010	✓	12-MAR-2010	20-APR-2010	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
Analytical Methods		QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	4	34	11.8	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	2	17	11.8	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	2	17	11.8	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Organotin Analysis	EP090	1	17	5.9	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	17	5.9	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Organotin Analysis	EP090	1	17	5.9	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP005	1	17	5.9	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Organotin Analysis	EP090	1	17	5.9	5.0	✓	ALS QCS3 requirement

Matrix: **WATER**

Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
Analytical Methods		QC	Reaular	Actual	Expected	Evaluation	
Laboratory Control Samples (LCS)							
Organotin Compounds (Soluble)	EP090S	1	11	9.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Organotin Compounds (Soluble)	EP090S	1	11	9.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Total Organic Carbon	EP005	SOIL	In-house. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a LECO furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO ₂) is automatically measured by infra-red detector.
Organotin Analysis	EP090	SOIL	(USEPA SW 846 - 8270D) Prepared sample extracts are analysed by GC/MS coupled with high volume injection, and quantified against an established calibration curve.
Organotin Compounds (Soluble)	EP090S	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by GC/MS coupled with high volume injection and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Preparation Methods	Method	Matrix	Method Descriptions
Organotin Sample Preparation	ORG35	SOIL	In house. 20g sample is spiked with surrogate and leached in a methanol:acetic acid:UHP water mix and vacuum filtered. Reagents and solvents are added to the sample and the mixture tumbled. The butyltin compounds are simultaneously derivatised and extracted. The extract is further extracted with petroleum ether. The resultant extracts are combined and concentrated for analysis.
Organotin Sample Preparation	ORG34	WATER	In-house. A specified volume of sample is spiked with surrogate, acidified and vacuum filtered. Reagents and solvent are added and the mixture tumbled. The butyltin compounds is derivitised, extracted and the substitution reaction completed. The extract is transferred to a separatory funnel and further extracted two times with petroleum ether. The resultant extracts are combined and concentrated for analysis.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP090: Organotin Compounds	ES1004273-003	VC4B(0.5-1M)	Tributyltin	56573-85-4	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.

Regular Sample Surrogates

Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP090S: Organotin Surrogate	ES1004273-002	VC4B(0-0.5M)	Tripopyltn	----	Not Determined	----	Surrogate recovery not determined due to (target or non-target) matrix interferences
EP090S: Organotin Surrogate	ES1004273-004	VC4B(1-1.5M)	Tripopyltn	----	Not Determined	----	Surrogate recovery not determined due to (target or non-target) matrix interferences
EP090S: Organotin Surrogate	ES1004273-006	VC4A(0-0.5M)	Tripopyltn	----	Not Determined	----	Surrogate recovery not determined due to (target or non-target) matrix interferences
EP090S: Organotin Surrogate	ES1004273-014	SS4E	Tripopyltn	----	Not Determined	----	Surrogate recovery not determined due to (target or non-target) matrix interferences
EP090S: Organotin Surrogate	ES1004273-003	VC4B(0.5-1M)	Tripopyltn	----	Not Determined	----	Surrogate recovery not determined due to (target or non-target) matrix interferences
EP090S: Organotin Surrogate	ES1004273-005	VC4B(1.5-2M)	Tripopyltn	----	Not Determined	----	Surrogate recovery not determined due to (target or non-target) matrix interferences
EP090S: Organotin Surrogate	ES1004273-011	SS4B	Tripopyltn	----	Not Determined	----	Surrogate recovery not determined due to (target or non-target) matrix interferences



Sub-Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted - Continued							
EP090S: Organotin Surrogate	ES1004273-013	SS4D	Tripopyltin	----	Not Determined	----	Surrogate recovery not determined due to (target or non-target) matrix interferences
EP090S: Organotin Surrogate	ES1004273-015	SS4F	Tripopyltin	----	Not Determined	----	Surrogate recovery not determined due to (target or non-target) matrix interferences

Sub-Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP090S: Organotin Surrogate	ES1004273-001	W1	Tripopyltin	----	113 %	10-108 %	Recovery greater than upper data quality objective

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**



Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)
Comprehensive Report

Work Order : **ES1004273**

Client : **WORLEY PARSONS - INFRASTRUCTURE MWE** **Laboratory** : Environmental Division Sydney

Contact : MS ORLA MURRAY **Contact** : Charlie Pierce

Address : Level 10/141 Walker Street **Address** : 277-289 Woodpark Road Smithfield
NORTH SYDNEY NSW, AUSTRALIA NSW Australia 2164
2060

E-mail : orla.murray@worleyparsons.com **E-mail** : charlie.pierce@alsenviro.com

Telephone : 8907 2131 **Telephone** : +61-2-8784 8555

Facsimile : ---- **Facsimile** : +61-2-8784 8500

Project : CALTEX MAINTENENCE DREDGING **Page** : 1 of 3

Order number : 301015-01887/04

C-O-C number : ---- **Quote number** : ES2009WORPAR0232 (SY/503/09)

Site : ----

Sampler : OM **QC Level** : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received : 05-MAR-2010 **Issue Date** : 09-MAR-2010 12:32

Client Requested Due Date : 15-MAR-2010 **Scheduled Reporting Date** : **15-MAR-2010**

Delivery Details

Mode of Delivery : Carrier **Temperature** : 5.6'C - Ice present

No. of coolers/boxes : 2 HARD, 1 BUCKET **No. of samples received** : 18

Security Seal : Intact. **No. of samples analysed** : 18

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Requested Deliverables
- **Samples received in appropriately pretreated and preserved containers.**
- **Sample(s) have been received within recommended holding times.**
- **This batch is for TBT and TOC only split from ES1004214.**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Jacob Waugh
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EP005 (solids) Total Organic Carbon (TOC) soils	SOIL - EA055-103 Moisture Content	SOIL - EP090 (solids) Organotins
ES1004273-002	05-MAR-2010 14:47	VC4B(0-0.5M)	✓	✓	✓
ES1004273-003	05-MAR-2010 14:47	VC4B(0.5-1M)	✓	✓	✓
ES1004273-004	05-MAR-2010 14:47	VC4B(1-1.5M)	✓	✓	✓
ES1004273-005	05-MAR-2010 14:47	VC4B(1.5-2M)	✓	✓	✓
ES1004273-006	05-MAR-2010 14:47	VC4A(0-0.5M)	✓	✓	✓
ES1004273-007	05-MAR-2010 14:47	VC4A(0.5-1M)	✓	✓	✓
ES1004273-008	05-MAR-2010 14:47	VC4A(1-1.5M)	✓	✓	✓
ES1004273-009	05-MAR-2010 14:47	VC4A (1.5-2M)	✓	✓	✓
ES1004273-010	05-MAR-2010 14:00	SS4A	✓	✓	✓
ES1004273-011	05-MAR-2010 14:00	SS4B	✓	✓	✓
ES1004273-012	05-MAR-2010 14:00	SS4C	✓	✓	✓
ES1004273-013	05-MAR-2010 14:00	SS4D	✓	✓	✓
ES1004273-014	05-MAR-2010 14:00	SS4E	✓	✓	✓
ES1004273-015	05-MAR-2010 14:00	SS4F	✓	✓	✓
ES1004273-016	05-MAR-2010 14:00	SS4G	✓	✓	✓
ES1004273-017	05-MAR-2010 14:00	FT1	✓	✓	✓
ES1004273-018	05-MAR-2010 14:00	FT2	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EP090S Organotins
ES1004273-001	05-MAR-2010 14:47	W1	✓



Requested Deliverables

MS ORLA MURRAY

- | | | |
|---|-------|-------------------------------|
| - *AU Certificate of Analysis - NATA (COA) | Email | orla.murray@worleyparsons.com |
| - *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) | Email | orla.murray@worleyparsons.com |
| - *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) | Email | orla.murray@worleyparsons.com |
| - A4 - AU Sample Receipt Notification - Environmental (SRN) | Email | orla.murray@worleyparsons.com |
| - A4 - AU Tax Invoice (INV) | Email | orla.murray@worleyparsons.com |
| - Default - Chain of Custody (COC) | Email | orla.murray@worleyparsons.com |
| - EDI Format - ENMRG (ENMRG) | Email | orla.murray@worleyparsons.com |



REPORT OF ANALYSIS

Laboratory Reference: A11/5791 [R00]

Client: WorleyParsons Services Pty Ltd
Level 12, 141 Walker Street
North Sydney NSW 2060

Order No: 301015-02448
Project: Sediment Analysis - Proj Caltex
Sample Type: Sediment
No. of Samples: 1
Date Received: 01/12/2011
Date Completed: 15/12/2011

Contact: Orla Murray

Laboratory Contact Details:

Client Services Manager: Trent Biggin
Technical Enquiries: Andrew Bradbury
Telephone: +61 7 3268 1228
Fax: +61 7 3268 1238
Email: brisbane@advancedanalytical.com.au
andrew.bradbury@advancedanalytical.com.au

Attached Results Approved By:

Ian Eckhard
Technical Director

Comments:

All samples tested as submitted by client. All attached results have been checked and approved for release. This is the Final Report and supersedes any reports previously issued with this batch number. This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.





Batch Number: A11/5791 [R00]
Project Reference: Sediment Analysis - Proj Caltex

Laboratory Reference:	-	-	/1
Client Reference:	-	-	SS5Y1
Date Sampled:	-	-	17/11/2011 15:00
Analysis Description	Method	Units	
Moisture Content			
Moisture Content	04-004	%	18.4
Trace Elements			
Silver	04-001	mg/kg	<0.1
Arsenic	04-001	mg/kg	1.1
Aluminium	04-001	mg/kg	730
Cadmium	04-001	mg/kg	<0.1
Cobalt	04-001	mg/kg	<0.5
Chromium	04-001	mg/kg	1.3
Copper	04-001	mg/kg	0.39
Iron	04-001	mg/kg	680
Lead	04-001	mg/kg	1.9
Mercury	04-002	mg/kg	0.01
Manganese	04-001	mg/kg	5.2
Nickel	04-001	mg/kg	0.50
Antimony	04-001	mg/kg	<0.5
Selenium*	ICPMS	mg/kg	0.16
Vanadium	04-001	mg/kg	1.8
Zinc	04-001	mg/kg	3.1
BTEX			
Benzene	04-021	mg/kg	<0.20
Toluene	04-021	mg/kg	<0.20
Ethyl Benzene	04-021	mg/kg	<0.20
m+p xylenes	04-021	mg/kg	<0.40
o-xylene	04-021	mg/kg	<0.20
Total BTEX	04-021	mg/kg	<1.2
Surrogate 1 Recovery	04-021	%	84
Surrogate 2 Recovery	04-021	%	80
Surrogate 3 Recovery	04-021	%	82
Date Extracted	04-021	-	2/12/2011
Date Analysed	04-021	-	10/12/2011



Batch Number: A11/5791 [R00]
Project Reference: Sediment Analysis - Proj Caltex

Laboratory Reference:	-	-	/1
Client Reference:	-	-	SS5Y1
Date Sampled:	-	-	17/11/2011 15:00
Analysis Description	Method	Units	
Total Petroleum Hydrocarbons			
TPHC6-C9	04-021	mg/kg	<10
TPHC10-14	04-020	mg/kg	<10
TPHC15-28	04-020	mg/kg	<50
TPHC29-36	04-020	mg/kg	<50
Surrogate Recovery	04-020	%	108
Date Extracted	04-020	-	6/12/11
Date Analysed	04-020	-	6/12/11
Poly Aromatic Hydrocarbons			
Naphthalene	04-022	µg/kg	<5
1-Methylnaphthalene	04-022	µg/kg	<5
2-Methylnaphthalene	04-022	µg/kg	<5
Acenaphthylene	04-022	µg/kg	<5
Acenaphthene	04-022	µg/kg	<5
Fluorene	04-022	µg/kg	<5
Phenanthrene	04-022	µg/kg	<5
Anthracene	04-022	µg/kg	<5
Fluoranthene	04-022	µg/kg	<5
Pyrene	04-022	µg/kg	<5
Benz(a)anthracene	04-022	µg/kg	<5
Chrysene	04-022	µg/kg	<5
Benzo(b)&(k)fluoranthene	04-022	µg/kg	<10
Benzo(a)pyrene	04-022	µg/kg	<5
Indeno(1,2,3-cd)pyrene	04-022	µg/kg	<5
Dibenz(a,h)anthracene	04-022	µg/kg	<5
Benzo(g,h,i)perylene	04-022	µg/kg	<5
Coronene	04-022	µg/kg	<10
Benzo(e)pyrene	04-022	µg/kg	<5
Perylene	04-022	µg/kg	<5
Total PAHs (as above)	04-022	µg/kg	<100
Surrogate 1 Recovery	04-022	%	87
Surrogate 2 Recovery	04-022	%	95

Issue Date: 15 December 2011

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 11 Julius Avenue
 North Ryde NSW 2113 Australia

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 Fax: + 61 2 9888 9577
 contact@advancedanalytical.com.au
 www.advancedanalytical.com.au



Batch Number: A11/5791 [R00]
Project Reference: Sediment Analysis - Proj Caltex

Laboratory Reference:	-	-	/1
Client Reference:	-	-	SS5Y1
Date Sampled:	-	-	17/11/2011 15:00
Analysis Description	Method	Units	
Surrogate 3 Recovery	04-022	%	108
Date Extracted	04-022	-	6/12/2011
Date Analysed	04-022	-	7/12/2011
Organochlorine Pesticides			
Aldrin	04-023	µg/kg	<1.0
<i>alpha</i> -BHC	04-023	µg/kg	<1.0
<i>beta</i> -BHC	04-023	µg/kg	<1.0
<i>gamma</i> -BHC(Lindane)	04-023	µg/kg	<1.0
<i>delta</i> -BHC	04-023	µg/kg	<1.0
<i>cis</i> -Chlordane	04-023	µg/kg	<1.0
<i>trans</i> -Chlordane	04-023	µg/kg	<1.0
<i>p,p'</i> -DDD	04-023	µg/kg	<1.0
<i>p,p'</i> -DDE	04-023	µg/kg	<1.0
<i>p,p'</i> -DDT	04-023	µg/kg	<1.0
Dieldrin	04-023	µg/kg	<1.0
<i>alpha</i> -Endosulfan	04-023	µg/kg	<1.0
<i>beta</i> -Endosulfan	04-023	µg/kg	<1.0
Endosulfan Sulphate	04-023	µg/kg	<1.0
Endrin	04-023	µg/kg	<1.0
Endrin ketone	04-023	µg/kg	<1.0
Endrin aldehyde	04-023	µg/kg	<1.0
Heptachlor	04-023	µg/kg	<1.0
Heptachlor epoxide	04-023	µg/kg	<1.0
Hexachlorobenzene	04-023	µg/kg	<1.0
Methoxychlor	04-023	µg/kg	<1.0
Oxychlordane	04-023	µg/kg	<1.0
Surrogate Recovery	04-023	%	106
Date Extracted	04-023	-	6/12/2011
Date Analysed	04-023	-	7/12/2011
Organophosphate Pesticides			
Dichlorvos	04-024	µg/kg	<20
Demeton-S-methyl	04-024	µg/kg	<20

Issue Date: 15 December 2011

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Batch Number: A11/5791 [R00]
Project Reference: Sediment Analysis - Proj Caltex

Laboratory Reference:	-	-	/1
Client Reference:	-	-	SS5Y1
Date Sampled:	-	-	17/11/2011 15:00
Analysis Description	Method	Units	
Dimethoate	04-024	µg/kg	<20
Diazinon	04-024	µg/kg	<20
Chlorpyrifos-methyl	04-024	µg/kg	<20
Parathion-methyl	04-024	µg/kg	<20
Pirimiphos-methyl	04-024	µg/kg	<20
Fenitrothion	04-024	µg/kg	<20
Malathion	04-024	µg/kg	<20
Chlorpyrifos	04-024	µg/kg	<20
Fenthion	04-024	µg/kg	<20
Parathion	04-024	µg/kg	<20
Chlorfenvinphos	04-024	µg/kg	<20
Bromophos-ethyl	04-024	µg/kg	<20
Methidathion	04-024	µg/kg	<20
Fenamiphos	04-024	µg/kg	<20
Prothiofos	04-024	µg/kg	<20
Ethion	04-024	µg/kg	<20
Carbophenothion	04-024	µg/kg	<20
Phosalone	04-024	µg/kg	<20
Azinphos-methyl	04-024	µg/kg	<20
Surrogate Recovery	04-024	%	103
Date Extracted	04-024	-	6/12/2011
Date Analysed	04-024	-	7/12/2011
Polychlorinated Biphenyls			
Mono-PCB congeners	04-029	µg/kg	<5.0
Di-PCB congeners	04-029	µg/kg	<5.0
Tri-PCB congeners	04-029	µg/kg	<5.0
Tetra-PCB congeners	04-029	µg/kg	<5.0
Penta-PCB congeners	04-029	µg/kg	<5.0
Hexa-PCB congeners	04-029	µg/kg	<5.0
Hepta-PCB congeners	04-029	µg/kg	<5.0
Octa-PCB congeners	04-029	µg/kg	<5.0
Nona-PCB congeners	04-029	µg/kg	<5.0

Issue Date: 15 December 2011

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Batch Number: A11/5791 [R00]
Project Reference: Sediment Analysis - Proj Caltex

Laboratory Reference:	-	-	/1
Client Reference:	-	-	SS5Y1
Date Sampled:	-	-	17/11/2011 15:00
Analysis Description	Method	Units	
Deca-PCB congeners	04-029	µg/kg	<5.0
Total PCB congeners	04-029	µg/kg	<5.0
Surrogate 1 Recovery	04-029	%	105
Surrogate 2 Recovery	04-029	%	103
Date Extracted	04-029	-	6/12/2011
Date Analysed	04-029	-	7/12/2011
Organotins			
Monobutyl tin	04-026	µgSn/kg	<0.50
Dibutyl tin	04-026	µgSn/kg	<0.50
Tributyl tin	04-026	µgSn/kg	<0.50
Surrogate 1 Recovery	04-026	%	93
Date Extracted	04-026	-	8/12/2011
Date Analysed	04-026	-	8/12/2011
Subcontract Analysis			
Total Organic Carbon	SUB	%	0.80

Method	Method Description
04-004	Moisture by gravimetric, %
04-001	Metals by ICP-OES, mg/kg
04-002	Mercury by CVAAS, mg/kg
ICPMS	*Analysed by ICP-MS
04-021	TPH C6-9 & BTEX by P&T GCMS, mg/kg
04-020	TPH by GC-FID, mg/kg
04-022	Low level PAHs & Phenols by GCMS, µg/kg
04-023	Low level OC Pesticides by GCMS, µg/kg
04-024	OP Pesticides by GCMS, µg/kg
04-029	PCBS (as congeners) by GCMS, µg/kg
04-026	Organotins by GCMS, µgSn/kg
SUB	Subcontracted Analyses



Batch Number: A11/5791 [R00]
Project Reference: Sediment Analysis - Proj Caltex

Result Comments

[<] Less than

[INS] Insufficient sample for this test

[NA] Test not required

- Spike recovery for Al, Fe could not be accurately determined due to a significant background analyte concentration.



Batch Number: A11/5791 [R00]
Project Reference: Sediment Analysis - Proj Caltex

QUALITY ASSURANCE REPORT

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Silver	mg/kg	<0.1	A11/5791-1	<0.1 <0.1	A11/5791-1	106%
Arsenic	mg/kg	<0.4	A11/5791-1	1.1 1.1 RPD:0	A11/5791-1	105%
Aluminium	mg/kg	<5	A11/5791-1	730 730 RPD:0	A11/5791-1	#
Cadmium	mg/kg	<0.1	A11/5791-1	<0.1 <0.1	A11/5791-1	105%
Cobalt	mg/kg	<0.5	A11/5791-1	<0.5 <0.5	A11/5791-1	100%
Chromium	mg/kg	<0.1	A11/5791-1	1.3 1.3 RPD:0	A11/5791-1	103%
Copper	mg/kg	<0.1	A11/5791-1	0.39 0.38 RPD:3	A11/5791-1	100%
Iron	mg/kg	<5	A11/5791-1	680 670 RPD:1	A11/5791-1	#
Lead	mg/kg	<0.5	A11/5791-1	1.9 1.9 RPD:0	A11/5791-1	97%
Mercury	mg/kg	<0.01	A11/5791-1	0.01 <0.01	A11/5791-1	102%
Manganese	mg/kg	<0.5	A11/5791-1	5.2 5.2 RPD:0	A11/5791-1	110%
Nickel	mg/kg	<0.1	A11/5791-1	0.50 0.48 RPD:4	A11/5791-1	99%
Antimony	mg/kg	<0.5	A11/5791-1	<0.5 <0.5	A11/5791-1	94%
Selenium*	mg/kg	<0.10	A11/5791-1	0.16 <0.10	A11/5791-1	102%
Vanadium	mg/kg	<0.1	A11/5791-1	1.8 1.8 RPD:0	A11/5791-1	103%
Zinc	mg/kg	<0.5	A11/5791-1	3.1 3.1 RPD:0	A11/5791-1	100%

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Benzene	mg/kg	<0.20	A11/5791-1	<0.20 <0.20	A11/5791-1	76%
Toluene	mg/kg	<0.20	A11/5791-1	<0.20 <0.20	A11/5791-1	70%
Ethyl Benzene	mg/kg	<0.20	A11/5791-1	<0.20 <0.20	A11/5791-1	70%
m+p xylenes	mg/kg	<0.40	A11/5791-1	<0.40 <0.40	A11/5791-1	75%
o-xylene	mg/kg	<0.20	A11/5791-1	<0.20 <0.20	A11/5791-1	73%
Total BTEX	mg/kg	<1.2	A11/5791-1	<1.2 <1.2	A11/5791-1	[NA]
Surrogate 1 Recovery	%	91	A11/5791-1	84 83 RPD:1	A11/5791-1	75%
Surrogate 2 Recovery	%	91	A11/5791-1	80 77 RPD:4	A11/5791-1	72%
Surrogate 3 Recovery	%	99	A11/5791-1	82 81 RPD:1	A11/5791-1	72%



Batch Number: A11/5791 [R00]
Project Reference: Sediment Analysis - Proj Caltex

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
TPHC6-C9	mg/kg	<10	A11/5791-1	<10 <10	A11/5791-1	74%
TPHC10-14	mg/kg	<10	A11/5791-1	<10 <10	A11/5791-1	91%
TPHC15-28	mg/kg	<50	A11/5791-1	<50 <50	A11/5791-1	89%
TPHC29-36	mg/kg	<50	A11/5791-1	<50 <50	A11/5791-1	83%
Surrogate Recovery	%	105	A11/5791-1	108 113 RPD: 5	A11/5791-1	92%

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Naphthalene	µg/kg	<5	A11/5791-1	<5 <5	A11/5791-1	74%
1-Methylnaphthalene	µg/kg	<5	A11/5791-1	<5 <5	A11/5791-1	83%
2-Methylnaphthalene	µg/kg	<5	A11/5791-1	<5 <5	A11/5791-1	80%
Acenaphthylene	µg/kg	<5	A11/5791-1	<5 <5	A11/5791-1	91%
Acenaphthene	µg/kg	<5	A11/5791-1	<5 <5	A11/5791-1	88%
Fluorene	µg/kg	<5	A11/5791-1	<5 <5	A11/5791-1	89%
Phenanthrene	µg/kg	<5	A11/5791-1	<5 <5	A11/5791-1	86%
Anthracene	µg/kg	<5	A11/5791-1	<5 <5	A11/5791-1	87%
Fluoranthene	µg/kg	<5	A11/5791-1	<5 <5	A11/5791-1	95%
Pyrene	µg/kg	<5	A11/5791-1	<5 <5	A11/5791-1	94%
Benz(a)anthracene	µg/kg	<5	A11/5791-1	<5 <5	A11/5791-1	79%
Chrysene	µg/kg	<5	A11/5791-1	<5 <5	A11/5791-1	96%
Benzo(b)&(k)fluoranthene	µg/kg	<10	A11/5791-1	<10 <10	A11/5791-1	92%
Benzo(a)pyrene	µg/kg	<5	A11/5791-1	<5 <5	A11/5791-1	94%
Indeno(1,2,3-cd)pyrene	µg/kg	<5	A11/5791-1	<5 <5	A11/5791-1	89%
Dibenz(a,h)anthracene	µg/kg	<5	A11/5791-1	<5 <5	A11/5791-1	92%
Benzo(g,h,i)perylene	µg/kg	<5	A11/5791-1	<5 <5	A11/5791-1	102%
Coronene	µg/kg	<10	A11/5791-1	<10 <10	A11/5791-1	89%
Benzo(e)pyrene	µg/kg	<5	A11/5791-1	<5 <5	A11/5791-1	100%
Perylene	µg/kg	<5	A11/5791-1	<5 <5	A11/5791-1	74%
Total PAHs (as above)	µg/kg	<100	A11/5791-1	<100 <100	A11/5791-1	NT
Surrogate 1 Recovery	%	62	A11/5791-1	87 72 RPD: 19	A11/5791-1	89%
Surrogate 2 Recovery	%	94	A11/5791-1	95 95 RPD: 0	A11/5791-1	91%
Surrogate 3 Recovery	%	108	A11/5791-1	108 104 RPD: 4	A11/5791-1	96%



Batch Number: A11/5791 [R00]
Project Reference: Sediment Analysis - Proj Caltex

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Aldrin	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	89%
<i>alpha</i> -BHC	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	91%
<i>beta</i> -BHC	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	87%
<i>gamma</i> -BHC (Lindane)	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	91%
<i>delta</i> -BHC	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	87%
<i>cis</i> -Chlordane	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	96%
<i>trans</i> -Chlordane	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	96%
<i>p,p'</i> -DDD	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	93%
<i>p,p'</i> -DDE	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	98%
<i>p,p'</i> -DDT	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	86%
Dieldrin	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	97%
<i>alpha</i> -Endosulfan	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	96%
<i>beta</i> -Endosulfan	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	96%
Endosulfan Sulphate	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	93%
Endrin	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	96%
Endrin ketone	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	89%
Endrin aldehyde	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	78%
Heptachlor	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	85%
Heptachlor epoxide	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	89%
Hexachlorobenzene	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	92%
Methoxychlor	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	84%
Oxychlordane	µg/kg	<1.0	A11/5791-1	<1.0 <1.0	A11/5791-1	NT
Surrogate Recovery	%	106	A11/5791-1	106 103 RPD: 3	A11/5791-1	98%



Batch Number: A11/5791 [R00]
Project Reference: Sediment Analysis - Proj Caltex

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Dichlorvos	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	90%
Demeton-S-methyl	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	91%
Dimethoate	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	98%
Diazinon	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	89%
Chlorpyrifos-methyl	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	87%
Parathion-methyl	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	83%
Pirimiphos-methyl	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	87%
Fenitrothion	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	84%
Malathion	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	84%
Chlorpyrifos	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	89%
Fenthion	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	90%
Parathion	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	86%
Chlorfenvinphos	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	95%
Bromophos-ethyl	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	93%
Methidathion	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	84%
Fenamiphos	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	95%
Prothiofos	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	87%
Ethion	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	84%
Carbophenothion	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	89%
Phosalone	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	81%
Azinphos-methyl	µg/kg	<20	A11/5791-1	<20 <20	A11/5791-1	84%
Surrogate Recovery	%	102	A11/5791-1	103 99 RPD: 4	A11/5791-1	99%



Batch Number: A11/5791 [R00]
Project Reference: Sediment Analysis - Proj Caltex

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Mono-PCB congeners	µg/kg	<5.0	A11/5791-1	<5.0 <5.0	A11/5791-1	104%
Di-PCB congeners	µg/kg	<5.0	A11/5791-1	<5.0 <5.0	A11/5791-1	106%
Tri-PCB congeners	µg/kg	<5.0	A11/5791-1	<5.0 <5.0	A11/5791-1	103%
Tetra-PCB congeners	µg/kg	<5.0	A11/5791-1	<5.0 <5.0	A11/5791-1	99%
Penta-PCB congeners	µg/kg	<5.0	A11/5791-1	<5.0 <5.0	A11/5791-1	94%
Hexa-PCB congeners	µg/kg	<5.0	A11/5791-1	<5.0 <5.0	A11/5791-1	90%
Hepta-PCB congeners	µg/kg	<5.0	A11/5791-1	<5.0 <5.0	A11/5791-1	91%
Octa-PCB congeners	µg/kg	<5.0	A11/5791-1	<5.0 <5.0	A11/5791-1	93%
Nona-PCB congeners	µg/kg	<5.0	A11/5791-1	<5.0 <5.0	A11/5791-1	90%
Deca-PCB congeners	µg/kg	<5.0	A11/5791-1	<5.0 <5.0	A11/5791-1	92%
Total PCB congeners	µg/kg	<5.0	A11/5791-1	<5.0 <5.0	A11/5791-1	95%
Surrogate 1 Recovery	%	100	A11/5791-1	105 98 RPD:7	A11/5791-1	96%
Surrogate 2 Recovery	%	100	A11/5791-1	103 100 RPD:3	A11/5791-1	87%

TEST	UNITS	Blank
Monobutyl tin	µgSn/kg	<0.50
Dibutyl tin	µgSn/kg	<0.50
Tributyl tin	µgSn/kg	<0.50
Surrogate 1 Recovery	%	100

TEST	Units	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Benzene	mg/kg	[NT]	[NT]	[NT]	External	87%
Toluene	mg/kg	[NT]	[NT]	[NT]	External	79%
Ethyl Benzene	mg/kg	[NT]	[NT]	[NT]	External	79%
m+p xylenes	mg/kg	[NT]	[NT]	[NT]	External	82%
o-xylene	mg/kg	[NT]	[NT]	[NT]	External	81%
Total BTEX	mg/kg	[NT]	[NT]	[NT]	External	[NA]
Surrogate 1 Recovery	%	[NT]	[NT]	[NT]	External	76%
Surrogate 2 Recovery	%	[NT]	[NT]	[NT]	External	77%
Surrogate 3 Recovery	%	[NT]	[NT]	[NT]	External	79%

TEST	Units	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
TPHC6-C9	mg/kg	[NT]	[NT]	[NT]	External	81%
TPHC10-14	mg/kg	[NT]	[NT]	[NT]	External	108%
TPHC15-28	mg/kg	[NT]	[NT]	[NT]	External	110%
TPHC29-36	mg/kg	[NT]	[NT]	[NT]	External	110%
Surrogate Recovery	%	[NT]	[NT]	[NT]	External	113%



Batch Number: A11/5791 [R00]
Project Reference: Sediment Analysis - Proj Caltex

TEST	Units	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Naphthalene	µg/kg	[NT]	[NT]	[NT]	External	88%
1-Methylnaphthalene	µg/kg	[NT]	[NT]	[NT]	External	92%
2-Methylnaphthalene	µg/kg	[NT]	[NT]	[NT]	External	90%
Acenaphthylene	µg/kg	[NT]	[NT]	[NT]	External	93%
Acenaphthene	µg/kg	[NT]	[NT]	[NT]	External	95%
Fluorene	µg/kg	[NT]	[NT]	[NT]	External	98%
Phenanthrene	µg/kg	[NT]	[NT]	[NT]	External	91%
Anthracene	µg/kg	[NT]	[NT]	[NT]	External	92%
Fluoranthene	µg/kg	[NT]	[NT]	[NT]	External	100%
Pyrene	µg/kg	[NT]	[NT]	[NT]	External	100%
Benz(a)anthracene	µg/kg	[NT]	[NT]	[NT]	External	85%
Chrysene	µg/kg	[NT]	[NT]	[NT]	External	105%
Benzo(b)&(k)fluoranthene	µg/kg	[NT]	[NT]	[NT]	External	93%
Benzo(a)pyrene	µg/kg	[NT]	[NT]	[NT]	External	97%
Indeno(1,2,3-cd)pyrene	µg/kg	[NT]	[NT]	[NT]	External	88%
Dibenz(a,h)anthracene	µg/kg	[NT]	[NT]	[NT]	External	90%
Benzo(g,h,i)perylene	µg/kg	[NT]	[NT]	[NT]	External	95%
Coronene	µg/kg	[NT]	[NT]	[NT]	External	89%
Benzo(e)pyrene	µg/kg	[NT]	[NT]	[NT]	External	100%
Perylene	µg/kg	[NT]	[NT]	[NT]	External	76%
Total PAHs (as above)	µg/kg	[NT]	[NT]	[NT]	External	NT
Surrogate 1 Recovery	%	[NT]	[NT]	[NT]	External	97%
Surrogate 2 Recovery	%	[NT]	[NT]	[NT]	External	96%
Surrogate 3 Recovery	%	[NT]	[NT]	[NT]	External	104%



Batch Number: A11/5791 [R00]
Project Reference: Sediment Analysis - Proj Caltex

TEST	Units	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Aldrin	µg/kg	[NT]	[NT]	[NT]	External	95%
<i>alpha</i> -BHC	µg/kg	[NT]	[NT]	[NT]	External	95%
<i>beta</i> -BHC	µg/kg	[NT]	[NT]	[NT]	External	94%
<i>gamma</i> -BHC (Lindane)	µg/kg	[NT]	[NT]	[NT]	External	96%
<i>delta</i> -BHC	µg/kg	[NT]	[NT]	[NT]	External	93%
<i>cis</i> -Chlordane	µg/kg	[NT]	[NT]	[NT]	External	102%
<i>trans</i> -Chlordane	µg/kg	[NT]	[NT]	[NT]	External	101%
<i>p,p'</i> -DDD	µg/kg	[NT]	[NT]	[NT]	External	100%
<i>p,p'</i> -DDE	µg/kg	[NT]	[NT]	[NT]	External	104%
<i>p,p'</i> -DDT	µg/kg	[NT]	[NT]	[NT]	External	91%
Dieldrin	µg/kg	[NT]	[NT]	[NT]	External	106%
<i>alpha</i> -Endosulfan	µg/kg	[NT]	[NT]	[NT]	External	102%
<i>beta</i> -Endosulfan	µg/kg	[NT]	[NT]	[NT]	External	101%
Endosulfan Sulphate	µg/kg	[NT]	[NT]	[NT]	External	101%
Endrin	µg/kg	[NT]	[NT]	[NT]	External	103%
Endrin ketone	µg/kg	[NT]	[NT]	[NT]	External	100%
Endrin aldehyde	µg/kg	[NT]	[NT]	[NT]	External	104%
Heptachlor	µg/kg	[NT]	[NT]	[NT]	External	86%
Heptachlor epoxide	µg/kg	[NT]	[NT]	[NT]	External	95%
Hexachlorobenzene	µg/kg	[NT]	[NT]	[NT]	External	95%
Methoxychlor	µg/kg	[NT]	[NT]	[NT]	External	92%
Oxychlordane	µg/kg	[NT]	[NT]	[NT]	External	NT
Surrogate Recovery	%	[NT]	[NT]	[NT]	External	105%



Batch Number: A11/5791 [R00]
Project Reference: Sediment Analysis - Proj Caltex

TEST	Units	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Dichlorvos	µg/kg	[NT]	[NT]	[NT]	External	96%
Demeton-S-methyl	µg/kg	[NT]	[NT]	[NT]	External	95%
Dimethoate	µg/kg	[NT]	[NT]	[NT]	External	104%
Diazinon	µg/kg	[NT]	[NT]	[NT]	External	92%
Chlorpyrifos-methyl	µg/kg	[NT]	[NT]	[NT]	External	91%
Parathion-methyl	µg/kg	[NT]	[NT]	[NT]	External	83%
Pirimiphos-methyl	µg/kg	[NT]	[NT]	[NT]	External	90%
Fenitrothion	µg/kg	[NT]	[NT]	[NT]	External	86%
Malathion	µg/kg	[NT]	[NT]	[NT]	External	93%
Chlorpyrifos	µg/kg	[NT]	[NT]	[NT]	External	95%
Fenthion	µg/kg	[NT]	[NT]	[NT]	External	94%
Parathion	µg/kg	[NT]	[NT]	[NT]	External	85%
Chlorfenvinphos	µg/kg	[NT]	[NT]	[NT]	External	102%
Bromophos-ethyl	µg/kg	[NT]	[NT]	[NT]	External	117%
Methidathion	µg/kg	[NT]	[NT]	[NT]	External	89%
Fenamiphos	µg/kg	[NT]	[NT]	[NT]	External	99%
Prothiofos	µg/kg	[NT]	[NT]	[NT]	External	93%
Ethion	µg/kg	[NT]	[NT]	[NT]	External	90%
Carbophenothion	µg/kg	[NT]	[NT]	[NT]	External	89%
Phosalone	µg/kg	[NT]	[NT]	[NT]	External	92%
Azinphos-methyl	µg/kg	[NT]	[NT]	[NT]	External	92%
Surrogate Recovery	%	[NT]	[NT]	[NT]	External	106%



Batch Number: A11/5791 [R00]
Project Reference: Sediment Analysis - Proj Caltex

TEST	Units	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Mono-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	110%
Di-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	109%
Tri-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	108%
Tetra-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	103%
Penta-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	97%
Hexa-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	94%
Hepta-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	94%
Octa-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	96%
Nona-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	92%
Deca-PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	95%
Total PCB congeners	µg/kg	[NT]	[NT]	[NT]	External	99%
Surrogate 1 Recovery	%	[NT]	[NT]	[NT]	External	101%
Surrogate 2 Recovery	%	[NT]	[NT]	[NT]	External	93%

Comments:

RPD = Relative Percent Deviation

[NT] = Not Tested

[N/A] = Not Applicable

'#' = Spike recovery data could not be calculated due to high levels of contaminants

Acceptable replicate reproducibility limit or RPD: Results < 10 times LOR: no limits

Results > 10 times LOR: 0% - 50%

Acceptable matrix spike & LCS recovery limits: Trace elements 70-130%

Organic analyses 50-150%

SVOC & speciated phenols 10-140%

Surrogates 10-140%

When levels outside these limits are obtained, an investigation into the cause of the deviation is performed before the batch is accepted or rejected, and results are released.

Fadi Soro

From: Glenyss Weeks
Sent: Wednesday, 30 November 2011 3:18 PM
To: Fadi Soro
Cc: orla.murray@worleyparsons.com
Subject: Triplicate sample- ES1125458007 (SS5Y1) FW: Schedule elutriate testing asap today please
Importance: High

Hi Fadi,

Can you please send 2 jars of sample ES1125458007 (SS5Y1) to Advanced Analytical tomorrow?

Please send the sample with the CoC I have attached here.

Thank you,
Glenyss

How was your customer experience? Please send us your feedback

Glenyss Weeks
Senior Project Manager

ALS | Environmental Division

Address
277-289 Woodpark Road, Smithfield, NSW, 2164

MOBILE 0415 847 905
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PHONE +61 2 8784 8555
FAX +61 2 8784 8500

5780-282
282-201

Winner of the inaugural CARE Award 2011 – Sustainable Technology & Innovation:
Reduction in Sample Volumes – Improving quality, safety, efficiency and sustainability in environmental practices



www.alsglobal.com

P Please consider the environment before printing this email

From: Murray, Orla (Sydney) [mailto:Orla.Murray@WorleyParsons.com]
Sent: Wednesday, 30 November 2011 2:02 PM
To: Glenyss Weeks
Subject: Schedule elutriate testing asap today please
Importance: High

I forgot to send a split triplicate sample to another lab. Could you please arrange for either ES1125458007 (SS5Y1) or ES1125458008 (SS5Y2) (which ever there is sufficient sample left over from) to be submitted to another lab (Advanced Analytical would be fine). The sample should be analysed for NAGD levels of the following similar to the suite codes in brackets:

TOC (EP003)

SAMPLE RECEIPT NOTIFICATION



Attention : Orla Murray

Client : WorleyParsons Services Pty Ltd
Level 12, 141 Walker Street
North Sydney NSW 2060

Telephone : 02 8456 7251

Facsimile :

Project : Sediment Analysis - Proj Caltex

Order Number : 301015-02448

Laboratory Reference : **A11/5791**

Completed Chain of Custody accompanied samples.	YES
Samples were received in good condition and correctly preserved for all tests.	YES
Samples were received in sufficient time to allow laboratory to meet holding times.	YES
Samples were received chilled/chilling (if required).	YES

Date samples received : **01/12/2011**

Matrix : **Sediment**

No. of samples : **1**

Scheduled reporting date : **15 Dec 11**

Client Services Manager : **Daniel Um**

Telephone : 02 9888 9077

Email : daniel.um@advancedanalytical.com.au

Contact your Client Services Manager for all queries and issues regarding this sample batch.

Note: Turnaround time begins at time of receipt at laboratory, surcharges may apply for fast turnaround.

Water samples will be appropriately stored for 1 month from date of receipt of samples.

Soil / Sediment samples will be appropriately stored for 3 months from date of receipt of samples.

COMMENTS:

Advanced Analytical Australia Pty Ltd

ABN 20 105 644 979

11 Julius Avenue

North Ryde NSW 2113 Australia

Ph: + 61 2 9888 9077

Fax: + 61 2 9888 9577

contact@advancedanalytical.com.au

www.advancedanalytical.com.au

CERTIFICATE OF ANALYSIS

<p>Work Order : ES1125458</p> <p>Client : WORLEY PARSONS - INFRASTRUCTURE MWE</p> <p>Contact : MS ORLA MURRAY</p> <p>Address : Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060</p> <p>E-mail : orla.murray@worleyparsons.com</p> <p>Telephone : 8907 2131</p> <p>Facsimile : ----</p> <p>Project : CALTEX</p> <p>Order number : 301015-02448</p> <p>C-O-C number : 211204-5</p> <p>Sampler : OM</p> <p>Site : ----</p> <p>Quote number : EN/034/11</p>	<p>Page : 1 of 41</p> <p>Laboratory : Environmental Division Sydney</p> <p>Contact : Client Services</p> <p>Address : 277-289 Woodpark Road Smithfield NSW Australia 2164</p> <p>E-mail : sydney@alsglobal.com</p> <p>Telephone : +61-2-8784 8555</p> <p>Facsimile : +61-2-8784 8500</p> <p>QC Level : NEPM 1999 Schedule B(3) and ALS QCS3 requirement</p> <p>Date Samples Received : 18-NOV-2011</p> <p>Issue Date : 02-DEC-2011</p> <p>No. of samples received : 23</p> <p>No. of samples analysed : 22</p>
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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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Andrew Matheson	Senior Organic Instrument Chemist	Brisbane Organics
Dianne Blane	Laboratory Supervisor	Newcastle
Edwardy Fadjar	Organic Coordinator	Sydney Organics
Evie.Sidarta	Inorganic Chemist	Sydney Inorganics
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics
Stephen Hislop	Senior Inorganic Chemist	Stafford Minerals - AY
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **ASS: EA037 (Rapid Field and F(ox) screening): pH F(ox) Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Vigorous; 4 - Very Vigorous**
- **EA037 ASS Field Screening: NATA accreditation does not cover performance of this service.**
- **EG035T-LL: LCS recovery for Mercury falls outside ALS Dynamic Control Limit. However, it is within the acceptance criteria based on ALS DQO. No further action is required.**
- **EP075: 'Sum of PAH' is the sum of the USEPA 16 priority PAHs**
- **Tributyltin: Samples SS5E and VCSE_0.6-0.8 show poor surrogate recovery due to matrix interference. Confirmed by re-extraction and re-analysis.**



Analytical Results

Sub-Matrix: **SEDIMENT**

				Client sample ID				
				Client sampling date / time				
				SS5A	SS5B	SS5C	SS5D	SS5Y1
				17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00
Compound	CAS Number	LOR	Unit	ES1125458-001	ES1125458-004	ES1125458-005	ES1125458-006	ES1125458-007
EA150: Particle Sizing								
+75µm	----	1	%	99	----	98	88	----
+150µm	----	1	%	97	----	96	78	----
+300µm	----	1	%	44	----	50	31	----
+425µm	----	1	%	10	----	14	6	----
+600µm	----	1	%	1	----	2	1	----
+1180µm	----	1	%	<1	----	<1	<1	----
+2.36mm	----	1	%	<1	----	<1	<1	----
+4.75mm	----	1	%	<1	----	<1	<1	----
+9.5mm	----	1	%	<1	----	<1	<1	----
+19.0mm	----	1	%	<1	----	<1	<1	----
+37.5mm	----	1	%	<1	----	<1	<1	----
+75.0mm	----	1	%	<1	----	<1	<1	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	18.4	23.3	22.4	28.1	18.3
EA150: Soil Classification based on Particle Size								
Fines (<75 µm)	----	1	%	<1	----	2	12	----
Sand (>75 µm)	----	1	%	99	----	98	88	----
Gravel (>2mm)	----	1	%	<1	----	<1	<1	----
Cobbles (>6cm)	----	1	%	<1	----	<1	<1	----
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	900	----	----	3850	3160
Iron	7439-89-6	50	mg/kg	780	----	----	4400	3520
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	----	----	<0.50	<0.50
Arsenic	7440-38-2	1.00	mg/kg	<1.00	----	----	4.54	3.69
Cadmium	7440-43-9	0.1	mg/kg	<0.1	----	----	<0.1	<0.1
Chromium	7440-47-3	1.0	mg/kg	1.2	----	----	7.5	6.5
Copper	7440-50-8	1.0	mg/kg	<1.0	----	----	6.6	5.4
Cobalt	7440-48-4	0.5	mg/kg	<0.5	----	----	0.6	0.5
Lead	7439-92-1	1.0	mg/kg	1.7	----	----	9.0	7.3
Manganese	7439-96-5	10	mg/kg	<10	----	----	18	15
Nickel	7440-02-0	1.0	mg/kg	<1.0	----	----	2.4	2.0
Selenium	7782-49-2	0.1	mg/kg	0.1	----	----	0.3	0.3
Silver	7440-22-4	0.1	mg/kg	<0.1	----	----	<0.1	<0.1
Vanadium	7440-62-2	2.0	mg/kg	<2.0	----	----	3.2	3.1
Zinc	7440-66-6	1.0	mg/kg	3.1	----	----	26.2	18.7



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	SS5A	SS5B	SS5C	SS5D	SS5Y1
				17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00
				ES1125458-001	ES1125458-004	ES1125458-005	ES1125458-006	ES1125458-007
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	<0.01	----	----	0.04	0.03
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	0.05	0.07	0.05	0.96	0.72
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	<3	----	----	<3	<3
C10 - C14 Fraction	----	3	mg/kg	----	----	----	<3	<3
C15 - C28 Fraction	----	3	mg/kg	----	----	----	60	8
C29 - C36 Fraction	----	5	mg/kg	----	----	----	40	<5
^ C10 - C36 Fraction (sum)	----	3	mg/kg	----	----	----	100	8
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons								
C6 - C10 Fraction	----	3	mg/kg	<3	----	----	<3	<3
EP080-SD: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	<0.2	<0.2
Toluene	108-88-3	0.2	mg/kg	<0.2	----	----	<0.2	<0.2
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	----	----	<0.2	<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	----	----	<0.2	<0.2
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	----	----	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg	<0.5	----	----	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	----	----	<0.2	<0.2
Naphthalene	91-20-3	0.2	mg/kg	<0.2	----	----	<0.2	<0.2
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	<0.5	16.7	13.5
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	----	----	<10	<10
Carbophenothion	786-19-6	10	µg/kg	<10	----	----	<10	<10
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	----	----	<10.0	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	----	----	<10	<10
Chlorpyrifos	2921-88-2	10	µg/kg	<10	----	----	<10	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	----	----	<10	<10
Demeton-S-methyl	919-86-8	10	µg/kg	<10	----	----	<10	<10
Diazinon	333-41-5	10	µg/kg	<10	----	----	<10	<10
Dichlorvos	62-73-7	10	µg/kg	<10	----	----	<10	<10
Dimethoate	60-51-5	10	µg/kg	<10	----	----	<10	<10
Ethion	563-12-2	10	µg/kg	<10	----	----	<10	<10
Fenamiphos	22224-92-6	10	µg/kg	<10	----	----	<10	<10
Fenthion	55-38-9	10	µg/kg	<10	----	----	<10	<10



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	SS5A	SS5B	SS5C	SS5D	SS5Y1
				17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00
				ES1125458-001	ES1125458-004	ES1125458-005	ES1125458-006	ES1125458-007
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued								
Malathion	121-75-5	10	µg/kg	<10	----	----	<10	<10
Azinphos Methyl	86-50-0	10	µg/kg	<10	----	----	<10	<10
Monocrotophos	6923-22-4	10	µg/kg	<10	----	----	<10	<10
Parathion	56-38-2	10	µg/kg	<10	----	----	<10	<10
Parathion-methyl	298-00-0	10	µg/kg	<10	----	----	<10	<10
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	----	----	<10	<10
Prothiofos	34643-46-4	10	µg/kg	<10	----	----	<10	<10
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
beta-BHC	319-85-7	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
delta-BHC	319-86-8	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
4,4'-DDD	72-54-8	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
4,4'-DDE	72-55-9	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
4,4'-DDT	50-29-3	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
^ Sum of DDD + DDE + DDT	----	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
Dieldrin	60-57-1	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
Endrin	72-20-8	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
Heptachlor	76-44-8	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	----	----	<0.25	<0.25
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	----	----	<0.25	<0.25
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	----	----	<0.25	<0.25
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	----	----	<0.25	<0.25
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	----	----	<0.50	<0.50
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	----	----	<5.0	<5.0
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	----	----	<5.0	<5.0



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	SS5A	SS5B	SS5C	SS5D	SS5Y1
				17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00
				ES1125458-001	ES1125458-004	ES1125458-005	ES1125458-006	ES1125458-007
EP131B: Polychlorinated Biphenyls (as Aroclors) - Continued								
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	----	----	<5.0	<5.0
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	----	----	<5.0	<5.0
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	----	----	<5.0	<5.0
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	----	----	<5.0	<5.0
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	----	----	<5.0	<5.0
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	----	----	<5.0	<5.0
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	----	----	----	11	<5
2-Methylnaphthalene	91-57-6	5	µg/kg	----	----	----	<5	<5
Acenaphthylene	208-96-8	4	µg/kg	----	----	----	12	<4
Acenaphthene	83-32-9	4	µg/kg	----	----	----	8	<4
Fluorene	86-73-7	4	µg/kg	----	----	----	6	<4
Phenanthrene	85-01-8	4	µg/kg	----	----	----	34	<4
Anthracene	120-12-7	4	µg/kg	----	----	----	11	<4
Fluoranthene	206-44-0	4	µg/kg	----	----	----	50	<4
Pyrene	129-00-0	4	µg/kg	----	----	----	47	<4
Benz(a)anthracene	56-55-3	4	µg/kg	----	----	----	36	<4
Chrysene	218-01-9	4	µg/kg	----	----	----	33	<4
Benzo(b)fluoranthene	205-99-2	4	µg/kg	----	----	----	50	<4
Benzo(k)fluoranthene	207-08-9	4	µg/kg	----	----	----	21	<4
Benzo(e)pyrene	192-97-2	4	µg/kg	----	----	----	28	<4
Benzo(a)pyrene	50-32-8	4	µg/kg	----	----	----	45	<4
Perylene	198-55-0	4	µg/kg	----	----	----	15	<4
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	----	----	----	33	<4
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	----	----	----	6	<4
Indeno(1,2,3-cd)pyrene	193-39-5	4	µg/kg	----	----	----	28	<4
Coronene	191-07-1	5	µg/kg	----	----	----	8	<5
^ Sum of PAHs	----	4	µg/kg	----	----	----	482	<4
EP080-SD: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	87.0	----	----	74.3	85.7
Toluene-D8	2037-26-5	0.1	%	104	----	----	90.6	104
4-Bromofluorobenzene	460-00-4	0.1	%	89.9	----	----	77.2	87.8
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	44.0	61.1	87.9	68.3	52.8
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	107	----	----	69.2	70.9



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

				SS5A	SS5B	SS5C	SS5D	SS5Y1
				17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00
Compound	CAS Number	LOR	Unit	ES1125458-001	ES1125458-004	ES1125458-005	ES1125458-006	ES1125458-007
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	58.0	----	----	57.5	35.5
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	79.8	----	----	32.9	52.5
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	----	----	----	88.1	90.4
Anthracene-d10	1719-06-8	0.1	%	----	----	----	88.7	104
4-Terphenyl-d14	1718-51-0	0.1	%	----	----	----	84.0	92.8



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	SS5Y2	SS5E	T BLANK	VC5C 0-0.5	VC5C 0.5-1
				17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-008	ES1125458-009	ES1125458-010	ES1125458-019	ES1125458-020
EA150: Particle Sizing								
+75µm	----	1	%	----	89	----	----	82
+150µm	----	1	%	----	75	----	----	80
+300µm	----	1	%	----	30	----	----	79
+425µm	----	1	%	----	11	----	----	78
+600µm	----	1	%	----	6	----	----	77
+1180µm	----	1	%	----	3	----	----	73
+2.36mm	----	1	%	----	1	----	----	61
+4.75mm	----	1	%	----	<1	----	----	21
+9.5mm	----	1	%	----	<1	----	----	<1
+19.0mm	----	1	%	----	<1	----	----	<1
+37.5mm	----	1	%	----	<1	----	----	<1
+75.0mm	----	1	%	----	<1	----	----	<1
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	----	----	----	8.4	7.3
pH (Fox)	----	0.1	pH Unit	----	----	----	6.0	4.9
Reaction Rate	----	1	-	----	----	----	3	3
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	30.4	33.2	5.8	22.7	64.3
EA150: Soil Classification based on Particle Size								
Fines (<75 µm)	----	1	%	----	11	----	----	18
Sand (>75 µm)	----	1	%	----	88	----	----	21
Gravel (>2mm)	----	1	%	----	1	----	----	61
Cobbles (>6cm)	----	1	%	----	<1	----	----	<1
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	1030	----	----	2790	----
Iron	7439-89-6	50	mg/kg	800	----	----	3350	----
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	----	----	<0.50	----
Arsenic	7440-38-2	1.00	mg/kg	1.08	----	----	1.40	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	----	----	<0.1	----
Chromium	7440-47-3	1.0	mg/kg	1.5	----	----	4.4	----
Copper	7440-50-8	1.0	mg/kg	<1.0	----	----	3.5	----
Cobalt	7440-48-4	0.5	mg/kg	<0.5	----	----	<0.5	----
Lead	7439-92-1	1.0	mg/kg	2.2	----	----	5.8	----
Manganese	7439-96-5	10	mg/kg	<10	----	----	<10	----
Nickel	7440-02-0	1.0	mg/kg	<1.0	----	----	1.3	----



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	SS5Y2	SS5E	T BLANK	VC5C 0-0.5	VC5C 0.5-1
				17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-008	ES1125458-009	ES1125458-010	ES1125458-019	ES1125458-020
EG020-SD: Total Metals in Sediments by ICPMS - Continued								
Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	0.2	----
Silver	7440-22-4	0.1	mg/kg	<0.1	----	----	<0.1	----
Vanadium	7440-62-2	2.0	mg/kg	<2.0	----	----	<2.0	----
Zinc	7440-66-6	1.0	mg/kg	3.3	----	----	17.0	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	0.04	----	----	0.09	----
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	0.06	2.99	----	2.23	39.6
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	<3	----	<3	<3	----
C10 - C14 Fraction	----	3	mg/kg	<3	<3	<3	<3	----
C15 - C28 Fraction	----	3	mg/kg	36	58	<3	49	----
C29 - C36 Fraction	----	5	mg/kg	24	34	<5	47	----
^ C10 - C36 Fraction (sum)	----	3	mg/kg	60	92	<3	96	----
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons								
C6 - C10 Fraction	----	3	mg/kg	<3	----	<3	<3	----
EP080-SD: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	<0.2	<0.2	----
Toluene	108-88-3	0.2	mg/kg	<0.2	----	<0.2	<0.2	----
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	----	<0.2	<0.2	----
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	----	<0.2	<0.2	----
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	----	<0.2	<0.2	----
^ Total Xylenes	1330-20-7	0.5	mg/kg	<0.5	----	<0.5	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	----	<0.2	<0.2	----
Naphthalene	91-20-3	0.2	mg/kg	<0.2	----	<0.2	<0.2	----
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.8	----	10.6	<0.5
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	----	----	<10	----
Carbophenothion	786-19-6	10	µg/kg	<10	----	----	<10	----
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	----	----	<10.0	----
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	----	----	<10	----
Chlorpyrifos	2921-88-2	10	µg/kg	<10	----	----	<10	----
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	----	----	<10	----
Demeton-S-methyl	919-86-8	10	µg/kg	<10	----	----	<10	----
Diazinon	333-41-5	10	µg/kg	<10	----	----	<10	----



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	SS5Y2	SS5E	T BLANK	VC5C 0-0.5	VC5C 0.5-1
				17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-008	ES1125458-009	ES1125458-010	ES1125458-019	ES1125458-020
EP130A: Organophosphorus Pesticides (Ultra-trace) - Continued								
Dichlorvos	62-73-7	10	µg/kg	<10	----	----	<10	----
Dimethoate	60-51-5	10	µg/kg	<10	----	----	<10	----
Ethion	563-12-2	10	µg/kg	<10	----	----	<10	----
Fenamiphos	22224-92-6	10	µg/kg	<10	----	----	<10	----
Fenthion	55-38-9	10	µg/kg	<10	----	----	<10	----
Malathion	121-75-5	10	µg/kg	<10	----	----	<10	----
Azinphos Methyl	86-50-0	10	µg/kg	<10	----	----	<10	----
Monocrotophos	6923-22-4	10	µg/kg	<10	----	----	<10	----
Parathion	56-38-2	10	µg/kg	<10	----	----	<10	----
Parathion-methyl	298-00-0	10	µg/kg	<10	----	----	<10	----
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	----	----	<10	----
Prothiofos	34643-46-4	10	µg/kg	<10	----	----	<10	----
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	----	----	<0.50	----
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	----	----	<0.50	----
beta-BHC	319-85-7	0.50	µg/kg	<0.50	----	----	<0.50	----
delta-BHC	319-86-8	0.50	µg/kg	<0.50	----	----	<0.50	----
4.4'-DDD	72-54-8	0.50	µg/kg	<0.50	----	----	<0.50	----
4.4'-DDE	72-55-9	0.50	µg/kg	<0.50	----	----	<0.50	----
4.4'-DDT	50-29-3	0.50	µg/kg	<0.50	----	----	<0.50	----
^ Sum of DDD + DDE + DDT	----	0.50	µg/kg	<0.50	----	----	<0.50	----
Dieldrin	60-57-1	0.50	µg/kg	<0.50	----	----	<0.50	----
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	----	----	<0.50	----
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	----	----	<0.50	----
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	----	----	<0.50	----
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	----	----	<0.50	----
Endrin	72-20-8	0.50	µg/kg	<0.50	----	----	<0.50	----
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	----	----	<0.50	----
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	----	----	<0.50	----
Heptachlor	76-44-8	0.50	µg/kg	<0.50	----	----	<0.50	----
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	----	----	<0.50	----
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	----	----	<0.50	----
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	----	----	<0.25	----
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	----	----	<0.50	----
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	----	----	<0.25	----
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	----	----	<0.25	----



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	SS5Y2	SS5E	T BLANK	VC5C 0-0.5	VC5C 0.5-1
				17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-008	ES1125458-009	ES1125458-010	ES1125458-019	ES1125458-020
EP131A: Organochlorine Pesticides - Continued								
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	----	----	<0.25	----
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	----	----	<0.50	----
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	----	----	<5.0	----
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	----	----	<5.0	----
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	----	----	<5.0	----
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	----	----	<5.0	----
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	----	----	<5.0	----
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	----	----	<5.0	----
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	----	----	<5.0	----
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	----	----	<5.0	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	14	18	----	16	----
2-Methylnaphthalene	91-57-6	5	µg/kg	<5	6	----	<5	----
Acenaphthylene	208-96-8	4	µg/kg	11	<4	----	13	----
Acenaphthene	83-32-9	4	µg/kg	<4	<4	----	<4	----
Fluorene	86-73-7	4	µg/kg	<4	<4	----	<4	----
Phenanthrene	85-01-8	4	µg/kg	28	31	----	29	----
Anthracene	120-12-7	4	µg/kg	9	12	----	10	----
Fluoranthene	206-44-0	4	µg/kg	42	64	----	40	----
Pyrene	129-00-0	4	µg/kg	40	57	----	46	----
Benz(a)anthracene	56-55-3	4	µg/kg	32	39	----	30	----
Chrysene	218-01-9	4	µg/kg	26	34	----	30	----
Benzo(b)fluoranthene	205-99-2	4	µg/kg	41	42	----	63	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	22	19	----	29	----
Benzo(e)pyrene	192-97-2	4	µg/kg	24	27	----	29	----
Benzo(a)pyrene	50-32-8	4	µg/kg	38	47	----	34	----
Perylene	198-55-0	4	µg/kg	13	19	----	224	----
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	28	51	----	40	----
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	5	18	----	4	----
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	24	38	----	20	----
Coronene	191-07-1	5	µg/kg	6	<5	----	<5	----
^ Sum of PAHs	----	4	µg/kg	403	522	----	657	----
EP080-SD: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	87.0	----	99.9	90.4	----
Toluene-D8	2037-26-5	0.1	%	99.7	----	115	112	----



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	SS5Y2	SS5E	T BLANK	VC5C 0-0.5	VC5C 0.5-1
				17-NOV-2011 15:00	17-NOV-2011 15:00	17-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-008	ES1125458-009	ES1125458-010	ES1125458-019	ES1125458-020
EP080-SD: TPH(V)/BTEX Surrogates - Continued								
4-Bromofluorobenzene	460-00-4	0.1	%	84.7	----	96.3	92.4	----
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	41.6	19.8	----	38.5	51.6
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	70.0	----	----	58.4	----
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	41.0	----	----	27.8	----
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	60.9	----	----	33.5	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	79.9	79.1	----	111	----
Anthracene-d10	1719-06-8	0.1	%	79.4	93.1	----	113	----
4-Terphenyl-d14	1718-51-0	0.1	%	89.3	101	----	103	----



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VCSD_2.1-3.1	VCSE_0.6-0.8	VCSA(0-0.5)	VCSA0.5-1	VCSA1.5-2
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-026	ES1125458-027	ES1125458-028	ES1125458-029	ES1125458-030
EA150: Particle Sizing								
+75µm	----	1	%	83	----	98	----	64
+150µm	----	1	%	79	----	91	----	61
+300µm	----	1	%	33	----	34	----	36
+425µm	----	1	%	17	----	10	----	24
+600µm	----	1	%	13	----	5	----	21
+1180µm	----	1	%	11	----	4	----	20
+2.36mm	----	1	%	7	----	2	----	18
+4.75mm	----	1	%	<1	----	1	----	15
+9.5mm	----	1	%	<1	----	1	----	<1
+19.0mm	----	1	%	<1	----	<1	----	<1
+37.5mm	----	1	%	<1	----	<1	----	<1
+75.0mm	----	1	%	<1	----	<1	----	<1
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	----	----	7.9	----	----
pH (Fox)	----	0.1	pH Unit	----	----	6.2	----	----
Reaction Rate	----	1	-	----	----	1	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	30.3	27.8	21.1	18.8	31.2
EA150: Soil Classification based on Particle Size								
Fines (<75 µm)	----	1	%	17	----	2	----	36
Sand (>75 µm)	----	1	%	77	----	96	----	46
Gravel (>2mm)	----	1	%	7	----	2	----	18
Cobbles (>6cm)	----	1	%	<1	----	<1	----	<1
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	7040	----	1010	----	----
Iron	7439-89-6	50	mg/kg	16400	----	2020	----	----
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	----	<0.50	----	----
Arsenic	7440-38-2	1.00	mg/kg	4.70	----	<1.00	----	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	----	<0.1	----	----
Chromium	7440-47-3	1.0	mg/kg	7.3	----	2.7	----	----
Copper	7440-50-8	1.0	mg/kg	3.4	----	4.5	----	----
Cobalt	7440-48-4	0.5	mg/kg	1.5	----	<0.5	----	----
Lead	7439-92-1	1.0	mg/kg	2.2	----	11.1	----	----
Manganese	7439-96-5	10	mg/kg	57	----	<10	----	----
Nickel	7440-02-0	1.0	mg/kg	4.2	----	<1.0	----	----



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VCSD_2.1-3.1	VCSE_0.6-0.8	VCSA(0-0.5)	VCSA0.5-1	VCSA1.5-2
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-026	ES1125458-027	ES1125458-028	ES1125458-029	ES1125458-030
EG020-SD: Total Metals in Sediments by ICPMS - Continued								
Selenium	7782-49-2	0.1	mg/kg	1.5	----	0.2	----	----
Silver	7440-22-4	0.1	mg/kg	<0.1	----	<0.1	----	----
Vanadium	7440-62-2	2.0	mg/kg	11.6	----	<2.0	----	----
Zinc	7440-66-6	1.0	mg/kg	14.6	----	46.4	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	<0.01	----	0.02	----	----
EP003: Total Organic Carbon (TOC) in Soil								
Total Organic Carbon	----	0.02	%	4.61	1.14	0.24	0.38	4.76
EP074A: Monocyclic Aromatic Hydrocarbons								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	----	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	<0.5	----	----
Styrene	100-42-5	0.5	mg/kg	<0.5	----	<0.5	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	<0.5	----	----
Isopropylbenzene	98-82-8	0.5	mg/kg	<0.5	----	<0.5	----	----
n-Propylbenzene	103-65-1	0.5	mg/kg	<0.5	----	<0.5	----	----
1,3,5-Trimethylbenzene	108-67-8	0.5	mg/kg	<0.5	----	<0.5	----	----
sec-Butylbenzene	135-98-8	0.5	mg/kg	<0.5	----	<0.5	----	----
1,2,4-Trimethylbenzene	95-63-6	0.5	mg/kg	<0.5	----	<0.5	----	----
tert-Butylbenzene	98-06-6	0.5	mg/kg	<0.5	----	<0.5	----	----
p-Isopropyltoluene	99-87-6	0.5	mg/kg	<0.5	----	<0.5	----	----
n-Butylbenzene	104-51-8	0.5	mg/kg	<0.5	----	<0.5	----	----
EP074B: Oxygenated Compounds								
Vinyl Acetate	108-05-4	5	mg/kg	<5	----	<5	----	----
2-Butanone (MEK)	78-93-3	5	mg/kg	<5	----	<5	----	----
4-Methyl-2-pentanone (MIBK)	108-10-1	5	mg/kg	<5	----	<5	----	----
2-Hexanone (MBK)	591-78-6	5	mg/kg	<5	----	<5	----	----
EP074C: Sulfonated Compounds								
Carbon disulfide	75-15-0	0.5	mg/kg	<0.5	----	<0.5	----	----
EP074D: Fumigants								
2,2-Dichloropropane	594-20-7	0.5	mg/kg	<0.5	----	<0.5	----	----
1,2-Dichloropropane	78-87-5	0.5	mg/kg	<0.5	----	<0.5	----	----
cis-1,3-Dichloropropylene	10061-01-5	0.5	mg/kg	<0.5	----	<0.5	----	----
trans-1,3-Dichloropropylene	10061-02-6	0.5	mg/kg	<0.5	----	<0.5	----	----
1,2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	<0.5	----	<0.5	----	----



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VCSD_2.1-3.1	VCSE_0.6-0.8	VCSA(0-0.5)	VCSA0.5-1	VCSA1.5-2
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-026	ES1125458-027	ES1125458-028	ES1125458-029	ES1125458-030
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	5	mg/kg	<5	----	<5	----	----
Chloromethane	74-87-3	5	mg/kg	<5	----	<5	----	----
Vinyl chloride	75-01-4	5	mg/kg	<5	----	<5	----	----
Bromomethane	74-83-9	5	mg/kg	<5	----	<5	----	----
Chloroethane	75-00-3	5	mg/kg	<5	----	<5	----	----
Trichlorofluoromethane	75-69-4	5	mg/kg	<5	----	<5	----	----
1.1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	----	<0.5	----	----
Iodomethane	74-88-4	0.5	mg/kg	<0.5	----	<0.5	----	----
trans-1.2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	----	<0.5	----	----
1.1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	----	<0.5	----	----
cis-1.2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	----	<0.5	----	----
1.1.1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	----	<0.5	----	----
1.1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	----	<0.5	----	----
Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	----	<0.5	----	----
1.2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	----	<0.5	----	----
Trichloroethene	79-01-6	0.5	mg/kg	<0.5	----	<0.5	----	----
Dibromomethane	74-95-3	0.5	mg/kg	<0.5	----	<0.5	----	----
1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	----	<0.5	----	----
1.3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	----	<0.5	----	----
Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	----	<0.5	----	----
1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	----	<0.5	----	----
trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	----	<0.5	----	----
cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	----	<0.5	----	----
1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	----	<0.5	----	----
1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	----	<0.5	----	----
Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	----	<0.5	----	----
1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	----	<0.5	----	----
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	----	<0.5	----	----
Bromobenzene	108-86-1	0.5	mg/kg	<0.5	----	<0.5	----	----
2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	----	<0.5	----	----
4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	----	<0.5	----	----
1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	----	<0.5	----	----
EP074G: Trihalomethanes								
Chloroform	67-66-3	0.5	mg/kg	<0.5	----	<0.5	----	----
Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	----	<0.5	----	----



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VCSD_2.1-3.1	VCSE_0.6-0.8	VCSA(0-0.5)	VCSA0.5-1	VCSA1.5-2
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-026	ES1125458-027	ES1125458-028	ES1125458-029	ES1125458-030
EP074G: Trihalomethanes - Continued								
Dibromochloromethane	124-48-1	0.5	mg/kg	<0.5	----	<0.5	----	----
Bromoform	75-25-2	0.5	mg/kg	<0.5	----	<0.5	----	----
EP075A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	<0.5	----	<0.5	----	----
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	----	<0.5	----	----
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	----	<0.5	----	----
3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.5	----	<0.5	----	----
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	----	<0.5	----	----
2,4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	----	<0.5	----	----
2,4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	----	<0.5	----	----
2,6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	----	<0.5	----	----
4-Chloro-3-Methylphenol	59-50-7	0.5	mg/kg	<0.5	----	<0.5	----	----
2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	----	<0.5	----	----
2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	----	<0.5	----	----
Pentachlorophenol	87-86-5	1	mg/kg	<1	----	<1	----	----
EP075B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	<0.5	----	----
2-Methylnaphthalene	91-57-6	0.5	mg/kg	<0.5	----	<0.5	----	----
2-Chloronaphthalene	91-58-7	0.5	mg/kg	<0.5	----	<0.5	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	<0.5	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	<0.5	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	<0.5	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	<0.5	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	<0.5	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	<0.5	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	<0.5	----	----
N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	<0.5	----	<0.5	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	<0.5	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	<0.5	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	----	<1	----	----
7,12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg	<0.5	----	<0.5	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	<0.5	----	----
3-Methylcholanthrene	56-49-5	0.5	mg/kg	<0.5	----	<0.5	----	----
Indeno(1,2,3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	<0.5	----	----
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	<0.5	----	----



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VCSD_2.1-3.1	VCSE_0.6-0.8	VCSA(0-0.5)	VCSA0.5-1	VCSA1.5-2
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-026	ES1125458-027	ES1125458-028	ES1125458-029	ES1125458-030
EP075B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	----	<0.5	----	----
^ Sum of PAHs	----	0.5	mg/kg	<0.5	----	<0.5	----	----
EP075C: Phthalate Esters								
Dimethyl phthalate	131-11-3	0.5	mg/kg	<0.5	----	<0.5	----	----
Diethyl phthalate	84-66-2	0.5	mg/kg	<0.5	----	<0.5	----	----
Di-n-butyl phthalate	84-74-2	0.5	mg/kg	<0.5	----	<0.5	----	----
Butyl benzyl phthalate	85-68-7	0.5	mg/kg	<0.5	----	<0.5	----	----
bis(2-ethylhexyl) phthalate	117-81-7	0.5	mg/kg	<0.5	----	<0.5	----	----
Di-n-octylphthalate	117-84-0	0.5	mg/kg	<0.5	----	<0.5	----	----
EP075D: Nitrosamines								
N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	<0.5	----	<0.5	----	----
N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	<0.5	----	<0.5	----	----
N-Nitrosopyrrolidine	930-55-2	0.5	mg/kg	<0.5	----	<0.5	----	----
N-Nitrosomorpholine	59-89-2	0.5	mg/kg	<0.5	----	<0.5	----	----
N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	<0.5	----	<0.5	----	----
N-Nitrosopiperidine	100-75-4	0.5	mg/kg	<0.5	----	<0.5	----	----
N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	<0.5	----	<0.5	----	----
N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	0.5	mg/kg	<0.5	----	<0.5	----	----
Methapyrilene	91-80-5	0.5	mg/kg	<0.5	----	<0.5	----	----
EP075E: Nitroaromatics and Ketones								
2-Picoline	109-06-8	0.5	mg/kg	<0.5	----	<0.5	----	----
Acetophenone	98-86-2	0.5	mg/kg	<0.5	----	<0.5	----	----
Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	----	<0.5	----	----
Isophorone	78-59-1	0.5	mg/kg	<0.5	----	<0.5	----	----
2,6-Dinitrotoluene	606-20-2	0.5	mg/kg	<0.5	----	<0.5	----	----
2,4-Dinitrotoluene	121-14-2	0.5	mg/kg	<0.5	----	<0.5	----	----
1-Naphthylamine	134-32-7	0.5	mg/kg	<0.5	----	<0.5	----	----
4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	<0.5	----	<0.5	----	----
5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	<0.5	----	<0.5	----	----
Azobenzene	103-33-3	1	mg/kg	<1	----	<1	----	----
1,3,5-Trinitrobenzene	99-35-4	0.5	mg/kg	<0.5	----	<0.5	----	----
Phenacetin	62-44-2	0.5	mg/kg	<0.5	----	<0.5	----	----
4-Aminobiphenyl	92-67-1	0.5	mg/kg	<0.5	----	<0.5	----	----
Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	----	<0.5	----	----
Pronamide	23950-58-5	0.5	mg/kg	<0.5	----	<0.5	----	----



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VCSD_2.1-3.1	VCSE_0.6-0.8	VCSA(0-0.5)	VCSA0.5-1	VCSA1.5-2
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-026	ES1125458-027	ES1125458-028	ES1125458-029	ES1125458-030
EP075E: Nitroaromatics and Ketones - Continued								
Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	<0.5	----	<0.5	----	----
Chlorobenzilate	510-15-6	0.5	mg/kg	<0.5	----	<0.5	----	----
EP075F: Haloethers								
Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg	<0.5	----	<0.5	----	----
Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg	<0.5	----	<0.5	----	----
4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg	<0.5	----	<0.5	----	----
4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg	<0.5	----	<0.5	----	----
EP075G: Chlorinated Hydrocarbons								
1,3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	----	<0.5	----	----
1,4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	----	<0.5	----	----
1,2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	----	<0.5	----	----
Hexachloroethane	67-72-1	0.5	mg/kg	<0.5	----	<0.5	----	----
1,2,4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	----	<0.5	----	----
Hexachloropropylene	1888-71-7	0.5	mg/kg	<0.5	----	<0.5	----	----
Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	----	<0.5	----	----
Hexachlorocyclopentadiene	77-47-4	0.5	mg/kg	<0.5	----	<0.5	----	----
Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	----	<0.5	----	----
Hexachlorobenzene (HCB)	118-74-1	0.5	mg/kg	<0.5	----	<0.5	----	----
EP075H: Anilines and Benzidines								
Aniline	62-53-3	0.5	mg/kg	<0.5	----	<0.5	----	----
4-Chloroaniline	106-47-8	0.5	mg/kg	<0.5	----	<0.5	----	----
2-Nitroaniline	88-74-4	0.5	mg/kg	<0.5	----	<0.5	----	----
3-Nitroaniline	99-09-2	0.5	mg/kg	<0.5	----	<0.5	----	----
Dibenzofuran	132-64-9	0.5	mg/kg	<0.5	----	<0.5	----	----
4-Nitroaniline	100-01-6	0.5	mg/kg	<0.5	----	<0.5	----	----
Carbazole	86-74-8	0.5	mg/kg	<0.5	----	<0.5	----	----
3,3'-Dichlorobenzidine	91-94-1	0.5	mg/kg	<0.5	----	<0.5	----	----
EP075I: Organochlorine Pesticides								
alpha-BHC	319-84-6	0.5	mg/kg	<0.5	----	<0.5	----	----
beta-BHC	319-85-7	0.5	mg/kg	<0.5	----	<0.5	----	----
gamma-BHC	58-89-9	0.5	mg/kg	<0.5	----	<0.5	----	----
delta-BHC	319-86-8	0.5	mg/kg	<0.5	----	<0.5	----	----
Heptachlor	76-44-8	0.5	mg/kg	<0.5	----	<0.5	----	----
Aldrin	309-00-2	0.5	mg/kg	<0.5	----	<0.5	----	----
Heptachlor epoxide	1024-57-3	0.5	mg/kg	<0.5	----	<0.5	----	----
alpha-Endosulfan	959-98-8	0.5	mg/kg	<0.5	----	<0.5	----	----



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VCSD_2.1-3.1	VCSE_0.6-0.8	VCSA(0-0.5)	VCSA0.5-1	VCSA1.5-2
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-026	ES1125458-027	ES1125458-028	ES1125458-029	ES1125458-030
EP075I: Organochlorine Pesticides - Continued								
4,4'-DDE	72-55-9	0.5	mg/kg	<0.5	----	<0.5	----	----
Dieldrin	60-57-1	0.5	mg/kg	<0.5	----	<0.5	----	----
Endrin	72-20-8	0.5	mg/kg	<0.5	----	<0.5	----	----
beta-Endosulfan	33213-65-9	0.5	mg/kg	<0.5	----	<0.5	----	----
4,4'-DDD	72-54-8	0.5	mg/kg	<0.5	----	<0.5	----	----
Endosulfan sulfate	1031-07-8	0.5	mg/kg	<0.5	----	<0.5	----	----
4,4'-DDT	50-29-3	0.5	mg/kg	<0.5	----	<0.5	----	----
EP075J: Organophosphorus Pesticides								
Dichlorvos	62-73-7	0.5	mg/kg	<0.5	----	<0.5	----	----
Dimethoate	60-51-5	0.5	mg/kg	<0.5	----	<0.5	----	----
Diazinon	333-41-5	0.5	mg/kg	<0.5	----	<0.5	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	<0.5	----	<0.5	----	----
Malathion	121-75-5	0.5	mg/kg	<0.5	----	<0.5	----	----
Fenthion	55-38-9	0.5	mg/kg	<0.5	----	<0.5	----	----
Chlorpyrifos	2921-88-2	0.5	mg/kg	<0.5	----	<0.5	----	----
Pirimphos-ethyl	23505-41-1	0.5	mg/kg	<0.5	----	<0.5	----	----
Chlorfenvinphos	470-90-6	0.5	mg/kg	<0.5	----	<0.5	----	----
Prothiofos	34643-46-4	0.5	mg/kg	<0.5	----	<0.5	----	----
Ethion	563-12-2	0.5	mg/kg	<0.5	----	<0.5	----	----
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	<3	----	<3	----	----
C10 - C14 Fraction	----	3	mg/kg	3	----	<3	----	----
C15 - C28 Fraction	----	3	mg/kg	46	----	9	----	----
C29 - C36 Fraction	----	5	mg/kg	119	----	<5	----	----
^ C10 - C36 Fraction (sum)	----	3	mg/kg	168	----	9	----	----
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons								
C6 - C10 Fraction	----	3	mg/kg	<3	----	<3	----	----
EP080-SD: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	<0.2	----	----
Toluene	108-88-3	0.2	mg/kg	<0.2	----	<0.2	----	----
Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	----	<0.2	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	----	<0.2	----	----
ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	----	<0.2	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg	<0.5	----	<0.5	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	----	<0.2	----	----
Naphthalene	91-20-3	0.2	mg/kg	<0.2	----	<0.2	----	----



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

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Compound	CAS Number	LOR	Unit	VCSD_2.1-3.1	VCSE_0.6-0.8	VCSA(0-0.5)	VCSA0.5-1	VCSA1.5-2
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-026	ES1125458-027	ES1125458-028	ES1125458-029	ES1125458-030
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	47.6	1.4	<0.5	<0.5
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	<10	----	<10	----	----
Carbophenothion	786-19-6	10	µg/kg	<10	----	<10	----	----
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	----	<10.0	----	----
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	----	<10	----	----
Chlorpyrifos	2921-88-2	10	µg/kg	<10	----	<10	----	----
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	----	<10	----	----
Demeton-S-methyl	919-86-8	10	µg/kg	<10	----	<10	----	----
Diazinon	333-41-5	10	µg/kg	<10	----	<10	----	----
Dichlorvos	62-73-7	10	µg/kg	<10	----	<10	----	----
Dimethoate	60-51-5	10	µg/kg	<10	----	<10	----	----
Ethion	563-12-2	10	µg/kg	<10	----	<10	----	----
Fenamiphos	22224-92-6	10	µg/kg	<10	----	<10	----	----
Fenthion	55-38-9	10	µg/kg	<10	----	<10	----	----
Malathion	121-75-5	10	µg/kg	<10	----	<10	----	----
Azinphos Methyl	86-50-0	10	µg/kg	<10	----	<10	----	----
Monocrotophos	6923-22-4	10	µg/kg	<10	----	<10	----	----
Parathion	56-38-2	10	µg/kg	<10	----	<10	----	----
Parathion-methyl	298-00-0	10	µg/kg	<10	----	<10	----	----
Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	----	<10	----	----
Prothiofos	34643-46-4	10	µg/kg	<10	----	<10	----	----
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.50	µg/kg	<0.50	----	<0.50	----	----
alpha-BHC	319-84-6	0.50	µg/kg	<0.50	----	<0.50	----	----
beta-BHC	319-85-7	0.50	µg/kg	<0.50	----	<0.50	----	----
delta-BHC	319-86-8	0.50	µg/kg	<0.50	----	<0.50	----	----
4.4'-DDD	72-54-8	0.50	µg/kg	<0.50	----	<0.50	----	----
4.4'-DDE	72-55-9	0.50	µg/kg	<0.50	----	<0.50	----	----
4.4'-DDT	50-29-3	0.50	µg/kg	<0.50	----	<0.50	----	----
^ Sum of DDD + DDE + DDT	----	0.50	µg/kg	<0.50	----	<0.50	----	----
Dieldrin	60-57-1	0.50	µg/kg	<0.50	----	<0.50	----	----
alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	----	<0.50	----	----
beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	----	<0.50	----	----
Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	----	<0.50	----	----
^ Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	----	<0.50	----	----



Analytical Results

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Compound	CAS Number	LOR	Unit	VCSD_2.1-3.1	VCSE_0.6-0.8	VCSA(0-0.5)	VCSA0.5-1	VCSA1.5-2
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-026	ES1125458-027	ES1125458-028	ES1125458-029	ES1125458-030
EP131A: Organochlorine Pesticides - Continued								
Endrin	72-20-8	0.50	µg/kg	<0.50	----	<0.50	----	----
Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	----	<0.50	----	----
Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	----	<0.50	----	----
Heptachlor	76-44-8	0.50	µg/kg	<0.50	----	<0.50	----	----
Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	----	<0.50	----	----
Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	----	<0.50	----	----
gamma-BHC	58-89-9	0.25	µg/kg	<0.25	----	<0.25	----	----
Methoxychlor	72-43-5	0.50	µg/kg	<0.50	----	<0.50	----	----
cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	----	<0.25	----	----
trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	----	<0.25	----	----
^ Total Chlordane (sum)	----	0.25	µg/kg	<0.25	----	<0.25	----	----
Oxychlordane	27304-13-8	0.50	µg/kg	<0.50	----	<0.50	----	----
EP131B: Polychlorinated Biphenyls (as Aroclors)								
^ Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	----	<5.0	----	----
Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	----	<5.0	----	----
Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	----	<5.0	----	----
Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	----	<5.0	----	----
Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	----	<5.0	----	----
Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	----	<5.0	----	----
Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	----	<5.0	----	----
Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	----	<5.0	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	5	µg/kg	----	----	5	----	----
2-Methylnaphthalene	91-57-6	5	µg/kg	----	----	<5	----	----
Acenaphthylene	208-96-8	4	µg/kg	----	----	<4	----	----
Acenaphthene	83-32-9	4	µg/kg	----	----	<4	----	----
Fluorene	86-73-7	4	µg/kg	----	----	<4	----	----
Phenanthrene	85-01-8	4	µg/kg	----	----	4	----	----
Anthracene	120-12-7	4	µg/kg	----	----	<4	----	----
Fluoranthene	206-44-0	4	µg/kg	----	----	5	----	----
Pyrene	129-00-0	4	µg/kg	----	----	4	----	----
Benz(a)anthracene	56-55-3	4	µg/kg	----	----	<4	----	----
Chrysene	218-01-9	4	µg/kg	----	----	<4	----	----
Benzo(b)fluoranthene	205-99-2	4	µg/kg	----	----	5	----	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	----	----	<4	----	----
Benzo(e)pyrene	192-97-2	4	µg/kg	----	----	<4	----	----



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Sub-Matrix: **SEDIMENT**

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Compound	CAS Number	LOR	Unit	VCSD_2.1-3.1	VCSE_0.6-0.8	VCSA(0-0.5)	VCSA0.5-1	VCSA1.5-2
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-026	ES1125458-027	ES1125458-028	ES1125458-029	ES1125458-030
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(a)pyrene	50-32-8	4	µg/kg	----	----	<4	----	----
Perylene	198-55-0	4	µg/kg	----	----	<4	----	----
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	----	----	<4	----	----
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	----	----	<4	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	----	----	<4	----	----
Coronene	191-07-1	5	µg/kg	----	----	<5	----	----
^ Sum of PAHs	----	4	µg/kg	----	----	23	----	----
EP074S: VOC Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	82.4	----	80.5	----	----
Toluene-D8	2037-26-5	0.1	%	95.8	----	93.9	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	89.0	----	88.2	----	----
EP075S: Acid Extractable Surrogates								
2-Fluorophenol	367-12-4	0.1	%	123	----	87.2	----	----
Phenol-d6	13127-88-3	0.1	%	102	----	67.8	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%	104	----	66.7	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%	112	----	88.5	----	----
EP075T: Base/Neutral Extractable Surrogates								
Nitrobenzene-D5	4165-60-0	0.1	%	117	----	85.8	----	----
1.2-Dichlorobenzene-D4	2199-69-1	0.1	%	96.7	----	73.6	----	----
2-Fluorobiphenyl	321-60-8	0.1	%	101	----	88.8	----	----
Anthracene-d10	1719-06-8	0.1	%	105	----	87.3	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	100	----	88.8	----	----
EP080-SD: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	82.2	----	82.0	----	----
Toluene-D8	2037-26-5	0.1	%	105	----	104	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	87.6	----	83.5	----	----
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	59.7	22.2	51.5	77.2	85.8
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	57.5	----	55.0	----	----
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	24.8	----	31.9	----	----
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	29.4	----	44.0	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	----	----	98.6	----	----



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				VCSD_2.1-3.1	VCSE_0.6-0.8	VCSA(0-0.5)	VCSA0.5-1	VCSA1.5-2
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
<i>Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	ES1125458-026	ES1125458-027	ES1125458-028	ES1125458-029	ES1125458-030
EP132T: Base/Neutral Extractable Surrogates - Continued								
Anthracene-d10	1719-06-8	0.1	%	----	----	97.4	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	----	----	85.4	----	----



Analytical Results

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Compound	CAS Number	LOR	Unit	VCSB 0-0.8	VCSB 0.8-1.3	VCSB 1.3-1.6	VCSB 1.3-1.6	VCSB 1.3-1.6	VCSD 0-0.5	VCSD 1.8-2.1
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-031	ES1125458-032	ES1125458-033	ES1125458-033	ES1125458-033	ES1125458-034	ES1125458-035
EA037: Ass Field Screening Analysis										
pH (F)	----	0.1	pH Unit	8.2	7.0	4.9	----	----	----	----
pH (Fox)	----	0.1	pH Unit	6.1	1.5	1.5	----	----	----	----
Reaction Rate	----	1	-	2	4	4	----	----	----	----
EA055: Moisture Content										
Moisture Content (dried @ 103°C)	----	1.0	%	27.5	33.3	16.6	61.3	18.0	18.0	18.0
EG005-SD: Total Metals in Sediments by ICP-AES										
Aluminium	7429-90-5	50	mg/kg	----	----	----	----	----	----	390
Iron	7439-89-6	50	mg/kg	----	----	----	----	----	----	34500
EG020-SD: Total Metals in Sediments by ICPMS										
Antimony	7440-36-0	0.50	mg/kg	----	----	----	----	----	----	<0.50
Arsenic	7440-38-2	1.00	mg/kg	----	----	----	----	----	----	17.1
Cadmium	7440-43-9	0.1	mg/kg	----	----	----	----	----	----	<0.1
Chromium	7440-47-3	1.0	mg/kg	----	----	----	----	----	----	<1.0
Copper	7440-50-8	1.0	mg/kg	----	----	----	----	----	----	<1.0
Cobalt	7440-48-4	0.5	mg/kg	----	----	----	----	----	----	<0.5
Lead	7439-92-1	1.0	mg/kg	----	----	----	----	----	----	<1.0
Manganese	7439-96-5	10	mg/kg	----	----	----	----	----	----	<10
Nickel	7440-02-0	1.0	mg/kg	----	----	----	----	----	----	<1.0
Selenium	7782-49-2	0.1	mg/kg	----	----	----	----	----	----	0.4
Silver	7440-22-4	0.1	mg/kg	----	----	----	----	----	----	<0.1
Vanadium	7440-62-2	2.0	mg/kg	----	----	----	----	----	----	<2.0
Zinc	7440-66-6	1.0	mg/kg	----	----	----	----	----	----	2.2
EG035T: Total Recoverable Mercury by FIMS										
Mercury	7439-97-6	0.01	mg/kg	----	----	----	----	----	----	<0.01
EP003: Total Organic Carbon (TOC) in Soil										
Total Organic Carbon	----	0.02	%	0.69	7.98	1.30	34.7	0.88	0.88	0.88
EP074A: Monocyclic Aromatic Hydrocarbons										
Benzene	71-43-2	0.2	mg/kg	----	----	----	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	----	----	----	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	----	----	----	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	----	----	<0.5	<0.5	<0.5	<0.5
Styrene	100-42-5	0.5	mg/kg	----	----	----	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	----	----	----	<0.5	<0.5	<0.5	<0.5
Isopropylbenzene	98-82-8	0.5	mg/kg	----	----	----	<0.5	<0.5	<0.5	<0.5
n-Propylbenzene	103-65-1	0.5	mg/kg	----	----	----	<0.5	<0.5	<0.5	<0.5
1.3.5-Trimethylbenzene	108-67-8	0.5	mg/kg	----	----	----	<0.5	<0.5	<0.5	<0.5



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

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Compound	CAS Number	LOR	Unit	VCSB 0-0.8	VCSB 0.8-1.3	VCSB 1.3-1.6	VCSB 1.3-1.6	VCSB 1.3-1.6	VCSD 0-0.5	VCSD 1.8-2.1
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-031	ES1125458-032	ES1125458-033	ES1125458-033	ES1125458-033	ES1125458-034	ES1125458-035
EP074A: Monocyclic Aromatic Hydrocarbons - Continued										
sec-Butylbenzene	135-98-8	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
1,2,4-Trimethylbenzene	95-63-6	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
tert-Butylbenzene	98-06-6	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
p-Isopropyltoluene	99-87-6	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
n-Butylbenzene	104-51-8	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
EP074B: Oxygenated Compounds										
Vinyl Acetate	108-05-4	5	mg/kg	----	----	----	----	----	<5	<5
2-Butanone (MEK)	78-93-3	5	mg/kg	----	----	----	----	----	<5	<5
4-Methyl-2-pentanone (MIBK)	108-10-1	5	mg/kg	----	----	----	----	----	<5	<5
2-Hexanone (MBK)	591-78-6	5	mg/kg	----	----	----	----	----	<5	<5
EP074C: Sulfonated Compounds										
Carbon disulfide	75-15-0	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
EP074D: Fumigants										
2,2-Dichloropropane	594-20-7	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
1,2-Dichloropropane	78-87-5	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
cis-1,3-Dichloropropylene	10061-01-5	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
trans-1,3-Dichloropropylene	10061-02-6	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
1,2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
EP074E: Halogenated Aliphatic Compounds										
Dichlorodifluoromethane	75-71-8	5	mg/kg	----	----	----	----	----	<5	<5
Chloromethane	74-87-3	5	mg/kg	----	----	----	----	----	<5	<5
Vinyl chloride	75-01-4	5	mg/kg	----	----	----	----	----	<5	<5
Bromomethane	74-83-9	5	mg/kg	----	----	----	----	----	<5	<5
Chloroethane	75-00-3	5	mg/kg	----	----	----	----	----	<5	<5
Trichlorofluoromethane	75-69-4	5	mg/kg	----	----	----	----	----	<5	<5
1,1-Dichloroethene	75-35-4	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Iodomethane	74-88-4	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
trans-1,2-Dichloroethene	156-60-5	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
1,1-Dichloroethane	75-34-3	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
cis-1,2-Dichloroethene	156-59-2	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
1,1,1-Trichloroethane	71-55-6	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
1,1-Dichloropropylene	563-58-6	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Carbon Tetrachloride	56-23-5	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
1,2-Dichloroethane	107-06-2	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Trichloroethene	79-01-6	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Dibromomethane	74-95-3	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VCSB 0-0.8	VCSB 0.8-1.3	VCSB 1.3-1.6	VCSB 1.6-1.8	VCSB 1.8-2.1
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-031	ES1125458-032	ES1125458-033	ES1125458-034	ES1125458-035
EP074E: Halogenated Aliphatic Compounds - Continued								
1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	----	----	----	<0.5	<0.5
1.3-Dichloropropane	142-28-9	0.5	mg/kg	----	----	----	<0.5	<0.5
Tetrachloroethene	127-18-4	0.5	mg/kg	----	----	----	<0.5	<0.5
1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	----	----	----	<0.5	<0.5
trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg	----	----	----	<0.5	<0.5
cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	----	----	----	<0.5	<0.5
1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	----	----	----	<0.5	<0.5
1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	----	----	----	<0.5	<0.5
Pentachloroethane	76-01-7	0.5	mg/kg	----	----	----	<0.5	<0.5
1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	----	----	----	<0.5	<0.5
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	0.5	mg/kg	----	----	----	<0.5	<0.5
Bromobenzene	108-86-1	0.5	mg/kg	----	----	----	<0.5	<0.5
2-Chlorotoluene	95-49-8	0.5	mg/kg	----	----	----	<0.5	<0.5
4-Chlorotoluene	106-43-4	0.5	mg/kg	----	----	----	<0.5	<0.5
1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	----	----	----	<0.5	<0.5
EP074G: Trihalomethanes								
Chloroform	67-66-3	0.5	mg/kg	----	----	----	<0.5	<0.5
Bromodichloromethane	75-27-4	0.5	mg/kg	----	----	----	<0.5	<0.5
Dibromochloromethane	124-48-1	0.5	mg/kg	----	----	----	<0.5	<0.5
Bromoform	75-25-2	0.5	mg/kg	----	----	----	<0.5	<0.5
EP075A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	----	----	----	1.0	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg	----	----	----	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg	----	----	----	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	----	----	----	2.2	<0.5
2-Nitrophenol	88-75-5	0.5	mg/kg	----	----	----	<0.5	<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	----	----	----	<0.5	<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	----	----	----	<0.5	<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	----	----	----	<0.5	<0.5
4-Chloro-3-Methylphenol	59-50-7	0.5	mg/kg	----	----	----	<0.5	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	----	----	----	<0.5	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	----	----	----	<0.5	<0.5
Pentachlorophenol	87-86-5	1	mg/kg	----	----	----	<1	<1
EP075B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	----	----	----	<0.5	<0.5



Analytical Results

Sub-Matrix: SEDIMENT

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VCSB 0-0.8	VCSB 0.8-1.3	VCSB 1.3-1.6	VCSB 1.3-1.6	VCSB 1.3-1.6	VCSB 1.3-1.6	VCSB 1.3-1.6
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-031	ES1125458-032	ES1125458-033	ES1125458-033	ES1125458-033	ES1125458-034	ES1125458-035
EP075B: Polynuclear Aromatic Hydrocarbons - Continued										
2-Methylnaphthalene	91-57-6	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
2-Chloronaphthalene	91-58-7	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	----	----	----	----	----	<1	<1
7,12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
3-Methylcholanthrene	56-49-5	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
^ Sum of PAHs	----	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
EP075C: Phthalate Esters										
Dimethyl phthalate	131-11-3	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Diethyl phthalate	84-66-2	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Di-n-butyl phthalate	84-74-2	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Butyl benzyl phthalate	85-68-7	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
bis(2-ethylhexyl) phthalate	117-81-7	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Di-n-octylphthalate	117-84-0	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
EP075D: Nitrosamines										
N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
N-Nitrosopyrrolidine	930-55-2	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
N-Nitrosomorpholine	59-89-2	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
N-Nitrosopiperidine	100-75-4	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VCSB 0-0.8	VCSB 0.8-1.3	VCSB 1.3-1.6	VCSB 1.3-1.6	VCSB 1.3-1.6	VCSD 0-0.5	VCSD 1.8-2.1
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-031	ES1125458-032	ES1125458-033	ES1125458-033	ES1125458-033	ES1125458-034	ES1125458-035
EP075D: Nitrosamines - Continued										
N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Methapyrilene	91-80-5	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
EP075E: Nitroaromatics and Ketones										
2-Picoline	109-06-8	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Acetophenone	98-86-2	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Nitrobenzene	98-95-3	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Isophorone	78-59-1	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
2,6-Dinitrotoluene	606-20-2	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
2,4-Dinitrotoluene	121-14-2	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
1-Naphthylamine	134-32-7	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Azobenzene	103-33-3	1	mg/kg	----	----	----	----	----	<1	<1
1,3,5-Trinitrobenzene	99-35-4	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Phenacetin	62-44-2	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
4-Aminobiphenyl	92-67-1	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Pentachloronitrobenzene	82-68-8	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Pronamide	23950-58-5	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Chlorobenzilate	510-15-6	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
EP075F: Haloethers										
Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
EP075G: Chlorinated Hydrocarbons										
1,3-Dichlorobenzene	541-73-1	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
1,4-Dichlorobenzene	106-46-7	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
1,2-Dichlorobenzene	95-50-1	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Hexachloroethane	67-72-1	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
1,2,4-Trichlorobenzene	120-82-1	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Hexachloropropylene	1888-71-7	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Hexachlorobutadiene	87-68-3	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Hexachlorocyclopentadiene	77-47-4	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5
Pentachlorobenzene	608-93-5	0.5	mg/kg	----	----	----	----	----	<0.5	<0.5



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VCSB 0-0.8	VCSB 0.8-1.3	VCSB 1.3-1.6	VCSB 1.3-1.6	VCSB 1.3-1.6	VCSB 1.3-1.6	VCSB 1.3-1.6	VCSB 1.3-1.6	VCSB 1.3-1.6	VCSB 1.3-1.6
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-031	ES1125458-032	ES1125458-033	ES1125458-033	ES1125458-033	ES1125458-033	ES1125458-033	ES1125458-033	ES1125458-033	ES1125458-033
EP075G: Chlorinated Hydrocarbons - Continued													
Hexachlorobenzene (HCB)	118-74-1	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
EP075H: Anilines and Benzidines													
Aniline	62-53-3	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
4-Chloroaniline	106-47-8	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
2-Nitroaniline	88-74-4	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
3-Nitroaniline	99-09-2	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
Dibenzofuran	132-64-9	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
4-Nitroaniline	100-01-6	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
Carbazole	86-74-8	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
3,3'-Dichlorobenzidine	91-94-1	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
EP075I: Organochlorine Pesticides													
alpha-BHC	319-84-6	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
beta-BHC	319-85-7	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
gamma-BHC	58-89-9	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
delta-BHC	319-86-8	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
Heptachlor	76-44-8	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
Aldrin	309-00-2	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
Heptachlor epoxide	1024-57-3	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
alpha-Endosulfan	959-98-8	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
4,4'-DDE	72-55-9	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
Dieldrin	60-57-1	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
Endrin	72-20-8	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
beta-Endosulfan	33213-65-9	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
4,4'-DDD	72-54-8	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
Endosulfan sulfate	1031-07-8	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
4,4'-DDT	50-29-3	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
EP075J: Organophosphorus Pesticides													
Dichlorvos	62-73-7	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
Dimethoate	60-51-5	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
Diazinon	333-41-5	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
Malathion	121-75-5	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
Fenthion	55-38-9	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
Chlorpyrifos	2921-88-2	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
Pirimphos-ethyl	23505-41-1	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5
Chlorfenvinphos	470-90-6	0.5	mg/kg	----	----	----	----	----	----	----	<0.5	<0.5	<0.5



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	VCSB 0-0.8	VCSB 0.8-1.3	VCSB 1.3-1.6	VCSD 0-0.5	VCSD 1.8-2.1
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-031	ES1125458-032	ES1125458-033	ES1125458-034	ES1125458-035
EP075J: Organophosphorus Pesticides - Continued								
Prothiofos	34643-46-4	0.5	mg/kg	----	----	----	<0.5	<0.5
Ethion	563-12-2	0.5	mg/kg	----	----	----	<0.5	<0.5
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	3	mg/kg	----	----	----	----	<3
C10 - C14 Fraction	----	3	mg/kg	<3	----	----	----	----
C15 - C28 Fraction	----	3	mg/kg	33	----	----	----	----
C29 - C36 Fraction	----	5	mg/kg	24	----	----	----	----
^ C10 - C36 Fraction (sum)	----	3	mg/kg	57	----	----	----	----
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons								
C6 - C10 Fraction	----	3	mg/kg	----	----	----	----	<3
EP080-SD: BTEXN								
Benzene	71-43-2	0.2	mg/kg	----	----	----	----	<0.2
Toluene	108-88-3	0.2	mg/kg	----	----	----	----	<0.2
Ethylbenzene	100-41-4	0.2	mg/kg	----	----	----	----	<0.2
meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	----	----	----	----	<0.2
ortho-Xylene	95-47-6	0.2	mg/kg	----	----	----	----	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg	----	----	----	----	<0.5
^ Sum of BTEX	----	0.2	mg/kg	----	----	----	----	<0.2
Naphthalene	91-20-3	0.2	mg/kg	----	----	----	----	<0.2
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	215	2.3	<0.5	2.4	<0.5
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Bromophos-ethyl	4824-78-6	10	µg/kg	----	----	----	----	<10
Carbophenothion	786-19-6	10	µg/kg	----	----	----	----	<10
Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	----	----	----	----	<10.0
Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	----	----	----	----	<10
Chlorpyrifos	2921-88-2	10	µg/kg	----	----	----	----	<10
Chlorpyrifos-methyl	5598-13-0	10	µg/kg	----	----	----	----	<10
Demeton-S-methyl	919-86-8	10	µg/kg	----	----	----	----	<10
Diazinon	333-41-5	10	µg/kg	----	----	----	----	<10
Dichlorvos	62-73-7	10	µg/kg	----	----	----	----	<10
Dimethoate	60-51-5	10	µg/kg	----	----	----	----	<10
Ethion	563-12-2	10	µg/kg	----	----	----	----	<10
Fenamiphos	22224-92-6	10	µg/kg	----	----	----	----	<10
Fenthion	55-38-9	10	µg/kg	----	----	----	----	<10
Malathion	121-75-5	10	µg/kg	----	----	----	----	<10



Analytical Results

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Compound	CAS Number	LOR	Unit	VCSB 0-0.8	VCSB 0.8-1.3	VCSB 1.3-1.6	VCSB 1.3-1.6	VCSB 1.3-1.6	VCSB 1.3-1.6	VCSB 1.3-1.6
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-031	ES1125458-032	ES1125458-033	ES1125458-033	ES1125458-033	ES1125458-034	ES1125458-035
EP131B: Polychlorinated Biphenyls (as Aroclors) - Continued										
Aroclor 1232	11141-16-5	5.0	µg/kg	----	----	----	----	----	----	<5.0
Aroclor 1242	53469-21-9	5.0	µg/kg	----	----	----	----	----	----	<5.0
Aroclor 1248	12672-29-6	5.0	µg/kg	----	----	----	----	----	----	<5.0
Aroclor 1254	11097-69-1	5.0	µg/kg	----	----	----	----	----	----	<5.0
Aroclor 1260	11096-82-5	5.0	µg/kg	----	----	----	----	----	----	<5.0
EP132B: Polynuclear Aromatic Hydrocarbons										
Naphthalene	91-20-3	5	µg/kg	31	----	----	----	----	----	----
2-Methylnaphthalene	91-57-6	5	µg/kg	8	----	----	----	----	----	----
Acenaphthylene	208-96-8	4	µg/kg	10	----	----	----	----	----	----
Acenaphthene	83-32-9	4	µg/kg	24	----	----	----	----	----	----
Fluorene	86-73-7	4	µg/kg	19	----	----	----	----	----	----
Phenanthrene	85-01-8	4	µg/kg	177	----	----	----	----	----	----
Anthracene	120-12-7	4	µg/kg	41	----	----	----	----	----	----
Fluoranthene	206-44-0	4	µg/kg	178	----	----	----	----	----	----
Pyrene	129-00-0	4	µg/kg	154	----	----	----	----	----	----
Benz(a)anthracene	56-55-3	4	µg/kg	89	----	----	----	----	----	----
Chrysene	218-01-9	4	µg/kg	73	----	----	----	----	----	----
Benzo(b)fluoranthene	205-99-2	4	µg/kg	96	----	----	----	----	----	----
Benzo(k)fluoranthene	207-08-9	4	µg/kg	52	----	----	----	----	----	----
Benzo(e)pyrene	192-97-2	4	µg/kg	51	----	----	----	----	----	----
Benzo(a)pyrene	50-32-8	4	µg/kg	91	----	----	----	----	----	----
Perylene	198-55-0	4	µg/kg	34	----	----	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	4	µg/kg	64	----	----	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	4	µg/kg	21	----	----	----	----	----	----
Indeno(1,2,3.cd)pyrene	193-39-5	4	µg/kg	54	----	----	----	----	----	----
Coronene	191-07-1	5	µg/kg	14	----	----	----	----	----	----
^ Sum of PAHs	----	4	µg/kg	1280	----	----	----	----	----	----
EP074S: VOC Surrogates										
1,2-Dichloroethane-D4	17060-07-0	0.1	%	----	----	----	----	----	87.3	95.2
Toluene-D8	2037-26-5	0.1	%	----	----	----	----	----	97.4	99.1
4-Bromofluorobenzene	460-00-4	0.1	%	----	----	----	----	----	87.8	99.2
EP075S: Acid Extractable Surrogates										
2-Fluorophenol	367-12-4	0.1	%	----	----	----	----	----	91.6	94.5
Phenol-d6	13127-88-3	0.1	%	----	----	----	----	----	73.0	63.9
2-Chlorophenol-D4	93951-73-6	0.1	%	----	----	----	----	----	78.4	67.2
2,4,6-Tribromophenol	118-79-6	0.1	%	----	----	----	----	----	107	89.0



Analytical Results

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Compound	CAS Number	LOR	Unit	VCSB 0-0.8	VCSB 0.8-1.3	VCSB 1.3-1.6	VCSD 0-0.5	VCSD 1.8-2.1
				18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00
				ES1125458-031	ES1125458-032	ES1125458-033	ES1125458-034	ES1125458-035
EP075T: Base/Neutral Extractable Surrogates								
Nitrobenzene-D5	4165-60-0	0.1	%	----	----	----	84.0	78.0
1,2-Dichlorobenzene-D4	2199-69-1	0.1	%	----	----	----	72.3	67.0
2-Fluorobiphenyl	321-60-8	0.1	%	----	----	----	85.8	79.4
Anthracene-d10	1719-06-8	0.1	%	----	----	----	82.4	74.4
4-Terphenyl-d14	1718-51-0	0.1	%	----	----	----	80.9	75.8
EP080-SD: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	----	----	----	----	92.3
Toluene-D8	2037-26-5	0.1	%	----	----	----	----	109
4-Bromofluorobenzene	460-00-4	0.1	%	----	----	----	----	88.8
EP090S: Organotin Surrogate								
Tripopyltin	----	0.1	%	62.8	63.3	76.1	50.3	54.0
EP130S: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	----	----	----	----	78.6
EP131S: OC Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	----	----	----	----	55.4
EP131T: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	----	----	----	----	74.8
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	83.9	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%	119	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	104	----	----	----	----



Analytical Results

Sub-Matrix: **SEDIMENT**

				Client sample ID					
				Client sampling date / time					
				VCSE 0-0.6	VCSE 1-1.6				
				18-NOV-2011 15:00	18-NOV-2011 15:00				
Compound	CAS Number	LOR	Unit	ES1125458-036	ES1125458-037				
EA150: Particle Sizing									
+75µm	----	1	%	66	70	----	----	----	----
+150µm	----	1	%	59	59	----	----	----	----
+300µm	----	1	%	48	29	----	----	----	----
+425µm	----	1	%	43	16	----	----	----	----
+600µm	----	1	%	41	11	----	----	----	----
+1180µm	----	1	%	36	8	----	----	----	----
+2.36mm	----	1	%	23	4	----	----	----	----
+4.75mm	----	1	%	3	2	----	----	----	----
+9.5mm	----	1	%	<1	1	----	----	----	----
+19.0mm	----	1	%	<1	<1	----	----	----	----
+37.5mm	----	1	%	<1	<1	----	----	----	----
+75.0mm	----	1	%	<1	<1	----	----	----	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%	55.9	40.6	----	----	----	----
EA150: Soil Classification based on Particle Size									
Fines (<75 µm)	----	1	%	34	30	----	----	----	----
Sand (>75 µm)	----	1	%	43	66	----	----	----	----
Gravel (>2mm)	----	1	%	23	4	----	----	----	----
Cobbles (>6cm)	----	1	%	<1	<1	----	----	----	----
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%	32.3	7.76	----	----	----	----
EP074A: Monocyclic Aromatic Hydrocarbons									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	----	----	----	----
Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	----	----	----	----
Isopropylbenzene	98-82-8	0.5	mg/kg	<0.5	<0.5	----	----	----	----
n-Propylbenzene	103-65-1	0.5	mg/kg	<0.5	<0.5	----	----	----	----
1.3.5-Trimethylbenzene	108-67-8	0.5	mg/kg	<0.5	<0.5	----	----	----	----
sec-Butylbenzene	135-98-8	0.5	mg/kg	<0.5	<0.5	----	----	----	----
1.2.4-Trimethylbenzene	95-63-6	0.5	mg/kg	<0.5	<0.5	----	----	----	----
tert-Butylbenzene	98-06-6	0.5	mg/kg	<0.5	<0.5	----	----	----	----
p-Isopropyltoluene	99-87-6	0.5	mg/kg	<0.5	<0.5	----	----	----	----
n-Butylbenzene	104-51-8	0.5	mg/kg	<0.5	<0.5	----	----	----	----



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				VCSE 0-0.6	VCSE 1-1.6	----	----	----
				18-NOV-2011 15:00	18-NOV-2011 15:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1125458-036	ES1125458-037	----	----	----
EP074B: Oxygenated Compounds								
Vinyl Acetate	108-05-4	5	mg/kg	<5	<5	----	----	----
2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	----	----	----
4-Methyl-2-pentanone (MIBK)	108-10-1	5	mg/kg	<5	<5	----	----	----
2-Hexanone (MBK)	591-78-6	5	mg/kg	<5	<5	----	----	----
EP074C: Sulfonated Compounds								
Carbon disulfide	75-15-0	0.5	mg/kg	<0.5	<0.5	----	----	----
EP074D: Fumigants								
2,2-Dichloropropane	594-20-7	0.5	mg/kg	<0.5	<0.5	----	----	----
1,2-Dichloropropane	78-87-5	0.5	mg/kg	<0.5	<0.5	----	----	----
cis-1,3-Dichloropropylene	10061-01-5	0.5	mg/kg	<0.5	<0.5	----	----	----
trans-1,3-Dichloropropylene	10061-02-6	0.5	mg/kg	<0.5	<0.5	----	----	----
1,2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	<0.5	<0.5	----	----	----
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	5	mg/kg	<5	<5	----	----	----
Chloromethane	74-87-3	5	mg/kg	<5	<5	----	----	----
Vinyl chloride	75-01-4	5	mg/kg	<5	<5	----	----	----
Bromomethane	74-83-9	5	mg/kg	<5	<5	----	----	----
Chloroethane	75-00-3	5	mg/kg	<5	<5	----	----	----
Trichlorofluoromethane	75-69-4	5	mg/kg	<5	<5	----	----	----
1,1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	<0.5	----	----	----
Iodomethane	74-88-4	0.5	mg/kg	<0.5	<0.5	----	----	----
trans-1,2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	<0.5	----	----	----
1,1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	<0.5	----	----	----
cis-1,2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	<0.5	----	----	----
1,1,1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	<0.5	----	----	----
1,1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	<0.5	----	----	----
Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	<0.5	----	----	----
1,2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	<0.5	----	----	----
Trichloroethene	79-01-6	0.5	mg/kg	<0.5	<0.5	----	----	----
Dibromomethane	74-95-3	0.5	mg/kg	<0.5	<0.5	----	----	----
1,1,2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	<0.5	----	----	----
1,3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	<0.5	----	----	----
1,1,1,2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	<0.5	----	----	----
trans-1,4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	<0.5	----	----	----
cis-1,4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	<0.5	----	----	----



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				VCSE 0-0.6	VCSE 1-1.6	----	----	----
				18-NOV-2011 15:00	18-NOV-2011 15:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1125458-036	ES1125458-037	----	----	----
EP074E: Halogenated Aliphatic Compounds - Continued								
1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	<0.5	----	----	----
1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	<0.5	----	----	----
Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	<0.5	----	----	----
1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	<0.5	----	----	----
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Bromobenzene	108-86-1	0.5	mg/kg	<0.5	<0.5	----	----	----
2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	<0.5	----	----	----
4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	<0.5	----	----	----
1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	<0.5	----	----	----
EP074G: Trihalomethanes								
Chloroform	67-66-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	<0.5	----	----	----
Dibromochloromethane	124-48-1	0.5	mg/kg	<0.5	<0.5	----	----	----
Bromoform	75-25-2	0.5	mg/kg	<0.5	<0.5	----	----	----
EP075A: Phenolic Compounds								
Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	----	----	----
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	----	----	----
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	----	----	----
3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.5	<0.5	----	----	----
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	----	----	----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	----	----	----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	----	----	----
2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	----	----	----
4-Chloro-3-Methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	----	----	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	----	----	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	----	----	----
Pentachlorophenol	87-86-5	1	mg/kg	<1	<1	----	----	----
EP075B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	----	----	----
2-Methylnaphthalene	91-57-6	0.5	mg/kg	<0.5	<0.5	----	----	----
2-Chloronaphthalene	91-58-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	----	----	----



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				VCSE 0-0.6	VCSE 1-1.6	----	----	----
				18-NOV-2011 15:00	18-NOV-2011 15:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1125458-036	ES1125458-037	----	----	----
EP075B: Polynuclear Aromatic Hydrocarbons - Continued								
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	----	----	----
N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	<1	----	----	----
7.12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	----	----	----
3-Methylcholanthrene	56-49-5	0.5	mg/kg	<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	----	----	----
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Sum of PAHs	----	0.5	mg/kg	<0.5	<0.5	----	----	----
EP075C: Phthalate Esters								
Dimethyl phthalate	131-11-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Diethyl phthalate	84-66-2	0.5	mg/kg	<0.5	<0.5	----	----	----
Di-n-butyl phthalate	84-74-2	0.5	mg/kg	<0.5	<0.5	----	----	----
Butyl benzyl phthalate	85-68-7	0.5	mg/kg	<0.5	<0.5	----	----	----
bis(2-ethylhexyl) phthalate	117-81-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Di-n-octylphthalate	117-84-0	0.5	mg/kg	<0.5	<0.5	----	----	----
EP075D: Nitrosamines								
N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	<0.5	<0.5	----	----	----
N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	<0.5	<0.5	----	----	----
N-Nitrosopyrrolidine	930-55-2	0.5	mg/kg	<0.5	<0.5	----	----	----
N-Nitrosomorpholine	59-89-2	0.5	mg/kg	<0.5	<0.5	----	----	----
N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	<0.5	<0.5	----	----	----
N-Nitrosopiperidine	100-75-4	0.5	mg/kg	<0.5	<0.5	----	----	----
N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	<0.5	<0.5	----	----	----
N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	0.5	mg/kg	<0.5	<0.5	----	----	----
Methapyrilene	91-80-5	0.5	mg/kg	<0.5	<0.5	----	----	----
EP075E: Nitroaromatics and Ketones								
2-Picoline	109-06-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Acetophenone	98-86-2	0.5	mg/kg	<0.5	<0.5	----	----	----



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

				VCSE 0-0.6	VCSE 1-1.6	----	----	----
				18-NOV-2011 15:00	18-NOV-2011 15:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1125458-036	ES1125458-037	----	----	----
EP075E: Nitroaromatics and Ketones - Continued								
Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Isophorone	78-59-1	0.5	mg/kg	<0.5	<0.5	----	----	----
2,6-Dinitrotoluene	606-20-2	0.5	mg/kg	<0.5	<0.5	----	----	----
2,4-Dinitrotoluene	121-14-2	0.5	mg/kg	<0.5	<0.5	----	----	----
1-Naphthylamine	134-32-7	0.5	mg/kg	<0.5	<0.5	----	----	----
4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	<0.5	<0.5	----	----	----
5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Azobenzene	103-33-3	1	mg/kg	<1	<1	----	----	----
1,3,5-Trinitrobenzene	99-35-4	0.5	mg/kg	<0.5	<0.5	----	----	----
Phenacetin	62-44-2	0.5	mg/kg	<0.5	<0.5	----	----	----
4-Aminobiphenyl	92-67-1	0.5	mg/kg	<0.5	<0.5	----	----	----
Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Pronamide	23950-58-5	0.5	mg/kg	<0.5	<0.5	----	----	----
Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Chlorobenzilate	510-15-6	0.5	mg/kg	<0.5	<0.5	----	----	----
EP075F: Haloethers								
Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg	<0.5	<0.5	----	----	----
Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg	<0.5	<0.5	----	----	----
4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg	<0.5	<0.5	----	----	----
4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg	<0.5	<0.5	----	----	----
EP075G: Chlorinated Hydrocarbons								
1,3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	<0.5	----	----	----
1,4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	<0.5	----	----	----
1,2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	<0.5	----	----	----
Hexachloroethane	67-72-1	0.5	mg/kg	<0.5	<0.5	----	----	----
1,2,4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	<0.5	----	----	----
Hexachloropropylene	1888-71-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Hexachlorocyclopentadiene	77-47-4	0.5	mg/kg	<0.5	<0.5	----	----	----
Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	<0.5	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.5	mg/kg	<0.5	<0.5	----	----	----
EP075H: Anilines and Benzidines								
Aniline	62-53-3	0.5	mg/kg	<0.5	<0.5	----	----	----
4-Chloroaniline	106-47-8	0.5	mg/kg	<0.5	<0.5	----	----	----
2-Nitroaniline	88-74-4	0.5	mg/kg	<0.5	<0.5	----	----	----
3-Nitroaniline	99-09-2	0.5	mg/kg	<0.5	<0.5	----	----	----



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

				VCSE 0-0.6	VCSE 1-1.6	----	----	----
				18-NOV-2011 15:00	18-NOV-2011 15:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1125458-036	ES1125458-037	----	----	----
EP075H: Anilines and Benzidines - Continued								
Dibenzofuran	132-64-9	0.5	mg/kg	<0.5	<0.5	----	----	----
4-Nitroaniline	100-01-6	0.5	mg/kg	<0.5	<0.5	----	----	----
Carbazole	86-74-8	0.5	mg/kg	<0.5	<0.5	----	----	----
3,3'-Dichlorobenzidine	91-94-1	0.5	mg/kg	<0.5	<0.5	----	----	----
EP075I: Organochlorine Pesticides								
alpha-BHC	319-84-6	0.5	mg/kg	<0.5	<0.5	----	----	----
beta-BHC	319-85-7	0.5	mg/kg	<0.5	<0.5	----	----	----
gamma-BHC	58-89-9	0.5	mg/kg	<0.5	<0.5	----	----	----
delta-BHC	319-86-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Heptachlor	76-44-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Aldrin	309-00-2	0.5	mg/kg	<0.5	<0.5	----	----	----
Heptachlor epoxide	1024-57-3	0.5	mg/kg	<0.5	<0.5	----	----	----
alpha-Endosulfan	959-98-8	0.5	mg/kg	<0.5	<0.5	----	----	----
4,4'-DDE	72-55-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Dieldrin	60-57-1	0.5	mg/kg	<0.5	<0.5	----	----	----
Endrin	72-20-8	0.5	mg/kg	<0.5	<0.5	----	----	----
beta-Endosulfan	33213-65-9	0.5	mg/kg	<0.5	<0.5	----	----	----
4,4'-DDD	72-54-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Endosulfan sulfate	1031-07-8	0.5	mg/kg	<0.5	<0.5	----	----	----
4,4'-DDT	50-29-3	0.5	mg/kg	<0.5	<0.5	----	----	----
EP075J: Organophosphorus Pesticides								
Dichlorvos	62-73-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Dimethoate	60-51-5	0.5	mg/kg	<0.5	<0.5	----	----	----
Diazinon	333-41-5	0.5	mg/kg	<0.5	<0.5	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	<0.5	<0.5	----	----	----
Malathion	121-75-5	0.5	mg/kg	<0.5	<0.5	----	----	----
Fenthion	55-38-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Chlorpyrifos	2921-88-2	0.5	mg/kg	<0.5	<0.5	----	----	----
Pirimphos-ethyl	23505-41-1	0.5	mg/kg	<0.5	<0.5	----	----	----
Chlorfenvinphos	470-90-6	0.5	mg/kg	<0.5	<0.5	----	----	----
Prothiofos	34643-46-4	0.5	mg/kg	<0.5	<0.5	----	----	----
Ethion	563-12-2	0.5	mg/kg	<0.5	<0.5	----	----	----
EP090: Organotin Compounds								
Tributyltin	56573-85-4	0.5	µgSn/kg	102	178	----	----	----
EP074S: VOC Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	91.6	93.1	----	----	----



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

				VCSE 0-0.6	VCSE 1-1.6	----	----	----
				18-NOV-2011 15:00	18-NOV-2011 15:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1125458-036	ES1125458-037	----	----	----
EP074S: VOC Surrogates - Continued								
Toluene-D8	2037-26-5	0.1	%	104	109	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	95.2	105	----	----	----
EP075S: Acid Extractable Surrogates								
2-Fluorophenol	367-12-4	0.1	%	88.1	94.8	----	----	----
Phenol-d6	13127-88-3	0.1	%	89.3	69.0	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%	95.0	71.1	----	----	----
2.4.6-Tribromophenol	118-79-6	0.1	%	120	93.2	----	----	----
EP075T: Base/Neutral Extractable Surrogates								
Nitrobenzene-D5	4165-60-0	0.1	%	101	73.8	----	----	----
1.2-Dichlorobenzene-D4	2199-69-1	0.1	%	88.6	65.1	----	----	----
2-Fluorobiphenyl	321-60-8	0.1	%	96.0	76.8	----	----	----
Anthracene-d10	1719-06-8	0.1	%	95.7	73.7	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	94.8	71.5	----	----	----
EP090S: Organotin Surrogate								
Tripopyltin	----	0.1	%	36.6	36.4	----	----	----



Surrogate Control Limits

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP074S: VOC Surrogates			
1,2-Dichloroethane-D4	17060-07-0	70.1	130.9
Toluene-D8	2037-26-5	66.3	137.7
4-Bromofluorobenzene	460-00-4	60.3	136.3
EP075S: Acid Extractable Surrogates			
2-Fluorophenol	367-12-4	10.0	147.0
Phenol-d6	13127-88-3	12.5	110.6
2-Chlorophenol-D4	93951-73-6	10.0	116.8
2,4,6-Tribromophenol	118-79-6	10.0	120.1
EP075T: Base/Neutral Extractable Surrogates			
Nitrobenzene-D5	4165-60-0	13.3	124.5
1,2-Dichlorobenzene-D4	2199-69-1	11.9	103.9
2-Fluorobiphenyl	321-60-8	11.3	126.1
Anthracene-d10	1719-06-8	13.1	128.1
4-Terphenyl-d14	1718-51-0	10.0	134.7
EP080-SD: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	67	137
Toluene-D8	2037-26-5	74	134
4-Bromofluorobenzene	460-00-4	73	137
EP090S: Organotin Surrogate			
Tripropyltin	----	35	130
EP130S: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	27.8	149
EP131S: OC Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	136
EP131T: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	10	164
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	30	115
Anthracene-d10	1719-06-8	27	133
4-Terphenyl-d14	1718-51-0	18	137

QUALITY CONTROL REPORT

<p>Work Order : ES1125458</p> <p>Client : WORLEY PARSONS - INFRASTRUCTURE MWE</p> <p>Contact : MS ORLA MURRAY</p> <p>Address : Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060</p> <p>E-mail : orla.murray@worleyparsons.com</p> <p>Telephone : 8907 2131</p> <p>Facsimile : ----</p> <p>Project : CALTEX</p> <p>Site : ----</p> <p>C-O-C number : 211204-5</p> <p>Sampler : OM</p> <p>Order number : 301015-02448</p> <p>Quote number : EN/034/11</p>	<p>Page : 1 of 23</p> <p>Laboratory : Environmental Division Sydney</p> <p>Contact : Client Services</p> <p>Address : 277-289 Woodpark Road Smithfield NSW Australia 2164</p> <p>E-mail : sydney@alsglobal.com</p> <p>Telephone : +61-2-8784 8555</p> <p>Facsimile : +61-2-8784 8500</p> <p>QC Level : NEPM 1999 Schedule B(3) and ALS QCS3 requirement</p> <p>Date Samples Received : 18-NOV-2011</p> <p>Issue Date : 02-DEC-2011</p> <p>No. of samples received : 23</p> <p>No. of samples analysed : 22</p>
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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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Andrew Matheson	Senior Organic Instrument Chemist	Brisbane Organics
Dianne Blane	Laboratory Supervisor	Newcastle
Edwandy Fadjar	Organic Coordinator	Sydney Organics
Evie.Sidarta	Inorganic Chemist	Sydney Inorganics
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics
Stephen Hislop	Senior Inorganic Chemist	Stafford Minerals - AY
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ES1125458-019	VC5C 0-0.5	EA037: pH (F)	----	0.1	pH Unit	8.4	8.3	1.2	0% - 20%
		EA037: pH (Fox)	----	0.1	pH Unit	6.0	5.8	3.4	0% - 20%
ES1125429-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	7.6	8.0	4.6	No Limit
ES1125458-019	VC5C 0-0.5	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	22.7	21.6	5.2	0% - 20%
ES1125488-002	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	2.5	2.9	14.5	No Limit
ES1125682-007	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	18.1	18.2	0.0	0% - 50%
ES1125458-027	VCSE_0.6-0.8	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	27.8	28.1	1.2	0% - 20%
ES1125458-001	SS5A	EG005-SD: Aluminium	7429-90-5	50	mg/kg	900	840	6.8	0% - 50%
		EG005-SD: Iron	7439-89-6	50	mg/kg	780	680	14.2	0% - 50%
ES1125458-001	SS5A	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.1	<0.1	0.0	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	<0.50	<0.50	0.0	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	1.2	1.2	0.0	No Limit
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	<1.0	<1.0	0.0	No Limit
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	1.7	1.7	0.0	No Limit
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	<1.0	0.0	No Limit
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	3.1	3.0	4.8	No Limit
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	<1.00	<1.00	0.0	No Limit
		EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	<10	0.0	No Limit
EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	<2.0	<2.0	0.0	No Limit		
ES1125458-001	SS5A	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	<0.01	0.0	No Limit
ES1125458-001	SS5A	EP003: Total Organic Carbon	----	0.02	%	0.05	0.05	0.0	No Limit
ES1125458-027	VCSE_0.6-0.8	EP003: Total Organic Carbon	----	0.02	%	1.14	1.18	3.2	0% - 20%
ES1125458-037	VCSE 1-1.6	EP003: Total Organic Carbon	----	0.02	%	7.76	7.58	2.3	0% - 20%



Sub-Matrix: SOIL

				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
ES1125458-028	VCSA(0-0.5)	EP074: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit	
		EP074: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
			106-42-3							
		EP074: Styrene	100-42-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: Isopropylbenzene	98-82-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: n-Propylbenzene	103-65-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: 1,3,5-Trimethylbenzene	108-67-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: sec-Butylbenzene	135-98-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: 1,2,4-Trimethylbenzene	95-63-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: tert-Butylbenzene	98-06-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: p-Isopropyltoluene	99-87-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
EP074: n-Butylbenzene	104-51-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit			
ES1125458-028	VCSA(0-0.5)	EP074: Vinyl Acetate	108-05-4	5	mg/kg	<5	<5	0.0	No Limit	
		EP074: 2-Butanone (MEK)	78-93-3	5	mg/kg	<5	<5	0.0	No Limit	
		EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	5	mg/kg	<5	<5	0.0	No Limit	
		EP074: 2-Hexanone (MBK)	591-78-6	5	mg/kg	<5	<5	0.0	No Limit	
ES1125458-028	VCSA(0-0.5)	EP074: Carbon disulfide	75-15-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
ES1125458-028	VCSA(0-0.5)	EP074: 2,2-Dichloropropane	594-20-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: 1,2-Dichloropropane	78-87-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: cis-1,3-Dichloropropylene	10061-01-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: trans-1,3-Dichloropropylene	10061-02-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: 1,2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
ES1125458-028	VCSA(0-0.5)	EP074: 1,1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: Iodomethane	74-88-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: trans-1,2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: 1,1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: cis-1,2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: 1,1,1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: 1,1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: 1,2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	
		EP074: Dibromomethane	74-95-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit	



Sub-Matrix: SOIL

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ES1125458-028	VCSA(0-0.5)	EP074: 1.1.2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	5	mg/kg	<5	<5	0.0	No Limit
		EP074: Chloromethane	74-87-3	5	mg/kg	<5	<5	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	5	mg/kg	<5	<5	0.0	No Limit
		EP074: Bromomethane	74-83-9	5	mg/kg	<5	<5	0.0	No Limit
EP074: Chloroethane	75-00-3	5	mg/kg	<5	<5	0.0	No Limit		
EP074: Trichlorofluoromethane	75-69-4	5	mg/kg	<5	<5	0.0	No Limit		
ES1125458-028	VCSA(0-0.5)	EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Bromobenzene	108-86-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: 1.2.3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
ES1125458-028	VCSA(0-0.5)	EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Dibromochloromethane	124-48-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP074: Bromoform	75-25-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
ES1125779-002	Anonymous	EP075: Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 3- & 4-Methylphenol	1319-77-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4-Chloro-3-Methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Pentachlorophenol	87-86-5	1	mg/kg	<1	<1	0.0	No Limit



Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ES1125779-002	Anonymous	EP075: Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2-Methylnaphthalene	91-57-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2-Chloronaphthalene	91-58-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 3-Methylcholanthrene	56-49-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075: Benzo(b) & Benzo(k)fluoranthene	205-99-2 207-08-9	1	mg/kg	<1	<1	0.0	No Limit		
ES1125779-002	Anonymous	EP075: Dimethyl phthalate	131-11-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Diethyl phthalate	84-66-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Di-n-butyl phthalate	84-74-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Butyl benzyl phthalate	85-68-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: bis(2-ethylhexyl) phthalate	117-81-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Di-n-octylphthalate	117-84-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
ES1125779-002	Anonymous	EP075: N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: N-Nitrosopyrrolidine	930-55-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: N-Nitrosomorpholine	59-89-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: N-Nitrosopiperidine	100-75-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: N-Nitrosodiphenyl & Diphenylamine	86-30-6 122-39-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Methapyrilene	91-80-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit



Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ES1125779-002	Anonymous	EP075: 2-Picoline	109-06-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Acetophenone	98-86-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Isophorone	78-59-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2,6-Dinitrotoluene	606-20-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2,4-Dinitrotoluene	121-14-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 1-Naphthylamine	134-32-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 1,3,5-Trinitrobenzene	99-35-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Phenacetin	62-44-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4-Aminobiphenyl	92-67-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Pronamide	23950-58-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075: Chlorobenzilate	510-15-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit		
EP075: Azobenzene	103-33-3	1	mg/kg	<1	<1	0.0	No Limit		
ES1125779-002	Anonymous	EP075: Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
ES1125779-002	Anonymous	EP075: 1,3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 1,4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 1,2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Hexachloroethane	67-72-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 1,2,4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Hexachloropropylene	1888-71-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Hexachlorobenzene (HCB)	118-74-1	1.0	mg/kg	<1.0	<1.0	0.0	No Limit
EP075: Hexachlorocyclopentadiene	77-47-4	2.5	mg/kg	<2.5	<2.5	0.0	No Limit		
ES1125779-002	Anonymous	EP075: Aniline	62-53-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4-Chloroaniline	106-47-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 2-Nitroaniline	88-74-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 3-Nitroaniline	99-09-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Dibenzofuran	132-64-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4-Nitroaniline	100-01-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit



Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ES1125779-002	Anonymous	EP075: Carbazole	86-74-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 3,3'-Dichlorobenzidine	91-94-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
ES1125779-002	Anonymous	EP075: alpha-BHC	319-84-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: beta-BHC	319-85-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: gamma-BHC	58-89-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: delta-BHC	319-86-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Heptachlor	76-44-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Aldrin	309-00-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Heptachlor epoxide	1024-57-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: alpha-Endosulfan	959-98-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4,4'-DDE	72-55-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Dieldrin	60-57-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Endrin	72-20-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: beta-Endosulfan	33213-65-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: 4,4'-DDD	72-54-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Endosulfan sulfate	1031-07-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075: 4,4'-DDT	50-29-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit		
ES1125779-002	Anonymous	EP075: Dichlorvos	62-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Dimethoate	60-51-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Diazinon	333-41-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Malathion	121-75-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Fenthion	55-38-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Chlorpyrifos	2921-88-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Pirimphos-ethyl	23505-41-1	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Chlorfenvinphos	470-90-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075: Prothiofos	34643-46-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075: Ethion	563-12-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit		
ES1125458-001	SS5A	EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
ES1125458-006	SS5D	EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	<3	0.0	No Limit
		EP071-SD: C15 - C28 Fraction	----	3	mg/kg	60	56	5.9	0% - 50%
		EP071-SD: C29 - C36 Fraction	----	5	mg/kg	40	37	8.3	No Limit
ES1125458-001	SS5A	EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit



Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ES1125458-001	SS5A	EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: meta- & para-Xylene	108-38-3 106-42-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
ES1125458-001	SS5A	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
ES1125458-027	VCSE_0.6-0.8	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	47.6	55.3	15.0	0% - 20%
ES1125458-035	VCSD 1.8-2.1	EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	<0.5	0.0	No Limit
ES1125458-006	SS5D	EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Carbophenothion	786-19-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Diazinon	333-41-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Dichlorvos	62-73-7	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Dimethoate	60-51-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Ethion	563-12-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Fenthion	55-38-9	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Malathion	121-75-5	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Parathion	56-38-2	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	<10	0.0	No Limit
		EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	<10	0.0	No Limit
EP130: Prothiofos	34643-46-4	10	µg/kg	<10	<10	0.0	No Limit		
EP130: Chlorfenvinphos (E)	18708-86-6	10.0	µg/kg	<10.0	<10.0	0.0	No Limit		
ES1125458-006	SS5D	EP131A: gamma-BHC	58-89-9	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: cis-Chlordane	5103-71-9	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: trans-Chlordane	5103-74-2	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: Total Chlordane (sum)	----	0.25	µg/kg	<0.25	<0.25	0.0	No Limit
		EP131A: Aldrin	309-00-2	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-BHC	319-84-6	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-BHC	319-85-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: delta-BHC	319-86-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDD	72-54-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit



Sub-Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ES1125458-006	SS5D	EP131A: 4,4'-DDE	72-55-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: 4,4'-DDT	50-29-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Sum of DDD + DDE + DDT	----	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Dieldrin	60-57-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan sulfate	1031-07-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endosulfan (sum)	115-29-7	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin	72-20-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin aldehyde	7421-93-4	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Endrin ketone	53494-70-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor	76-44-8	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Heptachlor epoxide	1024-57-3	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.50	µg/kg	<0.50	<0.50	0.0	No Limit
EP131A: Methoxychlor	72-43-5	0.50	µg/kg	<0.50	<0.50	0.0	No Limit		
ES1125458-006	SS5D	EP131B: Total Polychlorinated biphenyls	----	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1016	12674-11-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1221	11104-28-2	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1232	11141-16-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1242	53469-21-9	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1248	12672-29-6	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1254	11097-69-1	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
		EP131B: Aroclor 1260	11096-82-5	5.0	µg/kg	<5.0	<5.0	0.0	No Limit
ES1125458-006	SS5D	EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	12	11	0.0	No Limit
		EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	8	6	35.7	No Limit
		EP132B-SD: Fluorene	86-73-7	4	µg/kg	6	7	0.0	No Limit
		EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	34	40	17.6	0% - 50%
		EP132B-SD: Anthracene	120-12-7	4	µg/kg	11	12	0.0	No Limit
		EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	50	52	5.3	0% - 50%
		EP132B-SD: Pyrene	129-00-0	4	µg/kg	47	49	4.3	0% - 50%
		EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	36	40	8.0	0% - 50%
		EP132B-SD: Chrysene	218-01-9	4	µg/kg	33	32	0.0	No Limit
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	50	50	0.0	0% - 50%
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	21	26	20.9	No Limit
		EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	28	30	6.4	No Limit
		EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	45	46	0.0	0% - 50%
		EP132B-SD: Perylene	198-55-0	4	µg/kg	15	16	7.6	No Limit
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	33	34	3.2	No Limit

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 Work Order : ES1125458
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE
 Project : CALTEX



Sub-Matrix: **SOIL**

				<i>Laboratory Duplicate (DUP) Report</i>					
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD (%)</i>	<i>Recovery Limits (%)</i>
ES1125458-006	SS5D	EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	6	6	0.0	No Limit
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	4	µg/kg	28	28	3.7	No Limit
		EP132B-SD: Sum of PAHs	----	4	µg/kg	482	510	5.6	0% - 20%
		EP132B-SD: Naphthalene	91-20-3	5	µg/kg	11	17	41.0	No Limit
		EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	<5	0.0	No Limit
		EP132B-SD: Coronene	191-07-1	5	µg/kg	8	8	0.0	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit					Low
EG005-SD: Total Metals in Sediments by ICP-AES (QCLot: 2058920)								
EG005-SD: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005-SD: Iron	7439-89-6	50	mg/kg	<50	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2058918)								
EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.11 mg/kg	# 73.5	74.2	126
EP003: Total Organic Carbon (TOC) in Soil (QCLot: 2060123)								
EP003: Total Organic Carbon	----	0.02	%	<0.02	100 %	101	70	130
EP003: Total Organic Carbon (TOC) in Soil (QCLot: 2060124)								
EP003: Total Organic Carbon	----	0.02	%	<0.02	100 %	101	70	130
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 2057948)								
EP074: Benzene	71-43-2	0.5	mg/kg	<0.5	1 mg/kg	88.2	68	128
EP074: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	91.4	65	133
EP074: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	93.5	65	127
EP074: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	95.7	69	127
EP074: Styrene	100-42-5	0.5	mg/kg	<0.5	1 mg/kg	91.9	64	126
EP074: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	93.1	70	128
EP074: Isopropylbenzene	98-82-8	0.5	mg/kg	<0.5	1 mg/kg	95.1	66	128
EP074: n-Propylbenzene	103-65-1	0.5	mg/kg	<0.5	1 mg/kg	88.2	63	129
EP074: 1,3,5-Trimethylbenzene	108-67-8	0.5	mg/kg	<0.5	1 mg/kg	88.8	63	129
EP074: sec-Butylbenzene	135-98-8	0.5	mg/kg	<0.5	1 mg/kg	88.6	64	130
EP074: 1,2,4-Trimethylbenzene	95-63-6	0.5	mg/kg	<0.5	1 mg/kg	86.9	63	129
EP074: tert-Butylbenzene	98-06-6	0.5	mg/kg	<0.5	1 mg/kg	89.6	63	129
EP074: p-Isopropyltoluene	99-87-6	0.5	mg/kg	<0.5	1 mg/kg	89.7	62	130
EP074: n-Butylbenzene	104-51-8	0.5	mg/kg	<0.5	1 mg/kg	89.6	61	131
EP074B: Oxygenated Compounds (QCLot: 2057948)								
EP074: Vinyl Acetate	108-05-4	1 5	mg/kg mg/kg	---- <5	10 mg/kg ----	# 17.5 ----	29.6 ----	156 ----
EP074: 2-Butanone (MEK)	78-93-3	1 5	mg/kg mg/kg	---- <5	10 mg/kg ----	91.2 ----	44 ----	158 ----
EP074: 4-Methyl-2-pentanone (MIBK)	108-10-1	1 5	mg/kg mg/kg	---- <5	10 mg/kg ----	90.1 ----	54 ----	138 ----
EP074: 2-Hexanone (MBK)	591-78-6	1 5	mg/kg mg/kg	---- <5	10 mg/kg ----	87.9 ----	54 ----	136 ----
EP074C: Sulfonated Compounds (QCLot: 2057948)								



Sub-Matrix: SOIL

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike	Spike Recovery (%)		Recovery Limits (%)	
					Concentration	LCS	Low	High	
EP074C: Sulfonated Compounds (QCLot: 2057948) - continued									
EP074: Carbon disulfide	75-15-0	0.5	mg/kg	<0.5	1 mg/kg	78.4	54	126	
EP074D: Fumigants (QCLot: 2057948)									
EP074: 2,2-Dichloropropane	594-20-7	0.5	mg/kg	<0.5	1 mg/kg	85.9	55	133	
EP074: 1,2-Dichloropropane	78-87-5	0.5	mg/kg	<0.5	1 mg/kg	87.7	69	127	
EP074: cis-1,3-Dichloropropylene	10061-01-5	0.5	mg/kg	<0.5	1 mg/kg	86.4	54	124	
EP074: trans-1,3-Dichloropropylene	10061-02-6	0.5	mg/kg	<0.5	1 mg/kg	91.8	51	125	
EP074: 1,2-Dibromoethane (EDB)	106-93-4	0.5	mg/kg	<0.5	1 mg/kg	92.5	66	126	
EP074E: Halogenated Aliphatic Compounds (QCLot: 2057948)									
EP074: Dichlorodifluoromethane	75-71-8	1	mg/kg	----	10 mg/kg	65.8	30	148	
		5	mg/kg	<5	----	----	----	----	
EP074: Chloromethane	74-87-3	1	mg/kg	----	10 mg/kg	77.7	41	141	
		5	mg/kg	<5	----	----	----	----	
EP074: Vinyl chloride	75-01-4	1	mg/kg	----	10 mg/kg	110	43	147	
		5	mg/kg	<5	----	----	----	----	
EP074: Bromomethane	74-83-9	1	mg/kg	----	10 mg/kg	83.2	47	141	
		5	mg/kg	<5	----	----	----	----	
EP074: Chloroethane	75-00-3	1	mg/kg	----	10 mg/kg	84.7	47	143	
		5	mg/kg	<5	----	----	----	----	
EP074: Trichlorofluoromethane	75-69-4	1	mg/kg	----	10 mg/kg	86.5	49	135	
		5	mg/kg	<5	----	----	----	----	
EP074: 1,1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	1 mg/kg	82.1	54	136	
EP074: Iodomethane	74-88-4	0.5	mg/kg	<0.5	1 mg/kg	70.0	43	129	
EP074: trans-1,2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	1 mg/kg	87.7	62	130	
EP074: 1,1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	1 mg/kg	88.7	66	132	
EP074: cis-1,2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	1 mg/kg	91.6	66	132	
EP074: 1,1,1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	1 mg/kg	77.9	62	126	
EP074: 1,1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	1 mg/kg	88.6	64	128	
EP074: Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	1 mg/kg	93.6	59	125	
EP074: 1,2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	1 mg/kg	84.5	70	132	
EP074: Trichloroethene	79-01-6	0.5	mg/kg	<0.5	1 mg/kg	89.8	65	131	
EP074: Dibromomethane	74-95-3	0.5	mg/kg	<0.5	1 mg/kg	86.3	65	127	
EP074: 1,1,1,2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	1 mg/kg	91.4	70	130	
EP074: 1,3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	1 mg/kg	89.6	72	128	
EP074: Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	1 mg/kg	138	67	143	
EP074: 1,1,1,2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	1 mg/kg	97.8	62	122	
EP074: trans-1,4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	1 mg/kg	93.2	54	128	
EP074: cis-1,4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	1 mg/kg	93.8	55	129	
EP074: 1,1,1,2,2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	1 mg/kg	87.1	56	132	
EP074: 1,2,3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	1 mg/kg	91.2	65	135	



Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike	Spike Recovery (%)		Recovery Limits (%)	
					Concentration	LCS	Low	High	
EP074E: Halogenated Aliphatic Compounds (QCLot: 2057948) - continued									
EP074: Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	1 mg/kg	54.5	19.8	134	
EP074: 1,2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	1 mg/kg	78.3	53	129	
EP074F: Halogenated Aromatic Compounds (QCLot: 2057948)									
EP074: Chlorobenzene	108-90-7	0.5	mg/kg	<0.5	1 mg/kg	93.3	70	128	
EP074: Bromobenzene	108-86-1	0.5	mg/kg	<0.5	1 mg/kg	87.1	67	127	
EP074: 2-Chlorotoluene	95-49-8	0.5	mg/kg	<0.5	1 mg/kg	86.7	64	130	
EP074: 4-Chlorotoluene	106-43-4	0.5	mg/kg	<0.5	1 mg/kg	85.4	62	130	
EP074: 1,2,3-Trichlorobenzene	87-61-6	0.5	mg/kg	<0.5	1 mg/kg	87.6	60	132	
EP074G: Trihalomethanes (QCLot: 2057948)									
EP074: Chloroform	67-66-3	0.5	mg/kg	<0.5	1 mg/kg	84.8	65	131	
EP074: Bromodichloromethane	75-27-4	0.5	mg/kg	<0.5	1 mg/kg	87.5	61	121	
EP074: Dibromochloromethane	124-48-1	0.5	mg/kg	<0.5	1 mg/kg	96.2	63	121	
EP074: Bromoform	75-25-2	0.5	mg/kg	<0.5	1 mg/kg	76.2	60	126	
EP075A: Phenolic Compounds (QCLot: 2058046)									
EP075: Phenol	108-95-2	0.5	mg/kg	<0.5	1.25 mg/kg	79.9	66.9	114	
EP075: 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	1.25 mg/kg	66.2	58.5	108	
EP075: 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	1.25 mg/kg	87.7	43	103	
EP075: 3- & 4-Methylphenol	1319-77-3	1.0	mg/kg	<1.0	2.5 mg/kg	59.1	35.9	109	
EP075: 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	1.25 mg/kg	107	49.4	109	
EP075: 2,4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	1.25 mg/kg	42.9	.15	116	
EP075: 2,4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	1.25 mg/kg	61.3	52.5	106	
EP075: 2,6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	1.25 mg/kg	# 43.7	48.2	98.6	
EP075: 4-Chloro-3-Methylphenol	59-50-7	0.5	mg/kg	<0.5	1.25 mg/kg	93.0	59	106	
EP075: 2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	1.25 mg/kg	66.7	44.4	101	
EP075: 2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	1.25 mg/kg	95.0	48	107	
EP075: Pentachlorophenol	87-86-5	1.0	mg/kg	<1	2.5 mg/kg	35.9	4.43	89.2	
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 2058046)									
EP075: Naphthalene	91-20-3	0.5	mg/kg	<0.5	1.25 mg/kg	94.4	63.7	108	
EP075: 2-Methylnaphthalene	91-57-6	0.5	mg/kg	<0.5	1.25 mg/kg	95.5	60.8	110	
EP075: 2-Chloronaphthalene	91-58-7	0.5	mg/kg	<0.5	1.25 mg/kg	85.8	59.1	110	
EP075: Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	1.25 mg/kg	72.8	58.8	106	
EP075: Acenaphthene	83-32-9	0.5	mg/kg	<0.5	1.25 mg/kg	91.4	61.7	110	
EP075: Fluorene	86-73-7	0.5	mg/kg	<0.5	1.25 mg/kg	94.0	59.2	110	
EP075: Phenanthrene	85-01-8	0.5	mg/kg	<0.5	1.25 mg/kg	94.0	61.9	108	
EP075: Anthracene	120-12-7	0.5	mg/kg	<0.5	1.25 mg/kg	79.3	58.3	107	
EP075: Fluoranthene	206-44-0	0.5	mg/kg	<0.5	1.25 mg/kg	94.0	58.5	110	
EP075: Pyrene	129-00-0	0.5	mg/kg	<0.5	1.25 mg/kg	92.3	60.4	109	
EP075: N-2-Fluorenyl Acetamide	53-96-3	0.5	mg/kg	<0.5	1.25 mg/kg	92.6	59.5	110	



Sub-Matrix: SOIL

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike	Spike Recovery (%)		Recovery Limits (%)	
					Concentration	LCS	Low	High	
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 2058046) - continued									
EP075: Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	1.25 mg/kg	90.4	57.2	111	
EP075: Chrysene	218-01-9	0.5	mg/kg	<0.5	1.25 mg/kg	94.0	58.4	113	
EP075: Benzo(b) & Benzo(k)fluoranthene	205-99-2	1	mg/kg	----	2.5 mg/kg	89.2	57.1	112	
	207-08-9	1.0	mg/kg	<1	----	----	----	----	
EP075: 7,12-Dimethylbenz(a)anthracene	57-97-6	0.5	mg/kg	<0.5	1.25 mg/kg	73.3	48.1	106	
EP075: Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	1.25 mg/kg	76.8	56.6	108	
EP075: 3-Methylcholanthrene	56-49-5	0.5	mg/kg	<0.5	1.25 mg/kg	65.7	52.7	108	
EP075: Indeno(1,2,3-cd)pyrene	193-39-5	0.5	mg/kg	<0.5	1.25 mg/kg	94.9	56.8	110	
EP075: Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	1.25 mg/kg	94.0	54.7	110	
EP075: Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	1.25 mg/kg	92.6	55	112	
EP075C: Phthalate Esters (QCLot: 2058046)									
EP075: Dimethyl phthalate	131-11-3	0.5	mg/kg	<0.5	1.25 mg/kg	90.2	60.1	111	
EP075: Diethyl phthalate	84-66-2	0.5	mg/kg	<0.5	1.25 mg/kg	90.5	62.3	114	
EP075: Di-n-butyl phthalate	84-74-2	0.5	mg/kg	<0.5	1.25 mg/kg	89.7	65.5	122	
EP075: Butyl benzyl phthalate	85-68-7	0.5	mg/kg	<0.5	1.25 mg/kg	87.8	61.6	112	
EP075: bis(2-ethylhexyl) phthalate	117-81-7	5	mg/kg	----	1.25 mg/kg	107	66.6	135	
		5.0	mg/kg	<5.0	----	----	----	----	
EP075: Di-n-octylphthalate	117-84-0	0.5	mg/kg	<0.5	1.25 mg/kg	83.4	59	116	
EP075D: Nitrosamines (QCLot: 2058046)									
EP075: N-Nitrosomethylethylamine	10595-95-6	0.5	mg/kg	<0.5	1.25 mg/kg	91.7	39.4	124	
EP075: N-Nitrosodiethylamine	55-18-5	0.5	mg/kg	<0.5	1.25 mg/kg	80.3	62.7	112	
EP075: N-Nitrosopyrrolidine	930-55-2	0.5	mg/kg	----	1.25 mg/kg	# 110	42.8	102	
		1.0	mg/kg	<1.0	----	----	----	----	
EP075: N-Nitrosomorpholine	59-89-2	0.5	mg/kg	<0.5	1.25 mg/kg	105	52.4	112	
EP075: N-Nitrosodi-n-propylamine	621-64-7	0.5	mg/kg	<0.5	1.25 mg/kg	85.4	60.6	107	
EP075: N-Nitrosopiperidine	100-75-4	0.5	mg/kg	<0.5	1.25 mg/kg	88.3	59.6	108	
EP075: N-Nitrosodibutylamine	924-16-3	0.5	mg/kg	<0.5	1.25 mg/kg	86.1	59.4	106	
EP075: N-Nitrosodiphenyl & Diphenylamine	86-30-6	1.0	mg/kg	<1.0	2.5 mg/kg	73.0	38	110	
		122-39-4							
EP075: Methapyrilene	91-80-5	0.5	mg/kg	<0.5	1.25 mg/kg	35.5	16.3	123	
EP075E: Nitroaromatics and Ketones (QCLot: 2058046)									
EP075: 2-Picoline	109-06-8	0.5	mg/kg	<0.5	1.25 mg/kg	97.6	27.3	129	
EP075: Acetophenone	98-86-2	0.5	mg/kg	<0.5	1.25 mg/kg	90.4	62.6	110	
EP075: Nitrobenzene	98-95-3	0.5	mg/kg	<0.5	1.25 mg/kg	102	64.4	112	
EP075: Isophorone	78-59-1	0.5	mg/kg	<0.5	1.25 mg/kg	86.2	64	110	
EP075: 2,6-Dinitrotoluene	606-20-2	0.5	mg/kg	----	1.25 mg/kg	92.3	58	114	
		1.0	mg/kg	<1.0	----	----	----	----	
EP075: 2,4-Dinitrotoluene	121-14-2	0.5	mg/kg	----	1.25 mg/kg	100	55.8	113	
		1.0	mg/kg	<1.0	----	----	----	----	



Sub-Matrix: SOIL

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike	Spike Recovery (%)		Recovery Limits (%)	
					Concentration	LCS	Low	High	
EP075E: Nitroaromatics and Ketones (QCLot: 2058046) - continued									
EP075: 1-Naphthylamine	134-32-7	0.5	mg/kg	<0.5	1.25 mg/kg	91.5	2.24	93	
EP075: 4-Nitroquinoline-N-oxide	56-57-5	0.5	mg/kg	<0.5	1.25 mg/kg	34.1	3.12	108	
EP075: 5-Nitro-o-toluidine	99-55-8	0.5	mg/kg	<0.5	1.25 mg/kg	57.4	48.3	98.5	
EP075: Azobenzene	103-33-3	1	mg/kg	----	1.25 mg/kg	86.2	61.4	113	
		1.0	mg/kg	<1	----	----	----	----	
EP075: 1,3,5-Trinitrobenzene	99-35-4	0.5	mg/kg	<0.5	1.25 mg/kg	96.5	33	108	
EP075: Phenacetin	62-44-2	0.5	mg/kg	<0.5	1.25 mg/kg	88.2	58.1	110	
EP075: 4-Aminobiphenyl	92-67-1	0.5	mg/kg	<0.5	1.25 mg/kg	# 35.4	36.1	102	
EP075: Pentachloronitrobenzene	82-68-8	0.5	mg/kg	<0.5	1.25 mg/kg	96.1	55.8	106	
EP075: Pronamide	23950-58-5	0.5	mg/kg	<0.5	1.25 mg/kg	66.0	49.4	105	
EP075: Dimethylaminoazobenzene	60-11-7	0.5	mg/kg	<0.5	1.25 mg/kg	# 46.7	53.5	105	
EP075: Chlorobenzilate	510-15-6	0.5	mg/kg	<0.5	1.25 mg/kg	70.9	57.4	112	
EP075F: Haloethers (QCLot: 2058046)									
EP075: Bis(2-chloroethyl) ether	111-44-4	0.5	mg/kg	<0.5	1.25 mg/kg	81.6	63.1	113	
EP075: Bis(2-chloroethoxy) methane	111-91-1	0.5	mg/kg	<0.5	1.25 mg/kg	80.6	62.4	111	
EP075: 4-Chlorophenyl phenyl ether	7005-72-3	0.5	mg/kg	<0.5	1.25 mg/kg	92.1	59	111	
EP075: 4-Bromophenyl phenyl ether	101-55-3	0.5	mg/kg	<0.5	1.25 mg/kg	91.1	56.4	109	
EP075G: Chlorinated Hydrocarbons (QCLot: 2058046)									
EP075: 1,3-Dichlorobenzene	541-73-1	0.5	mg/kg	<0.5	1.25 mg/kg	87.2	60.4	106	
EP075: 1,4-Dichlorobenzene	106-46-7	0.5	mg/kg	<0.5	1.25 mg/kg	88.1	62.1	107	
EP075: 1,2-Dichlorobenzene	95-50-1	0.5	mg/kg	<0.5	1.25 mg/kg	87.0	61.3	107	
EP075: Hexachloroethane	67-72-1	0.5	mg/kg	<0.5	1.25 mg/kg	91.6	53.8	107	
EP075: 1,2,4-Trichlorobenzene	120-82-1	0.5	mg/kg	<0.5	1.25 mg/kg	91.6	62.9	108	
EP075: Hexachloropropylene	1888-71-7	0.5	mg/kg	<0.5	1.25 mg/kg	92.5	39.1	110	
EP075: Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	1.25 mg/kg	97.9	59.3	110	
EP075: Hexachlorocyclopentadiene	77-47-4	0.5	mg/kg	----	1.25 mg/kg	96.4	17.2	106	
		2.5	mg/kg	<2.5	----	----	----	----	
EP075: Pentachlorobenzene	608-93-5	0.5	mg/kg	<0.5	1.25 mg/kg	94.0	60	110	
EP075: Hexachlorobenzene (HCB)	118-74-1	0.5	mg/kg	----	1.25 mg/kg	90.8	59.9	111	
		1.0	mg/kg	<1.0	----	----	----	----	
EP075H: Anilines and Benzidines (QCLot: 2058046)									
EP075: Aniline	62-53-3	0.5	mg/kg	<0.5	1.25 mg/kg	# 111	13.2	108	
EP075: 4-Chloroaniline	106-47-8	0.5	mg/kg	<0.5	1.25 mg/kg	73.1	19.9	114	
EP075: 2-Nitroaniline	88-74-4	0.5	mg/kg	----	1.25 mg/kg	90.5	57.4	109	
		1.0	mg/kg	<1.0	----	----	----	----	
EP075: 3-Nitroaniline	99-09-2	0.5	mg/kg	----	1.25 mg/kg	54.6	31.5	93.7	
		1.0	mg/kg	<1.0	----	----	----	----	
EP075: Dibenzofuran	132-64-9	0.5	mg/kg	<0.5	1.25 mg/kg	91.5	60.2	111	
EP075: 4-Nitroaniline	100-01-6	0.5	mg/kg	<0.5	1.25 mg/kg	# 46.6	48.6	97.6	



Sub-Matrix: SOIL

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike	Spike Recovery (%)		Recovery Limits (%)	
					Concentration	LCS	Low	High	
EP075H: Anilines and Benzidines (QCLot: 2058046) - continued									
EP075: Carbazole	86-74-8	0.5	mg/kg	<0.5	1.25 mg/kg	81.6	61	109	
EP075: 3,3'-Dichlorobenzidine	91-94-1	0.5	mg/kg	<0.5	1.25 mg/kg	27.2	15.6	101	
EP075I: Organochlorine Pesticides (QCLot: 2058046)									
EP075: alpha-BHC	319-84-6	0.5	mg/kg	<0.5	1.25 mg/kg	94.9	59.5	110	
EP075: beta-BHC	319-85-7	0.5	mg/kg	<0.5	1.25 mg/kg	83.4	53.4	113	
EP075: gamma-BHC	58-89-9	0.5	mg/kg	<0.5	1.25 mg/kg	92.7	58.2	112	
EP075: delta-BHC	319-86-8	0.5	mg/kg	<0.5	1.25 mg/kg	91.8	56.9	114	
EP075: Heptachlor	76-44-8	0.5	mg/kg	<0.5	1.25 mg/kg	87.8	52	108	
EP075: Aldrin	309-00-2	0.5	mg/kg	<0.5	1.25 mg/kg	94.6	54.9	112	
EP075: Heptachlor epoxide	1024-57-3	0.5	mg/kg	<0.5	1.25 mg/kg	93.1	54.6	113	
EP075: alpha-Endosulfan	959-98-8	0.5	mg/kg	<0.5	1.25 mg/kg	107	51.7	115	
EP075: 4,4'-DDE	72-55-9	0.5	mg/kg	<0.5	1.25 mg/kg	91.4	60.3	112	
EP075: Dieldrin	60-57-1	0.5	mg/kg	<0.5	1.25 mg/kg	93.0	61.9	116	
EP075: Endrin	72-20-8	0.5	mg/kg	<0.5	1.25 mg/kg	74.0	49	110	
EP075: beta-Endosulfan	33213-65-9	0.5	mg/kg	<0.5	1.25 mg/kg	94.6	59.5	112	
EP075: 4,4'-DDD	72-54-8	0.5	mg/kg	<0.5	1.25 mg/kg	99.2	58.5	116	
EP075: Endosulfan sulfate	1031-07-8	0.5	mg/kg	<0.5	1.25 mg/kg	106	52.6	114	
EP075: 4,4'-DDT	50-29-3	0.5	mg/kg	----	1.25 mg/kg	77.2	39.2	113	
		1.0	mg/kg	<1.0	----	----	----	----	
EP075J: Organophosphorus Pesticides (QCLot: 2058046)									
EP075: Dichlorvos	62-73-7	0.5	mg/kg	<0.5	1.25 mg/kg	72.8	24.6	109	
EP075: Dimethoate	60-51-5	0.5	mg/kg	<0.5	1.25 mg/kg	93.2	46.4	118	
EP075: Diazinon	333-41-5	0.5	mg/kg	<0.5	1.25 mg/kg	89.9	50.3	116	
EP075: Chlorpyrifos-methyl	5598-13-0	0.5	mg/kg	<0.5	1.25 mg/kg	98.3	41.7	119	
EP075: Malathion	121-75-5	0.5	mg/kg	<0.5	1.25 mg/kg	98.4	52.1	121	
EP075: Fenthion	55-38-9	0.5	mg/kg	<0.5	1.25 mg/kg	91.7	43	116	
EP075: Chlorpyrifos	2921-88-2	0.5	mg/kg	<0.5	1.25 mg/kg	97.8	51.1	115	
EP075: Pirimphos-ethyl	23505-41-1	0.5	mg/kg	<0.5	1.25 mg/kg	93.2	50.9	115	
EP075: Chlorfenvinphos	470-90-6	0.5	mg/kg	<0.5	----	----	----	----	
		0.55	mg/kg	----	1.375 mg/kg	84.0	45.3	104	
EP075: Prothiofos	34643-46-4	0.5	mg/kg	<0.5	1.25 mg/kg	90.1	51.5	116	
EP075: Ethion	563-12-2	0.5	mg/kg	<0.5	1.25 mg/kg	95.6	47.3	115	
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 2057947)									
EP080-SD: C6 - C9 Fraction	----	3	mg/kg	<3	26 mg/kg	92.3	61	133	
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 2058885)									
EP071-SD: C10 - C14 Fraction	----	3	mg/kg	<3	5 mg/kg	107	75.2	116	
EP071-SD: C15 - C28 Fraction	----	3	mg/kg	<3	6.75 mg/kg	111	75.3	113	
EP071-SD: C29 - C36 Fraction	----	5	mg/kg	<5	5 mg/kg	88.0	72.6	117	



Sub-Matrix: SOIL

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike	Spike Recovery (%)		Recovery Limits (%)	
					Concentration	LCS	Low	High	
EP080-SD: BTEXN (QCLot: 2057947)									
EP080-SD: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	82.8	66	122	
EP080-SD: Toluene	108-88-3	0.2	mg/kg	<0.2	1 mg/kg	87.1	69	122	
EP080-SD: Ethylbenzene	100-41-4	0.2	mg/kg	<0.2	1 mg/kg	85.5	66	126	
EP080-SD: meta- & para-Xylene	108-38-3	0.2	mg/kg	<0.2	2.5 mg/kg	67.5	59	129	
	106-42-3								
EP080-SD: ortho-Xylene	95-47-6	0.2	mg/kg	<0.2	1 mg/kg	82.1	66	126	
EP090: Organotin Compounds (QCLot: 2060163)									
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	58.2	19.5	129	
EP090: Organotin Compounds (QCLot: 2060166)									
EP090: Tributyltin	56573-85-4	0.5	µgSn/kg	<0.5	1.25 µgSn/kg	74.0	19.5	129	
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 2058874)									
EP130: Bromophos-ethyl	4824-78-6	10	µg/kg	<10	50 µg/kg	91.7	36.9	142	
EP130: Carbophenothion	786-19-6	10	µg/kg	<10	50 µg/kg	77.6	0.5	157	
EP130: Chlorfenvinphos (E)	18708-86-6	10	µg/kg	<10.0	5 µg/kg	131	50.3	137	
EP130: Chlorfenvinphos (Z)	18708-87-7	10	µg/kg	<10	50 µg/kg	114	55.9	152	
EP130: Chlorpyrifos	2921-88-2	10	µg/kg	<10	50 µg/kg	110	49	140	
EP130: Chlorpyrifos-methyl	5598-13-0	10	µg/kg	<10	50 µg/kg	104	28.1	142	
EP130: Demeton-S-methyl	919-86-8	10	µg/kg	<10	50 µg/kg	49.8	36.6	172	
EP130: Diazinon	333-41-5	10	µg/kg	<10	50 µg/kg	97.0	37.2	148	
EP130: Dichlorvos	62-73-7	10	µg/kg	<10	50 µg/kg	83.7	32.7	153	
EP130: Dimethoate	60-51-5	10	µg/kg	<10	50 µg/kg	107	33.2	150	
EP130: Ethion	563-12-2	10	µg/kg	<10	50 µg/kg	111	44	146	
EP130: Fenamiphos	22224-92-6	10	µg/kg	<10	50 µg/kg	110	3.08	162	
EP130: Fenthion	55-38-9	10	µg/kg	<10	50 µg/kg	67.4	10.6	157	
EP130: Malathion	121-75-5	10	µg/kg	<10	50 µg/kg	117	38.1	143	
EP130: Azinphos Methyl	86-50-0	10	µg/kg	<10	50 µg/kg	77.0	8.13	159	
EP130: Monocrotophos	6923-22-4	10	µg/kg	<10	50 µg/kg	108	19.7	176	
EP130: Parathion	56-38-2	10	µg/kg	<10	50 µg/kg	103	39.2	145	
EP130: Parathion-methyl	298-00-0	10	µg/kg	<10	50 µg/kg	109	23.5	152	
EP130: Pirimphos-ethyl	23505-41-1	10	µg/kg	<10	50 µg/kg	111	47.1	141	
EP130: Prothiofos	34643-46-4	10	µg/kg	<10	50 µg/kg	114	36.1	148	
EP131A: Organochlorine Pesticides (QCLot: 2058875)									
EP131A: Aldrin	309-00-2	0.5	µg/kg	<0.50	5 µg/kg	65.1	31.7	140	
EP131A: alpha-BHC	319-84-6	0.5	µg/kg	<0.50	5 µg/kg	67.9	24.5	150	
EP131A: beta-BHC	319-85-7	0.5	µg/kg	<0.50	5 µg/kg	62.4	36.9	139	
EP131A: delta-BHC	319-86-8	0.5	µg/kg	<0.50	5 µg/kg	65.3	38.2	137	
EP131A: 4,4'-DDD	72-54-8	0.5	µg/kg	<0.50	5 µg/kg	67.5	42.5	141	
EP131A: 4,4'-DDE	72-55-9	0.5	µg/kg	<0.50	5 µg/kg	56.7	34.8	140	



Sub-Matrix: SOIL

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike	Spike Recovery (%)		Recovery Limits (%)	
					Concentration	LCS	Low	High	
EP131A: Organochlorine Pesticides (QCLot: 2058875) - continued									
EP131A: 4,4'-DDT	50-29-3	0.5	µg/kg	<0.50	5 µg/kg	55.7	38	143	
EP131A: Sum of DDD + DDE + DDT	----	0.5	µg/kg	<0.50	----	----	----	----	
EP131A: Dieldrin	60-57-1	0.5	µg/kg	<0.50	5 µg/kg	58.6	43.2	134	
EP131A: alpha-Endosulfan	959-98-8	0.5	µg/kg	<0.50	5 µg/kg	60.3	23.7	139	
EP131A: beta-Endosulfan	33213-65-9	0.5	µg/kg	<0.50	5 µg/kg	60.3	35.8	138	
EP131A: Endosulfan sulfate	1031-07-8	0.5	µg/kg	<0.50	5 µg/kg	66.6	7.45	158	
EP131A: Endosulfan (sum)	115-29-7	0.5	µg/kg	<0.50	----	----	----	----	
EP131A: Endrin	72-20-8	0.5	µg/kg	<0.50	5 µg/kg	50.4	21.6	162	
EP131A: Endrin aldehyde	7421-93-4	0.5	µg/kg	<0.50	5 µg/kg	57.0	19.3	131	
EP131A: Endrin ketone	53494-70-5	0.5	µg/kg	<0.50	5 µg/kg	78.6	17.9	141	
EP131A: Heptachlor	76-44-8	0.5	µg/kg	<0.50	5 µg/kg	72.2	31	153	
EP131A: Heptachlor epoxide	1024-57-3	0.5	µg/kg	<0.50	5 µg/kg	126	34.3	138	
EP131A: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/kg	<0.50	5 µg/kg	54.3	18.6	146	
EP131A: gamma-BHC	58-89-9	0.5	µg/kg	<0.50	5 µg/kg	64.5	30.7	145	
EP131A: Methoxychlor	72-43-5	0.5	µg/kg	<0.50	5 µg/kg	68.1	15	157	
EP131A: cis-Chlordane	5103-71-9	0.5	µg/kg	<0.50	5 µg/kg	63.1	22.3	145	
EP131A: trans-Chlordane	5103-74-2	0.5	µg/kg	<0.50	5 µg/kg	63.9	42.4	139	
EP131A: Total Chlordane (sum)	----	0.5	µg/kg	<0.50	----	----	----	----	
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 2058876)									
EP131B: Total Polychlorinated biphenyls	----	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1016	12674-11-2	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1221	11104-28-2	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1232	11141-16-5	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1242	53469-21-9	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1248	12672-29-6	5	µg/kg	<5.0	----	----	----	----	
EP131B: Aroclor 1254	11097-69-1	5	µg/kg	<5.0	50 µg/kg	78.0	61.3	121	
EP131B: Aroclor 1260	11096-82-5	5	µg/kg	<5.0	----	----	----	----	
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2058883)									
EP132B-SD: Naphthalene	91-20-3	5	µg/kg	<5	25 µg/kg	81.6	----	----	
EP132B-SD: 2-Methylnaphthalene	91-57-6	5	µg/kg	<5	25 µg/kg	116	----	----	
EP132B-SD: Acenaphthylene	208-96-8	4	µg/kg	<4	25 µg/kg	96.5	----	----	
EP132B-SD: Acenaphthene	83-32-9	4	µg/kg	<4	25 µg/kg	111	----	----	
EP132B-SD: Fluorene	86-73-7	4	µg/kg	<4	25 µg/kg	89.2	----	----	
EP132B-SD: Phenanthrene	85-01-8	4	µg/kg	<4	25 µg/kg	94.4	----	----	
EP132B-SD: Anthracene	120-12-7	4	µg/kg	<4	25 µg/kg	92.0	----	----	
EP132B-SD: Fluoranthene	206-44-0	4	µg/kg	<4	25 µg/kg	90.4	----	----	
EP132B-SD: Pyrene	129-00-0	4	µg/kg	<4	25 µg/kg	95.1	----	----	
EP132B-SD: Benz(a)anthracene	56-55-3	4	µg/kg	<4	25 µg/kg	95.8	----	----	
EP132B-SD: Chrysene	218-01-9	4	µg/kg	<4	25 µg/kg	86.5	----	----	



Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2058883) - continued									
EP132B-SD: Benzo(b)fluoranthene	205-99-2	4	µg/kg	<4	25 µg/kg	90.5	----	----	
EP132B-SD: Benzo(k)fluoranthene	207-08-9	4	µg/kg	<4	25 µg/kg	92.6	----	----	
EP132B-SD: Benzo(e)pyrene	192-97-2	4	µg/kg	<4	25 µg/kg	92.2	----	----	
EP132B-SD: Benzo(a)pyrene	50-32-8	4	µg/kg	<4	25 µg/kg	92.7	----	----	
EP132B-SD: Perylene	198-55-0	4	µg/kg	<4	25 µg/kg	92.6	----	----	
EP132B-SD: Benzo(g,h,i)perylene	191-24-2	4	µg/kg	<4	25 µg/kg	91.6	----	----	
EP132B-SD: Dibenz(a,h)anthracene	53-70-3	4	µg/kg	<4	25 µg/kg	94.0	----	----	
EP132B-SD: Indeno(1,2,3,cd)pyrene	193-39-5	4	µg/kg	<4	25 µg/kg	93.2	----	----	
EP132B-SD: Coronene	191-07-1	5	µg/kg	<5	25 µg/kg	94.9	----	----	
EP132B-SD: Sum of PAHs	----	4	µg/kg	<4	----	----	----	----	



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2058918)							
ES1125458-001	SS5A	EG035T-LL: Mercury	7439-97-6	.5 mg/kg	96.3	70	130
EP074A: Monocyclic Aromatic Hydrocarbons (QCLot: 2057948)							
ES1125458-028	VCSA(0-0.5)	EP074: Benzene	71-43-2	2.5 mg/kg	77.3	70	130
		EP074: Toluene	108-88-3	2.5 mg/kg	78.8	70	130
EP074E: Halogenated Aliphatic Compounds (QCLot: 2057948)							
ES1125458-028	VCSA(0-0.5)	EP074: 1,1-Dichloroethene	75-35-4	2.5 mg/kg	78.9	70	130
		EP074: Trichloroethene	79-01-6	2.5 mg/kg	72.1	70	130
EP074F: Halogenated Aromatic Compounds (QCLot: 2057948)							
ES1125458-028	VCSA(0-0.5)	EP074: Chlorobenzene	108-90-7	2.5 mg/kg	76.1	70	130
EP075A: Phenolic Compounds (QCLot: 2058046)							
ES1125779-002	Anonymous	EP075: Phenol	108-95-2	5 mg/kg	75.9	60	130
		EP075: 2-Chlorophenol	95-57-8	5 mg/kg	80.2	60	130
		EP075: 2-Nitrophenol	88-75-5	5 mg/kg	111	50	130
		EP075: 4-Chloro-3-Methylphenol	59-50-7	5 mg/kg	88.0	50	130
		EP075: Pentachlorophenol	87-86-5	10 mg/kg	56.8	5	130
EP075B: Polynuclear Aromatic Hydrocarbons (QCLot: 2058046)							
ES1125779-002	Anonymous	EP075: Acenaphthene	83-32-9	5 mg/kg	82.0	50	130
		EP075: Pyrene	129-00-0	5 mg/kg	89.6	50	130
EP075D: Nitrosamines (QCLot: 2058046)							
ES1125779-002	Anonymous	EP075: N-Nitrosodi-n-propylamine	621-64-7	5 mg/kg	76.0	50	130
EP075E: Nitroaromatics and Ketones (QCLot: 2058046)							
ES1125779-002	Anonymous	EP075: 2,4-Dinitrotoluene	121-14-2	5 mg/kg	95.8	40	130
EP075G: Chlorinated Hydrocarbons (QCLot: 2058046)							
ES1125779-002	Anonymous	EP075: 1,4-Dichlorobenzene	106-46-7	5 mg/kg	81.3	60	130
		EP075: 1,2,4-Trichlorobenzene	120-82-1	5 mg/kg	90.6	50	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 2057947)							
ES1125458-001	SS5A	EP080-SD: C6 - C9 Fraction	----	25 mg/kg	111	70	130
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons (QCLot: 2058885)							
ES1125458-006	SS5D	EP071-SD: C10 - C14 Fraction	----	19.75 mg/kg	81.3	70	130
		EP071-SD: C15 - C28 Fraction	----	87.25 mg/kg	71.6	70	130
		EP071-SD: C29 - C36 Fraction	----	60 mg/kg	93.4	70	130
EP080-SD: BTEXN (QCLot: 2057947)							
ES1125458-001	SS5A	EP080-SD: Benzene	71-43-2	2.5 mg/kg	93.6	70	130
		EP080-SD: Toluene	108-88-3	2.5 mg/kg	83.9	70	130



Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike	Spike Recovery (%)	Recovery Limits (%)	
				Concentration	MS	Low	High
EP080-SD: BTEXN (QCLot: 2057947) - continued							
ES1125458-001	SS5A	EP080-SD: Ethylbenzene	100-41-4	2.5 mg/kg	102	70	130
		EP080-SD: meta- & para-Xylene	108-38-3	2.5 mg/kg	101	70	130
		EP080-SD: ortho-Xylene	106-42-3	2.5 mg/kg	97.7	70	130
EP090: Organotin Compounds (QCLot: 2060163)							
ES1125458-004	SS5B	EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	86.7	20	130
EP090: Organotin Compounds (QCLot: 2060166)							
ES1125458-036	VCSE 0-0.6	EP090: Tributyltin	56573-85-4	1.25 µgSn/kg	# Not Determined	20	130
EP130A: Organophosphorus Pesticides (Ultra-trace) (QCLot: 2058874)							
ES1125458-006	SS5D	EP130: Bromophos-ethyl	4824-78-6	50 µg/kg	62.8	36.9	142
		EP130: Carbophenothion	786-19-6	50 µg/kg	74.6	0.5	157
		EP130: Chlorfenvinphos (E)	18708-86-6	5 µg/kg	116	50.3	137
		EP130: Chlorfenvinphos (Z)	18708-87-7	50 µg/kg	109	55.9	152
		EP130: Chlorpyrifos	2921-88-2	50 µg/kg	113	49	140
		EP130: Chlorpyrifos-methyl	5598-13-0	50 µg/kg	83.0	28.1	142
		EP130: Demeton-S-methyl	919-86-8	50 µg/kg	43.6	36.6	172
		EP130: Diazinon	333-41-5	50 µg/kg	72.6	37.2	148
		EP130: Dichlorvos	62-73-7	50 µg/kg	# 28.9	32.7	153
		EP130: Dimethoate	60-51-5	50 µg/kg	57.6	33.2	150
		EP130: Ethion	563-12-2	50 µg/kg	95.9	44	146
		EP130: Fenamiphos	22224-92-6	50 µg/kg	28.9	3.08	162
		EP130: Fenthion	55-38-9	50 µg/kg	87.8	10.6	157
		EP130: Malathion	121-75-5	50 µg/kg	96.1	38.1	143
		EP130: Azinphos Methyl	86-50-0	50 µg/kg	66.9	8.13	159
		EP130: Monocrotophos	6923-22-4	50 µg/kg	30.1	19.7	176
		EP130: Parathion	56-38-2	50 µg/kg	91.8	39.2	145
		EP130: Parathion-methyl	298-00-0	50 µg/kg	80.5	23.5	152
EP130: Pirimphos-ethyl	23505-41-1	50 µg/kg	96.9	47.1	141		
EP130: Prothiofos	34643-46-4	50 µg/kg	81.6	36.1	148		
EP131A: Organochlorine Pesticides (QCLot: 2058875)							
ES1125458-006	SS5D	EP131A: Aldrin	309-00-2	5 µg/kg	34.3	31.7	140
		EP131A: alpha-BHC	319-84-6	5 µg/kg	32.9	24.5	150
		EP131A: beta-BHC	319-85-7	5 µg/kg	59.9	36.9	139
		EP131A: delta-BHC	319-86-8	5 µg/kg	58.4	38.2	137
		EP131A: 4,4`-DDD	72-54-8	5 µg/kg	47.0	42.5	141
		EP131A: 4,4`-DDE	72-55-9	5 µg/kg	131	34.8	140
		EP131A: 4,4`-DDT	50-29-3	5 µg/kg	46.6	38	143
		EP131A: Dieldrin	60-57-1	5 µg/kg	# 35.9	43.2	134
		EP131A: alpha-Endosulfan	959-98-8	5 µg/kg	34.4	23.7	139



Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike	Spike Recovery (%)	Recovery Limits (%)	
				Concentration	MS	Low	High
EP131A: Organochlorine Pesticides (QCLot: 2058875) - continued							
ES1125458-006	SS5D	EP131A: beta-Endosulfan	33213-65-9	5 µg/kg	55.9	35.8	138
		EP131A: Endosulfan sulfate	1031-07-8	5 µg/kg	27.9	7.45	158
		EP131A: Endrin	72-20-8	5 µg/kg	42.4	21.6	162
		EP131A: Endrin aldehyde	7421-93-4	5 µg/kg	33.0	19.3	131
		EP131A: Endrin ketone	53494-70-5	5 µg/kg	32.8	17.9	141
		EP131A: Heptachlor	76-44-8	5 µg/kg	43.4	31	153
		EP131A: Heptachlor epoxide	1024-57-3	5 µg/kg	59.1	34.3	138
		EP131A: Hexachlorobenzene (HCB)	118-74-1	5 µg/kg	29.1	18.6	146
		EP131A: gamma-BHC	58-89-9	5 µg/kg	56.5	30.7	145
		EP131A: Methoxychlor	72-43-5	5 µg/kg	40.9	15	157
		EP131A: cis-Chlordane	5103-71-9	5 µg/kg	34.8	22.3	145
		EP131A: trans-Chlordane	5103-74-2	5 µg/kg	# 35.9	42.4	139
		EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 2058876)					
ES1125458-006	SS5D	EP131B: Aroclor 1254	11097-69-1	50 µg/kg	68.0	61.3	121
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2058883)							
ES1125458-006	SS5D	EP132B-SD: Naphthalene	91-20-3	25 µg/kg	93.0	70	130
		EP132B-SD: 2-Methylnaphthalene	91-57-6	25 µg/kg	94.0	70	130
		EP132B-SD: Acenaphthylene	208-96-8	25 µg/kg	113	70	130
		EP132B-SD: Acenaphthene	83-32-9	25 µg/kg	103	70	130
		EP132B-SD: Fluorene	86-73-7	25 µg/kg	91.7	70	130
		EP132B-SD: Phenanthrene	85-01-8	25 µg/kg	# 131	70	130
		EP132B-SD: Anthracene	120-12-7	25 µg/kg	90.0	70	130
		EP132B-SD: Fluoranthene	206-44-0	25 µg/kg	102	70	130
		EP132B-SD: Pyrene	129-00-0	25 µg/kg	85.7	70	130
		EP132B-SD: Benz(a)anthracene	56-55-3	25 µg/kg	110	70	130
		EP132B-SD: Chrysene	218-01-9	25 µg/kg	101	70	130
		EP132B-SD: Benzo(b)fluoranthene	205-99-2	25 µg/kg	127	70	130
		EP132B-SD: Benzo(k)fluoranthene	207-08-9	25 µg/kg	120	70	130
		EP132B-SD: Benzo(e)pyrene	192-97-2	25 µg/kg	119	70	130
		EP132B-SD: Benzo(a)pyrene	50-32-8	25 µg/kg	129	70	130
		EP132B-SD: Perylene	198-55-0	25 µg/kg	112	70	130
		EP132B-SD: Benzo(g,h,i)perylene	191-24-2	25 µg/kg	121	70	130
		EP132B-SD: Dibenz(a,h)anthracene	53-70-3	25 µg/kg	93.9	70	130
		EP132B-SD: Indeno(1.2.3.cd)pyrene	193-39-5	25 µg/kg	113	70	130
		EP132B-SD: Coronene	191-07-1	25 µg/kg	81.4	70	130

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1125458	Page	: 1 of 13
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Client Services
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: sydney@alsglobal.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 18-NOV-2011
C-O-C number	: 211204-5	Issue Date	: 02-DEC-2011
Sampler	: OM	No. of samples received	: 23
Order number	: 301015-02448	No. of samples analysed	: 22
Quote number	: EN/034/11		

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA037: Ass Field Screening Analysis								
Pulp Bag (EA037) VCSB 1.3-1.6	18-NOV-2011	25-NOV-2011	19-NOV-2011	*	25-NOV-2011	19-NOV-2011	*	
Snap Lock Bag (EA037) VC5C 0-0.5, VCSB 0-0.8,	VC5C 0.5-1, VCSB 0.8-1.3	18-NOV-2011	25-NOV-2011	19-NOV-2011	*	25-NOV-2011	19-NOV-2011	*
Soil Glass Jar - Unpreserved (EA037) VCSA(0-0.5)		18-NOV-2011	25-NOV-2011	19-NOV-2011	*	25-NOV-2011	19-NOV-2011	*
EA055: Moisture Content								
Soil Glass Jar - Unpreserved (EA055-103) SS5A, SS5Y1, SS5E,	SS5D, SS5Y2, T BLANK	17-NOV-2011	----	----	----	24-NOV-2011	01-DEC-2011	✓
Soil Glass Jar - Unpreserved (EA055-103) SS5B,	SS5C	17-NOV-2011	----	----	----	25-NOV-2011	01-DEC-2011	✓
Soil Glass Jar - Unpreserved (EA055-103) VC5C 0-0.5, VCSA(0-0.5), VCSD 0-0.5, VCSE 0-0.6,	VCSD_2.1-3.1, VCSB 0-0.8, VCSD 1.8-2.1, VCSE 1-1.6	18-NOV-2011	----	----	----	24-NOV-2011	02-DEC-2011	✓
Soil Glass Jar - Unpreserved (EA055-103) VC5C 0.5-1, VCSA0.5-1, VCSB 0.8-1.3,	VCSE_0.6-0.8, VCSA1.5-2, VCSB 1.3-1.6	18-NOV-2011	----	----	----	25-NOV-2011	02-DEC-2011	✓
EA150: Particle Sizing								
Snap Lock Bag (EA150) SS5A, SS5E	SS5D,	17-NOV-2011	---	15-MAY-2012	----	28-NOV-2011	26-MAY-2012	✓
Snap Lock Bag (EA150) VC5C 0.5-1, VCSA(0-0.5), VCSE 1-1.6	VCSD_2.1-3.1, VCSE 0-0.6,	18-NOV-2011	---	16-MAY-2012	----	28-NOV-2011	26-MAY-2012	✓
Soil Glass Jar - Unpreserved (EA150) SS5C		17-NOV-2011	---	15-MAY-2012	----	28-NOV-2011	26-MAY-2012	✓
Soil Glass Jar - Unpreserved (EA150) VCSA1.5-2		18-NOV-2011	---	16-MAY-2012	----	28-NOV-2011	26-MAY-2012	✓



Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA150: Soil Classification based on Particle Size								
Snap Lock Bag (EA150) SS5A, SS5E	SS5D,	17-NOV-2011	---	15-MAY-2012	----	28-NOV-2011	26-MAY-2012	✓
Snap Lock Bag (EA150) VC5C 0.5-1, VC5A(0-0.5), VCSE 1-1.6	VCSD_2.1-3.1, VCSE 0-0.6,	18-NOV-2011	---	16-MAY-2012	----	28-NOV-2011	26-MAY-2012	✓
Soil Glass Jar - Unpreserved (EA150) SS5C		17-NOV-2011	---	15-MAY-2012	----	28-NOV-2011	26-MAY-2012	✓
Soil Glass Jar - Unpreserved (EA150) VC5A1.5-2		18-NOV-2011	---	16-MAY-2012	----	28-NOV-2011	26-MAY-2012	✓
EG005-SD: Total Metals in Sediments by ICP-AES								
Soil Glass Jar - Unpreserved (EG005-SD) SS5A, SS5Y1,	SS5D, SS5Y2	17-NOV-2011	24-NOV-2011	15-MAY-2012	✓	25-NOV-2011	15-MAY-2012	✓
Soil Glass Jar - Unpreserved (EG005-SD) VC5C 0-0.5, VC5A(0-0.5),	VCSD_2.1-3.1, VCSD 1.8-2.1	18-NOV-2011	24-NOV-2011	16-MAY-2012	✓	25-NOV-2011	16-MAY-2012	✓
EG020-SD: Total Metals in Sediments by ICPMS								
Soil Glass Jar - Unpreserved (EG020-SD) SS5A, SS5Y1,	SS5D, SS5Y2	17-NOV-2011	24-NOV-2011	15-MAY-2012	✓	29-NOV-2011	15-MAY-2012	✓
Soil Glass Jar - Unpreserved (EG020-SD) VC5C 0-0.5, VC5A(0-0.5),	VCSD_2.1-3.1, VCSD 1.8-2.1	18-NOV-2011	24-NOV-2011	16-MAY-2012	✓	29-NOV-2011	16-MAY-2012	✓
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved (EG035T-LL) SS5A, SS5Y1,	SS5D, SS5Y2	17-NOV-2011	24-NOV-2011	15-DEC-2011	✓	28-NOV-2011	15-DEC-2011	✓
Soil Glass Jar - Unpreserved (EG035T-LL) VC5C 0-0.5, VC5A(0-0.5),	VCSD_2.1-3.1, VCSD 1.8-2.1	18-NOV-2011	24-NOV-2011	16-DEC-2011	✓	28-NOV-2011	16-DEC-2011	✓



Matrix: SOIL

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP003: Total Organic Carbon (TOC) in Soil								
Pulp Bag (EP003) SS5A, SS5C, SS5Y1, SS5E	SS5B, SS5D, SS5Y2,	17-NOV-2011	25-NOV-2011	24-NOV-2011	✖	25-NOV-2011	23-DEC-2011	✔
Pulp Bag (EP003) VC5C 0-0.5, VCSD_2.1-3.1, VCSA(0-0.5), VCSA1.5-2, VCSB 0.8-1.3, VCSD 1.8-2.1, VCSE 1-1.6	VC5C 0.5-1, VCSE_0.6-0.8, VCSA0.5-1, VCSB 0-0.8, VCSD 0-0.5, VCSE 0-0.6,	18-NOV-2011	25-NOV-2011	25-NOV-2011	✔	25-NOV-2011	23-DEC-2011	✔
Soil Glass Jar - Unpreserved (EP003) VCSB 1.3-1.6		18-NOV-2011	25-NOV-2011	25-NOV-2011	✔	25-NOV-2011	23-DEC-2011	✔
EP080-SD / EP071-SD: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP071-SD) SS5D, SS5Y2, T BLANK	SS5Y1, SS5E,	17-NOV-2011	24-NOV-2011	01-DEC-2011	✔	25-NOV-2011	03-JAN-2012	✔
Soil Glass Jar - Unpreserved (EP071-SD) VC5C 0-0.5, VCSA(0-0.5),	VCSD_2.1-3.1, VCSB 0-0.8	18-NOV-2011	24-NOV-2011	02-DEC-2011	✔	25-NOV-2011	03-JAN-2012	✔
EP074D: Fumigants								
Soil Glass Jar - Unpreserved (EP074) VCSD_2.1-3.1, VCSD 0-0.5, VCSE 0-0.6,	VCSA(0-0.5), VCSD 1.8-2.1, VCSE 1-1.6	18-NOV-2011	24-NOV-2011	02-DEC-2011	✔	25-NOV-2011	02-DEC-2011	✔
EP074E: Halogenated Aliphatic Compounds								
Soil Glass Jar - Unpreserved (EP074) VCSD_2.1-3.1, VCSD 0-0.5, VCSE 0-0.6,	VCSA(0-0.5), VCSD 1.8-2.1, VCSE 1-1.6	18-NOV-2011	24-NOV-2011	02-DEC-2011	✔	25-NOV-2011	02-DEC-2011	✔
EP074F: Halogenated Aromatic Compounds								
Soil Glass Jar - Unpreserved (EP074) VCSD_2.1-3.1, VCSD 0-0.5, VCSE 0-0.6,	VCSA(0-0.5), VCSD 1.8-2.1, VCSE 1-1.6	18-NOV-2011	24-NOV-2011	02-DEC-2011	✔	25-NOV-2011	02-DEC-2011	✔
EP074A: Monocyclic Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved (EP074) VCSD_2.1-3.1, VCSD 0-0.5, VCSE 0-0.6,	VCSA(0-0.5), VCSD 1.8-2.1, VCSE 1-1.6	18-NOV-2011	24-NOV-2011	02-DEC-2011	✔	25-NOV-2011	02-DEC-2011	✔



Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP074B: Oxygenated Compounds								
Soil Glass Jar - Unpreserved (EP074) VCSD_2.1-3.1, VCSD 0-0.5, VCSE 0-0.6,	VCSA(0-0.5), VCSD 1.8-2.1, VCSE 1-1.6	18-NOV-2011	24-NOV-2011	02-DEC-2011	✓	25-NOV-2011	02-DEC-2011	✓
EP074C: Sulfonated Compounds								
Soil Glass Jar - Unpreserved (EP074) VCSD_2.1-3.1, VCSD 0-0.5, VCSE 0-0.6,	VCSA(0-0.5), VCSD 1.8-2.1, VCSE 1-1.6	18-NOV-2011	24-NOV-2011	02-DEC-2011	✓	25-NOV-2011	02-DEC-2011	✓
EP074G: Trihalomethanes								
Soil Glass Jar - Unpreserved (EP074) VCSD_2.1-3.1, VCSD 0-0.5, VCSE 0-0.6,	VCSA(0-0.5), VCSD 1.8-2.1, VCSE 1-1.6	18-NOV-2011	24-NOV-2011	02-DEC-2011	✓	25-NOV-2011	02-DEC-2011	✓
EP075H: Anilines and Benzidines								
Soil Glass Jar - Unpreserved (EP075) VCSD_2.1-3.1, VCSD 0-0.5, VCSE 0-0.6,	VCSA(0-0.5), VCSD 1.8-2.1, VCSE 1-1.6	18-NOV-2011	24-NOV-2011	02-DEC-2011	✓	25-NOV-2011	03-JAN-2012	✓
EP075G: Chlorinated Hydrocarbons								
Soil Glass Jar - Unpreserved (EP075) VCSD_2.1-3.1, VCSD 0-0.5, VCSE 0-0.6,	VCSA(0-0.5), VCSD 1.8-2.1, VCSE 1-1.6	18-NOV-2011	24-NOV-2011	02-DEC-2011	✓	25-NOV-2011	03-JAN-2012	✓
EP075F: Haloethers								
Soil Glass Jar - Unpreserved (EP075) VCSD_2.1-3.1, VCSD 0-0.5, VCSE 0-0.6,	VCSA(0-0.5), VCSD 1.8-2.1, VCSE 1-1.6	18-NOV-2011	24-NOV-2011	02-DEC-2011	✓	25-NOV-2011	03-JAN-2012	✓
EP075E: Nitroaromatics and Ketones								
Soil Glass Jar - Unpreserved (EP075) VCSD_2.1-3.1, VCSD 0-0.5, VCSE 0-0.6,	VCSA(0-0.5), VCSD 1.8-2.1, VCSE 1-1.6	18-NOV-2011	24-NOV-2011	02-DEC-2011	✓	25-NOV-2011	03-JAN-2012	✓
EP075D: Nitrosamines								
Soil Glass Jar - Unpreserved (EP075) VCSD_2.1-3.1, VCSD 0-0.5, VCSE 0-0.6,	VCSA(0-0.5), VCSD 1.8-2.1, VCSE 1-1.6	18-NOV-2011	24-NOV-2011	02-DEC-2011	✓	25-NOV-2011	03-JAN-2012	✓
EP075I: Organochlorine Pesticides								
Soil Glass Jar - Unpreserved (EP075) VCSD_2.1-3.1, VCSD 0-0.5, VCSE 0-0.6,	VCSA(0-0.5), VCSD 1.8-2.1, VCSE 1-1.6	18-NOV-2011	24-NOV-2011	02-DEC-2011	✓	25-NOV-2011	03-JAN-2012	✓



Matrix: SOIL

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis				
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation		
EP075J: Organophosphorus Pesticides									
Soil Glass Jar - Unpreserved (EP075) VCSD_2.1-3.1, VCSD 0-0.5, VCSE 0-0.6,	VCSA(0-0.5), VCSD 1.8-2.1, VCSE 1-1.6	18-NOV-2011	24-NOV-2011	02-DEC-2011	✔	25-NOV-2011	03-JAN-2012	✔	
EP075A: Phenolic Compounds									
Soil Glass Jar - Unpreserved (EP075) VCSD_2.1-3.1, VCSD 0-0.5, VCSE 0-0.6,	VCSA(0-0.5), VCSD 1.8-2.1, VCSE 1-1.6	18-NOV-2011	24-NOV-2011	02-DEC-2011	✔	25-NOV-2011	03-JAN-2012	✔	
EP075C: Phthalate Esters									
Soil Glass Jar - Unpreserved (EP075) VCSD_2.1-3.1, VCSD 0-0.5, VCSE 0-0.6,	VCSA(0-0.5), VCSD 1.8-2.1, VCSE 1-1.6	18-NOV-2011	24-NOV-2011	02-DEC-2011	✔	25-NOV-2011	03-JAN-2012	✔	
EP075B: Polynuclear Aromatic Hydrocarbons									
Soil Glass Jar - Unpreserved (EP075) VCSD_2.1-3.1, VCSD 0-0.5, VCSE 0-0.6,	VCSA(0-0.5), VCSD 1.8-2.1, VCSE 1-1.6	18-NOV-2011	24-NOV-2011	02-DEC-2011	✔	25-NOV-2011	03-JAN-2012	✔	
EP080-SD: BTEXN									
Soil Glass Jar - Unpreserved (EP080-SD) SS5A, SS5Y1, T BLANK	SS5D, SS5Y2,	17-NOV-2011	24-NOV-2011	01-DEC-2011	✔	25-NOV-2011	01-DEC-2011	✔	
Soil Glass Jar - Unpreserved (EP080-SD) VC5C 0-0.5, VCSA(0-0.5),	VCSD_2.1-3.1, VCSD 1.8-2.1	18-NOV-2011	24-NOV-2011	02-DEC-2011	✔	25-NOV-2011	02-DEC-2011	✔	
EP080-SD / EP071-SD: Total Recoverable Hydrocarbons									
Soil Glass Jar - Unpreserved (EP080-SD) SS5A, SS5Y1, T BLANK	SS5D, SS5Y2,	17-NOV-2011	24-NOV-2011	01-DEC-2011	✔	25-NOV-2011	01-DEC-2011	✔	
Soil Glass Jar - Unpreserved (EP080-SD) VC5C 0-0.5, VCSA(0-0.5),	VCSD_2.1-3.1, VCSD 1.8-2.1	18-NOV-2011	24-NOV-2011	02-DEC-2011	✔	25-NOV-2011	02-DEC-2011	✔	



Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP090: Organotin Compounds								
Soil Glass Jar - Unpreserved (EP090) SS5A, SS5C, SS5Y1, SS5E	SS5B, SS5D, SS5Y2	17-NOV-2011	25-NOV-2011	01-DEC-2011	✓	27-NOV-2011	04-JAN-2012	✓
Soil Glass Jar - Unpreserved (EP090) VC5C 0-0.5, VCSD_2.1-3.1, VCSA(0-0.5), VCSA1.5-2, VCSB 0.8-1.3, VCSD 0-0.5, VCSE 0-0.6,	VC5C 0.5-1, VCSE_0.6-0.8, VCSA0.5-1, VCSB 0-0.8, VCSB 1.3-1.6, VCSD 1.8-2.1, VCSE 1-1.6	18-NOV-2011	25-NOV-2011	02-DEC-2011	✓	27-NOV-2011	04-JAN-2012	✓
EP130A: Organophosphorus Pesticides (Ultra-trace)								
Soil Glass Jar - Unpreserved (EP130) SS5A, SS5Y1,	SS5D, SS5Y2	17-NOV-2011	24-NOV-2011	01-DEC-2011	✓	28-NOV-2011	03-JAN-2012	✓
Soil Glass Jar - Unpreserved (EP130) VC5C 0-0.5, VCSA(0-0.5),	VCSD_2.1-3.1, VCSD 1.8-2.1	18-NOV-2011	24-NOV-2011	02-DEC-2011	✓	28-NOV-2011	03-JAN-2012	✓
EP131A: Organochlorine Pesticides								
Soil Glass Jar - Unpreserved (EP131A) SS5A, SS5Y1,	SS5D, SS5Y2	17-NOV-2011	24-NOV-2011	01-DEC-2011	✓	28-NOV-2011	03-JAN-2012	✓
Soil Glass Jar - Unpreserved (EP131A) VC5C 0-0.5, VCSA(0-0.5),	VCSD_2.1-3.1, VCSD 1.8-2.1	18-NOV-2011	24-NOV-2011	02-DEC-2011	✓	28-NOV-2011	03-JAN-2012	✓
EP131B: Polychlorinated Biphenyls (as Aroclors)								
Soil Glass Jar - Unpreserved (EP131B) SS5A, SS5Y1,	SS5D, SS5Y2	17-NOV-2011	24-NOV-2011	01-DEC-2011	✓	28-NOV-2011	03-JAN-2012	✓
Soil Glass Jar - Unpreserved (EP131B) VC5C 0-0.5, VCSA(0-0.5),	VCSD_2.1-3.1, VCSD 1.8-2.1	18-NOV-2011	24-NOV-2011	02-DEC-2011	✓	28-NOV-2011	03-JAN-2012	✓
EP132B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved (EP132B-SD) SS5D, SS5Y2,	SS5Y1, SS5E	17-NOV-2011	24-NOV-2011	01-DEC-2011	✓	25-NOV-2011	03-JAN-2012	✓
Soil Glass Jar - Unpreserved (EP132B-SD) VC5C 0-0.5, VCSB 0-0.8	VCSA(0-0.5),	18-NOV-2011	24-NOV-2011	02-DEC-2011	✓	25-NOV-2011	03-JAN-2012	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
ASS Field Screening Analysis	EA037	1	6	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	5	44	11.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organochlorine Pesticides (Ultra-trace)	EP131A	1	8	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	8	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	3	19	15.8	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	7	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	8	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Semivolatile Organic Compounds	EP075	1	10	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Fe and Al in Sediments by ICPAES	EG005-SD	1	8	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	8	12.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP003	3	21	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	9	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	9	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	6	16.7	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	2	19	10.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Semivolatile Organic Compounds	EP075	1	10	10.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP003	2	21	9.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	9	11.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	9	11.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Organotin Analysis	EP090	2	19	10.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	7	14.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Semivolatile Organic Compounds	EP075	1	10	10.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Fe and Al in Sediments by ICPAES	EG005-SD	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	8	12.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Organic Carbon	EP003	2	21	9.5	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	9	11.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	9	11.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	6	16.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement



Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Matrix Spikes (MS)							
Organochlorine Pesticides (Ultra-trace)	EP131A	1	8	12.5	5.0	✔	ALS QCS3 requirement
Organophosphorus Pesticides (Ultra-trace)	EP130	1	8	12.5	5.0	✔	ALS QCS3 requirement
Organotin Analysis	EP090	2	19	10.5	5.0	✔	ALS QCS3 requirement
PAHs in Sediments by GCMS(SIM)	EP132B-SD	1	7	14.3	5.0	✔	ALS QCS3 requirement
PCB's (Ultra-trace)	EP131B	1	8	12.5	5.0	✔	ALS QCS3 requirement
Semivolatile Organic Compounds	EP075	1	10	10.0	5.0	✔	ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	8	12.5	5.0	✔	ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071-SD	1	9	11.1	5.0	✔	ALS QCS3 requirement
TPH Volatiles/BTEX in Sediments	EP080-SD	1	9	11.1	5.0	✔	ALS QCS3 requirement
Volatile Organic Compounds	EP074	1	6	16.7	5.0	✔	ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
ASS Field Screening Analysis	* EA037	SOIL	Acid Sulfate Soils Laboratory Methods Guidelines, version 2.1 June 2004. As received samples are tested for pH field and pH fox and assessed for a reaction rating.
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2010 Draft) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Particle Size Analysis (Sieving)	EA150	SOIL	Particle Size Analysis by Sieving according to AS1289.3.6.1 - 1995
Total Fe and Al in Sediments by ICPAES	EG005-SD	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3). LORs per NODG
Total Metals in Sediments by ICPMS	EG020-SD	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. Analyte list and LORs per NODG.
Total Mercury by FIMS (Low Level)	EG035T-LL	SOIL	AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3)
Total Organic Carbon	EP003	SOIL	In-house C-IR17. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a LECO furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO ₂) is automatically measured by infra-red detector.
TPH - Semivolatile Fraction	EP071-SD	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 504)
Volatile Organic Compounds	EP074	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 501)
Semivolatile Organic Compounds	EP075	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (1999) Schedule B(3) (Method 502)
TPH Volatiles/BTEX in Sediments	EP080-SD	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 501)
Organotin Analysis	EP090	SOIL	(USEPA SW 846 - 8270D) Prepared sample extracts are analysed by GC/MS coupled with high volume injection, and quantified against an established calibration curve.
Organophosphorus Pesticides (Ultra-trace)	EP130	SOIL	USEPA Method 3640 (GPC cleanup), 8141 (GC/FPD - Capillary Column) This technique is compliant with NEPM (1999) Schedule B(3) (Method 505)
Organochlorine Pesticides (Ultra-trace)	EP131A	SOIL	USEPA Method 3640 (GPC cleanup), 3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PCB's (Ultra-trace)	EP131B	SOIL	USEPA Method 3640 (GPC cleanup), 3620 (Florisil), 8081/8082 (GC/uECD/uECD) This technique is compliant with NEPM (1999) Schedule B(3) (Method 504)
PAHs in Sediments by GCMS(SIM)	EP132B-SD	SOIL	8270 GCMS Capillary column, SIM mode using large volume programmed temperature vaporisation injection.



<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Drying only	EN020D	SOIL	In House
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (1999) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	(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 A - Concentrating)	ORG17A	SOIL	In-house, Mechanical agitation (tumbler). 20g of sample, Na ₂ SO ₄ and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Tumbler Extraction of Solids/ Sample Cleanup	ORG17A-UTP	SOIL	In-house, Mechanical agitation (tumbler). 20g of sample, Na ₂ SO ₄ and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. Samples are extracted, concentrated (by KD) and exchanged into an appropriate solvent for GPC and florisil cleanup as required.
Tumbler Extraction of Solids for LVI (Non-concentrating)	ORG17D	SOIL	In house: 10g of sample, Na ₂ SO ₄ and surrogate are extracted with 50mL 1:1 DCM/Acetone by end over end tumbling. An aliquot is concentrated by nitrogen blowdown to a reduced volume for analysis if required.
Organotin Sample Preparation	ORG35	SOIL	In house. 20g sample is spiked with surrogate and leached in a methanol:acetic acid:UHP water mix and vacuum filtered. Reagents and solvents are added to the sample and the mixture tumbled. The butyltin compounds are simultaneously derivatised and extracted. The extract is further extracted with petroleum ether. The resultant extracts are combined and concentrated for analysis.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EG035T: Total Recoverable Mercury by FIMS	2436000-002	----	Mercury	7439-97-6	73.5 %	74.2-126%	Recovery less than lower control limit
EP074B: Oxygenated Compounds	2435004-012	----	Vinyl Acetate	108-05-4	17.5 %	29.6-156%	Recovery less than lower control limit
EP075A: Phenolic Compounds	2435140-002	----	2,6-Dichlorophenol	87-65-0	43.7 %	48.2-98.6%	Recovery less than lower control limit
EP075D: Nitrosamines	2435140-002	----	N-Nitrosopyrrolidine	930-55-2	110 %	42.8-102%	Recovery greater than upper control limit
EP075E: Nitroaromatics and Ketones	2435140-002	----	4-Aminobiphenyl	92-67-1	35.4 %	36.1-102%	Recovery less than lower control limit
EP075E: Nitroaromatics and Ketones	2435140-002	----	Dimethylaminoazobenzene	60-11-7	46.7 %	53.5-105%	Recovery less than lower control limit
EP075H: Anilines and Benzidines	2435140-002	----	Aniline	62-53-3	111 %	13.2-108%	Recovery greater than upper control limit
EP075H: Anilines and Benzidines	2435140-002	----	4-Nitroaniline	100-01-6	46.6 %	48.6-97.6%	Recovery less than lower control limit
Matrix Spike (MS) Recoveries							
EP090: Organotin Compounds	ES1125458-036	VCSE 0-0.6	Tributyltin	56573-85-4	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP130A: Organophosphorus Pesticides (Ultra-trace)	ES1125458-006	SS5D	Dichlorvos	62-73-7	28.9 %	32.7-153%	Recovery less than lower data quality objective
EP131A: Organochlorine Pesticides	ES1125458-006	SS5D	Dieldrin	60-57-1	35.9 %	43.2-134%	Recovery less than lower data quality objective
EP131A: Organochlorine Pesticides	ES1125458-006	SS5D	trans-Chlordane	5103-74-2	35.9 %	42.4-139%	Recovery less than lower data quality objective
EP132B: Polynuclear Aromatic Hydrocarbons	ES1125458-006	SS5D	Phenanthrene	85-01-8	131 %	70-130%	Recovery greater than upper data quality objective

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.

Regular Sample Surrogates

Sub-Matrix: **SEDIMENT**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP075S: Acid Extractable Surrogates	ES1125458-036	VCSE 0-0.6	2,4,6-Tribromophenol	118-79-6	120 %	10.0-120.1 %	Recovery greater than upper data quality objective
EP090S: Organotin Surrogate	ES1125458-009	SS5E	Tripopyltin	----	19.8 %	35-130 %	Recovery less than lower data quality objective
EP090S: Organotin Surrogate	ES1125458-027	VCSE_0.6-0.8	Tripopyltin	----	22.2 %	35-130 %	Recovery less than lower data quality objective



Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **SOIL**

Method	Extraction / Preparation			Analysis			
	Container / Client Sample ID(s)	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA037: Ass Field Screening Analysis							
Pulp Bag VCSB 1.3-1.6		25-NOV-2011	19-NOV-2011	6	25-NOV-2011	19-NOV-2011	6
Snap Lock Bag VC5C 0-0.5, VC5C 0.5-1, VCSB 0-0.8, VCSB 0.8-1.3		25-NOV-2011	19-NOV-2011	6	25-NOV-2011	19-NOV-2011	6
Soil Glass Jar - Unpreserved VCSA(0-0.5)		25-NOV-2011	19-NOV-2011	6	25-NOV-2011	19-NOV-2011	6
EP003: Total Organic Carbon (TOC) in Soil							
Pulp Bag SS5A, SS5C, SS5Y1, SS5E	SS5B, SS5D, SS5Y2,	25-NOV-2011	24-NOV-2011	1	----	----	----

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**



CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095
Ph: 08 8359 0890 E: adelaide@alsenviro.com

BRISBANE 32 Sand Street Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com

GLADSTONE 46 Callomondah Drive Clinton QLD 4680
Ph: 07 4971 5600 E: gladstone@alsglobal.com

MACKAY 78 Harbour Road Mackay QLD 4740
Ph: 07 4944 0177 E: makay@alsglobal.com

MELBOURNE 2-4 Westall Road Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsenviro.com

MUDGEE 27 Sydney Road Mudgee NSW 2850
Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

NEWCASTLE 5 Rosegum Road Warabrook NSW 2304
Ph: 02 4968 9433 E: samples.newcastle@alsenviro.com

NOWRA 4/13 Geary Place North Nowra NSW 2541
Ph: 02 4423 2063 E: nowra@alsglobal.com

PERTH 10 Hod Way Malaga WA 6090
Ph: 08 9209 7655 E: samples.perth@alsenviro.com

SYDNEY 277 Woodpark Road Smithfield NSW 2164
Ph: 02 8784 8555 E: samples.sydney@alsenviro.com

TOWNSVILLE 14-15 Desma Court Bohle QLD 4819
Ph: 07 4796 0600 E: townsville.environmental@alsenviro.com

WOLLONGONG 99 Kenny Street Wollongong NSW 2500
Ph: 02 4225 3125 E: portkembia@alsglobal.com

CLIENT: **WorleyParsons**
OFFICE: **Nth Sydney**
PROJECT: **Catex**
PURCHASE ORDER NUMBER: **301015-02448**
PROJECT MANAGER: **O. MURRAY**

TURNAROUND REQUIREMENTS:
(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)
 Standard TAT (List due date):
 Non Standard or urgent TAT (List due date):
ALS QUOTE NO.: **ZN-034-11**
COC SEQUENCE NUMBER (Circle)
COC: 1 2 3 4 5 6 7
OF: 1 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)
Custody Seal Intact? Yes No N/A
Free ice / frozen ice bricks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt: °C
Other comment: **6.6°C**

SAMPLER: **1** SAMPLER MOBILE: **0408 207481**
COC emailed to ALS? (YES NO) EDD FORMAT (or default):
Email Reports to (will default to PM if no other addresses are listed):
Email Invoice to (will default to PM if no other addresses are listed):

RELINQUISHED BY: **O. MURRAY**
DATE/TIME: **18/11/11 18:20**
RECEIVED BY: **AS**
DATE/TIME: **18-11-11 20:28**

RELINQUISHED BY:
DATE/TIME:

COMMENTS/ SPECIAL HANDLING/STORAGE OR DISPOSAL:
3 Esbies. Fast TAT required (5-day) for TBT & TOC. VCSD+VCSE are highly contaminated

ALS USE	SAMPLE DETAILS MATRIX - SOLID (S), WATER (W)	CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITS (if any) (Suites Codes must be listed to extract suite price Metals are required, specify Total (unfiltered bottle required) and preserved (if not filtered bottle required))															
LAB ID	SAMPLE ID	DATE/ TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	EA 150 (PBA)	EP003 (TOC)	EP090 (TBT)	EP132-SD	EP071-SD	SD-1 (OC/6/103)	SD-2 (OC/6/103)	SD-3 (in vials)	EP080-SD (BTEX)	Hold for element TBT	SD3 (VOCs)	ASS field bag	Hold for CHL
1	SS5A	17/11/11	S	Vantows	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	SSX1	"	"															
3	SSX2	"	"															
4	SS5B	"	"															
5	SS5C	"	"		X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	SS5D	"	"		X	X	X	X	X	X	X	X	X	X	X	X	X	X
7	SS5Y1	"	"		X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	SS5Y2	"	"		X	X	X	X	X	X	X	X	X	X	X	X	X	X
9	SS5E	"	"		X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	TBlank	"	"															
11	VCSD 2.1-3.1	18/11/11	"		X	X	X	X	X	X	X	X	X	X	X	X	X	X
12	VCSE 0.6-0.8	"	"		X	X	X	X	X	X	X	X	X	X	X	X	X	X
TOTAL																		

Environmental Division
Sydney
Work Order
ES1125458

Telephone : + 61-2-9784 8555

levels, amounts, or samples requiring specific QC analysis etc.

Samples not homogenised. Please homog in lab.

VCSD & VCSE are highly contaminated with oil / AS

Highly carbon off gas?

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

211204



CHAIN OF CUSTODY

ALS Laboratory: please tick →

- ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsenviro.com
- BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com
- GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 4971 5000 E: gladstone@alsglobal.com
- MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: makay@alsglobal.com
- MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsenviro.com
- MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee@mail@alsglobal.com
- NEWCASTLE 2304 E: samples.newcastle@alsenviro.com
- NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com
- PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
- SYDNEY 277 Woodpark Road Smithfield NSW 2184 Ph: 02 8784 8555 E: samples.sydney@alsenviro.com
- TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4798 0600 E: townsville.environmental@alsenviro.com
- WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT:	TURNAROUND REQUIREMENTS: <input checked="" type="checkbox"/> Standard TAT (List due date): <input type="checkbox"/> Non Standard or urgent TAT (List due date):	FOR LABORATORY USE ONLY (Circle) Custody Seal Intact? Yes <u>(circled)</u> No N/A Free ice / frozen ice bricks present upon receipt? Yes No N/A Random Sample Temperature on Receipt: °C Other comment: <u>4.6</u>
OFFICE: <u>Calbra</u>	ALS QUOTE NO.: <u>EN-039-11</u>	COC SEQUENCE NUMBER (Circle) COC: 1 <u>(2)</u> 3 4 5 6 7 OF: 1 <u>(2)</u> 3 4 5 6 7
PROJECT: <u>301015-0a448</u>	CONTACT PH:	
PURCHASE ORDER NUMBER:		
PROJECT MANAGER: <u>O. MURRAY</u>		

SAMPLER: SAMPLER MOBILE:	RELINQUISHED BY: <u>O. MURRAY</u>	RECEIVED BY: <u>Says K... ALS</u>	RELINQUISHED BY:	RECEIVED BY:
COC emailed to ALS? (YES / NO) EDD FORMAT (or default):	DATE/TIME: <u>18/11/11</u>	DATE/TIME: <u>18-11-11 20:25</u>	DATE/TIME:	DATE/TIME:
Email Reports to (will default to PM if no other addresses are listed):				
Email Invoice to (will default to PM if no other addresses are listed):				

COMMENTS/ SPECIAL HANDLING/STORAGE OR DISPOSAL: as pg 1

ALS USE	SAMPLE DETAILS		MATRIX	CONTAINER INFORMATION		ANALYSIS REQUIRED INCLUDING SUITES (NB. Codes must be listed to attract suite price) Where Metals are required, specify total, filtered, or dissolved. Dissolved and filtered bottle required).										Additional Information				
	MATRIX - SOLID (S), WATER (W)	DATE/ TIME		TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS															
	LAB ID	SAMPLE ID	DATE/ TIME	MATRIX	TYPE & PRESERVATIVE	TOTAL CONTAINERS	EA150 (PBA)	EP003 (TOC)	EP090 (TBA)	EP132-SD (PBA)	EP071-SD (PBA)	BD1 (6x10 PBA)	SD2 (6x10 PBA)	SD8 (metal)	EP080-SD (PBA)	Hold for TBA	683 (VCS)	ASS Field	Hold for CS	
	13	VCSA (0-0.5)	18/11/11	S	Various	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	14	VCSA 0.5-1				X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	15	VCSA 1.5-2				X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	16	VCSB 0-0.8				X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	17	VCSB 0.8-1.3				X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	18	VCSB 1.3-1.6				X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	19	VCSC 0-0.5				X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	20	VCSC 0.5-1				X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	21	VCSD 0-0.5				X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	22	VCSD 1.8-2.4				X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	23	VCSE 0-0.6				X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	24	VCSE 1-1.6				X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	25	+ Site Water																		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

211205

CERTIFICATE OF ANALYSIS

Work Order	: ES1128506	Page	: 1 of 3
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Client Services
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: sydney@alsglobal.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: REBATCH OF ES1125458	Date Samples Received	: 23-DEC-2011
C-O-C number	: ----	Issue Date	: 09-JAN-2012
Sampler	: ----	No. of samples received	: 1
Site	: ----	No. of samples analysed	: 1
Quote number	: EN/034/11		

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Di-An Dao		Sydney Inorganics
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

SS5A

Client sampling date / time

17-NOV-2011 15:00

Compound	CAS Number	LOR	Unit	ES1128506-001				
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	20.5	----	----	----	----
EG005-SD: Total Metals in Sediments by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	730	----	----	----	----
Iron	7439-89-6	50	mg/kg	770	----	----	----	----
EG020-SD: Total Metals in Sediments by ICPMS								
Antimony	7440-36-0	0.50	mg/kg	<0.50	----	----	----	----
Arsenic	7440-38-2	1.00	mg/kg	<1.00	----	----	----	----
Cadmium	7440-43-9	0.1	mg/kg	<0.1	----	----	----	----
Chromium	7440-47-3	1.0	mg/kg	2.0	----	----	----	----
Copper	7440-50-8	1.0	mg/kg	<1.0	----	----	----	----
Cobalt	7440-48-4	0.5	mg/kg	<0.5	----	----	----	----
Lead	7439-92-1	1.0	mg/kg	1.9	----	----	----	----
Manganese	7439-96-5	10	mg/kg	<10	----	----	----	----
Nickel	7440-02-0	1.0	mg/kg	<1.0	----	----	----	----
Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
Silver	7440-22-4	0.1	mg/kg	<0.1	----	----	----	----
Vanadium	7440-62-2	2.0	mg/kg	<2.0	----	----	----	----
Zinc	7440-66-6	1.0	mg/kg	3.7	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.01	mg/kg	<0.01	----	----	----	----

QUALITY CONTROL REPORT

Work Order	: ES1128506	Page	: 1 of 6
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Client Services
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: sydney@alsglobal.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 23-DEC-2011
Sampler	: ----	Issue Date	: 09-JAN-2012
Order number	: REBATCH OF ES1125458		
Quote number	: EN/034/11	No. of samples received	: 1
		No. of samples analysed	: 1

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Di-An Dao		Sydney Inorganics
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 2112633)									
ES1128480-002	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	20.9	23.6	12.1	0% - 20%
EG005-SD: Total Metals in Sediments by ICP-AES (QC Lot: 2115647)									
EM1114618-001	Anonymous	EG005-SD: Aluminium	7429-90-5	50	mg/kg	12800	13400	5.1	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	18900	19100	1.1	0% - 20%
EM1114618-011	Anonymous	EG005-SD: Aluminium	7429-90-5	50	mg/kg	13800	14000	1.2	0% - 20%
		EG005-SD: Iron	7439-89-6	50	mg/kg	17300	17400	0.8	0% - 20%
EG020-SD: Total Metals in Sediments by ICPMS (QC Lot: 2115646)									
EM1114618-001	Anonymous	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	0.2	0.2	0.0	No Limit
		EG020-SD: Selenium	7782-49-2	0.1	mg/kg	0.5	0.7	36.1	No Limit
		EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
		EG020-SD: Cobalt	7440-48-4	0.5	mg/kg	12.4	12.8	3.4	0% - 20%
		EG020-SD: Antimony	7440-36-0	0.50	mg/kg	0.57	0.62	8.1	No Limit
		EG020-SD: Chromium	7440-47-3	1.0	mg/kg	30.4	30.4	0.0	0% - 20%
		EG020-SD: Copper	7440-50-8	1.0	mg/kg	29.4	32.1	8.5	0% - 20%
		EG020-SD: Lead	7439-92-1	1.0	mg/kg	31.1	30.9	0.6	0% - 20%
		EG020-SD: Nickel	7440-02-0	1.0	mg/kg	29.6	30.5	3.1	0% - 20%
		EG020-SD: Zinc	7440-66-6	1.0	mg/kg	263	256	2.7	0% - 20%
		EG020-SD: Arsenic	7440-38-2	1.00	mg/kg	5.84	6.00	2.6	No Limit
		EG020-SD: Manganese	7439-96-5	10	mg/kg	186	158	16.2	0% - 50%
		EG020-SD: Vanadium	7440-62-2	2.0	mg/kg	37.6	40.3	7.0	0% - 20%
		EM1114618-011	Anonymous	EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	0.2	0.2
EG020-SD: Selenium	7782-49-2			0.1	mg/kg	0.9	0.6	49.6	No Limit
EG020-SD: Silver	7440-22-4			0.1	mg/kg	0.2	<0.1	0.0	No Limit
EG020-SD: Cobalt	7440-48-4			0.5	mg/kg	11.8	11.6	2.3	0% - 20%
EG020-SD: Antimony	7440-36-0			0.50	mg/kg	0.71	0.75	5.3	No Limit
EG020-SD: Chromium	7440-47-3			1.0	mg/kg	27.5	27.6	0.0	0% - 20%
EG020-SD: Copper	7440-50-8			1.0	mg/kg	20.9	20.6	1.2	0% - 20%
EG020-SD: Lead	7439-92-1			1.0	mg/kg	25.3	25.9	2.0	0% - 20%
EG020-SD: Nickel	7440-02-0			1.0	mg/kg	18.9	19.0	0.6	0% - 50%
EG020-SD: Zinc	7440-66-6			1.0	mg/kg	190	188	1.0	0% - 20%
EG020-SD: Arsenic	7440-38-2			1.00	mg/kg	2.91	2.66	9.1	No Limit
EG020-SD: Manganese	7439-96-5			10	mg/kg	113	111	1.8	0% - 50%
EG020-SD: Vanadium	7440-62-2			2.0	mg/kg	46.1	46.8	1.5	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 2115645)									
EM1114618-001	Anonymous	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.05	0.05	0.0	No Limit

Page : 4 of 6
 Work Order : ES1128506
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE
 Project : CALTEX



Sub-Matrix: **SOIL**

Laboratory Duplicate (DUP) Report

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD (%)</i>	<i>Recovery Limits (%)</i>
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 2115645) - continued									
EM1114618-011	Anonymous	EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	0.04	0.04	0.0	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
EG005-SD: Total Metals in Sediments by ICP-AES (QCLot: 2115647)								
EG005-SD: Aluminium	7429-90-5	50	mg/kg	<50	----	----	----	----
EG005-SD: Iron	7439-89-6	50	mg/kg	<50	----	----	----	----
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 2115646)								
EG020-SD: Antimony	7440-36-0	0.5	mg/kg	<0.50	----	----	----	----
EG020-SD: Arsenic	7440-38-2	1.0	mg/kg	<1.00	13.1 mg/kg	105	70	130
EG020-SD: Cadmium	7440-43-9	0.1	mg/kg	<0.1	2.76 mg/kg	94.8	70	130
EG020-SD: Chromium	7440-47-3	1.0	mg/kg	<1.0	60.9 mg/kg	98.4	70	130
EG020-SD: Copper	7440-50-8	1.0	mg/kg	<1.0	54.7 mg/kg	101	70	130
EG020-SD: Cobalt	7440-48-4	10	mg/kg	<10.0	24.5 mg/kg	101	70	130
EG020-SD: Lead	7439-92-1	1.0	mg/kg	<1.0	54.8 mg/kg	103	70	130
EG020-SD: Manganese	7439-96-5	10	mg/kg	<10	136 mg/kg	107	70	130
EG020-SD: Nickel	7440-02-0	1.0	mg/kg	<1.0	55.2 mg/kg	101	70	130
EG020-SD: Selenium	7782-49-2	0.1	mg/kg	<0.1	----	----	----	----
EG020-SD: Silver	7440-22-4	0.1	mg/kg	<0.1	5.6 mg/kg	80.4	70	130
EG020-SD: Vanadium	7440-62-2	2	mg/kg	<2.0	34 mg/kg	104	70	130
EG020-SD: Zinc	7440-66-6	1.0	mg/kg	<1.0	104 mg/kg	102	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2115645)								
EG035T-LL: Mercury	7439-97-6	0.01	mg/kg	<0.01	0.11 mg/kg	85.2	74.2	126



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				<i>Matrix Spike (MS) Report</i>			
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Spike</i>	<i>Spike Recovery (%)</i>		
				<i>Concentration</i>	<i>MS</i>	<i>Low</i>	<i>High</i>
EG020-SD: Total Metals in Sediments by ICPMS (QCLot: 2115646)							
EM1114618-002	Anonymous	EG020-SD: Arsenic	7440-38-2	50 mg/kg	96.2	70	130
		EG020-SD: Cadmium	7440-43-9	50 mg/kg	99.6	70	130
		EG020-SD: Chromium	7440-47-3	50 mg/kg	96.0	70	130
		EG020-SD: Copper	7440-50-8	250 mg/kg	100	70	130
		EG020-SD: Lead	7439-92-1	250 mg/kg	100	70	130
		EG020-SD: Nickel	7440-02-0	50 mg/kg	102	70	130
		EG020-SD: Zinc	7440-66-6	250 mg/kg	98.0	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2115645)							
EM1114618-001	Anonymous	EG035T-LL: Mercury	7439-97-6	0.50 mg/kg	82.6	70	130

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1128506	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Client Services
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: sydney@alsglobal.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 23-DEC-2011
C-O-C number	: ----	Issue Date	: 09-JAN-2012
Sampler	: ----	No. of samples received	: 1
Order number	: REBATCH OF ES1125458	No. of samples analysed	: 1
Quote number	: EN/034/11		

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content							
Lab Split: Managed Moisture for Dry Weight Det. (EA055-103) SS5A	17-NOV-2011	----	----	----	03-JAN-2012	15-MAY-2012	✓
EG005-SD: Total Metals in Sediments by ICP-AES							
Soil Glass Jar - Unpreserved (EG005-SD) SS5A	17-NOV-2011	05-JAN-2012	15-MAY-2012	✓	06-JAN-2012	15-MAY-2012	✓
EG020-SD: Total Metals in Sediments by ICPMS							
Soil Glass Jar - Unpreserved (EG020-SD) SS5A	17-NOV-2011	05-JAN-2012	15-MAY-2012	✓	06-JAN-2012	15-MAY-2012	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T-LL) SS5A	17-NOV-2011	05-JAN-2012	15-DEC-2011	*	06-JAN-2012	15-DEC-2011	*



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	1	5	20.0	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Fe and Al in Sediments by ICPAES	EG005-SD	2	15	13.3	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	2	15	13.3	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	2	15	13.3	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Total Mercury by FIMS (Low Level)	EG035T-LL	1	15	6.7	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	15	6.7	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Total Fe and Al in Sediments by ICPAES	EG005-SD	1	15	6.7	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS (Low Level)	EG035T-LL	1	15	6.7	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	15	6.7	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Total Mercury by FIMS (Low Level)	EG035T-LL	1	15	6.7	5.0	✔	ALS QCS3 requirement
Total Metals in Sediments by ICPMS	EG020-SD	1	15	6.7	5.0	✔	ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2010 Draft) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Total Fe and Al in Sediments by ICPAES	EG005-SD	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3). LORs per NODG
Total Metals in Sediments by ICPMS	EG020-SD	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. Analyte list and LORs per NODG.
Total Mercury by FIMS (Low Level)	EG035T-LL	SOIL	AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (1999) Schedule B(3) (Method 202)



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: SOIL

Method Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EG035T: Total Recoverable Mercury by FIMS						
Soil Glass Jar - Unpreserved SS5A	05-JAN-2012	15-DEC-2011	21	06-JAN-2012	15-DEC-2011	22

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.

SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Work Order : ES1128506	
Client : WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory : Environmental Division Sydney
Contact : MS ORLA MURRAY	Contact : Client Services
Address : Level 10/141 Walker Street	Address : 277-289 Woodpark Road Smithfield
NORTH SYDNEY NSW, AUSTRALIA	NSW Australia 2164
2060	
E-mail : orla.murray@worleyparsons.com	E-mail : sydney@alsglobal.com
Telephone : 8907 2131	Telephone : +61-2-8784 8555
Facsimile : ----	Facsimile : +61-2-8784 8500
Project : CALTEX	Page : 1 of 2
Order number : REBATCH OF ES1125458	
C-O-C number : ----	Quote number : EM2011WORPAR0266 (EN/034/11)
Site : ----	
Sampler : ----	QC Level : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received : 23-DEC-2011	Issue Date : 23-DEC-2011 19:59
Client Requested Due Date : 09-JAN-2012	Scheduled Reporting Date : 09-JAN-2012

Delivery Details

Mode of Delivery : Carrier	Temperature : 4.1°C
No. of coolers/boxes : REBATCH	No. of samples received : 1
Security Seal : N/A	No. of samples analysed : 1

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- **Samples received in appropriately pretreated and preserved containers.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **This is a rebatch of ES1125458.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of work order.

5280-282
289-291

Fadi Soro

From: Jennifer Cullen
Sent: Thursday, 22 December 2011 11:11 AM
To: Fadi Soro; Samples Sydney
Subject: FW: Missing results from work order ES1125458

Hi Fadi,

Could you please tell me if how much sediment is left in the 3 jars provided for SS5A in work order ES1125458? If there is some left we will rebatch them so keep them out of the fridge for now.

Thanks

How was your customer experience? Please send us your feedback

Kind Regards

Jennifer Cullen
CLIENT SERVICES COORDINATOR

ALS | Environmental Division

Address
277-289 Woodpark Road, Smithfield, NSW, 2164

PHONE +61 2 8784 8555
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Please consider the environment before printing this email.

From: Murray, Orla (Sydney) [mailto:Orla.Murray@WorleyParsons.com]
Sent: Thursday, 22 December 2011 8:14 AM
To: Jennifer Cullen
Subject: RE: Missing results from work order ES1125458

OK no worries. Is there any sediment left from those three remaining jars of SS5A to test for metals again (SD-3)?

Regards,

Orla Murray
Environmental Scientist
Coastal and Marine
WorleyParsons

orla.murray@worleyparsons.com
Tel: +61 2 8456 7251

From: Jennifer Cullen [mailto:Jennifer.Cullen@alsglobal.com]
Sent: Wednesday, 21 December 2011 1:43 PM

22/12/2011

Environmental Division
Sydney
Work Order
ES1128506
Telephone : +61-2-8784 8555



①



WorleyParsons

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CALTEX REFINERIES NSW

CALTEX DREDGING

SEDIMENT SAMPLING AND ANALYSIS PLAN IMPLEMENTATION REPORT

ELUTRIATE LABORATORY RESULTS

Frank 3/12/9 2pm

Frank Ferraro

From: Watters, Ali (Sydney) [Ali.STONE@WorleyParsons.com]
Sent: Thursday, 3 December 2009 1:15 PM
To: Jacob Waugh
Cc: Samples Sydney; Hannaford, Nick (Sydney)
Subject: RE: ES0917655 ES0917729 results pending.

Jacob

Thank you for the preliminary results.

We wish to proceed with TBT elutriate testing of the following currently being kept on hold by ALS:

MS

- ES0917728-013 (VC1A1 0-0.6X)
ES0917649-018 (SS3BX)
ES0917649-024 (SS2DX)

Could you please undertake the following analysis:

ALS method - EN68, Preparation of elutriates from marine sediment - TBT ALS method - EP090, Organo Tins (TBT)

Could you also please ensure the sea water sample (W1) used for the elutriate test is tested for TBT.

4

Thanks

Ali

-----Original Message-----

From: Jacob Waugh [mailto:Jacob.Waugh@als.com.au]
Sent: Thursday, 3 December 2009 12:06 PM
To: Hannaford, Nick (Sydney)
Cc: Watters, Ali (Sydney)
Subject: RE: ES0917655 ES0917729 results pending.

Hi Nick,

Sorry for the delay. ES0917655 has now been released this morning so you should have results for this one. If for some reason the emails haven't made it to your inbox yet let me know and I can forward straight away.

ES0917729 has been delayed has been delayed by the TBT results. I just checked our system and I can see that results for all samples are in, however they have not been authorised by the chemist. I have attached a prelim excel sheet for this batch that may help you make decisions on which samples need elutriate TBT however do remember that the results could potentially change if the chemist has any concerns with the results.

Ali,

As discussed once you know the sediments that you want re-batched for Elutriate TBT please email them (with the relevant ALS work order numbers) to myself and samples.sydney@alsenviro.com so we can get it started for you. As mentioned we do now have the sea water your sampler just dropped off.

Jacob Waugh
Production Co-ordinator
ALS Laboratory Group
Environmental Division
Sydney, Australia
Phone: +61 2 8784 8555
Fax: +61 2 8784 8500
www.alsglobal.com

Environmental Division Sydney Work Order ES0918462 Telephone: +61-2-8784 8555

Spec / Forward Lab / Split WO
Lab / Analysis:
Organised By / Date: Brisbane
Relinquished By / Date:
Connote / Courier:
WO No:
Attach By PO / Internal Sheet:



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES0918462	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: REBATCH OF ES0917728	Date Samples Received	: 03-DEC-2009
C-O-C number	: ----	Issue Date	: 15-DEC-2009
Sampler	: NH	No. of samples received	: 4
Site	: ----	No. of samples analysed	: 4
Quote number	: SY/503/09		

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

Signatories	Position	Accreditation Category
Matt Frost	Organic Instrument Chemist	Organics
Nanthini Coilparampil	Senior Inorganic Chemist	Inorganics

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting



Analytical Results

Sub-Matrix: **ELUTRIATE**

Client sample ID

Client sampling date / time

				VC1A1 0-0.6X	SS3BX	SS2DX	W1	
				04-DEC-2009 12:00	04-DEC-2009 12:00	04-DEC-2009 12:00	18-NOV-2009 11:00	----
<i>Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	ES0918462-001	ES0918462-002	ES0918462-003	ES0918462-004	----
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	----	----	----	<2	----
Tributyltin	56573-85-4	2	ngSn/L	70	<2	8	----	----
EP090S: Organotin Surrogate								
Tripopyltin	----	0.1	%	----	----	----	44.6	----
Tripopyltin	----	0.1	%	59.4	52.5	96.5	----	----



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				VC1A1 0-0.6X	SS3BX	SS2DX	W1	----
				18-NOV-2009 15:00	17-NOV-2009 15:00	18-NOV-2009 15:00	03-DEC-2009 15:00	----
Compound	CAS Number	LOR	Unit	ES0918462-001	ES0918462-002	ES0918462-003	ES0918462-004	----
EN68: Seawater Elutriate Testing Procedure								
Seawater Sampling Date	----	0.1	-	----	----	----	18/11/09	----
Seawater Sampling Date	----	0.1	-	18/11/09	18/11/09	18/11/09	----	----

Page : 5 of 5
Work Order : ES0918462
Client : WORLEY PARSONS - INFRASTRUCTURE MWE
Project : CALTEX MAINTENANCE DREDGING



Surrogate Control Limits

Sub-Matrix: ELUTRIATE		<i>Recovery Limits (%)</i>	
<i>Compound</i>	<i>CAS Number</i>	<i>Low</i>	<i>High</i>
EP090S: Organotin Surrogate			
Tripopyltin	----	10	108



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES0918462	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 03-DEC-2009
Sampler	: NH	Issue Date	: 15-DEC-2009
Order number	: REBATCH OF ES0917728		
Quote number	: SY/503/09	No. of samples received	: 4
		No. of samples analysed	: 4

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Matt Frost	Organic Instrument Chemist	Organics
Nanthini Coilparampil	Senior Inorganic Chemist	Inorganics

Environmental Division Sydney

Part of the **ALS Laboratory Group**

277-289 Woodpark Road Smithfield NSW Australia 2164

Tel. +61-2-8784 8555 Fax. +61-2-8784 8500 www.alsglobal.com

A Campbell Brothers Limited Company



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit			LCS	Low	High
EP090: Organotin Compounds (Soluble) (QCLot: 1189227)								
EP090S: Tributyltin	56573-85-4	2	ngSn/L	---- <2	147 ngSn/L ----	72.0 ----	29 ----	100 ----



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES0918462	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: Ms ALI WATTERS	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ali.watters@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: +61 02 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 03-DEC-2009
Sampler	: NH	Issue Date	: 15-DEC-2009
Order number	: REBATCH OF ES0917728		
Quote number	: SY/503/09	No. of samples received	: 4
		No. of samples analysed	: 4

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EN68: Seawater Elutriate Testing Procedure							
LabSplit: Leach for organics and other tests SS3BX	17-NOV-2009	---	---	----	04-DEC-2009	01-DEC-2009	*
LabSplit: Leach for organics and other tests VC1A1 0-0.6X, SS2DX	18-NOV-2009	---	---	----	04-DEC-2009	02-DEC-2009	*
EP090: Organotin Compounds (Soluble)							
Amber Glass Bottle - Unpreserved VC1A1 0-0.6X, SS2DX	04-DEC-2009	11-DEC-2009	11-DEC-2009	✓	14-DEC-2009	23-JAN-2010	✓

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EN68: Seawater Elutriate Testing Procedure							
LabSplit: Leach for organics and other tests W1	03-DEC-2009	---	---	----	04-DEC-2009	17-DEC-2009	✓
EP090: Organotin Compounds (Soluble)							
Amber Glass Bottle - Unpreserved W1	18-NOV-2009	11-DEC-2009	25-NOV-2009	*	14-DEC-2009	23-JAN-2010	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Control Samples (LCS)							
Organotin Compounds (Soluble)	EP090S	2	6	33.3	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Organotin Compounds (Soluble)	EP090S	2	6	33.3	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Organotin Compounds (Soluble)	EP090S	SOIL	USEPA SW 846 - 8270D Sample extracts are analysed by GC/MS coupled with high volume injection and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Organotin Compounds (Soluble)	EP090S	WATER	USEPA SW 846 - 8270D Sample extracts are analysed by GC/MS coupled with high volume injection and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Preparation Methods	Method	Matrix	Method Descriptions
Seawater Elutriate Testing Procedure	* EN68a	SOIL	USEPA Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Guide, 1991, EPA-503/8-91/001, USEPA and US Army Corps of Engineers. ANZECC Interim Ocean Disposal Guidelines, December, 1998 This Procedure outlines the preparation of leachate designed to simulate release of contaminants from sediment during the disposal of dredged material. Release can occur by physical processes or a variety of chemical changes such as oxidation of metal sulphides and release of contaminants adsorbed to particles or organic matter.
Organotin Sample Preparation	ORG34	SOIL	In-house. A specified volume of sample is spiked with surrogate, acidified and vacuum filtered. Reagents and solvent are added and the mixture tumbled. The butyltin compounds is derivatisated, extracted and the substitution reaction completed. The extract is transferred to a separatory funnel and further extracted two times with petroleum ether. The resultant extracts are combined and concentrated for analysis.
Seawater Elutriate Testing Procedure	* EN68a	WATER	USEPA Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Guide, 1991, EPA-503/8-91/001, USEPA and US Army Corps of Engineers. ANZECC Interim Ocean Disposal Guidelines, December, 1998 This Procedure outlines the preparation of leachate designed to simulate release of contaminants from sediment during the disposal of dredged material. Release can occur by physical processes or a variety of chemical changes such as oxidation of metal sulphides and release of contaminants adsorbed to particles or organic matter.
Organotin Sample Preparation	ORG34	WATER	In-house. A specified volume of sample is spiked with surrogate, acidified and vacuum filtered. Reagents and solvent are added and the mixture tumbled. The butyltin compounds is derivatisated, extracted and the substitution reaction completed. The extract is transferred to a separatory funnel and further extracted two times with petroleum ether. The resultant extracts are combined and concentrated for analysis.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **SOIL**

Method	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EN68: Seawater Elutriate Testing Procedure						
LabSplit: Leach for organics and other tests SS3BX	----	----	----	04-DEC-2009	01-DEC-2009	3
LabSplit: Leach for organics and other tests VC1A1 0-0.6X, SS2DX	----	----	----	04-DEC-2009	02-DEC-2009	2

Matrix: **WATER**

Method	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EP090: Organotin Compounds (Soluble)						
Amber Glass Bottle - Unpreserved W1	11-DEC-2009	25-NOV-2009	16	----	----	----

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.

Fadi
19/3/10
6:15pm

Fadi Soro

From: Jacob Waugh
Sent: Friday, 19 March 2010 4:40 PM
To: Samples Sydney; Fadi Soro
Cc: Frank Ferraro; Charlie Pierce
Subject: FW: Work Order ES1004273

Hi Fadi,
 Please re-batch as per the below request. Please make sure the sea-water is re-batched also.

Charlie,
 Because Frank is on an earlier shift now can you please send re-batch requests to samples.sydney so Frank or Fadi can action them?

Jacob Waugh
 Production Co-ordinator
ALS Laboratory Group
Environmental Division
 Sydney, Australia
 Phone: +61 2 8784 8555
 Fax: +61 2 8784 8500
www.alsglobal.com

Environmental Division
 Sydney

Work Order

ES1005242



Telephone : +61-2-8784 8555

From: Charlie Pierce
Sent: Friday, 19 March 2010 4:33 PM
To: Jacob Waugh; Uma Nagendiram; Frank Ferraro
Subject: FW: Work Order ES1004273

Dear Frank

Please rebatch this for elutriate testing, testing will commence first thing Monday morning.

Kind Regards

Charlie Pierce
 Laboratory Manager - Sydney
ALS Laboratory Group
Environmental Division
 Sydney, Australia
 Phone: + 61 2 8784 8555
 Fax: + 61 2 8784 8500
www.alsglobal.com

ES1005242



Telephone : +61-2-8784 8555

From: Murray, Orla (Sydney) [mailto:Orla.Murray@v.als.com.au]
Sent: Friday, 19 March 2010 3:28 PM
To: Charlie Pierce
Subject: RE: Work Order ES1004273

Thanks Charlie.

Can you please arrange for the immediate elutriation and testing for elutriate TBT (as per quote SY/503/09 V3) for the following samples:

Sample ID	ALS sample ID
VC4B (0.5-1m) ①	ES1004214-003 5399-401
VC4B (1-1.5m) ②	ES1004214-004
VC4B (1.5-2m) ③	ES1004214-005



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1005242	Page	: 1 of 10
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING -REBATCH OF ES1004273	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: 301015-018871/04-REB	Date Samples Received	: 19-MAR-2010
C-O-C number	: REBATCH	Issue Date	: 31-MAR-2010
Sampler	: OM	No. of samples received	: 11
Site	: ----	No. of samples analysed	: 11
Quote number	: SY/503/09		

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



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Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Matt Frost	Organic Instrument Chemist	Organics
Wisam.Marassa	Metals Coordinator	Inorganics

Environmental Division Sydney

Part of the **ALS Laboratory Group**

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

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Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **EN68 was tumbled outside of holding time due to sample received too late**
- **EN68: This analysis in accordance with National Ocean Disposal Guidelines, Commonwealth of Australia, 2002 - (modified). Results reported are those determined on a 1:4 sediment/seawater elutriate without blank correction.**



Analytical Results

Sub-Matrix: ELUTRIATE

Client sample ID

Client sampling date / time

				VC4B(0.5-1M)	VC4B(1-1.5M)	VC4B(1.5-2M)	SS4E	SS4B
				22-MAR-2010 12:00	22-MAR-2010 12:00	22-MAR-2010 12:00	22-MAR-2010 12:00	22-MAR-2010 12:00
Compound	CAS Number	LOR	Unit	ES1005242-001	ES1005242-002	ES1005242-003	ES1005242-004	ES1005242-005
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	3350	4530	1040	258	43
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	96.6	92.7	91.8	91.5	101



Analytical Results

Sub-Matrix: **ELUTRIATE**

Client sample ID

Client sampling date / time

				SS4D	VC4C(0.5-1M)	SS4F	SS4G	FT1
				22-MAR-2010 12:00	22-MAR-2010 12:00	22-MAR-2010 12:00	22-MAR-2010 12:00	22-MAR-2010 12:00
<i>Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	ES1005242-006	ES1005242-007	ES1005242-008	ES1005242-009	ES1005242-010
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	19	173	20	26	35
EP090S: Organotin Surrogate								
Tripopyltin	----	0.1	%	85.3	88.2	96.7	99.7	99.7



Analytical Results

Sub-Matrix: **ELUTRIATE**

Client sample ID

Client sampling date / time

				SITE WATER	----	----	----	----
				22-MAR-2010 12:00	----	----	----	----
				ES1005242-011	----	----	----	----
<i>Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>					
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	12	----	----	----	----
EP090S: Organotin Surrogate								
Tripopyltin	----	0.1	%	85.0	----	----	----	----



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

				VC4B(0.5-1M)	VC4B(1-1.5M)	VC4B(1.5-2M)	SS4E	SS4B
				05-MAR-2010 15:00	05-MAR-2010 15:00	05-MAR-2010 15:00	05-MAR-2010 15:00	05-MAR-2010 15:00
<i>Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	ES1005242-001	ES1005242-002	ES1005242-003	ES1005242-004	ES1005242-005
EN68: Seawater Elutriate Testing Procedure								
Seawater Sampling Date	----	0.1	-	05/03/10	05/03/10	05/03/10	05/03/10	05/03/10

Page : 8 of 10
 Work Order : ES1005242
 Client : WORLEY PARSONS - INFRASTRUCTURE MWE
 Project : CALTEX MAINTENANCE DREDGING -REBATCH OF ES1004273



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

				SS4D	VC4C(0.5-1M)	SS4F	SS4G	FT1
				05-MAR-2010 15:00	05-MAR-2010 15:00	05-MAR-2010 15:00	05-MAR-2010 15:00	05-MAR-2010 15:00
<i>Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	ES1005242-006	ES1005242-007	ES1005242-008	ES1005242-009	ES1005242-010
EN68: Seawater Elutriate Testing Procedure								
Seawater Sampling Date	----	0.1	-	05/03/10	05/03/10	05/03/10	05/03/10	05/03/10



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

				SITE WATER	----	----	----	----
				05-MAR-2010 15:00	----	----	----	----
<i>Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	ES1005242-011	----	----	----	----
EN68: Seawater Elutriate Testing Procedure								
Seawater Sampling Date	----	0.1	-	05/03/10	----	----	----	----

Page : 10 of 10
Work Order : ES1005242
Client : WORLEY PARSONS - INFRASTRUCTURE MWE
Project : CALTEX MAINTENANCE DREDGING -REBATCH OF ES1004273



Surrogate Control Limits

Sub-Matrix: ELUTRIATE		<i>Recovery Limits (%)</i>	
<i>Compound</i>	<i>CAS Number</i>	<i>Low</i>	<i>High</i>
EP090S: Organotin Surrogate			
Tripopyltin	----	10	108



Environmental Division

QUALITY CONTROL REPORT

Work Order	: ES1005242	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING -REBATCH OF ES1004273	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 19-MAR-2010
C-O-C number	: REBATCH	Issue Date	: 31-MAR-2010
Sampler	: OM	No. of samples received	: 11
Order number	: 301015-018871/04-REB	No. of samples analysed	: 11
Quote number	: SY/503/09		

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This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



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Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Matt Frost	Organic Instrument Chemist	Organics
Wisam.Marassa	Metals Coordinator	Inorganics



General Comments

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Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit			LCS	Low	High	
EP090: Organotin Compounds (Soluble) (QCLot: 1289228)									
EP090S: Tributyltin	56573-85-4	2	ngSn/L	---- <2	147 ngSn/L ----	86.4 ----	29 ----	100 ----	



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1005242	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Charlie Pierce
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: charlie.pierce@alsenviro.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX MAINTENANCE DREDGING -REBATCH OF ES1004273	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: REBATCH	Date Samples Received	: 19-MAR-2010
Sampler	: OM	Issue Date	: 31-MAR-2010
Order number	: 301015-018871/04-REB		
Quote number	: SY/503/09	No. of samples received	: 11
		No. of samples analysed	: 11

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Environmental Division Sydney

Part of the **ALS Laboratory Group**

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A Campbell Brothers Limited Company



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EN68: Seawater Elutriate Testing Procedure								
LabSplit: Leach for organics and other tests								
VC4B(0.5-1M), VC4B(1.5-2M), SS4B, VC4C(0.5-1M), SS4G, SITE WATER	VC4B(1-1.5M), SS4E, SS4D, SS4F, FT1,	05-MAR-2010	---	---	----	22-MAR-2010	19-MAR-2010	*
EP090: Organotin Compounds (Soluble)								
Amber Glass Bottle - Unpreserved								
VC4B(0.5-1M), VC4B(1.5-2M), SS4B, VC4C(0.5-1M), SS4G, SITE WATER	VC4B(1-1.5M), SS4E, SS4D, SS4F, FT1,	22-MAR-2010	26-MAR-2010	29-MAR-2010	✓	30-MAR-2010	05-MAY-2010	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Control Samples (LCS)							
Organotin Compounds (Soluble)	EP090S	1	1	100.0	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Organotin Compounds (Soluble)	EP090S	1	1	100.0	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Organotin Compounds (Soluble)	EP090S	SOIL	USEPA SW 846 - 8270D Sample extracts are analysed by GC/MS coupled with high volume injection and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Seawater Elutriate Testing Procedure	* EN68a	SOIL	USEPA Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Guide, 1991, EPA-503/8-91/001, USEPA and US Army Corps of Engineers. ANZECC Interim Ocean Disposal Guidelines, December, 1998 This Procedure outlines the preparation of leachate designed to simulate release of contaminants from sediment during the disposal of dredged material. Release can occur by physical processes or a variety of chemical changes such as oxidation of metal sulphides and release of contaminants adsorbed to particles or organic matter.
Organotin Sample Preparation	ORG34	SOIL	In-house. A specified volume of sample is spiked with surrogate, acidified and vacuum filtered. Reagents and solvent are added and the mixture tumbled. The butyltin compounds is derivatisated, extracted and the substitution reaction completed. The extract is transferred to a separatory funnel and further extracted two times with petroleum ether. The resultant extracts are combined and concentrated for analysis.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: SOIL

Method	Extraction / Preparation			Analysis			
	Container / Client Sample ID(s)	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EN68: Seawater Elutriate Testing Procedure							
LabSplit: Leach for organics and other tests							
VC4B(0.5-1M), VC4B(1.5-2M), SS4B, VC4C(0.5-1M), SS4G, SITE WATER	VC4B(1-1.5M), SS4E, SS4D, SS4F, FT1,	----	----	----	22-MAR-2010	19-MAR-2010	3

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.

CERTIFICATE OF ANALYSIS

<p>Work Order : ES1126468</p> <p>Client : WORLEY PARSONS - INFRASTRUCTURE MWE</p> <p>Contact : MS ORLA MURRAY</p> <p>Address : Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060</p> <p>E-mail : orla.murray@worleyparsons.com</p> <p>Telephone : 8907 2131</p> <p>Facsimile : ----</p> <p>Project : CALTEX</p> <p>Order number : REBATCH OF ES1125458</p> <p>C-O-C number : ----</p> <p>Sampler : OM</p> <p>Site : ----</p> <p>Quote number : EN/034/11</p>	<p>Page : 1 of 5</p> <p>Laboratory : Environmental Division Sydney</p> <p>Contact : Client Services</p> <p>Address : 277-289 Woodpark Road Smithfield NSW Australia 2164</p> <p>E-mail : sydney@alsglobal.com</p> <p>Telephone : +61-2-8784 8555</p> <p>Facsimile : +61-2-8784 8500</p> <p>QC Level : NEPM 1999 Schedule B(3) and ALS QCS3 requirement</p> <p>Date Samples Received : 30-NOV-2011</p> <p>Issue Date : 12-DEC-2011</p> <p>No. of samples received : 4</p> <p>No. of samples analysed : 4</p>
---	---

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.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Andrew Matheson	Senior Organic Instrument Chemist	Brisbane Organics
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **EN68: This analysis in accordance with National Ocean Disposal Guidelines, Commonwealth of Australia, 2002 - (modified). Results reported are those determined on a 1:4 sediment/seawater elutriate without blank correction.**
-



Analytical Results

Sub-Matrix: **ELUTRIATE**

Client sample ID

Client sampling date / time

				SS5D	VCSE_0.6-0.8	VCSB 0-0.8	SITE WATER	----
				02-DEC-2011 12:00	02-DEC-2011 12:00	02-DEC-2011 12:00	02-DEC-2011 12:00	----
<i>Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	ES1126468-001	ES1126468-002	ES1126468-003	ES1126468-004	----
EP090: Organotin Compounds (Soluble)								
Tributyltin	56573-85-4	2	ngSn/L	<2	<2	43	<2	----
EP090S: Organotin Surrogate								
Tripropyltin	----	0.1	%	114	89.8	115	106	----



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

				SS5D	VCSE_0.6-0.8	VCSB 0-0.8	SITE WATER	----
				17-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	18-NOV-2011 15:00	----
<i>Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	ES1126468-001	ES1126468-002	ES1126468-003	ES1126468-004	----
EN68: Seawater Elutriate Testing Procedure								
Seawater Sampling Date	----	0.1	-	02/12/2011	02/12/2011	02/12/2011	02/12/2011	----



Surrogate Control Limits

Sub-Matrix: ELUTRIATE		<i>Recovery Limits (%)</i>	
<i>Compound</i>	<i>CAS Number</i>	<i>Low</i>	<i>High</i>
EP090S: Organotin Surrogate			
Tripopyltin	----	24	116

QUALITY CONTROL REPORT

Work Order	: ES1126468	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Client Services
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: sydney@alsglobal.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 30-NOV-2011
C-O-C number	: ----	Issue Date	: 12-DEC-2011
Sampler	: OM	No. of samples received	: 4
Order number	: REBATCH OF ES1125458	No. of samples analysed	: 4
Quote number	: EN/034/11		

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.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

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Accredited for compliance with ISO/IEC 17025.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Andrew Matheson	Senior Organic Instrument Chemist	Brisbane Organics
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP090: Organotin Compounds (Soluble) (QC Lot: 2077350)									
EB1125958-001	Anonymous	EP090S: Tributyltin	56573-85-4	2	ngSn/L	<2	<2	0.0	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit			LCS	Low	High
EP090: Organotin Compounds (Soluble) (QCLot: 2077350)								
EP090S: Tributyltin	56573-85-4	2	ngSn/L	<2	147 ngSn/L	90.7	29	115



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				<i>Matrix Spike (MS) Report</i>				
				<i>Spike</i>	<i>Spike Recovery (%)</i>		<i>Recovery Limits (%)</i>	
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Concentration</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	
EP090: Organotin Compounds (Soluble) (QCLot: 2077350)								
EB1125958-002	Anonymous	EP090S: Tributyltin	56573-85-4	147 ngSn/L	102	20	130	

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1126468	Page	: 1 of 5
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Sydney
Contact	: MS ORLA MURRAY	Contact	: Client Services
Address	: Level 10/141 Walker Street NORTH SYDNEY NSW, AUSTRALIA 2060	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: orla.murray@worleyparsons.com	E-mail	: sydney@alsglobal.com
Telephone	: 8907 2131	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: CALTEX	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: ----	Date Samples Received	: 30-NOV-2011
Sampler	: OM	Issue Date	: 12-DEC-2011
Order number	: REBATCH OF ES1125458		
Quote number	: EN/034/11	No. of samples received	: 4
		No. of samples analysed	: 4

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.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EN68: Seawater Elutriate Testing Procedure							
LabSplit: Leach for organics and other tests (EN68a) SS5D	17-NOV-2011	---	01-DEC-2011	----	02-DEC-2011	01-DEC-2011	*
LabSplit: Leach for organics and other tests (EN68a) VCSE_0.6-0.8, SITE WATER	18-NOV-2011	---	02-DEC-2011	----	02-DEC-2011	02-DEC-2011	✓
EP090: Organotin Compounds (Soluble)							
Amber Glass Bottle - Unpreserved (EP090S) SS5D, VCSE 0-0.8,	02-DEC-2011	07-DEC-2011	09-DEC-2011	✓	07-DEC-2011	16-JAN-2012	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Organotin Compounds (Soluble)	EP090S	1	7	14.3	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Organotin Compounds (Soluble)	EP090S	1	7	14.3	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Organotin Compounds (Soluble)	EP090S	1	7	14.3	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Organotin Compounds (Soluble)	EP090S	1	7	14.3	5.0	✔	ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Organotin Compounds (Soluble)	EP090S	SOIL	USEPA SW 846 - 8270D Sample extracts are analysed by GC/MS coupled with high volume injection and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Seawater Elutriate Testing Procedure	* EN68a	SOIL	USEPA Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Guide, 1991, EPA-503/8-91/001, USEPA and US Army Corps of Engineers. ANZECC Interim Ocean Disposal Guidelines, December, 1998 This Procedure outlines the preparation of leachate designed to simulate release of contaminants from sediment during the disposal of dredged material. Release can occur by physical processes or a variety of chemical changes such as oxidation of metal sulphides and release of contaminants adsorbed to particles or organic matter.
Organotin Sample Preparation	ORG34	SOIL	In-house. A specified volume of sample is spiked with surrogate, acidified and vacuum filtered. Reagents and solvent are added and the mixture tumbled. The butyltin compounds is derivatisated, extracted and the substitution reaction completed. The extract is transferred to a separatory funnel and further extracted two times with petroleum ether. The resultant extracts are combined and concentrated for analysis.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: SOIL

Method	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EN68: Seawater Elutriate Testing Procedure						
LabSplit: Leach for organics and other tests SS5D	----	----	----	02-DEC-2011	01-DEC-2011	1

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.

Fadi Soro

Fadi Soro
30/11/11

From: Glenyss Weeks
Sent: Wednesday, 30 November 2011 2:10 PM
To: Fadi Soro
Cc: Nanthini Coilparampil; Wisam Marassa; Wael Saleh
Subject: ReBatch ES1125458 FW: Schedule elutriate testing asap today please
Importance: High

Fadi,

Can you please rebatch the following samples? (including the site water to be used for the elutriation)

WP Sample ID	ALS Sample ID
① SS5D	ES1125458006
② VCSE 0.6-0.8	ES1125458027
③ VCSB 0-0.8	ES1125458031
④ Site water provided with the samples	#25

5280-282, 289-291

Wael- Please log these in for TBT on the elutriate.

Nanthini- can we do the elutriation by the end of this week? I will talk to the client about giving us such short notice for these. I believe this may be the case for Orla's entire project, which will make it impossible for us to meet all holding times.

Thank you,
Glenyss

From: Murray, Orla (Sydney) [mailto:Orla.Murray@WorleyParsons.com]
Sent: Wednesday, 30 November 2011 2:02 PM
To: Glenyss Weeks
Subject: Schedule elutriate testing asap today please
Importance: High

Thanks Glenyss.

Three things.

Can you please arrange for elutriate TBT testing to be undertaken on the following three samples and the site water blank. These will need to be elutriated asap as the holding time for SS5D is up today and tomorrow for the other two samples:

WP Sample ID	ALS Sample ID
SS5D	ES1125458006
VCSE 0.6-0.8	ES1125458027
VCSB 0-0.8	ES1125458031
Site water provided	

Subcon / Forward Lab / Split WO
 Lab / Analysis: ALS Brisbane / TBT
 Organised By / Date: _____
 Relinquished By / Date: _____
 Connote / Courier: _____
 WO No: _____
 Attach By PO / Internal Sheet: _____

Environmental Division
Sydney
Work Order
ES1126468

Telephone : + 61-2-9784 8555



Fadi Soro

Fadi Soro
30/11/11

From: Glenyss Weeks
Sent: Wednesday, 30 November 2011 2:10 PM
To: Fadi Soro
Cc: Nanthini Coilparampil; Wisam Marassa; Wael Saleh
Subject: ReBatch ES1125458 FW: Schedule elutriate testing asap today please
Importance: High

Fadi,

Can you please rebatch the following samples? (including the site water to be used for the elutriation)

WP Sample ID	ALS Sample ID
① SS5D	ES1125458006
② VCSE 0.6-0.8	ES1125458027
③ VCSB 0-0.8	ES1125458031
④ Site water provided with the samples	#25

5280-282, 289-291

Wael- Please log these in for TBT on the elutriate.

Nanthini- can we do the elutriation by the end of this week? I will talk to the client about giving us such short notice for these. I believe this may be the case for Orla's entire project, which will make it impossible for us to meet all holding times.

Thank you,
Glenyss

From: Murray, Orla (Sydney) [mailto:Orla.Murray@WorleyParsons.com]
Sent: Wednesday, 30 November 2011 2:02 PM
To: Glenyss Weeks
Subject: Schedule elutriate testing asap today please
Importance: High

Thanks Glenyss.

Three things.

Can you please arrange for elutriate TBT testing to be undertaken on the following three samples and the site water blank. These will need to be elutriated asap as the holding time for SS5D is up today and tomorrow for the other two samples:

WP Sample ID	ALS Sample ID
SS5D	ES1125458006
VCSE 0.6-0.8	ES1125458027
VCSB 0-0.8	ES1125458031
Site water provided	

Subcon / Forward Lab / Split WO
 Lab / Analysis: ALS Brisbane / TBT
 Organised By / Date: _____
 Relinquished By / Date: _____
 Connote / Courier: _____
 WO No: _____
 Attach By PO / Internal Sheet: _____

Environmental Division
Sydney
Work Order
ES1126468

Telephone : + 61-2-9784 8555





WorleyParsons

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CALTEX REFINERIES NSW

CALTEX DREDGING

SEDIMENT SAMPLING AND ANALYSIS PLAN IMPLEMENTATION REPORT

WHOLE SEDIMENT TOXICITY LABORATORY RESULTS

Chronic Amphipod Reproduction Test Report CAR008

Client: Worley Parsons, Ali Watters
Project: Caltex Dredged Sediments
Test Performed: 10-day chronic amphipod reproduction toxicity test using the amphipod *Melita plumulosa*

Sampled:	4-5/03/2010	Test Initiated:	26/03/2010
Arrived:	4-5/03/2010		
CSIRO Sample No.	Sample Name	Sample Description	
E10008	VC4B (1.5-2m)	Very coarse sandy sediment (505 µg Sn/kg, norm 1% TOC)	
E10016	SS4D	Very coarse sandy sediment (1040 µg Sn/kg, norm 1% TOC)	
E10021	VC4C (0.5-1m)	Very coarse sandy sediment (231 µg Sn/kg, norm 1% TOC)	
E10022	VC4C (1-1.5m)	Very coarse sandy sediment (blind control) (<70 µg Sn/kg, norm 1% TOC blind control)	

Test Method: This test measures the survival and number of amphipod (*Melita plumulosa*) embryos in the second brood following exposure to undiluted test sediments over a 10 day period. Sediments were homogenised immediately prior to being added to test vials (40 g sediment per 250 ml vial, 5 replicates per sediment). Filtered seawater (30 ‰) was added, and each beaker was incubated at 21°C with aeration overnight to allow sediments to settle. The following day, overlying water was replaced, five gravid females (gravid for <24 h) and 7 males were randomly assigned to each beaker. Amphipods used in the tests were isolated from laboratory cultures. The test sediments were renewed after 5 days by gently sieving away the adults and placing them into a new sub-sample of the same test sediment that had been equilibrated overnight. This allows for the removal of juveniles from the first brood which is typically less affected by contaminants in the test sediment. On day 10 the number of embryos per female are counted by microscopy and expressed as a percentage of the blind control (VC4C 1-1.5m). The sediment was also checked (by sieving the sediment through 180 µm mesh) for juvenile amphipods that had escaped the marsupium during the latter stages of the test. Physio-chemical parameter (temperature, pH, salinity and dissolved oxygen) were measured throughout the test. A silty control was also tested for quality assurance purposes. All treatments were fed at a rate of 1 mg sera micron® fish food/amphipod twice a week. Statistical significance between treatments was calculated using ToxCalc Version 5.0.23 (Tidepool Software)

Results: The number of embryos per female in the silty control was within the test acceptability limits of 10-18 embryos per female. There was no statistical significant difference ($p=0.05$) in embryos per female or survival between any of the sediments and the blind control (VC4C 1-1.5 m) which contained $<70 \mu\text{g Sn/kg}$ (normalised to 1% TOC). Therefore all the test sediments were considered to be non-toxic to the reproduction and survival of the amphipod.

Sediment	Survival (% survival)	% of Control ^a	Embryos per female	% of Control ^a
Silty control	90 ± 3^b	NA	11 ± 1	NA
VC4C (1-1.5m) blind control	75 ± 9	100 ± 12	8 ± 1	100 ± 15
VC4B (1.5-2m)	85 ± 3	113 ± 4	8 ± 1	99 ± 10
SS4D	92 ± 3	122 ± 4	9 ± 1	108 ± 13
VC4C (0.5-1m)	78 ± 7	104 ± 10	8 ± 1	101 ± 9

^a Calculated as a percent of the blind control.

^b Standard error calculated on the five replicate samples.

Quality Assurance/Quality Control: Criteria	Range	Criterion Met?
$\geq 80\%$ survival in silty control	$90 \pm 3\%$	Yes
10-18 embryos per female produced in silty control	11 ± 1	Yes
pH of overlying water in test beakers	8.0 ± 0.2	Yes
Salinity of overlying water in test beakers	$30 \pm 2\text{‰}$	Yes
Dissolved oxygen in overlying water in test beakers	$>80\%$	Yes
Temperature of overlying water in test beakers	$21 \pm 1^\circ\text{C}$	Yes

Test carried out by: David Spadaro and Ian Hamilton
 Test supervised by: Stuart Simpson (ph: 02 9710 6807)

Test report prepared by: David Spadaro (ph: 02 9710 6801)

Date: 13/04/2010



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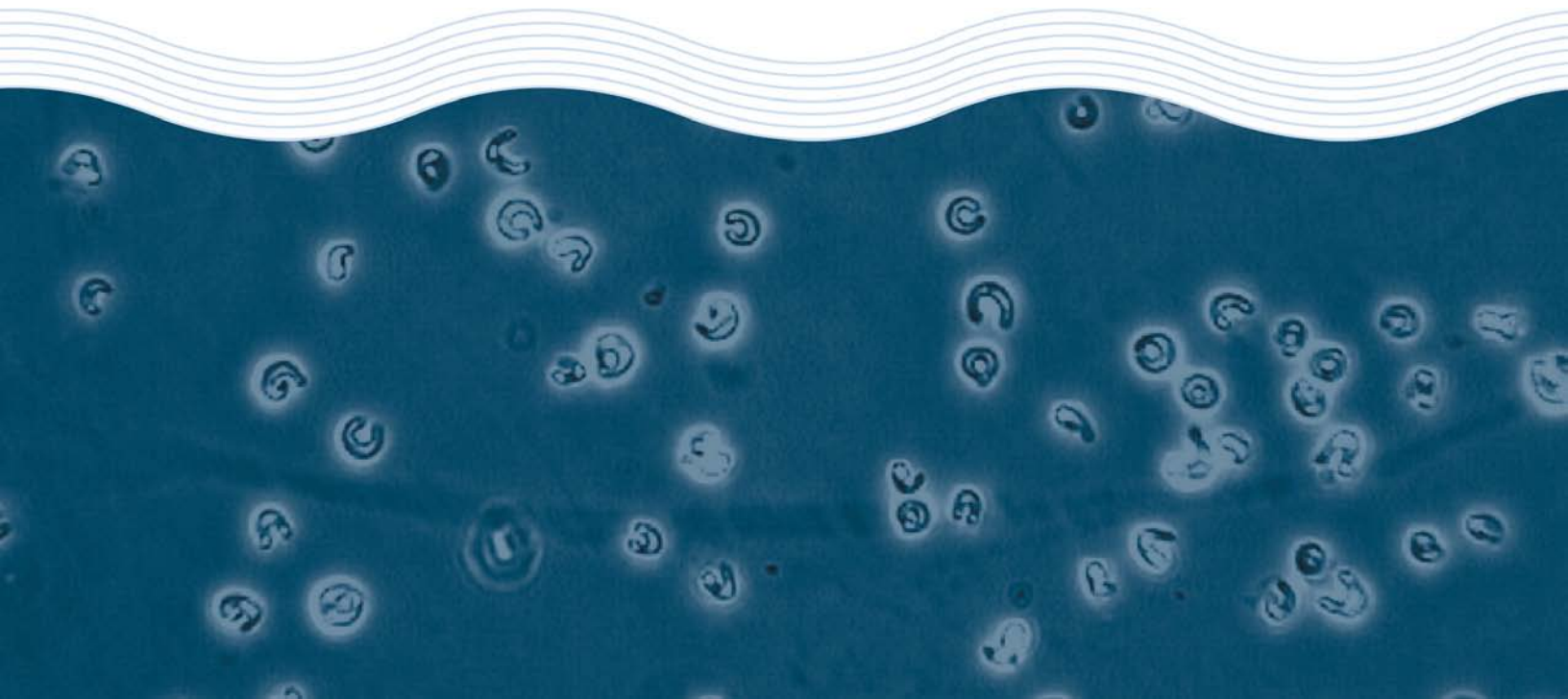
SEDIMENT SAMPLING AND ANALYSIS PLAN IMPLEMENTATION REPORT

ELUTRIATE TOXICITY LABORATORY RESULTS

Toxicity Assessment of Four Sediment Elutriates

**CSIRO Centre for Environmental
Contaminants Research**

April 2010



Toxicity Assessment of Four Sediment Elutriates

**CSIRO Centre for Environmental
Contaminants Research**

April 2010

Toxicity Test Report: TR0588/1

(page 1 of 3)

This document is issued in accordance with NATA's accreditation requirements

Client:	CSIRO Centre for Environmental Contaminants and Research Locked Mail Bag 2007 Kirrawee NSW 2232	ESA Job #:	PR0588
Attention:	David Spadaro	Date Sampled:	5 March 2010
Client Ref:	Not Supplied	Date Received:	17 April 2010
		Sampled By:	Client
		ESA Quote #:	PL0588_q01

Lab ID No.:	Sample Name:	Sample Description:
4128	VC4B (0.5-1M), whole sediments	Sediment sample received chilled in apparent good condition.
4129	VC4B (1.5-2M), whole sediments	Sediment sample received chilled in apparent good condition.
4130	VC4C (0.5-1M), whole sediments	Sediment sample received chilled in apparent good condition.
4131	SS4G, whole sediments	Sediment sample received chilled in apparent good condition.

Test Performed:	48-hr larval development test using the rock oyster <i>Saccostrea commercialis</i>
Test Protocol:	ESA SOP 106 (ESA 2009), based on APHA (1998) and Krassoi (1995)
Test Temperature:	The test was performed at 25±1°C.
Deviations from Protocol:	Test was performed in polycarbonate vials instead of glass tissue vials as requested.
Comments on Solution Preparation:	Sediment elutriates were prepared according to USEPA (1991). One hundred millilitres of sediment was mixed with 400 mL filtered seawater (FSW). The mixture was stirred vigorously for 30 min with a magnetic stirrer. At 10 min intervals, the mixture was also stirred manually to ensure thorough mixing of the sediment and solution. The mixture was allowed to settle for 1 h before the supernatant was carefully siphoned off without disturbing the sediment. Total ammonia and sulphide concentrations for all of the prepared elutriates were below the detection limits of 2.0mg/L and 0.10mg/L, respectively. The sediment elutriates were serially diluted with FSW to achieve the test concentrations. A FSW control was tested concurrently with the samples.
Source of Test Organisms:	Farm-reared, Wallis Lakes, NSW.
Test Initiated:	22 April 2010 at 2000h

Toxicity Test Report: TR0588/1

(page 2 of 3)

Sample 4128: VC4B (0.5-1M)		Sample 4129: VC4B (1.5-2M)		Sample 4130: VC4C (0.5-1M)	
Concentration (%)	% Alive/Normal larvae (Mean ± SD)	Concentration (%)	% Alive/Normal larvae (Mean ± SD)	Concentration (%)	% Alive/Normal larvae (Mean ± SD)
FSW Control	72.8 ± 4.2	FSW Control	72.8 ± 4.2	FSW Control	72.8 ± 4.2
6.3	72.8 ± 3.8	6.3	72.8 ± 5.8	6.3	67.2 ± 5.6
12.5	68.3 ± 9.0	12.5	68.3 ± 5.6	12.5	71.1 ± 7.9
25	69.4 ± 6.1	25	67.2 ± 4.9	25	68.3 ± 4.9
50	71.7 ± 4.6	50	70.6 ± 7.3	50	68.3 ± 2.1
100	74.4 ± 5.6	100	72.2 ± 5.3	100	62.8 ± 9.5
48-hr EC10 = >100%		48-hr EC10 = >100%		48-hr EC10 = 82.6% *	
48-hr EC50 = >100%		48-hr EC50 = >100%		48-hr EC50 = >100%	
NOEC = 100%		NOEC = 100%		NOEC = 100%	
LOEC = >100%		LOEC = >100%		LOEC = >100%	

* 95% confidence limits are not available

Sample 4131: SS4G		Vacant	Vacant
Concentration (%)	% Alive/Normal larvae (Mean ± SD)		
FSW Control	72.8 ± 4.2		
6.3	72.2 ± 5.9		
12.5	68.3 ± 9.3		
25	65.0 ± 4.9		
50	70.0 ± 9.0		
100	68.3 ± 5.8		
48-hr EC10 = >100%			
48-hr EC50 = >100%			
NOEC = 100%			
LOEC = >100%			

QA/QC Parameter	Criterion	This Test	Criterion met?
FSW Control mean % survival	>70%	81.1%	Yes
FSW Control mean % normal	>70%	89.7%	Yes
Reference Toxicant within cusum chart limits	18.9-27.3µg Cu/L	20.1µg Cu/L	Yes

Test Report Authorised by:



Dr Rick Krassoi, Director on 3 May 2010

Toxicity Test Report: TR0588/1

(page 3 of 3)

Results are based on the samples in the condition as received by ESA.

NATA Accredited Laboratory Number: 14709

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Citations:

APHA (1998) Standard Methods for the Examination of Water and Wastewater. 20th Ed. American Public Health Association, American Water Works Association and the Water Environment Federation, Washington, DC.

ESA (2009) SOP 106 – *Bivalve Larval Development Test*. Issue No. 7. Ecotox Services Australasia, Sydney, NSW.

Krasso, R (1995) Salinity adjustment of effluents for use with marine bioassays: effects on the larvae of the doughboy scallop *Chlamys asperrimus* and the Sydney rock oyster *Saccostrea commercialis*. *Australasian Journal of Ecotoxicology*, 1: 143-148.

USEPA (1991) Evaluation of Dredged Material Proposed for Ocean Disposal. Testing Manual. United States Environmental Protection Agency. Office of Marine and Estuarine Protection. EPA-503/8-91/001.

Chain-of-Custody Documentation

Sample Receipt Notification

Attention : David Spadaro

Client : CSIRO
Locked Mail Bag 2007
Kirrawee NSW 2232

Email : david.spadaro@csiro.au
Telephone : 9710 6807
Facsimile : 9710 6800

Date : 20/04/2010

Re : Receipt of Sediment Samples

Pages : 2

ESA Project : PR0588

For Review

Additional Documentation Required - Please Respond

Sample Delivery Details

Completed Chain of Custody accompanied samples: YES

Samples received in apparent good condition and correctly bottled: YES

Security seals on sample bottles and esky intact: YES

Date samples received : 17/04/2010

Time samples received : 10:00

No. of samples received : 4

Sample matrix : sediment

Sample temperature : chilled

Comments : Includes VC4B (0.5-1m) whole sediment (ESA ID# 4128), VC4B (1.5-2m) whole sediment (ESA ID# 4129), VC4C (0.5-1m) whole sediment (ESA ID# 4130), SS4G whole sediment (ESA ID# 4131)

Contact Details

Customer Services Officer : Tina Micevska

Telephone : 61 2 9420 9481

Facsimile : 61 2 9420 9484

Email : tmicevska@ecotox.com.au

Please contact customer services officer for all queries or issues regarding samples

Note that the chain-of-custody provides definitive information on the tests to be performed

Ecotox Services Australia

ABN 45 094 714 904

Unit 27, 2 Chaplin Drive

Lane Cove NSW 2066 Australia

Phone : 61 2 9420 9481

Fax : 61 2 9420 9484

Email : info@ecotox.com.au



CHAIN OF CUSTODY

CSIRO ID (E___)	Sample Description / Sample No	Collection		Water Physico-chemical Parameters						Analyses Required				Additional Information
		Date	Time	Cond.	Salinity	pH	D.O.	Temp	Other (specify)	48-h oyster larval development (elutriates)				
(CSIRO Use only)		dd/mm/y	hh:m m (24h)	mS	‰		mg/L or % sat.	°C						
E10006	VC4B(0.5-1M), whole sediments	5/03/10		NA	NA	NA	NA	NA		X				- Prepare 1:4 elutriate and commence toxicity test. - If possible, conduct in polycarbonate test vessels
E10008	VC4B(1.5-2M), whole sediments	5/03/10		NA	NA	NA	NA	NA		X				
E10021	VC4C(0.5-1M), whole sediments	5/03/10		NA	NA	NA	NA	NA		X				
E10019	SS4G, whole sediments	5/03/10		NA	NA	NA	NA	NA		X				

				Method of Shipment, Date			
Forwarded by:	David Spadaro						
Signature:							
Received By:				Tina Miodora			
Signature:							
For:	CSIRO	Date:	16/04/2010	Toll courier, ref number: 093152			
For:		Date:		ESA			
		Date:		Date: 17/4/10 @ 10:00			

				Method of Shipment, Date			
Collected By:							
Signature:							
Received By:							
Signature:							
For:		Date:					
For:		Date:					

Statistical Printouts for the Rock Oyster Larval Development Tests

Bivalve Larval Development Test-Proportion Alive/Normal

Start Date:	22/04/2010 20:00	Test ID:	PR0588/01	Sample ID:	VC4B (0.5-1.0M)
End Date:	24/04/2010 20:00	Lab ID:	4128	Sample Type:	SEL-Sediment elutriate
Sample Date:		Protocol:	ESA 106	Test Species:	SR-Saccostrea commercialis

Comments:

Conc-%	1	2	3	4
FSW Control	0.7556	0.7333	0.7556	0.6667
6.3	0.7333	0.6889	0.7111	0.7778
12.5	0.7333	0.6889	0.5556	0.7556
25	0.6222	0.7333	0.7556	0.6667
50	0.7111	0.6667	0.7778	0.7111
100	0.8000	0.7556	0.6667	0.7556

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	N				Mean	N-Mean
FSW Control	0.7278	1.0000	1.0227	0.9553	1.0536	4.546	4				0.7278	1.0000
6.3	0.7278	1.0000	1.0226	0.9791	1.0799	4.217	4	0.001	2.410	0.1080	0.7278	1.0000
12.5	0.6833	0.9389	0.9755	0.8411	1.0536	9.719	4	1.053	2.410	0.1080	0.7097	0.9752
25	0.6944	0.9542	0.9865	0.9089	1.0536	6.735	4	0.808	2.410	0.1080	0.7097	0.9752
50	0.7167	0.9847	1.0105	0.9553	1.0799	5.099	4	0.272	2.410	0.1080	0.7097	0.9752
100	0.7444	1.0229	1.0424	0.9553	1.1071	6.074	4	-0.441	2.410	0.1080	0.7097	0.9752

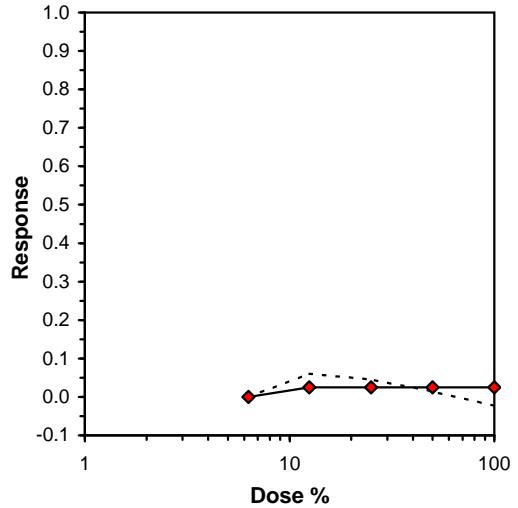
Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.952806	0.916	-0.61881	-0.1363
Bartlett's Test indicates equal variances ($p = 0.79$)	2.396966	15.08627		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.100604	0.138101	0.002493	0.004015	0.685698	5, 18

Treatments vs FSW Control

Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			

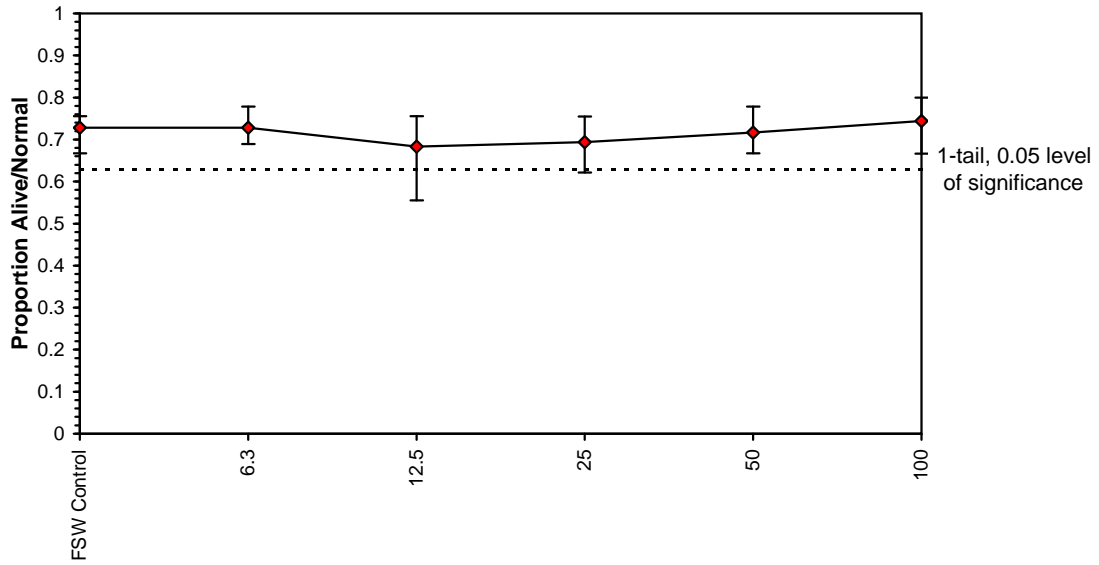
Log-Logit Interpolation (200 Resamples)



Bivalve Larval Development Test-Proportion Alive/Normal

Start Date: 22/04/2010 20:00 Test ID: PR0588/01 Sample ID: VC4B (0.5-1.0M)
End Date: 24/04/2010 20:00 Lab ID: 4128 Sample Type: SEL-Sediment elutriate
Sample Date: Protocol: ESA 106 Test Species: SR-Saccostrea commercialis
Comments:

Dose-Response Plot



Bivalve Larval Development Test-Proportion Alive/Normal

Start Date: 22/04/2010 20:00 Test ID: PR0588/01 Sample ID: VC4B (0.5-1.0M)
 End Date: 24/04/2010 20:00 Lab ID: 4128 Sample Type: SEL-Sediment elutriate
 Sample Date: Protocol: ESA 106 Test Species: SR-Saccostrea commercialis

Comments:

Auxiliary Data Summary

Conc-%	Parameter	Mean	Min	Max	SD	CV%	N
FSW Control	% Alive / Normal	72.78	66.67	75.56	4.21	2.82	4
6.3		72.78	68.89	77.78	3.80	2.68	4
12.5		68.33	55.56	75.56	8.96	4.38	4
25		69.44	62.22	75.56	6.12	3.56	4
50		71.67	66.67	77.78	4.58	2.99	4
100		74.44	66.67	80.00	5.59	3.18	4
FSW Control	pH	8.20	8.20	8.20	0.00	0.00	1
6.3		8.20	8.20	8.20	0.00	0.00	1
12.5		8.10	8.10	8.10	0.00	0.00	1
25		8.10	8.10	8.10	0.00	0.00	1
50		8.10	8.10	8.10	0.00	0.00	1
100		8.00	8.00	8.00	0.00	0.00	1
FSW Control	Salinity ppt	35.10	35.10	35.10	0.00	0.00	1
6.3		35.00	35.00	35.00	0.00	0.00	1
12.5		35.30	35.30	35.30	0.00	0.00	1
25		35.40	35.40	35.40	0.00	0.00	1
50		35.50	35.50	35.50	0.00	0.00	1
100		35.60	35.60	35.60	0.00	0.00	1
FSW Control	DO %	100.00	100.00	100.00	0.00	0.00	1
6.3		96.70	96.70	96.70	0.00	0.00	1
12.5		96.40	96.40	96.40	0.00	0.00	1
25		96.40	96.40	96.40	0.00	0.00	1
50		96.40	96.40	96.40	0.00	0.00	1
100		96.00	96.00	96.00	0.00	0.00	1

Bivalve Larval Development Test-Proportion Alive/Normal

Start Date:	22/04/2010 20:00	Test ID:	PR0588/02	Sample ID:	VC4B (1.5-2M)
End Date:	24/04/2010 20:00	Lab ID:	4129	Sample Type:	SEL-Sediment elutriate
Sample Date:		Protocol:	ESA 106	Test Species:	SR-Saccostrea commercialis

Comments:

Conc-%	1	2	3	4
FSW Control	0.7556	0.7333	0.7556	0.6667
6.3	0.6667	0.7778	0.7778	0.6889
12.5	0.6222	0.6667	0.7556	0.6889
25	0.6444	0.7333	0.6222	0.6889
50	0.7778	0.6667	0.7556	0.6222
100	0.7556	0.7778	0.6889	0.6667

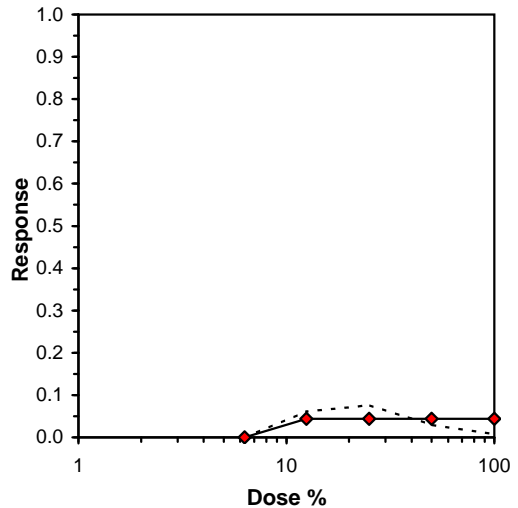
Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	N				Mean	N-Mean
FSW Control	0.7278	1.0000	1.0227	0.9553	1.0536	4.546	4	-0.020	2.410	0.1055	0.7278	1.0000
6.3	0.7278	1.0000	1.0236	0.9553	1.0799	6.428	4	1.107	2.410	0.1055	0.6958	0.9561
12.5	0.6833	0.9389	0.9742	0.9089	1.0536	6.204	4	1.387	2.410	0.1055	0.6958	0.9561
25	0.6722	0.9237	0.9620	0.9089	1.0282	5.499	4	0.531	2.410	0.1055	0.6958	0.9561
50	0.7056	0.9695	0.9994	0.9089	1.0799	8.080	4	0.130	2.410	0.1055	0.6958	0.9561
100	0.7222	0.9924	1.0170	0.9553	1.0799	5.829	4					

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.9223	0.916	-0.02921	-1.48612						
Bartlett's Test indicates equal variances ($p = 0.97$)	0.966229	15.08627								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.09817	0.13476	0.002772	0.003829	0.614197	5, 18

Treatments vs FSW Control

Log-Logit Interpolation (200 Resamples)

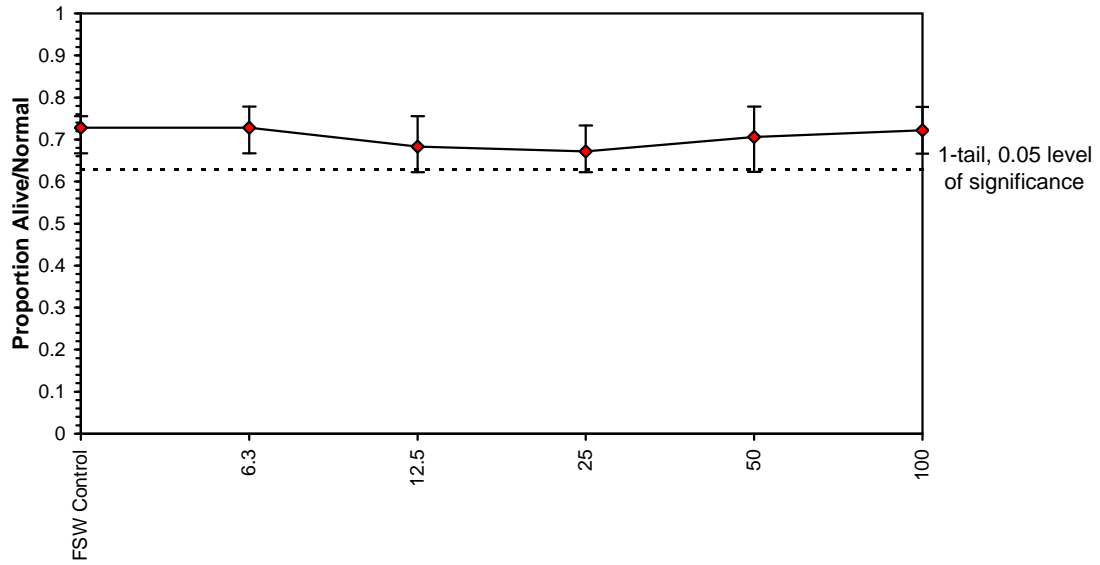
Point	%	SD	95% CL(Exp)	Skew
IC05	>100			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Bivalve Larval Development Test-Proportion Alive/Normal

Start Date: 22/04/2010 20:00 Test ID: PR0588/02 Sample ID: VC4B (1.5-2M)
End Date: 24/04/2010 20:00 Lab ID: 4129 Sample Type: SEL-Sediment elutriate
Sample Date: Protocol: ESA 106 Test Species: SR-Saccostrea commercialis
Comments:

Dose-Response Plot



Bivalve Larval Development Test-Proportion Alive/Normal

Start Date: 22/04/2010 20:00 Test ID: PR0588/02 Sample ID: VC4B (1.5-2M)
 End Date: 24/04/2010 20:00 Lab ID: 4129 Sample Type: SEL-Sediment elutriate
 Sample Date: Protocol: ESA 106 Test Species: SR-Saccostrea commercialis
 Comments:

Auxiliary Data Summary

Conc-%	Parameter	Mean	Min	Max	SD	CV%	N
FWS Control	% Alive / Normal	72.78	66.67	75.56	4.21	2.82	4
6.3		72.78	66.67	77.78	5.84	3.32	4
12.5		68.33	62.22	75.56	5.56	3.45	4
25		67.22	62.22	73.33	4.93	3.30	4
50		70.56	62.22	77.78	7.34	3.84	4
100		72.22	66.67	77.78	5.29	3.18	4
FWS Control	pH	8.20	8.20	8.20	0.00	0.00	1
6.3		8.20	8.20	8.20	0.00	0.00	1
12.5		8.10	8.10	8.10	0.00	0.00	1
25		8.10	8.10	8.10	0.00	0.00	1
50		8.10	8.10	8.10	0.00	0.00	1
100		8.00	8.00	8.00	0.00	0.00	1
FWS Control	Salinity ppt	35.10	35.10	35.10	0.00	0.00	1
6.3		35.10	35.10	35.10	0.00	0.00	1
12.5		35.30	35.30	35.30	0.00	0.00	1
25		35.40	35.40	35.40	0.00	0.00	1
50		35.60	35.60	35.60	0.00	0.00	1
100		35.00	35.00	35.00	0.00	0.00	1
FWS Control	DO %	100.00	100.00	100.00	0.00	0.00	1
6.3		96.80	96.80	96.80	0.00	0.00	1
12.5		96.60	96.60	96.60	0.00	0.00	1
25		96.80	96.80	96.80	0.00	0.00	1
50		96.10	96.10	96.10	0.00	0.00	1
100		95.00	95.00	95.00	0.00	0.00	1

Bivalve Larval Development Test-Proportion Alive/Normal

Start Date:	22/04/2010 20:00	Test ID:	PR0588/03	Sample ID:	VC4C (0.5-1M)
End Date:	24/04/2010 20:00	Lab ID:	4130	Sample Type:	SEL-Sediment elutriate
Sample Date:		Protocol:	ESA 106	Test Species:	SR-Saccostrea commercialis

Conc-%	1	2	3	4
F5W Control	0.7556	0.7333	0.7556	0.6667
6.3	0.6000	0.6667	0.7333	0.6889
12.5	0.7556	0.6000	0.7111	0.7778
25	0.6667	0.6444	0.7556	0.6667
50	0.6889	0.7111	0.6667	0.6667
100	0.6889	0.4889	0.6889	0.6444

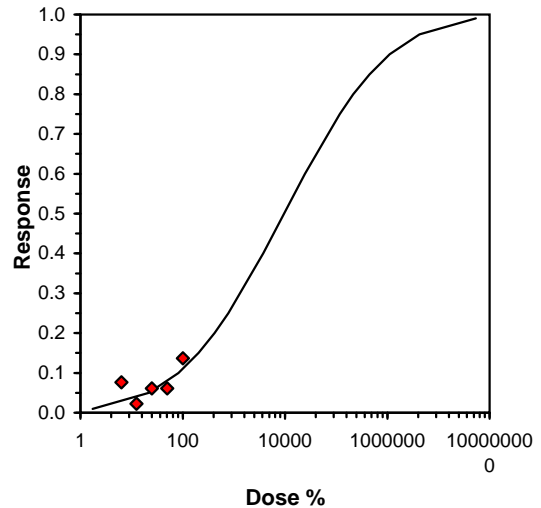
Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					t-Stat	1-Tailed Critical	MSD	Number Resp	Total Number
			Mean	Min	Max	CV%	N					
F5W Control	0.7278	1.0000	1.0227	0.9553	1.0536	4.546	4				49	180
6.3	0.6722	0.9237	0.9622	0.8861	1.0282	6.142	4	1.302	2.410	0.1120	59	180
12.5	0.7111	0.9771	1.0057	0.8861	1.0799	8.538	4	0.365	2.410	0.1120	52	180
25	0.6833	0.9389	0.9741	0.9319	1.0536	5.563	4	1.046	2.410	0.1120	57	180
50	0.6833	0.9389	0.9733	0.9553	1.0033	2.360	4	1.063	2.410	0.1120	57	180
100	0.6278	0.8626	0.9161	0.7743	0.9791	10.602	4	2.293	2.410	0.1120	67	180

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.933478	0.916	-0.84586	0.496483
Bartlett's Test indicates equal variances ($p = 0.36$)	5.521427	15.08627		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.104516	0.143472	0.005483	0.004321	0.319742	5, 18

Parameter	Value	SE	95% Fiducial Limits	Maximum Likelihood-Probit						
				Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	0.620886	0.635306	-0.62431 1.866086	0.272222	1.525613	7.814728	0.68	3.981286	1.610602	12
Intercept	2.528076	1.13293	0.307533 4.74862							
TSCR	0.279388	0.032749	0.2152 0.343577							

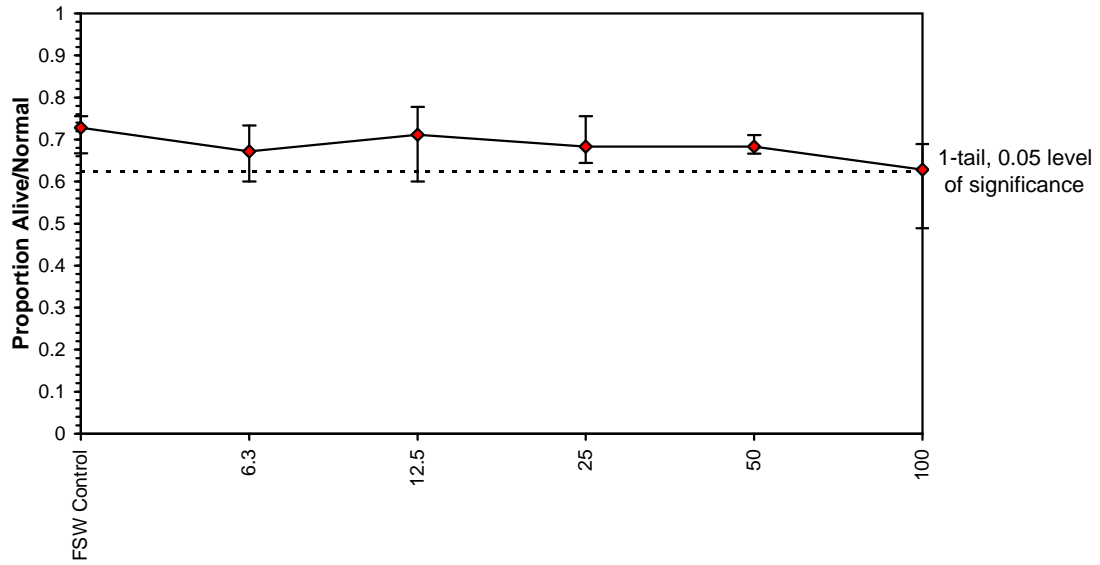
Point	Probits	%	95% Fiducial Limits
EC01	2.674	1.715791	
EC05	3.355	21.4823	
EC10	3.718	82.64486	
EC15	3.964	205.118	
EC20	4.158	422.4435	
EC25	4.326	785.147	
EC40	4.747	3743.211	
EC50	5.000	9578.24	
EC60	5.253	24509.09	
EC75	5.674	116847.8	
EC80	5.842	217171.5	
EC85	6.036	447268	
EC90	6.282	1110083	
EC95	6.645	4270616	
EC99	7.326	53469670	



Bivalve Larval Development Test-Proportion Alive/Normal

Start Date: 22/04/2010 20:00 Test ID: PR0588/03 Sample ID: VC4C (0.5-1M)
End Date: 24/04/2010 20:00 Lab ID: 4130 Sample Type: SEL-Sediment elutriate
Sample Date: Protocol: ESA 106 Test Species: SR-Saccostrea commercialis
Comments:

Dose-Response Plot



Bivalve Larval Development Test-Proportion Alive/Normal

Start Date:	22/04/2010 20:00	Test ID:	PR0588/03	Sample ID:	VC4C (0.5-1M)
End Date:	24/04/2010 20:00	Lab ID:	4130	Sample Type:	SEL-Sediment elutriate
Sample Date:		Protocol:	ESA 106	Test Species:	SR-Saccostrea commercialis

Comments:

Auxiliary Data Summary

Conc-%	Parameter	Mean	Min	Max	SD	CV%	N
FSW Control	% Alive / Normal	72.78	66.67	75.56	4.21	2.82	4
6.3		67.22	60.00	73.33	5.56	3.51	4
12.5		71.11	60.00	77.78	7.91	3.95	4
25		68.33	64.44	75.56	4.93	3.25	4
50		68.33	66.67	71.11	2.13	2.13	4
100		62.78	48.89	68.89	9.49	4.91	4
FSW Control	pH	8.20	8.20	8.20	0.00	0.00	1
6.3		8.20	8.20	8.20	0.00	0.00	1
12.5		8.10	8.10	8.10	0.00	0.00	1
25		8.10	8.10	8.10	0.00	0.00	1
50		8.10	8.10	8.10	0.00	0.00	1
100		7.90	7.90	7.90	0.00	0.00	1
FSW Control	Salinity ppt	35.10	35.10	35.10	0.00	0.00	1
6.3		35.20	35.20	35.20	0.00	0.00	1
12.5		35.30	35.30	35.30	0.00	0.00	1
25		35.40	35.40	35.40	0.00	0.00	1
50		35.50	35.50	35.50	0.00	0.00	1
100		35.50	35.50	35.50	0.00	0.00	1
FSW Control	DO %	100.00	100.00	100.00	0.00	0.00	1
6.3		96.90	96.90	96.90	0.00	0.00	1
12.5		96.40	96.40	96.40	0.00	0.00	1
25		96.50	96.50	96.50	0.00	0.00	1
50		95.70	95.70	95.70	0.00	0.00	1
100		92.20	92.20	92.20	0.00	0.00	1

Bivalve Larval Development Test-Proportion Alive/Normal

Start Date:	22/04/2010 20:00	Test ID:	PR0588/04	Sample ID:	SS4G
End Date:	24/04/2010 20:00	Lab ID:	4131	Sample Type:	SEL-Sediment elutriate
Sample Date:		Protocol:	ESA 106	Test Species:	SR-Saccostrea commercialis

Comments:

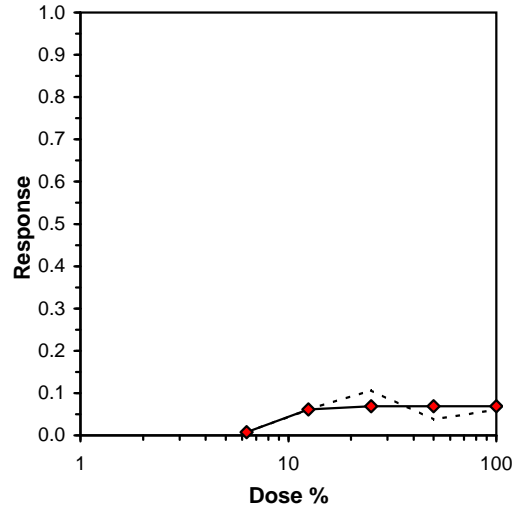
Conc-%	1	2	3	4
FSW Control	0.7556	0.7333	0.7556	0.6667
6.3	0.7556	0.7111	0.7778	0.6444
12.5	0.7111	0.6889	0.5556	0.7778
25	0.6667	0.6889	0.5778	0.6667
50	0.6889	0.7556	0.5778	0.7778
100	0.6889	0.6000	0.7111	0.7333

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root					t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	N				Mean	N-Mean
FSW Control	0.7278	1.0000	1.0227	0.9553	1.0536	4.546	4				0.7278	1.0000
6.3	0.7222	0.9924	1.0172	0.9319	1.0799	6.402	4	0.106	2.410	0.1248	0.7222	0.9924
12.5	0.6833	0.9389	0.9759	0.8411	1.0799	10.207	4	0.904	2.410	0.1248	0.6833	0.9389
25	0.6500	0.8931	0.9383	0.8635	0.9791	5.448	4	1.629	2.410	0.1248	0.6778	0.9313
50	0.7000	0.9618	0.9940	0.8635	1.0799	9.752	4	0.553	2.410	0.1248	0.6778	0.9313
100	0.6833	0.9389	0.9742	0.8861	1.0282	6.369	4	0.937	2.410	0.1248	0.6778	0.9313

Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	0.923296	0.916	-0.71508	-0.22567						
Bartlett's Test indicates equal variances ($p = 0.75$)	2.705912	15.08627								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.116948	0.160536	0.003916	0.005364	0.610062	5, 18

Treatments vs FSW Control

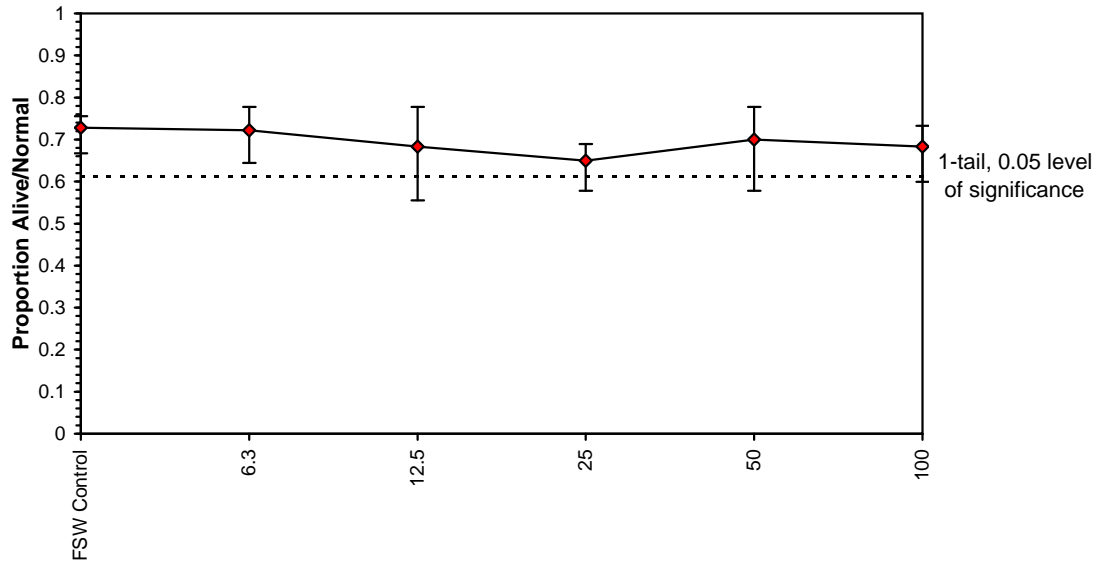
Log-Logit Interpolation (200 Resamples)				
Point	%	SD	95% CL(Exp)	Skew
IC05	10.930			
IC10	>100			
IC15	>100			
IC20	>100			
IC25	>100			
IC40	>100			
IC50	>100			



Bivalve Larval Development Test-Proportion Alive/Normal

Start Date: 22/04/2010 20:00 Test ID: PR0588/04 Sample ID: SS4G
End Date: 24/04/2010 20:00 Lab ID: 4131 Sample Type: SEL-Sediment elutriate
Sample Date: Protocol: ESA 106 Test Species: SR-Saccostrea commercialis
Comments:

Dose-Response Plot



Bivalve Larval Development Test-Proportion Alive/Normal

Start Date: 22/04/2010 20:00 Test ID: PR0588/04 Sample ID: SS4G
 End Date: 24/04/2010 20:00 Lab ID: 4131 Sample Type: SEL-Sediment elutriate
 Sample Date: Protocol: ESA 106 Test Species: SR-Saccostrea commercialis
 Comments:

Auxiliary Data Summary

Conc-%	Parameter	Mean	Min	Max	SD	CV%	N
FSW Control	% Alive / Normal	72.78	66.67	75.56	4.21	2.82	4
6.3		72.22	64.44	77.78	5.88	3.36	4
12.5		68.33	55.56	77.78	9.32	4.47	4
25		65.00	57.78	68.89	4.93	3.42	4
50		70.00	57.78	77.78	8.98	4.28	4
100		68.33	60.00	73.33	5.84	3.54	4
FSW Control	pH	8.20	8.20	8.20	0.00	0.00	1
6.3		8.20	8.20	8.20	0.00	0.00	1
12.5		8.10	8.10	8.10	0.00	0.00	1
25		8.10	8.10	8.10	0.00	0.00	1
50		8.10	8.10	8.10	0.00	0.00	1
100		8.00	8.00	8.00	0.00	0.00	1
FSW Control	Salinity ppt	35.10	35.10	35.10	0.00	0.00	1
6.3		35.10	35.10	35.10	0.00	0.00	1
12.5		35.30	35.30	35.30	0.00	0.00	1
25		35.30	35.30	35.30	0.00	0.00	1
50		35.40	35.40	35.40	0.00	0.00	1
100		35.50	35.50	35.50	0.00	0.00	1
FSW Control	DO %	100.00	100.00	100.00	0.00	0.00	1
6.3		97.00	97.00	97.00	0.00	0.00	1
12.5		96.10	96.10	96.10	0.00	0.00	1
25		96.60	96.60	96.60	0.00	0.00	1
50		96.40	96.40	96.40	0.00	0.00	1
100		95.00	95.00	95.00	0.00	0.00	1



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SEDIMENT SAMPLING AND ANALYSIS PLAN IMPLEMENTATION REPORT

Appendix 7 Summary of Results

Summary of Geochemical Results and Disposal Criteria

Analyte	Units	Metals																BTEX	TPHs					TRHs	Pesticides		PCBs	PAHs					TBT raw	TBT normalised	VOCs/ SVOCs		
		Moisture Content (dried @ 103°C)	Total Organic Carbon	Antimony	Arsenic	Cadmium	Chromium	Copper	Cobalt	Lead	Manganese	Nickel	Selenium	Silver	Vanadium	Zinc	Mercury		C6 - C9 Fraction Normalised	C10 - C14 Fraction Normalised	C15 - C28 Fraction Normalised	C29 - C36 Fraction Normalised	Sum TPHs Normalised		C6-C10 Fraction	OC Pesticides		OP Pesticides	Total PCBs normalised	Naphthalene	Benzo(a)pyrene	Sum of carcinogenic PAHs TEF				Sum of PAHs	Sum of PAH normalised
LOR	1	0.02	0.5	1	0.1	1	1	0.5	1	10	1	0.1	0.1	2	1	0.01	0.2	3	3	3	5	3-5	3	0.5-10	0.5	5	5	4	4	4	4	4	0.5	0.2-0.5			
Waste Classification	CT1 - General solid waste	-	-	-	100	20	100	-	-	100	-	40	20	100	-	-	4	10-1000	-	-	NA	-	-	NA	NA	-	-	800	-	NA	-	-	-	-	-	-	
Waste Classification	CT2 - Restricted solid waste	-	-	-	400	80	400	-	-	400	-	160	80	400	-	-	16	40-4000	-	-	NA	-	-	NA	NA	-	-	3,200	-	NA	-	-	-	-	-	-	
Site Contamination Criteria	NEPM HIL/HSL C - developed open space or recreational areas	-	-	-	300	100	240	20,000	300	600	9,000	800	700	-	-	30,000	400	38,420	-	-	-	-	-	5,100	9,000 - 500,000	300,000 - 750,000	2,000	-	-	4,000	400,000	-	-	-	-	-	
Aquatic Ecology	NAGD / ANZECC ISGQ low	-	-	2	20	1.5	80	65	-	50	-	21	-	1	-	200	0.15	-	-	-	-	-	550	-	0.32-280	23	-	-	-	-	-	10000	-	-	9	-	
Aquatic Ecology	NAGD / ANZECC ISGQ high	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	70*	-
Area 3	Nov-09	SS3D	22	1.16	<0.50	1.5	0.05	5.3	5.1	0.25	4.5	12	1	0.2	0.05	3.8	19.1	0.03	---	---	---	---	---	---	---	---	5	2	16	18	16	1.2	1.0	1.0	---		
Area 3	Nov-11	SS5E	33.2	2.99	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	18	47	80	522	175	1.8	0.6	---	---		
Area 3	Nov-11	VC5B (0-0.8)	27.5	0.69	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
Area 3	Nov-11	VC5B (0.8-1.3)	33.3	7.98	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
Area 3	Nov-11	VC5B (1.3-1.6)	16.6	1.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
Area 3	Nov-11	VC5C (0-0.5)	22.7	2.23	<0.50	1.4	0.05	4.4	3.5	0.25	5.8	---	1.3	0.2	0.05	1	17	0.09	---	<LOR	0.67	22	21	43	<LOR	<LOR	<LOR	<LOR	16	34	53	657	295	10.6	4.8	---	
Area 3	Nov-11	VC5C (0.5-1)	64.3	39.6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.25	0.0
Area 3	Nov-11	VC5D (0-0.5)	61.3	34.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.4	0.2
Area 3	Nov-11	VC5D (1.8-2.1)	18	0.88	<0.50	1.7	0.05	0.5	0.5	0.25	0.5	5	0.5	0.4	0.05	1	2.2	0.005	<LOR	<LOR	---	---	---	---	---	<LOR	<LOR	<LOR	<LOR	---	---	---	---	---	0.25	0.3	
Area 3	Nov-11	VC5D (2.1-3.1)	30.3	4.61	<0.50	4.7	0.05	7.3	3.4	1.5	2.2	57	4.2	1.5	0.05	11.6	14.6	0.005	<LOR	<LOR	0.65	10	26	36	<LOR	<LOR	<LOR	<LOR	---	---	---	---	---	0.25	0.1		
Area 3	Nov-11	VC5E (0-0.6)	55.9	32.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	102	10.2
Area 3	Nov-11	VC5E (0.6-0.8)	27.8	1.14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	178	42
Area 3	Nov-11	VC5E (1-1.6)	40.6	7.76	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	47.6	23
ALL Dredge Areas	Mean	-	2.0	<LOR	2.1	0.07	3.9	3.5	0.43	4.8	8.8	0.6	0.20	0.07	7	20	0.05	<LOR	<LOR	5.7	39	30	121	<LOR	<LOR	<LOR	<LOR	7	16	31	170	312	42	151	<LOR		
	SD	-	6.9	N/A	3.5	0.06	5.2	5.5	0.52	9.1	10.2	1.3	0.35	0.15	15	64	0.12	N/A	N/A	6.1	44	33	170	N/A	N/A	N/A	N/A	7	32	43	334	593	106	504	N/A		
	95% UCL of Mean	-	3.3	<LOR	2.9	0.08	5.1	4.7	0.55	6.9	11.1	0.9	0.28	0.11	10	35	0.08	<LOR	<LOR	8.2	57	43	193	<LOR	<LOR	<LOR	<LOR	9	23	41	246	446	64	255	<LOR		
Dredge Area 1 - Sub-Berth Approach	Mean	-	0.25	<LOR	0.7	0.06	1.6	2.3	0.25	2.5	6.8	0.2	0.08	0.09	9	7	0.04	<LOR	<LOR	8.6	62	44	202	<LOR	<LOR	<LOR	<LOR	5	8	20	87	296	212	<LOR			
	SD	-	0.79	N/A	0.5	0.07	1.1	1.6	0.00	2.4	6.1	0.5	0.06	0.20	10	10	0.13	N/A	N/A	7.5	57	44	229	N/A	N/A	N/A	N/A	4	11	13	136	456	675	N/A			
	95% UCL of Mean	-	0.50	<LOR	1.2	0.09	2.3	3.0	0.29	3.2	8.8	0.3	0.10	0.16	15	10	0.08	<LOR	<LOR	13.0	104	69	333	<LOR	<LOR	<LOR	<LOR	7	12	24	130	441	408	<LOR			
Dredge Area 2 - Sub-berth	Mean	-	0.24	<LOR	2.6	0.06	5.6	2.3	0.56	3.3	6.5	0.6	0.28	0.05	5	11	0.07	<LOR	<LOR	<LOR	14	10	53	<LOR	<LOR	<LOR	<LOR	5	13	30	158	350	37	174	<LOR		
	SD	-	0.32	N/A	4.1	0.02	6.7	2.1	0.76	11.8	7.3	5.1	0.01	0.33	25	47	0.17	N/A	N/A	79	58	285	N/A	N/A	N/A	N/A	1	7	7	106	2407	197	955	N/A			
	95% UCL of Mean	-	0.31	<LOR	4.3	<0.01	8.6	2.8	0.95	4.7	8.5	1.2	0.51	<0.1	8	17	0.13	<LOR	<LOR	<LOR	53	26	106	<LOR	<LOR	<LOR	<LOR	8	24	44	323	732	65	315	<LOR		
Dredge Area 3 - Fixed Berths	Mean	-	6.5	<LOR	4.4	0.08	6.5	7.2	0.65	11.3	15.1	1.6	0.36	0.07	6	57	0.051	<LOR	<LOR	1.6	21	20	51	<LOR	<LOR	<LOR	<LOR	12	33	56	350	306	25	<LOR			
	SD	-	12.1	N/A	5.0	0.06	6.7	10.0	0.63	16.5	17.1	2.0	0.43	0.04	6	124	0.06	N/A	N/A	1.3	14	11	27	N/A	N/A	N/A	N/A	12	55	73	492	546	73	N/A			
	95% UCL of Mean	-	10.8	<LOR	6.5	0.11	9.5	11.7	0.96	18.8	22.5	2.5	0.55	0.09	8	114	0.08	<LOR	<LOR	2.7	33	29	73	<LOR	<LOR	<LOR	<LOR	17	57	87	564	546	54	<LOR			

Notes:
 All organics are normalised to 1% TOC (with 0.2 to 10% TOC)
 Where results are below LOR, half the LOR has been used in the statistical analyses (*italicised*)
 NEPC - National Environmental Protection Council (NEPC) (1999) National Environmental Protection (Assessment of Site Contamination) Measure
 ANZECC ISQG-low - ANZECC/ARMCANZ (2000) Guidelines for Fresh and Marine Water Quality as updated (in draft) by Simpson et al. (2008)
 * NAGD maximum level = 70 µgSn/kg whereas ANZECC ISQG-high = 80 µgSn/kg
 Total PAHs HILs relevant to the sum of all PAHs reported where carcinogenic PAHs meet the BaP TEF HILs and naphthalenemeets the relevant HSL.
 BTEX HSLs and ESL of obtained by summing the individual constituents (coarse grained soils where applicable) in Tables 1A(6) and 1B(5) for NEPM ScheduleB1

QA/QC Summary

Field Triplicates - Sediment

Analyte		Moisture Content	Antimony	Arsenic	Cadmium	Chromium	Copper	Cobalt	Lead	Manganese	Nickel	Selenium	Silver	Vanadium	Zinc	Mercury	Naphthalene	2-Methylnaphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benz(b)fluoranthene	Benz(k)fluoranthene	Benz(e)pyrene	Benz(o)pyrene	Perylene	Benz(g,h,i)perylene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Coronene	Sum of PAHs	Sum of PAH normalised	TBT	TBT Normalised	Total Organic Carbon	TOC adopted									
Units		%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg							
Field triplicate of SS4G	Mar-10	LOR	1	0.5	1	0.1	1	1	0.5	1	10	1	0.1	0.1	2	1	0.01	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0.5	0.5	0.02	0.2				
		SS4G	16.3	<0.50	<1.00	<0.1	1.2	1	<0.5	1.6	<10	<1.0	<0.1	<0.1	<0.1	56.3	2.5	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
		FT1	17.4	<0.50	<1.00	<0.1	1.4	6.3	<0.5	1.8	<10	<1.0	<0.1	<0.1	<0.1	44.6	7.9	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
		FT2	17.6	<0.50	<1.00	<0.1	1.5	1.3	<0.5	2	<10	<1.0	<0.1	<0.1	<0.1	<2.0	4.8	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
		Average	17.1	-	-	-	1.4	2.9	-	1.8	-	-	-	-	50	5.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		SD	0.7	-	-	-	0.2	3.0	-	0.2	-	-	-	-	8.3	2.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
% RSD	4.1	-	-	-	11.2	104	-	11.1	-	-	-	-	16.4	53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				

Notes:

The relative standard deviation (RSD) for field triplicates or relative percent difference (RPD) for field replicates should be within ±50%, although they may not always do so where the sample SS5Y was assumed to be a "split triplicate" sample which was analysed by the secondary laboratory. The sample label and results indicate the sample may have been one of the missing field triplicates.

Split Triplicates/ Duplicates - Sediment

Analyte		Moisture Content	Antimony	Arsenic	Cadmium	Chromium	Copper	Cobalt	Lead	Manganese	Nickel	Selenium	Silver	Vanadium	Zinc	Mercury	Naphthalene	2-Methylnaphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benz(b)fluoranthene	Benz(k)fluoranthene	Benz(e)pyrene	Benz(o)pyrene	Perylene	Benz(g,h,i)perylene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Coronene	Sum of PAHs	Sum of PAH normalised	TBT	TBT Normalised	Total Organic Carbon	TOC adopted															
Units		%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg									
Split Duplicate of VC1B	Nov-09	LOR	1	0.5	1	0.1	1	1	0.5	1	10	1	0.1	0.1	2	1	0.01	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0.5	0.5	0.02	0.2					
		VC1B	18.9	<0.50	<1.00	<0.1	<1.0	2.4	<0.5	1	<10	<1.0	<0.1	<0.1	<2.0	2.5	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
		VC1B DUP	18.3	<0.50	<1.00	<0.1	<1.0	2.4	<0.5	<1.0	<10	<1.0	<0.1	<0.1	<2.0	2.6	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
		Mean	18.6	-	-	-	2.4	2.4	-	1	-	-	-	-	2.55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
		% RPD	3.2	-	-	-	0.0	-	-	-	-	-	-	-	-3.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
		SD	17.1	<0.50	<1.00	<0.1	<1.0	<1.0	<0.5	<1.0	<10	<1.0	<0.1	<0.1	<2.0	1.4	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					
Split Duplicate of VC2A	Nov-09	LOR	1	0.5	1	0.1	1	1	0.5	1	10	1	0.1	0.1	2	1	0.01	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0.5	0.5	0.02	0.2		
		VC2ADUP	17.1	<0.50	<1.00	<0.1	<1.0	<1.0	<0.5	<1.0	<10	<1.0	<0.1	<0.1	<2.0	1.4	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
		Mean	17	-	-	-	2.4	2.4	-	1	-	-	-	-	2.55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		% RPD	1.2	-	-	-	0.0	-	-	-	-	-	-	-	-3.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		SD	19.1	<0.50	<1.00	<0.1	<1.0	<1.0	<0.5	<1.0	<10	<1.0	<0.1	<0.1	<2.5	6.3	0.02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
		% RPD	21.15	<0.50	1.02	<0.1	3.2	1.7	<0.5	3.6	<10	<1.0	<0.1	<0.1	3.4	9	0.02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Split Duplicate of VC3B	Nov-09	LOR	1	0.5	1	0.1	1	1	0.5	1	10	1	0.1	0.1	2	1	0.01	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0.5	0.5	0.02	0.2
		VC3B	19.1	<0.50	<1.00	<0.1	2.2	1.3	<0.5	2.4	<10	<1.0	<0.1	<0.1	2.5	6.3	0.02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
		VC3B DUP	23.2	<0.50	1.02	<0.1	3.2	1.7	<0.5	3.6	<10	<1.0	<0.1	<0.1	3.4	9	0.02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
		Mean	21.15	<0.50	1.02	<0.1	2.7	1.5	3	-	-	-	-	2.95	7.6																																										



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Appendix 8 Dilution Modelling of Elutriate TBT at the Sydney Offshore Spoil Ground



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A1 INTRODUCTION

Either split hopper barges or trailer suction hopper dredgers are proposed to be used for dredge material disposal operations as part of the Caltex dredging project. In both of these vessels, doors in the bottom of the ship's hull (or the hull itself) would be opened, and the entire hopper contents (a mixture of water and solids) would be emptied within the Sydney Offshore Spoil Ground.

In the National Assessment Guidelines for Dredging (Commonwealth of Australia, 2009), hereafter denoted as NAGD, it is recommended that the applicable ANZECC/ARMCANZ (2000) marine water quality guidelines not be exceeded after allowing for initial mixing, defined as mixing which occurs within four hours of dumping.

Initial dilution of disposed dredged material in the ocean depends on a number of factors, such as water depth, stratification in the water column, and current velocities and directions. As described in Appendix A of the NAGD (refer page 59), initial dilution can be determined using either of two methods, namely:

- the liquid and suspended particulate phases of the waste may be assumed to be evenly distributed after four hours over a column of water bounded on the surface by the release zone and extending to the ocean floor, thermocline or halocline, if one exists, or to a depth of 20m, whichever is shallower (this methodology is denoted herein as the *analytical method*); or,
- it can be calculated using the US Army Engineers Waterways Research Station STFATE model (this methodology is denoted herein as the *numerical method*).

The most critical contaminant relative to screening levels for the subject dredging is tributyltin (TBT), and it is this contaminant that is considered herein. The more accurate numerical method (STFATE modelling) has been adopted herein to predict the initial dilution of TBT for disposal operations at the Sydney Offshore Spoil Ground. The analytical method is overly conservative for application in this case, given that the mixing zone is specified to only extend to a depth of 20m in the methodology, when actual depths are approximately 100m.

Background information is provided in Section A2, and the STFATE modelling is described in Section A3.



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A2 BACKGROUND INFORMATION

A2.1 TBT Concentrations

A summary of elutriate testing results for TBT is provided in **Table A1**, varying with location (Area 1, Area 2, Area 3, and combined over all areas).

Table A1: Elutriate testing results for TBT (95% upper confidence limit mean concentrations)

Area	TBT in Sediment (µg/kg) ¹	TBT in Elutriate (µg/L) ²	% of TBT released in elutriate test ³
1	430.7	3.119	1.9
2	309.1	0.0382	0.03
3	48.1	0.0689	0.4
All	254.7	1.133	1.2

It is evident that sediment and elutriate TBT concentrations were highest in Area 1. Given that these concentrations were significantly higher than for other areas (and all areas combined), simulating the disposal of Area 1 sediment is critical (would generate the highest concentrations of TBT in the water column). Therefore, disposal of only Area 1 sediments (i.e. the worst-case 95%UCL) has been simulated herein as per DSEWPaC's comments (refer Appendix 1 of the main report).

The ANZECC/ARMCANZ (2000) trigger values for TBT at the 95% and 99% levels of protection are 0.006µg/L and 0.0004 µg/L respectively.

A2.2 Dredged Sediment Properties

The sediment to be dredged varies in properties depending on location. The approximate proportions of various sediment types is provided in **Table A2**.

Table A2: Proportions (%) of various sediments to be dredged (by mass)

Area	Proportion (%)				
	Clay	Silt	Sand	Gravel	Total
1	5.3	2.1	89.1	3.5	100
2	6.0	2.0	92.0	0.0	100
3	13.4	3.7	68.9	14.0	100
All	8.3	2.7	82.3	6.7	100

¹ Normalised to 1% TOC within limits of 0.2% to 10% TOC.

² As remaining in the supernatant after the elutriate test and corrected for the seawater blank.

³ Assuming a sediment density of 2650kg/m³ and voids ratio of 0.37, and given that the elutriate test is undertaken with 4 times the volume of seawater. For example, for Area 1 it can be shown that with 431µg/kg of TBT in a sample (that is, per kg of solid particles), there would be 165µg/L of TBT initially (potentially available) in the elutriate testing container. The fact that only 3.1µg/L remained in the supernatant after the elutriate test indicated that only 1.9% of the TBT was released.



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The proportions of sediments in the dredging vessel hopper prior to disposal would vary depending on the dredging methodology (backhoe loading a split hopper barge or trailer suction hopper dredging, with or without overflowing). Approximate proportions of insitu sediment (by volume)⁴ that would be located in the hopper for each dredging case are provided in **Table A3**. Note that it is proposed that a combination of trailer suction hopper dredging and backhoe dredging would be undertaken.

Table A3: Proportions of insitu sediment (by volume) for four dredging cases

Case	Dredging Operation	Proportion of insitu sediment (by volume) in hopper (%)
Case 1	backhoe loading a split hopper barge (with overflowing)	80
Case 2	backhoe loading a split hopper barge (no overflowing)	40
Case 3	trailer suction hopper dredging (with overflowing)	70
Case 4	trailer suction hopper dredging (no overflowing)	20

For the critical Area 1 location, approximate hopper volumetric fractions (proportion of each sediment type by volume, expressed as a decimal) for each of the sediment types were determined as listed in **Table A4**, based on an insitu solids proportion of 78% by mass (43% porosity)⁵ and bulking factors of 1.25, 2.5, 1.43, and 5.0 for each of the dredging cases respectively⁵.

Table A4: Volumetric fractions of each sediment type in hopper for four dredging cases, for Area 1

Sediment Type	Volumetric Fraction			
	Case 1	Case 2	Case 3	Case 4
Gravel	0.016	0.008	0.014	0.004
Medium Sand	0.408	0.204	0.357	0.102
Silt	0.010	0.005	0.008	0.002
Clay	0.024	0.012	0.021	0.006

Volumetric fractions for other areas have not been listed herein as simulations were only undertaken for the critical “worst case 95%UCL” Area 1 location.

⁴ With the remainder of material in the hopper generally being water, and noting that this insitu sediment also contains water filling the voids.

⁵ As recommended by Dr Paul Schroeder, Research Civil Engineer and dredging expert, Environmental Laboratory, US Army Corps of Engineers.



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A3 STFATE MODELLING

A3.1 Model Background

In STFATE, the behaviour of the material during disposal is assumed to be separated into three phases, namely:

- convective descent, during which the disposal cloud falls under the influence of gravity and its initial momentum is imparted by gravity;
- dynamic collapse, occurring when the descending cloud either impacts the bottom or arrives at a level of neutral buoyancy where descent is retarded and horizontal spreading dominates; and,
- passive transport-dispersion, commencing when the material transport and spreading are determined more by ambient currents and turbulence than by the dynamics of the disposal operation (USEPA, 1998).

Note that, given the size of the disposal area and time between disposal episodes, it can be assumed that subsequent disposal operations from the same dredging campaign would not interact in the water column. That is, only a single disposal operation has been simulated in each STFATE run.

A3.2 Cases Simulated

Four simulations were undertaken based on dredging of Area 1 sediments, that is for the four dredging cases as follows:

1. backhoe loading a split hopper barge (with overflowing);
2. backhoe loading a split hopper barge (no overflowing);
3. trailer suction hopper dredging (with overflowing); and,
4. trailer suction hopper dredging (no overflowing).

The inputs used in this modelling are described in Section A3.3, while the results are provided in Section A3.4.

A3.3 Modelling Inputs

The values selected as input variables into the STFATE model for Case 1 are summarised in **Table A5**. Note that in selecting default STFATE material properties (refer **Table A4**), sand was treated as “medium sand”. Also, it is recommended that the elutriate concentration be used as input for the type of modelling selected in STFATE, as adopted. This is reasonable since the ratio of solids (with voids) to water in the hopper is similar to the equivalent ratio in the elutriate.



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Table A5: Input variables used in STFATE modelling for Case 1

Variable		Units	Selection
Type of analysis			Section 404(b)(1) Regulatory Analysis for US Navigable Waters
Method of disposal			Split-hull barge
Program Options	Simulation type		Descent, collapse and diffusion (default coefficients)
	Evaluation type		Tier II, Compare Water Quality
	Initial TBT concentration in fluid fraction	mg/L	3.12×10^{-3}
	Background concentration at disposal site	mg/L	0
Output Options	Depths for which output desired	m	10, 25, 50, 75, 100
	Duration of the simulation	hours	4
	Long-term time step for diffusion	s	600
Site Description	Grid points		96 x 96
	Grid spacing	m	18 x 18
	Roughness height	m	1.5×10^{-3}
	Slope of bottom	degrees	0
	Constant water depth	m	100
	Water density	g/cm ³	1.025 constant
Material Description	Layers in vessel		1
	Volume of hopper	m ³	765
	Velocity of vessel	m/s	0.8
	Material type		Four types ⁶ , see Table A4
	Dredge material specific gravity		2.65
	Volumetric fraction (proportion of solids by volume)	m ³ /m ³	Four fractions, see Table A4
	Solid fraction fall velocity	mm/s	STFATE default for each material type
	Void ratio after deposition		STFATE default for each material type
	Critical shear stress	N/m ²	STFATE default for each material type
	Cohesive		STFATE default for each material type
	Stripped during descent		STFATE default for each material type
Velocity Data	Ambient velocity profile type		Single depth averaged velocity
	Depth averaged velocity	m/s	0.1
Disposal operation	Length of disposal vessel bin	m	31.2
	Width of disposal vessel bin	m	7.5
	Pre-disposal draft of vessel	m	3.5
	Post-disposal draft of vessel	m	1.3

⁶ Parameters for material types include the percent clay/ silt fraction as per DSEWPaC's comments (refer Appendix 1 of the main report).



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Variable		Units	Selection
	Time needed to empty the disposal vessel	s	10
	Dumping over a depression		No

The only variable changed for Case 2 (compared to Case 1) was the volumetric fraction for each sediment type as per **Table A4**. For Case 3, the variables changed compared to Case 1 were as follows:

- volumetric fraction for each sediment type as per **Table A4**;
- volume of hopper of 965m³;
- length of disposal vessel bin of 35.5m;
- pre-disposal draft of vessel of 3.7m; and,
- post-disposal draft of vessel of 1.9m.

For Case 4, the only variable changed compared to Case 3 was the volumetric fraction for each sediment type as per **Table A4**.

A3.4 Modelling Results

The STFATE (numerical) modelling results for the four cases simulated are summarised in **Table A6**. The results were compared to the ANZECC/ARMCANZ (2000) marine water quality guidelines for TBT at the 95% protection level (i.e. 0.006 µg/L) and at the 99% level of protection (i.e. 0.0004 µg/L). The multiplier required for each result to exceed the relevant guidelines is also provided.

Table A6: Summary of STFATE modelling results

Case	Maximum concentration of TBT in the water column after four hours (µg/L)	Multiplier that TBT concentration is less than	
		95% protection level	99% protection level
1 - backhoe loading a split hopper barge (with overflowing)	4.3×10 ⁻⁵	139	9.3
2 - backhoe loading a split hopper barge (no overflowing)	6.2×10 ⁻⁵	97	6.5
3 - trailer suction hopper dredging (with overflowing)	5.7×10 ⁻⁵	105	7.0
4 - trailer suction hopper dredging (no overflowing)	8.9×10 ⁻⁵	68	4.5

It is evident from the STFATE (numerical) method that after initial mixing (that is after four hours), TBT concentrations at the Sydney Offshore Spoil Ground would be less than the ANZECC/ARMCANZ (2000) trigger values at both the 95% and 99% protection levels for all four dredging scenarios for the “worst-case” Area 1 sediments.



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The results also indicate that of the four potential dredging methods, trailer suction hopper dredging without overflowing is likely to result in the highest concentration of TBT in the water column after initial mixing. However, the results for this method show that TBT in the water column is expected to be about 70 times *less than* the ANZECC/ ARMCANZ (2000) protection level for 95% of species.

Therefore, the concentrations of TBT in material from the proposed Caltex dredge areas are not of concern to water quality during disposal at the Sydney Offshore Spoil Ground.



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A4 REFERENCES

ANZECC/ARMCANZ (2000) *National Water Quality Management Strategy, Paper No. 4, Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, October, Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ), ISBN 09578245 0 5 (set), ISSN 1038 7072.

Commonwealth of Australia (2009) *National Assessment Guidelines for Dredging*.

United States Environmental Protection Agency [USEPA] (1998) *Evaluation of Dredged Material Proposed for Discharge in Waters of the US, Testing Manual, Inland Testing Manual*, EPA 823-B-98-004, USEPA and US Army Corps of Engineers, February.

WorleyParsons (2011) *Caltex Maintenance Dredging Sampling and Analysis Plan Implementation Report*, Revision C, 9 May.



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Appendix 9 Planning Focus Meeting Minutes

Caltex Maintenance Dredging Project

NOTES FROM PLANNING FOCUS MEETING (PFM)

Meeting Date: 16th September 2011

Meeting location – 2 Market St, Sydney

Meeting opened 11.00.

Attendees		
Attendees:	Company	
Christina Halim (CH)	Caltex	
Kylie Gordon (KG)	Caltex	
Orla Murray (OM)	WorleyParsons	
Matt Potter (MP)	WorleyParsons	
Marcel Green (MG)	I&I (Fisheries)	
Ryan Bennett (RB)	SPC	
Craig Patterson (CP)	OEH	
Apologies:	Company	
Barry McDonnell	Caltex	
Stuart Carr	Maritime	
Rory Gray	Maritime	
Gary Batman	SPC	
Item #	Item Description	WP Response
1	Primary Approval	
	<p>RB, as a planner for SPC, indicated that the project would likely fall under Part 4 of the <i>Environmental Planning and Assessment Act, 1979</i> *EP&A Act) under Clause 69 of State Environmental Planning Policy (Infrastructure) 2007 (I-SEPP).</p> <p>RB also indicated that Schedule 3 of the EP&A Regulations should be checked to ensure that the project is not Designated Development (i.e. an “extractive industry” with an area greater than 2ha, within 40m of a waterway, within 200m of a coastline or in areas of acid sulfate soil material or contamination).</p>	<p>There are two options:</p> <ul style="list-style-type: none"> a) Approach Maritime formally with reason to consider that the dredging is in Maritime’s interest and could be carried out under Part 5 of the EP&A Act. b) Undertake the dredging under Part 4 of the EP&A Act as consent is required in accordance with Clause 69 of the I-SEPP. <p>Please refer to additional advice to be provided by WorleyParsons on the approval process.</p>
	RB	If consent is required, each authority would get 28 days for responding to the

		application.	
	RB	Maritime, as owner of the sand, may have a preferred option for the disposal of the sand (i.e. Maritime may wish to sell the sand).	Noted. As discussed, the sand is unlikely to be acceptable to Councils or government authorities due to the elevated concentrations of TBT. As such, it is unlikely that the sand would be reused without some sort of treatment (such as cement stabilisation) which would reduce the value of the sand as a product.
	RB	A new SEPP is soon to be gazetted. The SEPP should be checked to ensure that there are no other provisions for State Significant Development (SSD) and Designated Development should be checked.	The only relevant Class of State Significant Development proposed in the new SEPP is Class 18 "Port Facilities and Wharf or Boating Facilities". This only applies where there is a capital investment value (CIV) >\$30M. The CIV for this project is ≤ \$15M and therefore, does not trigger SSD.
	CP	The decision of Part 4 versus Part 5 is critical and affects whether the project would be integrated development under Part 4.	Noted.
2	Secondary Approvals		
	RB	SPC's role in approvals would be provision of Harbour Master Approval. SPC would not be involved as a consent or determining authority. The application form for Harbour Master approval can be found on the SPC website. Approval would not take a substantial amount of time. It is also possible to pre-consult SPC. Applications for HM Approval require the completion of the Environmental Assessment.	Noted.
	MG	If Maritime authorises the works, it takes away the Fisheries authority role (for dredging, not for harm to marine vegetation).	Noted.
	RB	There is currently a long turn-around time for review of sea dumping applications by the Commonwealth Department of Sustainability, Environment, Water, Populations and Communities (SEWPaC). SPC have been looking into the feasibility of capital and maintenance dredging. It may be that the future workload of SEWPaC is reduced, hence reducing the review timeframe.	WP liaison with SEWPaC indicated SEWPaC has a high workload but the Department tries to adhere to the 90 day statutory period. Note that should any clarifications be required within the first 60days, the 90 day period starts again following submission of additional material. SEWPaC have advised that a separate sea dumping permit

			<p>application would be required for the capital dredge material.</p> <p>SEWPaC have been informed that we wish to undertake sampling and analysis as soon as possible.</p>
	?	<p>Consultation with the Office of Water in Primary Industries is required. A Controlled Activity Approval (CAA) under the <i>Water Management Act, 2000</i> (WM Act) may be required if the project falls under Part 4 of the EP&A Act, otherwise, the Office of Water may be required in a consultative role.</p>	<p>A CAA or concurrence from the Office of Water is likely to be required as the project would involve the “removal of material” (i.e. the removal of material, whether or not extractive material...) on “water front land” (i.e. the bed of an estuary or within coastal waters of the state).</p> <p>This is likely to be a simple matter and the Office of Water would be consulted during the Environmental Assessment process once the approvals pathway (i.e. Part 4 vs Part 5) has been determined.</p>
	CP	<p>OEH would primarily be concerned about the impact to the aquatic reserve and bird habitat past Bonna Point from noise and sedimentation (potentially contaminated).</p>	Noted.
	CP	<p>The EPL application process time is 60 days.</p> <p>As this is longer than the proposed dredging timeframe (i.e. 6 or 11 weeks depending on methodology), CP will look to see if there is a way around issuing a licence for such a short period.</p>	Noted.
	CP	<p>OEH would base any EPL conditions on previous licences issued for dredging Botany bay.</p> <p>WP should look at the EPL(s) for Port Botany works and make sure the environmental assessments covers similar issues.</p>	Noted.
3	Marine Ecology Assessment		
	MG	<p>The assessment should focus on the distribution and extent of seagrass. The footprint is most likely too far out, too deep and too well shipped.</p>	Noted.
	MG	<p>As such, a desktop study would likely suffice. A biota survey of the dredge and disposal areas is probably not required.</p>	Noted.
	MG	<p>Sydney Water could be contacted for access to the survey data used for the</p>	Noted.

		desalination pipeline project.	
	RB	<p>A Marine Mammal Management Plan for cetaceans may be required as a condition of approval such as recently required for dredging in Botany Bay. The recent plan provided a map of zones. The plan involved volunteers who observe whale migrations and communicate the migrations with the dredging operator.</p> <p>The migration seasons should be considered in relation to the project timeframe.</p>	<p>Noted.</p> <p>Management of cetaceans is also required for transport to and disposal at the offshore spoil ground in accordance with conditions of any sea dumping permit that would be issued.</p>
	CB	A seagrass reference panel was set up for the Energy Australia cable project.	Noted.
	MG/KG	The nearest commercial fishing occurs in Georges River (oyster farming). The fish farm which was located adjacent to the Caltex wharf is no longer there (believed moved to Georges River).	Noted.
4	Noise Assessment		
	CP	<p>Kurnell residents are very sensitive to noise.</p> <p>Caltex have received complaints from residents on current waterfront works.</p>	<p>Noted.</p> <p>Caltex response by email (CH)- Caltex is unsure what this relates to. Caltex received one community complaint about a month or so ago in relation to dust from maintenance work being carried out on the wharf, however CH is not aware if this was raised/discussed with the OEH. CP maybe referring to concerns raised about the proposed work to upgrade the Jet Pipeline capacity. However this work has not commenced and is yet to be approved by the NSW Department of Planning & Infrastructure.</p>
	CP	The noise assessment should consider the cumulative impact from the jet pipeline works, a 12 month project.	<p>Caltex response by email (CH) - while the Jet Pipeline Upgrade project is expected to take 12 months to complete, the work in the refinery's right of way, that might generate noise impacts for the nearby residents is anticipated to take 3-4 months to complete.</p> <p>Caltex anticipates approval by the NSW Department of Planning & Infrastructure in the near future and anticipate work starting in Q4 2011.</p>

	MP	A 1km limit for dredging was employed for the WDA desalination pipeline dredging and was limited to daylight hours.	
5	Proposed Dredging and Disposal Methodology		
	CP	OEH agrees that due to the elevated TBT concentrations in the proposed dredge material, and the lack of TBT guidelines for reuse, the public and Council are unlikely to agree with the reuse of the sand.	Noted.
	CP	OEH agree that land disposal would require full dewatering, access for transferring spoil from barges to trucks, and trucking/ transport issues.	Noted.
	CP	OEH doesn't see a problem with the proposed dredging method, i.e. using a trailer suction hopper dredge (TSHD) based on its efficiency and the type of material to be dredged (i.e. limited fines).	Noted.
6	Other Comments		
	RB	A search should be conducted to see if there are any submarine cables (e.g. Optus and Telstra) within the dredge footprint.	An assessment of existing services would be undertaken during the environmental assessment. It would also be expected that the dredging Contractor would carry out a services search prior to dredging.
	KG	Botany Bay Protection Council (Burnie Clarke) recently raised concerns over dredging in Botany Bay.	Noted.
	CP	An oil slick was reported in the media in April 2011. As such, the community are very aware of downstream impacts from such disturbances.	Community concerns noted. This is likely to be an issue for consideration by SEWPaC regarding sea disposal. SEWPaC would consider that there is potential for additional contamination since the previous investigations as a result of any reported slick. WP requested additional information from Caltex. Caltex responded with information on the management of the oily water discharge including information that no contamination was evident on

			<p>the shoreline during inspections by OEH.</p> <p>WP added testing of PAHs and TPHs in surface samples to the Supplementary SAP and submitted to SEWPaC. Whilst no additional contamination is expected, this testing would likely flag if there has been an impact to the proposed dredge area as a result of the discharge.</p>
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