

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: EW1301209	Page	: 1 of 8
Amendment	: 1		
Client	: SHOALHAVEN CITY COUNCIL	Laboratory	: Environmental Division NSW South Coast
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Project	: West Nowra Landfill	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: 15425.16780		
C-O-C number	: ----	Date Samples Received	: 24-APR-2013
Sampler	: ----	Issue Date	: 31-MAY-2013
Site	: ----		
Quote number	: WO/084/11	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 Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



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

- This report has been amended following the addition of the purchase order number which is required by the client.



NATA Accredited Laboratory 825

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>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong
Hoa Nguyen	Senior Inorganic Chemist	Sydney Inorganics
Pabi Subba	Senior Organic Chemist	Sydney Organics
		Sydney Organics



Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Client sample ID

**Proposed landfill cell
3D2**

Client sampling date / time

24-APR-2013 10:30

EW1301209-001

Compound	CAS Number	LOR	Unit					
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	----	10	mg/L	144	----	----	----	----
EA025: Suspended Solids								
Suspended Solids (SS)	----	5	mg/L	55	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	11	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	11	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	21	----	----	----	----
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	52	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	6	----	----	----	----
Magnesium	7439-95-4	1	mg/L	3	----	----	----	----
Sodium	7440-23-5	1	mg/L	50	----	----	----	----
Potassium	7440-09-7	1	mg/L	7	----	----	----	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.94	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----
Barium	7440-39-3	0.001	mg/L	0.009	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	0.0002	----	----	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	0.002	----	----	----	----
Copper	7440-50-8	0.001	mg/L	0.004	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	0.040	----	----	----	----
Lead	7439-92-1	0.001	mg/L	0.002	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	0.039	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----
EG050F: Dissolved Hexavalent Chromium								
Hexavalent Chromium	18540-29-9	0.01	mg/L	<0.01	----	----	----	----
EK040P: Fluoride by PC Titrator								



Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Client sample ID

**Proposed landfill cell
3D2**

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EW1301209-001

Compound	CAS Number	LOR	Unit					
EK040P: Fluoride by PC Titrator - Continued								
Fluoride	16984-48-8	0.1	mg/L	<0.1	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	3.17	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	----	0.01	mg/L	0.07	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.35	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.42	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	----	----	----	----
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	2.12	----	----	----	----
Total Cations	----	0.01	meq/L	2.90	----	----	----	----
EN67 PK: Field Tests								
pH	----	0.1	pH Unit	4.6	----	----	----	----
Redox Potential	----	0.1	mV	190	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	24	----	----	----	----
EP035G: Total Phenol by Discrete Analyser								
Phenols (Total)	----	0.05	mg/L	<0.05	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.5	µg/L	<0.5	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	----	----	----	----
beta-BHC	319-85-7	0.5	µg/L	<0.5	----	----	----	----
gamma-BHC	58-89-9	0.5	µg/L	<0.5	----	----	----	----
delta-BHC	319-86-8	0.5	µg/L	<0.5	----	----	----	----
Heptachlor	76-44-8	0.5	µg/L	<0.5	----	----	----	----
Aldrin	309-00-2	0.5	µg/L	<0.5	----	----	----	----
Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	----	----	----	----
trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	----	----	----	----
alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	----	----	----	----
cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)

Client sample ID

Proposed landfill cell
3D2

Client sampling date / time

24-APR-2013 10:30

Compound	CAS Number	LOR	Unit	EW1301209-001	---	---	---	---
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EP068A: Organochlorine Pesticides (OC) - Continued

Dieldrin	60-57-1	0.5	µg/L	<0.5	---	---	---	---
4,4'-DDE	72-55-9	0.5	µg/L	<0.5	---	---	---	---
Endrin	72-20-8	0.5	µg/L	<0.5	---	---	---	---
beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	---	---	---	---
4,4'-DDD	72-54-8	0.5	µg/L	<0.5	---	---	---	---
Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	---	---	---	---
Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	---	---	---	---
4,4'-DDT	50-29-3	2.0	µg/L	<2.0	---	---	---	---
Endrin ketone	53494-70-5	0.5	µg/L	<0.5	---	---	---	---
Methoxychlor	72-43-5	2.0	µg/L	<2.0	---	---	---	---
^ Total Chlordane (sum)	----	0.5	µg/L	<0.5	---	---	---	---
^ Sum of DDD + DDE + DDT	----	0.5	µg/L	<0.5	---	---	---	---
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L	<0.5	---	---	---	---

EP068B: Organophosphorus Pesticides (OP)

Dichlorvos	62-73-7	0.5	µg/L	<0.5	---	---	---	---
Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	---	---	---	---
Monocrotophos	6923-22-4	2.0	µg/L	<2.0	---	---	---	---
Dimethoate	60-51-5	0.5	µg/L	<0.5	---	---	---	---
Diazinon	333-41-5	0.5	µg/L	<0.5	---	---	---	---
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	---	---	---	---
Parathion-methyl	298-00-0	2.0	µg/L	<2.0	---	---	---	---
Malathion	121-75-5	0.5	µg/L	<0.5	---	---	---	---
Fenthion	55-38-9	0.5	µg/L	<0.5	---	---	---	---
Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	---	---	---	---
Parathion	56-38-2	2.0	µg/L	<2.0	---	---	---	---
Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	---	---	---	---
Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	---	---	---	---
Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	---	---	---	---
Fenamiphos	22224-92-6	0.5	µg/L	<0.5	---	---	---	---
Prothiofos	34643-46-4	0.5	µg/L	<0.5	---	---	---	---
Ethion	563-12-2	0.5	µg/L	<0.5	---	---	---	---
Carbophenothion	786-19-6	0.5	µg/L	<0.5	---	---	---	---
Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	---	---	---	---



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EP075(SIM)B: Polynuclear Aromatic Hydrocarbons

Naphthalene	91-20-3	1.0	µg/L	<1.0	---	---	---	---
Acenaphthylene	208-96-8	1.0	µg/L	<1.0	---	---	---	---
Acenaphthene	83-32-9	1.0	µg/L	<1.0	---	---	---	---
Fluorene	86-73-7	1.0	µg/L	<1.0	---	---	---	---
Phenanthrene	85-01-8	1.0	µg/L	<1.0	---	---	---	---
Anthracene	120-12-7	1.0	µg/L	<1.0	---	---	---	---
Fluoranthene	206-44-0	1.0	µg/L	<1.0	---	---	---	---
Pyrene	129-00-0	1.0	µg/L	<1.0	---	---	---	---
Benz(a)anthracene	56-55-3	1.0	µg/L	<1.0	---	---	---	---
Chrysene	218-01-9	1.0	µg/L	<1.0	---	---	---	---
Benzo(b)fluoranthene	205-99-2	1.0	µg/L	<1.0	---	---	---	---
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	<1.0	---	---	---	---
Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	---	---	---	---
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L	<1.0	---	---	---	---
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	<1.0	---	---	---	---
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	<1.0	---	---	---	---
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	<0.5	---	---	---	---
^ Benzo(a)pyrene TEQ (WHO)	----	0.5	µg/L	<0.5	---	---	---	---

EP080/071: Total Petroleum Hydrocarbons

C6 - C9 Fraction	----	20	µg/L	<20	---	---	---	---
C10 - C14 Fraction	----	50	µg/L	390	---	---	---	---
C15 - C28 Fraction	----	100	µg/L	120	---	---	---	---
C29 - C36 Fraction	----	50	µg/L	80	---	---	---	---
^ C10 - C36 Fraction (sum)	----	50	µg/L	590	---	---	---	---

EP080/071: Total Recoverable Hydrocarbons - NEPM 2010 Draft

C6 - C10 Fraction	----	20	µg/L	<20	---	---	---	---
^ C6 - C10 Fraction minus BTEX (F1)	----	20	µg/L	<20	---	---	---	---
>C10 - C16 Fraction	----	100	µg/L	140	---	---	---	---
>C16 - C34 Fraction	----	100	µg/L	170	---	---	---	---
>C34 - C40 Fraction	----	100	µg/L	<100	---	---	---	---
^ >C10 - C40 Fraction (sum)	----	100	µg/L	310	---	---	---	---

EP080: BTEXN

Benzene	71-43-2	1	µg/L	<1	---	---	---	---
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Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

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3D2**

Client sampling date / time

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EW1301209-001

Compound	CAS Number	LOR	Unit					
EP080: BTEXN - Continued								
Toluene	108-88-3	2	µg/L	<2	---	---	---	---
Ethylbenzene	100-41-4	2	µg/L	<2	---	---	---	---
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	---	---	---	---
ortho-Xylene	95-47-6	2	µg/L	<2	---	---	---	---
^ Total Xylenes	1330-20-7	2	µg/L	<2	---	---	---	---
^ Sum of BTEX	----	1	µg/L	<1	---	---	---	---
Naphthalene	91-20-3	5	µg/L	<5	---	---	---	---
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	65.9	---	---	---	---
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	74.2	---	---	---	---
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.1	%	19.4	---	---	---	---
2-Chlorophenol-D4	93951-73-6	0.1	%	44.1	---	---	---	---
2,4,6-Tribromophenol	118-79-6	0.1	%	75.0	---	---	---	---
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	56.9	---	---	---	---
Anthracene-d10	1719-06-8	0.1	%	69.9	---	---	---	---
4-Terphenyl-d14	1718-51-0	0.1	%	64.8	---	---	---	---
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	94.8	---	---	---	---
Toluene-D8	2037-26-5	0.1	%	103	---	---	---	---
4-Bromofluorobenzene	460-00-4	0.1	%	91.3	---	---	---	---



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	30	120
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	26.8	129
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	44
2-Chlorophenol-D4	93951-73-6	15.9	102
2,4,6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20.4	112
Anthracene-d10	1719-06-8	29.6	118
4-Terphenyl-d14	1718-51-0	21.5	126
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128