

Environmental Division

CERTIFICATE OF ANALYSIS

<p>Work Order : EW1202340</p> <p>Client : WOLLONGONG CITY COUNCIL</p> <p>Contact : MR WAYDE PETERSON</p> <p>Address : 41 BURELLI STREET WOLLONGONG NSW, AUSTRALIA 2500</p> <p>E-mail : wpeterson@wollongong.nsw.gov.au</p> <p>Telephone : +61 02 4227 7111</p> <p>Facsimile : +61 02 4227 7277</p> <p>Project : Helensburgh Leachate Annual</p> <p>Order number : 3001821</p> <p>C-O-C number : ----</p> <p>Sampler : Craig Wilson</p> <p>Site : ----</p> <p>Quote number : WL/001/11 Helensburgh Leachate Annual</p>	<p>Page : 1 of 7</p> <p>Laboratory : Environmental Division NSW South Coast</p> <p>Contact : Glenn Davies</p> <p>Address : 99 Kenny Street, Wollongong 2500 Unit 4 / 13 Geary Place, PO Box 3105, North Nowra 2541 AUSTRALIA</p> <p>E-mail : glenn.davies@alsglobal.com</p> <p>Telephone : 02 4225 3125</p> <p>Facsimile : 02 4225 3128</p> <p>QC Level : NEPM 1999 Schedule B(3) and ALS QCS3 requirement</p> <p>Date Samples Received : 23-AUG-2012</p> <p>Issue Date : 03-SEP-2012</p> <p>No. of samples received : 1</p> <p>No. of samples analysed : 1</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



WORLD RECOGNISED
ACCREDITATION

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>
Celine Conceicao	Senior Spectroscopist	Sydney 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.

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: **WATER**

				Client sample ID	Leachate				
				Client sampling date / time	23-AUG-2012 09:15	----	----	----	----
Compound	CAS Number	LOR	Unit	EW1202340-001	----	----	----	----	----
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	900	----	----	----	----	----
EA025: Suspended Solids									
Suspended Solids (SS)	----	5	mg/L	27	----	----	----	----	----
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	710	----	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	710	----	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	23	----	----	----	----	----
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L	112	----	----	----	----	----
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L	96	----	----	----	----	----
Magnesium	7439-95-4	1	mg/L	43	----	----	----	----	----
Sodium	7440-23-5	1	mg/L	151	----	----	----	----	----
Potassium	7440-09-7	1	mg/L	48	----	----	----	----	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.03	----	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	0.002	----	----	----	----	----
Barium	7440-39-3	0.001	mg/L	0.212	----	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----	----
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	0.205	----	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	0.013	----	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	----
EG050T: Total Hexavalent Chromium									
Hexavalent Chromium	18540-29-9	0.010	mg/L	<0.010	----	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	<0.1	----	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser									



Analytical Results

Sub-Matrix: WATER

				Client sample ID	Leachate				
				Client sampling date / time	23-AUG-2012 09:15	----	----	----	----
Compound	CAS Number	LOR	Unit	EW1202340-001	----	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser - Continued									
Ammonia as N	7664-41-7	0.01	mg/L	23.2	----	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	----	0.01	mg/L	0.33	----	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	3.61	----	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	3.94	----	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.20	----	----	----	----	----
EN67 PK: Field Tests									
pH	----	0.1	pH Unit	7.6	----	----	----	----	----
Electrical Conductivity (Non Compensated)	----	1	µS/cm	1590	----	----	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	15	----	----	----	----	----
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	----	----	----	----	----
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	----	----	----	----	----



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				Client sampling date / time	23-AUG-2012 09:15	----	----	----	----
Compound	CAS Number	LOR	Unit	EW1202340-001	----	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
4,4'-DDT	50-29-3	2	µg/L	<2	----	----	----	----	----
Endrin ketone	53494-70-5	0.5	µg/L	<0.5	----	----	----	----	----
Methoxychlor	72-43-5	2	µg/L	<2	----	----	----	----	----
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	µg/L	<2	----	----	----	----	----
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	µg/L	<2	----	----	----	----	----
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	µg/L	<2	----	----	----	----	----
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	----	----	----	----	----
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	----	----	----	----	----



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Compound	CAS Number	LOR	Unit	EW1202340-001	----	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
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	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	----	----	----	----	----
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	----	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.1	%	81.7	----	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.1	%	92.6	----	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.1	%	25.2	----	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.1	%	53.0	----	----	----	----	----
2,4,6-Tribromophenol	118-79-6	0.1	%	77.9	----	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%	74.1	----	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%	90.9	----	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	78.6	----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.1	%	89.5	----	----	----	----	----
Toluene-D8	2037-26-5	0.1	%	93.3	----	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	80.9	----	----	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	33.6	142.5
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	28.1	147.7
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10.0	64.1
2-Chlorophenol-D4	93951-73-6	11.3	122.9
2,4,6-Tribromophenol	118-79-6	11.7	144.0
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	19.9	122.8
Anthracene-d10	1719-06-8	23.3	125.8
4-Terphenyl-d14	1718-51-0	20.3	134.5
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