



Interpretive Quality Control Report - Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged on the 'Quality Control Report'. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). - Anonymous - Client' Sample IDs refer to samples which are not specifically part of this work order but formed part of the QC process lot.

Non-surrogates

Matrix Type: WATER

Matrix Type: WATER						
ALS OC Lot	Matrix Type	Laboratory Sample ID	Client Sample ID	Analyte	Data	Limits
				Nitrite + Nitrate as N	ND	----
EP074E: Halogenated Aliphatic Compounds	WATER	ES0501662-006	Anonymous	Trichloroethene	ND	----
						MS recovery not determined, background level greater than or equal to 4x spike level.
						MS recovery not determined, background level greater than or equal to 4x spike level.

- For all matrices, no RPD recovery outliers occur for the duplicate analysis.
- For all matrices, no method blank result outliers occur.
- For all matrices, no laboratory spike recoveries breaches occur.

Surrogates

- For all matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time

The following report highlights outliers within this 'Interpretive Quality Control Report - Analysis Holding Time':

Matrix Type: WATER

Matrix Type: WATER							
Method Container / Client Sample ID(s)	Date Sampled	Extraction / Preparation		Analysis			
		Date extracted	Due for extraction	Pass?	Date analysed	Due for analysis	Pass?
EG050G-T: Hexavalent Chromium by Discrete Analyser - Total							
Clear Plastic Bottle - Natural MW42D, MW37D, MW36D, MW03D, MW38D, RINSATE 1, RINSATE 2	3 Mar 2005				7 Mar 2005	4 Mar 2005	Fail by 2 days
EK059G: Nitrite and Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Natural MW42D, MW37D, MW36D, MW03D, MW38D, RINSATE 1, RINSATE 2	3 Mar 2005				8 Mar 2005	5 Mar 2005	Fail by 2 days



ALS Environmental

Client : SINCLAIR KNIGHT MERZ
Project : EN01669

Work Order : ES0501668
ALS Quote Reference : ----

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Outliers : Frequency of Quality Control Samples

The following report highlights outliers within this 'Interpretive Quality Control Report - Frequency of Quality Control Samples'.

- No frequency outliers occur.



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Method Reference Summary

The analytical procedures used by ALS Environmental are based on established internationally-recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house procedure 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 herein. Reference methods from which ALSE methods are based are provided in parenthesis.

Matrix Type: WATER

Method Reference Summary

Preparation Methods

EK061/EK067 : TKN/TP Digestion - APHA 20th ed., 4500 Norg - D; APHA 20th ed., 4500 P - H. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

EN25 : Digestion for Total Recoverable Metals - USEPA SW846-3005 Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

ORG14 : Separatory Funnel Extraction of Liquids - USEPA SW 846 - 3510B 500 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2). ALS default excludes sediment which may be resident in the container.

Analytical Methods

EA065 : Hardness as CaCO₃ - APHA 20th ed., 2340. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

ED093F : Major Cations - Filtered - APHA 20th ed., 3120; USEPA SW 846 - 6010 The ICPAES technique ionises filtered sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

EG020A-T : Total Metals by ICP-MS - Suite A - (APHA 20th 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.

EG035T : Total Mercury by FIMS - AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl₂ 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) (Appdx. 2)

EG050G-T : Hexavalent Chromium by Discrete Analyser - Total - APHA 20th ed., 3500 Cr-A & B. Hexavalent chromium is determined directly on water sample by Seal Discrete Analyser as received by pH adjustment and colour development using diphenylcarbazide. Each run of samples is measured against a five-point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

EK055G : Ammonia as N by Discrete analyser - APHA 20th ed., 4500 NH₃+H Ammonia is determined by direct colorimetry by Seal. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

EK059G : Nitrite and Nitrate as N (NO_x) by Discrete Analyser - APHA 20th ed., 4500 NO₃-I. SEAL Method 2-018-1-L February 2003. Combined oxidised Nitrogen (NO₂+NO₃) is determined by Cadmium Reduction and direct colorimetry by SEAL. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

EK061 : Total Kjeldahl Nitrogen as N - APHA 20th ed., 4500-Norg-D 100mL water samples are digested using a traditional Kjeldahl digestion followed by determination by FIA. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

EK062-SYD : Total Nitrogen as N (TKN + Nox) - APHA 20th ed., 4500 N org / NO₃. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

EP005 : Total Organic Carbon - APHA 20th ed., 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)



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Project : EN01669

Matrix Type: WATER

Analytical Methods

EP026 : Chemical Oxygen Demand (COD) - APHA 20th ed., 5220 B. Samples are digested with a known excess of acidic potassium dichromate solution using silver sulphate as a catalyst. The chromium is reduced from Cr (VI) to Cr (III) by oxygen. The unreacted Cr (VI) can then be titrated with ferrous ammonium sulfate to determine the amount of Cr (VI) consumed. The oxidisable organic matter can be calculated in terms of oxygen equivalents. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

EP030 : Biochemical Oxygen Demand (BOD) - APHA 20th ed., 5210 B. The 5-Day BOD test provides an empirical measure of the oxygen consumption capacity of a given water. A portion of the sample is diluted into oxygenated, nutrient rich water, and a seed added to begin biological decay. The initial dissolved oxygen content is measured, then the bottle is sealed and incubated for five days. The remaining dissolved oxygen is measured, and from the difference, the demand for oxygen, by biological decay, is determined. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

EP071 : TPH - Semivolatile Fraction - USEPA SW 846 - 8015A. The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

EP074 : Volatile Organic Compounds - USEPA SW 846 - 8260B. Water samples are directly purged prior to analysis 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) (Appdx. 2)

EP075 : Semivolatile Organic Compounds - USEPA SW 846 - 8270D. Sample 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) (Appdx. 2)

EP075(SIM) : PAH/Phenols (GC/MS - SIM) - USEPA SW 846 - 8270D. Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

EP080 : TPH Volatiles/BTEX - USEPA SW 846 - 8260B. Water samples are directly purged prior to analysis 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) (Appdx. 2)

ALS Environmental



CERTIFICATE OF ANALYSIS

Client	: SINGLAIR KNIGHT MERZ	Laboratory	: ALS Environmental Sydney	Page	: 1 of 10
Contact	: MS LOUISE MACDONALD	Contact	: Greg Vogel		
Address	: P O BOX 164 ST LEONARDS NSW AUSTRALIA 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164	Work order	: ES0501691
Project	: EN01669	Quote number	: ---	Date received	: 7 Mar 2005
Order number	: - Not provided -			Date issued	: 17 Mar 2005
C-O-C number	: - Not provided -				
Site	: - Not provided -				
E-mail	: lmacdonald@skm.com.au	E-mail	: Greg.Vogel@alsenviro.com	No. of samples	
Telephone	: (02) 9928-2100	Telephone	: 61-2-87848555	Received	: 3
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This final report for the ALSE work order reference ES0501691 supersedes any previous reports with this reference. Results apply to the samples as submitted. All pages of this report have been checked and approved for release.

This report contains the following information:

- Analytical results for samples submitted
- Surrogate control limits

ALSE - QUALITY, SERVICE and TECHNOLOGY provided GLOBALLY



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This document has been digitally signed by those names that appear on this report and are the authorised signatories. Digital signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatory	Department
Greg Vogel	Inorganics - NATA 10911 (Sydney)
Peter Dickenson	Inorganics - NATA 10911 (Sydney)
Rassem Ayoubi	Organics - NATA 10911 (Sydney)
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When moisture determination has been performed, results are reported on a dry weight basis. When a reported 'less than' result is higher than the LOR, this may be due to primary sample extracts/digestion dilution and/or insufficient sample amount for analysis. Surrogate Recovery Limits are static and based on USEPA SW846 or ALS-QWL/EN38 (in the absence of specified USEPA limits).
Abbreviations: CAS number = Chemical Abstract Services number, LOR = Limit of Reporting. # Indicates a raised LOR, * Indicates failed Surrogate Recoveries.
When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes.

Analytical Results

Analytical Results									
Client Sample ID :				MW36S		MW35S		MW41D	
Sample Matrix Type / Description :				WATER / WATER		WATER / WATER		WATER / WATER	
Sample Date / Time :				4 Mar 2005		4 Mar 2005		4 Mar 2005	
Laboratory Sample ID :				0:00		0:00		0:00	
Laboratory Sample ID :				ES0501691-001		ES0501691-002		ES0501691-003	
Analyte	CAS number	LOR	Units						
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3									
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	----	----	----	2		
Magnesium	7439-95-4	1	mg/L	----	----	----	6		
Sodium	7440-23-5	1	mg/L	----	----	----	146		
Potassium	7440-09-7	1	mg/L	----	----	----	2		
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L	0.002	<0.001	<0.001	<0.001		
Cadmium	7440-43-9	0.0001	mg/L	0.0001	0.0002	0.0001	0.0001		
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001		
Copper	7440-50-8	0.001	mg/L	<0.001	0.005	0.002	0.002		
Lead	7439-92-1	0.001	mg/L	0.009	0.003	0.003	0.003		
Nickel	7440-02-0	0.001	mg/L	0.012	0.009	0.003	0.003		
Zinc	7440-66-6	0.005	mg/L	0.270	0.325	0.265	0.265		
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001		
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.010	mg/L	----	0.283	0.046	0.046		
EK059G: NOx as N by Discrete Analyser									
Nitrite + Nitrate as N		0.010	mg/L	----	0.361	<0.010	<0.010		
EK061: Total Kjeldahl Nitrogen (TKN)									
Total Kjeldahl Nitrogen as N		0.1	mg/L	----	0.1	0.1	0.1		
EK062: Total Nitrogen as N (TKN + NOx)									
Total Nitrogen as N		0.1	mg/L	----	0.5	0.1	0.1		
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon		1	mg/L	11	10	2	2		
EP026: Chemical Oxygen Demand (COD)									
Chemical Oxygen Demand		5	mg/L	----	121	14	14		
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand		2	mg/L	----	----	<2	<2		
EP074A: Monocyclic Aromatic Hydrocarbons									
Benzene	71-43-2	5	µg/L	<5	<5	<5	<5		

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Analytical Results

Client Sample ID :		MW36S	MW35S	MW41D	ES0501691-003
Sample Matrix Type / Description :		WATER / WATER	WATER / WATER	WATER / WATER	
Sample Date / Time :		4 Mar 2005	4 Mar 2005	4 Mar 2005	
Laboratory Sample ID :		ES0501691-001	ES0501691-002	ES0501691-003	
Analyte	CAS number	LOR	Units		
EP074A: Monocyclic Aromatic Hydrocarbons					
Toluene	108-88-3	5	µg/L	<5	<5
Ethylbenzene	100-41-4	5	µg/L	<5	<5
meta- & para-Xylene	108-38-3 106-42-3	5	µg/L	<5	<5
Styrene	100-42-5	5	µg/L	<5	<5
ortho-Xylene	95-47-6	5	µg/L	<5	<5
Isopropylbenzene	98-82-8	5	µg/L	<5	<5
n-Propylbenzene	103-65-1	5	µg/L	<5	<5
1,3,5-Trimethylbenzene	108-67-8	5	µg/L	<5	<5
sec-Butylbenzene	135-98-8	5	µg/L	<5	<5
1,2,4-Trimethylbenzene	95-63-6	5	µg/L	<5	<5
tert-Butylbenzene	98-06-6	5	µg/L	<5	<5
p-Isopropyltoluene	99-87-6	5	µg/L	<5	<5
n-Butylbenzene	104-51-8	5	µg/L	<5	<5
EP074B: Oxygenated Compounds					
Vinyl Acetate	108-05-4	50	µg/L	<50	<50
2-Butanone (MEK)	78-93-3	50	µg/L	<50	<50
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	<50	<50
2-Hexanone (MBK)	591-78-6	50	µg/L	<50	<50
EP074C: Sulfonated Compounds					
Carbon disulfide	75-15-0	5	µg/L	<5	<5
EP074D: Fumigants					
2,2-Dichloropropane	594-20-7	5	µg/L	<5	<5
1,2-Dichloropropane	78-87-5	5	µg/L	<5	<5
cis-1,3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5
trans-1,3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5
1,2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5
EP074E: Halogenated Aliphatic Compounds					
Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50
Chloromethane	74-87-3	50	µg/L	<50	<50
Vinyl chloride	75-01-4	50	µg/L	<50	<50
Bromomethane	74-83-9	50	µg/L	<50	<50
Chloroethane	75-00-3	50	µg/L	<50	<50
Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50
1,1-Dichloroethene	75-35-4	5	µg/L	<5	<5
Iodomethane	74-88-4	5	µg/L	<5	<5
trans-1,2-Dichloroethene	156-60-5	5	µg/L	<5	<5



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Analytical Results

Analytical Results				Client Sample ID :		MW36S		MW35S		MW41D	
Sample Matrix Type / Description : Sample Date / Time :				WATER / WATER 4 Mar 2005 0:00		WATER / WATER 4 Mar 2005 0:00		WATER / WATER 4 Mar 2005 0:00		WATER / WATER 4 Mar 2005 0:00	
Laboratory Sample ID :				ES0501691-001		ES0501691-002		ES0501691-003			
Analyte	CAS number	LOR	Units								
EP074E: Halogenated Aliphatic Compounds											
1,1-Dichloroethane	75-34-3	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethene	156-59-2	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
1,1,1-Trichloroethane	71-55-6	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane	107-06-2	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
Trichloroethene	79-01-6	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
Dibromomethane	74-95-3	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
1,1,2-Trichloroethane	79-00-5	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
1,3-Dichloropropane	142-28-9	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
Tetrachloroethene	127-18-4	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
1,1,1,2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
trans-1,4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
1,2,3-Trichloropropane	96-18-4	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
Pentachloroethane	76-01-7	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
1,2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
EP074F: Halogenated Aromatic Compounds											
Chlorobenzene	108-90-7	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
Bromobenzene	108-86-1	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
1,3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
1,4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
1,2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
1,2,4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
1,2,3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
EP074G: Trihalomethanes											
Chloroform	67-66-3	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
Bromodichloromethane	75-27-4	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
Dibromochloromethane	124-48-1	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
Bromoform	75-25-2	5	µg/L	<5	<5	<5	<5	<5	<5	<5	<5
EP074H: Naphthalene											
Naphthalene	91-20-3	7	µg/L	<7	<7	<7	<7	<7	<7	<7	<7