

Quality Control Report - Matrix Spikes (MS)

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 type 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 interferences. - Anonymous - Client Sample IDs refer to samples which are not specifically part of this work order but formed part of the QC process lot. Abbreviations: **LOR** = Limit of Reporting, **RPD** = Relative Percent Difference.

* Indicates failed QC

Matrix Type: WATER

Matrix Type: WATER					Actual Results		Recovery Limits	
					Sample Result	Spike Recovery MS	Low	High
Analyte name	Laboratory Sample ID	Client Sample ID	LOR	Spike Concentration				
EG020F: Dissolved Metals by ICP-MS								
EG020F: Dissolved Metals by ICP-MS - (QC Lot: 51549)								
Arsenic	ES0501691-001	Anonymous	0.001 mg/L	0.2 mg/L	0.002	100	70	130
Cadmium			0.0001 mg/L	0.05	0.0001	99.7	70	130
Chromium			0.001 mg/L	0.2	<0.001	88.8	70	130
Copper			0.001 mg/L	0.2	<0.001	102	70	130
Lead			0.001 mg/L	0.2	0.009	98.2	70	130
Nickel			0.001 mg/L	0.2	0.012	105	70	130
Zinc			0.005 mg/L	0.2	0.270	70.2	70	130
EG035F: Dissolved Mercury by FIMS								
EG035F: Dissolved Mercury by FIMS - (QC Lot: 50660)								
Mercury	ES0501691-001	Anonymous	0.0001 mg/L	0.0100	<0.0001	94.9	70	130
EG050F: Hexavalent Chromium - Filtered								
EG050F: Hexavalent Chromium - Filtered - (QC Lot: 49246)								
Hexavalent Chromium	ES0501695-001	MW39S	0.01 mg/L	0.50	<0.010	114	70	130
EK055G: Ammonia as N by Discrete Analyser								
EK055G: Ammonia as N by Discrete Analyser - (QC Lot: 49536)								
Ammonia as N	ES0501642-004	Anonymous	0.01 mg/L	1.00	0.315	127	70	130
EK055G: Ammonia as N by Discrete Analyser - (QC Lot: 49537)				mg/L	mg/L	%	%	%
Ammonia as N	ES0501695-004	MW40D	0.01 mg/L	1.00	0.052	100	70	130
EK059G: NOX as N by Discrete Analyser								
EK059G: NOX as N by Discrete Analyser - (QC Lot: 49176)								
Nitrite + Nitrate as N	ES0501665-001	Anonymous	0.01 mg/L	0.60	0.429	106	70	130
EK061: Total Kjeldahl Nitrogen (TKN)								
EK061: Total Kjeldahl Nitrogen (TKN) - (QC Lot: 49546)								
Total Kjeldahl Nitrogen as N	ES0501690-004	Anonymous	0.1 mg/L	5.0	0.4	129	70	130
EP005: Total Organic Carbon (TOC)								
EP005: Total Organic Carbon (TOC) - (QC Lot: 49043)								
Total Organic Carbon	ES0501668-010	Anonymous	1 mg/L	100	<1	78.0	70	130



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Matrix Type: WATER

Matrix Type: WATER					Actual Results		Recovery Limits			
Analyte name		Laboratory Sample ID	Client Sample ID	LOR	Spike Concentration	Sample Result	Spike Recovery	MS	Low	High
EP026: Chemical Oxygen Demand (COD)										
EP026: Chemical Oxygen Demand (COD) - (QC Lot: 50066)					mg/L		%	%	%	%
Chemical Oxygen Demand		ES0501668-010	Anonymous	5 mg/L	143	7	106		70	130
EP074A: Monocyclic Aromatic Hydrocarbons										
EP074A: Monocyclic Aromatic Hydrocarbons - (QC Lot: 50190)					µg/L		%	%	%	%
Benzene		ES0501691-001	Anonymous	5 µg/L	25	<5	92.6		70	130
Toluene				5 µg/L	25	<5	98.0		70	130
EP074E: Halogenated Aliphatic Compounds										
EP074E: Halogenated Aliphatic Compounds - (QC Lot: 50190)					µg/L		%	%	%	%
1,1-Dichloroethene		ES0501691-001	Anonymous	5 µg/L	25	<5	93.6		70	130
Trichloroethene				5 µg/L	25	<5	95.5		70	130
EP074F: Halogenated Aromatic Compounds										
EP074F: Halogenated Aromatic Compounds - (QC Lot: 50190)					µg/L		%	%	%	%
Chlorobenzene		ES0501691-001	Anonymous	5 µg/L	25	<5	108		70	130
EP080/071: Total Petroleum Hydrocarbons										
EP080/071: Total Petroleum Hydrocarbons - (QC Lot: 50189)					µg/L		%	%	%	%
C6 - C9 Fraction		ES0501668-010	Anonymous	20 µg/L	250	<20	97.8		80	120

INTERPRETIVE QUALITY CONTROL REPORT

Client	: SINCLAIR KNIGHT MERZ	Laboratory	: ALS Environmental Sydney	Page	: 1 of 9
Contact	: MS LOUSIE 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	: ES0501695
Project	: EN01669	Quote number	: ---	Amendment No.	:
Order number	: - Not provided -			Date received	: 7 Mar 2005
C-O-C number	: - Not provided -			Date issued	: 17 Mar 2005
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	: 4
Facsimile	: (02) 9928-2272	Facsimile	: 61-2-87848500	Analysed	: 4

This Interpretive Quality Control Report was issued on 17 Mar 2005 for the ALS work order reference ES0501695 and supersedes any previous reports with this reference.

This report contains the following information:

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

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Interpretive Quality Control Report - Analysis Holding Time

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 preclude subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the sample aliquot was taken. Elapsed time to analysis represents time from sampling where no extraction / digestion is involved or time from extraction / digestion where this is present. For composite samples, sampling date/time is taken as that of the oldest sample contributing to that composite. Sample date/time for laboratory produced leaches are taken from the completion date/time of the leaching process. Outliers for holding time are based on USEPA SW846, APHA, AS and NEPM (1999). Failed outliers, refer to the 'Summary of Outliers'.

Matrix Type: WATER

Analysis Holding Time and Preservation

Method	Date Sampled	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Pass?	Date analysed	Due for analysis	Pass?
Container / Client Sample ID(s)							
ED093F: Major Cations - Filtered							
Clear Plastic Bottle - Natural MW39D, MW40D	2 Mar 2005	----	----	----	10 Mar 2005	30 Mar 2005	Pass
Clear Plastic Bottle - Nitric Acid; Filtered MW39S	2 Mar 2005	----	----	----	10 Mar 2005	30 Mar 2005	Pass
EG020A-F: Dissolved Metals by ICP-MS - Suite A							
Clear Plastic Bottle - Nitric Acid; Filtered MW39D, MW40S, MW40D	2 Mar 2005	----	----	----	15 Mar 2005	29 Aug 2005	Pass
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered MW39D, MW40S, MW40D	2 Mar 2005	----	----	----	14 Mar 2005	30 Mar 2005	Pass
EG050G-F: Hexavalent Chromium by Discrete Analyser - Filtered							
Amber Glass Bottle - Unpreserved MW39S	2 Mar 2005	----	----	----	8 Mar 2005	3 Mar 2005	Fail by 4 days
Clear Plastic Bottle - Natural MW39D, MW40D	2 Mar 2005	----	----	----	8 Mar 2005	3 Mar 2005	Fail by 4 days
EK055G: Ammonia as N by Discreate analyser							
Amber Glass Bottle - Unpreserved MW39S	2 Mar 2005	----	----	----	9 Mar 2005	30 Mar 2005	Pass
Clear Plastic Bottle - Sulphuric Acid MW39D, MW40D	2 Mar 2005	----	----	----	9 Mar 2005	30 Mar 2005	Pass
EK059G: Nitrite and Nitrate as N (NOx) by Discrete Analyser							
Amber Glass Bottle - Unpreserved MW39S	2 Mar 2005	----	----	----	8 Mar 2005	4 Mar 2005	Fail by 3 days
Clear Plastic Bottle - Natural MW39D, MW40D	2 Mar 2005	----	----	----	8 Mar 2005	4 Mar 2005	Fail by 3 days
EK061: Total Kjeldahl Nitrogen as N							
Amber Glass Bottle - Unpreserved MW39S	2 Mar 2005	9 Mar 2005	30 Mar 2005	Pass	9 Mar 2005	30 Mar 2005	Pass

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ALS Environmental
Analysis Holding Time and Preservation

Matrix Type: WATER

Method	Container / Client Sample ID(s)	Date Sampled	Extraction / Preparation		Pass?	Analysis	
			Date extracted	Due for extraction		Date analysed	Due for analysis
EK061: Total Kjeldahl Nitrogen as N - continued							
Clear Plastic Bottle - Sulphuric Acid	MW39D, MW40D	2 Mar 2005	9 Mar 2005	30 Mar 2005	Pass	9 Mar 2005	30 Mar 2005
EP005: Total Organic Carbon							
Amber VOC Vial - HCl	MW39S	2 Mar 2005	-----	-----	-----	8 Mar 2005	30 Mar 2005
Clear Plastic Bottle - Sulphuric Acid	MW39D, MW40D	2 Mar 2005	-----	-----	-----	8 Mar 2005	30 Mar 2005
EP026: Chemical Oxygen Demand (COD)							
Amber Glass Bottle - Unpreserved	MW39S	2 Mar 2005	-----	-----	-----	11 Mar 2005	30 Mar 2005
Clear Plastic Bottle - Sulphuric Acid	MW39D, MW40D	2 Mar 2005	-----	-----	-----	11 Mar 2005	30 Mar 2005
EP030: Biochemical Oxygen Demand (BOD)							
Amber Glass Bottle - Unpreserved	MW39S	2 Mar 2005	-----	-----	-----	8 Mar 2005	4 Mar 2005
Clear Plastic Bottle - Natural	MW39D, MW40D	2 Mar 2005	-----	-----	-----	8 Mar 2005	4 Mar 2005
EP071: TPH - Semivolatile Fraction							
Amber Glass Bottle - Unpreserved	MW39S, MW40S,	2 Mar 2005	9 Mar 2005	9 Mar 2005	Pass	10 Mar 2005	18 Apr 2005
EP074: Volatile Organic Compounds							
Amber VOC Vial - HCl	MW39D, MW40D	2 Mar 2005	-----	-----	-----	10 Mar 2005	16 Mar 2005
EP075: Semivolatile Organic Compounds							
Amber Glass Bottle - Unpreserved	MW39S, MW40S,	2 Mar 2005	9 Mar 2005	9 Mar 2005	Pass	10 Mar 2005	18 Apr 2005
EP080: TPH Volatiles/BTEX							
Amber VOC Vial - HCl	MW39S, MW40S,	2 Mar 2005	-----	-----	-----	10 Mar 2005	16 Mar 2005

Interpretive Quality Control Report - Frequency of Quality Control Samples

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which this work order was processed. Actual rate should be greater than or equal to the expected rate.

Matrix Type: WATER		Frequency of Quality Control Samples	
Quality Control Sample Type		Quality Control Specification	
Method	Count	Rate (%)	Expected
	QC	Actual	
Laboratory Duplicates (DUP)			
ED093F: Major Cations - Filtered	4	37	10.0
EG020A-F: Dissolved Metals by ICP-MS - Suite A	2	20	10.0
EG035F: Dissolved Mercury by FIMS	2	20	10.0
EG050G-F: Hexavalent Chromium by Discrete Analyser - Filtered	1	4	10.0
EK055G: Ammonia as N by Discrete analyser	3	21	10.0
EK059G: Nitrite and Nitrate as N (NOx) by Discrete Analyser	2	18	10.0
EK061: Total Kjeldahl Nitrogen as N	2	16	10.0
EP005: Total Organic Carbon	1	9	10.0
EP026: Chemical Oxygen Demand (COD)	1	9	10.0
EP030: Biochemical Oxygen Demand (BOD)	1	7	13.3
EP074: Volatile Organic Compounds	1	8	10.0
EP080: TPH Volatiles/BTEX	2	19	10.0
Laboratory Control Samples (LCS)			
ED093F: Major Cations - Filtered	2	37	5.0
EG020A-F: Dissolved Metals by ICP-MS - Suite A	1	20	5.0
EG035F: Dissolved Mercury by FIMS	1	20	5.0
EG050G-F: Hexavalent Chromium by Discrete Analyser - Filtered	1	4	5.0
EK055G: Ammonia as N by Discrete analyser	2	21	5.0
EK059G: Nitrite and Nitrate as N (NOx) by Discrete Analyser	1	18	5.0
EK061: Total Kjeldahl Nitrogen as N	1	16	5.0
EP005: Total Organic Carbon	1	9	5.0
EP026: Chemical Oxygen Demand (COD)	2	9	10.0
EP030: Biochemical Oxygen Demand (BOD)	1	7	6.7
EP071: TPH - Semivolatile Fraction	1	17	5.0
EP074: Volatile Organic Compounds	1	8	5.0
EP075: Semivolatile Organic Compounds	1	12	5.0
EP080: TPH Volatiles/BTEX	1	19	5.0



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Matrix Type: WATER

Method	Quality Control Sample Type	Count		Rate (%)		Quality Control Specification	
		QC	Regular	Actual	Expected		
Method Blanks (MB)							
ED093F: Major Cations - Filtered		2	37	5.4	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EG020A-F: Dissolved Metals by ICP-MS - Suite A		1	20	5.0	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EG035F: Dissolved Mercury by FIMS		1	20	5.0	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EG050G-F: Hexavalent Chromium by Discrete Analyser - Filtered		1	4	25.0	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EK055G: Ammonia as N by Discrete analyser		2	21	9.5	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EK059G: Nitrite and Nitrate as N (NOx) by Discrete Analyser		1	18	5.6	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EK061: Total Kjeldahl Nitrogen as N		1	16	6.3	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EP005: Total Organic Carbon		1	9	11.1	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EP026: Chemical Oxygen Demand (COD)		1	9	11.1	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EP030: Biochemical Oxygen Demand (BOD)		1	7	14.3	6.7	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EP071: TPH - Semivolatile Fraction		1	17	5.9	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EP074: Volatile Organic Compounds		1	8	12.5	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EP075: Semivolatile Organic Compounds		1	12	8.3	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EP080: TPH Volatiles/BTEX		1	19	5.3	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
Matrix Spikes (MS)							
EG020A-F: Dissolved Metals by ICP-MS - Suite A		1	20	5.0	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EG035F: Dissolved Mercury by FIMS		1	20	5.0	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EG050G-F: Hexavalent Chromium by Discrete Analyser - Filtered		1	4	25.0	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EK055G: Ammonia as N by Discrete analyser		2	21	9.5	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EK059G: Nitrite and Nitrate as N (NOx) by Discrete Analyser		1	18	5.6	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EK061: Total Kjeldahl Nitrogen as N		1	16	6.3	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EP005: Total Organic Carbon		1	9	11.1	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EP026: Chemical Oxygen Demand (COD)		1	9	11.1	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EP074: Volatile Organic Compounds		1	8	12.5	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement
EP080: TPH Volatiles/BTEX		1	19	5.3	5.0	NEPM 1999	Schedule B(3) and ALSE QCS3 requirement

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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-QW/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

ALS QC Lot		Matrix Type	Laboratory Sample ID	Client Sample ID	Analyte	Data	Limits	Comment
Laboratory Control Samples (LCS)								
EP075A: Phenolic Compounds		WATER	52486-015	----	Pentachlorophenol	107 %	4-101 %	Recovery greater than upper control limit

- 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 matrix spike recoveries breaches occur.

Surrogates

- For all matrices, no surrogate recovery outliers occur.