



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: EB1100125	Page	: 1 of 6
Client	: ECOZ ENVIRONMENTAL SERVICES	Laboratory	: Environmental Division Brisbane
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Project	: DW100077	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: Eva and Cobar 2		
C-O-C number	: ----	Date Samples Received	: 01-JAN-2011
Sampler	: NuPower	Issue Date	: 25-JAN-2011
Order number	: ----		
Quote number	: BN/308/10	No. of samples received	: 45
		No. of samples analysed	: 29

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

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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	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005T: Total Metals by ICP-AES							
Pulp Bag (-1000µm) 20019 - <1mm		17-JAN-2011	---	----	20-JAN-2011	----	----
Pulp Bag (-1000µm) 20017 - <1mm, 20020 - <1mm, 12213 - <1mm, 12219 - <1mm, 12221 - <1mm, 12223 - <1mm, 12205 - <1mm, 20012 - <1mm, 20014 - <1mm, 20016 - <1mm, 20104 - <1mm, 20106 - <1mm, 20108 - <1mm, 20110 - <1mm, 20018 - <1mm, 20021 - <1mm, 12216 - <1mm, 12220 - <1mm, 12222 - <1mm, 12203 - <1mm, 12212 - <1mm, 20013 - <1mm, 20015 - <1mm, 20101 - <1mm, 20105 - <1mm, 20107 - <1mm, 20109 - <1mm, 20111 - <1mm	05-JAN-2011	17-JAN-2011	04-JUL-2011	✓	20-JAN-2011	04-JUL-2011	✓

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Matrix: SOIL

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS							
Pulp Bag (-1000µm) 20019 - <1mm		17-JAN-2011	---	----	20-JAN-2011	----	----
Pulp Bag (-1000µm) 20017 - <1mm, 20018 - <1mm, 20020 - <1mm, 20021 - <1mm, 12213 - <1mm, 12216 - <1mm, 12219 - <1mm, 12220 - <1mm, 12221 - <1mm, 12222 - <1mm, 12223 - <1mm, 12203 - <1mm, 12205 - <1mm, 12212 - <1mm, 20012 - <1mm, 20013 - <1mm, 20014 - <1mm, 20015 - <1mm, 20016 - <1mm, 20101 - <1mm, 20104 - <1mm, 20105 - <1mm, 20106 - <1mm, 20107 - <1mm, 20108 - <1mm, 20109 - <1mm, 20110 - <1mm, 20111 - <1mm	05-JAN-2011	17-JAN-2011	04-JUL-2011	✓	21-JAN-2011	04-JUL-2011	✓
EG035T: Total Recoverable Mercury by FIMS							
Pulp Bag (-1000µm) 20019 - <1mm		17-JAN-2011	---	----	20-JAN-2011	----	----
Pulp Bag (-1000µm) 20017 - <1mm, 20018 - <1mm, 20020 - <1mm, 20021 - <1mm, 12213 - <1mm, 12216 - <1mm, 12219 - <1mm, 12220 - <1mm, 12221 - <1mm, 12222 - <1mm, 12223 - <1mm, 12203 - <1mm, 12205 - <1mm, 12212 - <1mm, 20012 - <1mm, 20013 - <1mm, 20014 - <1mm, 20015 - <1mm, 20016 - <1mm, 20101 - <1mm, 20104 - <1mm, 20105 - <1mm, 20106 - <1mm, 20107 - <1mm, 20108 - <1mm, 20109 - <1mm, 20110 - <1mm, 20111 - <1mm	05-JAN-2011	17-JAN-2011	02-FEB-2011	✓	20-JAN-2011	02-FEB-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		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Total Metals by ICP-MS - Suite R	EG020R-T	4	28	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	6	59	10.2	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	6	59	10.2	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite X	EG020X-T	3	26	11.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Total Mercury by FIMS	EG035T	3	59	5.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	3	59	5.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite X	EG020X-T	2	26	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Total Metals by ICP-MS - Suite R	EG020R-T	3	28	10.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	3	59	5.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	3	59	5.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite X	EG020X-T	2	26	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Total Mercury by FIMS	EG035T	3	59	5.1	5.0	✓	ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	3	59	5.1	5.0	✓	ALS QCS3 requirement
Total Metals by ICP-MS - Suite X	EG020X-T	2	26	7.7	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
Total Metals by ICP-AES	EG005T	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)
Total Metals by ICP-MS - Suite R	EG020R-T	SOIL	(APHA 21st ed., 3125; USEPA SW846 - 6020) (ICPMS) Metals in solids are determined following an appropriate acid digestion. The ICPMS technique ionizes selected elements. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass / charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (1999) Schedule B(3)
Total Metals by ICP-MS - Suite X	EG020X-T	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.
Total Mercury by FIMS	EG035T	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)
Sizing (sieving 1000µm to 45µm)	GEO26B	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

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EG005T: Total Metals by ICP-AES	EB1100125-008	12219 <1mm	Manganese	7439-96-5	44.1 %	0-20%	RPD exceeds LOR based limits
EG005T: Total Metals by ICP-AES	EB1100125-028	20110 <1mm	Manganese	7439-96-5	21.4 %	0-20%	RPD exceeds LOR based limits
EG020T: Total Metals by ICP-MS	EB1100125-001	20017 <1mm	Uranium	7440-61-1	29.2 %	0-20%	RPD exceeds LOR based limits
Matrix Spike (MS) Recoveries							
EG005T: Total Metals by ICP-AES	EB1100125-019	20015 <1mm	Copper	7440-50-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EG005T: Total Metals by ICP-AES	EB1023900-014	Anonymous	Manganese	7439-96-5	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

- 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.