

CLIENT DETAILS

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Project **Mungindi Discharge Event Monitoring**
 Order Number **(Not specified)**
 Samples **3**
 Date Started **12 Dec 2014**

LABORATORY DETAILS

Manager **Andrew Tomlins**
 Laboratory **SGS Brisbane Environmental**
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SGS Reference **BE011177 R0**
 Report Number **0000034942**
 Date Reported **18 Dec 2014**
 Date Received **11 Dec 2014**

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(20707/1706).

NO3, NO2, TN and TP subcontracted to SGS Sydney, Unit 16 33 Maddox St Alexandria NSW 2015, NATA Accreditation Number: 2562, Site Number: 4354, SE134446R0.

OCOP: The surrogates do not pass SGS acceptance criteria due to matrix interference (emulsion layer present)

SIGNATORIES



Caroline McDermid
Inorganics Supervisor



Michael Morrison
Senior Organic Chemist

Parameter	Units	LOR	BE011177.001	BE011177.002	BE011177.003
Sample Number			BE011177.001	BE011177.002	BE011177.003
Sample Matrix			Water	Water	Water
Sample Date			08 Dec 2014	08 Dec 2014	08 Dec 2014
Sample Name			MG Site 3	MG Site 4	MG Site 5
			Drainage Channel	Sedimentation	Sedimentation
			NE of N Module	Pond E Module	Pond W Module

pH in water Method: AN101

pH**	pH Units	0.1	6.5	6.6	6.8

Conductivity and TDS by Calculation - Water Method: AN106

Conductivity @ 25 C	µS/cm	5	130	58	210

Total and Volatile Suspended Solids (TSS / VSS) Method: AN114

Total Suspended Solids Dried at 103-105°C	mg/L	1	250	1800	160

TKN Kjeldahl Digestion by Discrete Analyser Method: AN281/AN292

Total Nitrogen (calc)	mg/L	0.05	2.3	2.0	4.4

Total Phosphorus by Kjeldahl Digestion DA in Water Method: AN279/AN293

Total Phosphorus (Kjeldahl Digestion)	mg/L	0.01	0.86	1.0	1.0

OC Pesticides in Water Method: AN400/AN420

	µg/L	0.1	<0.1	<0.1	<0.1
Alpha BHC	µg/L	0.1	<0.1	<0.1	<0.1
Hexachlorobenzene (HCB)	µg/L	0.1	<0.1	<0.1	<0.1
Beta BHC	µg/L	0.1	<0.1	<0.1	<0.1
Lindane (gamma BHC)	µg/L	0.1	<0.1	<0.1	<0.1
Delta BHC	µg/L	0.1	<0.1	<0.1	<0.1
Heptachlor	µg/L	0.1	<0.1	<0.1	<0.1
Aldrin	µg/L	0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	µg/L	0.1	<0.1	<0.1	<0.1
Isodrin	µg/L	0.1	<0.1	<0.1	<0.1
Gamma Chlordane	µg/L	0.1	<0.1	<0.1	<0.1
Alpha Chlordane	µg/L	0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	µg/L	0.1	<0.1	<0.1	<0.1
p,p'-DDE	µg/L	0.1	<0.1	<0.1	<0.1
Dieldrin	µg/L	0.1	<0.1	<0.1	<0.1
Endrin	µg/L	0.1	<0.1	<0.1	<0.1
Beta Endosulfan	µg/L	0.1	<0.1	<0.1	<0.1
p,p'-DDD	µg/L	0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	µg/L	0.1	<0.1	<0.1	<0.1
p,p'-DDT	µg/L	0.1	<0.1	<0.1	<0.1
Endrin ketone	µg/L	0.1	<0.1	<0.1	<0.1
Methoxychlor	µg/L	0.1	<0.1	<0.1	<0.1
Mirex	µg/L	0.1	<0.1	<0.1	<0.1

Sample Number	BE011177.001	BE011177.002	BE011177.003
Sample Matrix	Water	Water	Water
Sample Date	08 Dec 2014	08 Dec 2014	08 Dec 2014
Sample Name	MG Site 3	MG Site 4	MG Site 5
Drainage Channel	NE of N Module	Sedimentation Pond E Module	Sedimentation Pond W Module

Parameter Units LOR

OC Pesticides in Water Method: AN400/AN420 (continued)

Surrogates

d14-p-terphenyl (Surrogate)	%	-	56	50	40
2-fluorobiphenyl (Surrogate)	%	-	54	48	38
d5-nitrobenzene (Surrogate)	%	-	60	60	40

OP Pesticides in Water Method: AN400/AN420

Dichlorvos	µg/L	1	<1	<1	<1
Dimethoate	µg/L	1	<1	<1	<1
Diazinon (Dimpylate)	µg/L	0.5	<0.5	<0.5	<0.5
Fenitrothion	µg/L	0.2	<0.2	<0.2	<0.2
Malathion	µg/L	0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	µg/L	0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	µg/L	0.2	<0.2	<0.2	<0.2
Methidathion	µg/L	0.5	<0.5	<0.5	<0.5
Ethion	µg/L	0.2	<0.2	<0.2	<0.2
Azinphos-methyl	µg/L	0.2	<0.2	<0.2	<0.2

Surrogates

d14-p-terphenyl (Surrogate)	%	-	56	50	40
d5-nitrobenzene (Surrogate)	%	-	54	48	38
2-fluorobiphenyl (Surrogate)	%	-	60	60	40

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared to the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA', the results are less than the LOR and thus the RPD is not applicable.

Conductivity and TDS by Calculation - Water Method: ME-(AU)-[ENV]AN106

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Conductivity @ 25 C	LB016951	µS/cm	5	<5	0%	99%

OC Pesticides in Water Method: ME-(AU)-[ENV]AN400/AN420

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Alpha BHC	LB016949	µg/L	0.1	<0.1	
Hexachlorobenzene (HCB)	LB016949	µg/L	0.1	<0.1	
Beta BHC	LB016949	µg/L	0.1	<0.1	
Lindane (gamma BHC)	LB016949	µg/L	0.1	<0.1	62%
Delta BHC	LB016949	µg/L	0.1	<0.1	
Heptachlor	LB016949	µg/L	0.1	<0.1	61%
Aldrin	LB016949	µg/L	0.1	<0.1	70%
Heptachlor epoxide	LB016949	µg/L	0.1	<0.1	
Isodrin	LB016949	µg/L	0.1	<0.1	60%
Gamma Chlordane	LB016949	µg/L	0.1	<0.1	63%
Alpha Chlordane	LB016949	µg/L	0.1	<0.1	
Alpha Endosulfan	LB016949	µg/L	0.1	<0.1	
p,p'-DDE	LB016949	µg/L	0.1	<0.1	66%
Dieldrin	LB016949	µg/L	0.1	<0.1	70%
Endrin	LB016949	µg/L	0.1	<0.1	82%
Beta Endosulfan	LB016949	µg/L	0.1	<0.1	
p,p'-DDD	LB016949	µg/L	0.1	<0.1	
Endosulfan sulphate	LB016949	µg/L	0.1	<0.1	
p,p'-DDT	LB016949	µg/L	0.1	<0.1	
Endrin ketone	LB016949	µg/L	0.1	<0.1	
Methoxychlor	LB016949	µg/L	0.1	<0.1	
Mirex	LB016949	µg/L	0.1	<0.1	62%

Surrogates

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
d14-p-terphenyl (Surrogate)	LB016949	%	-	84%	80%
2-fluorobiphenyl (Surrogate)	LB016949	%	-	74%	70%
d5-nitrobenzene (Surrogate)	LB016949	%	-	78%	78%

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

OP Pesticides in Water Method: ME-(AU)-(ENV)AN400/AN420

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Dichlorvos	LB016949	µg/L	1	<1	
Dimethoate	LB016949	µg/L	1	<1	
Diazinon (Dimpylate)	LB016949	µg/L	0.5	<0.5	70%
Fenitrothion	LB016949	µg/L	0.2	<0.2	
Malathion	LB016949	µg/L	0.2	<0.2	
Chlorpyrifos (Chlorpyrifos Ethyl)	LB016949	µg/L	0.2	<0.2	82%
Parathion-ethyl (Parathion)	LB016949	µg/L	0.2	<0.2	62%
Bromophos Ethyl	LB016949	µg/L	0.2	<0.2	
Methidathion	LB016949	µg/L	0.5	<0.5	74%
Ethion	LB016949	µg/L	0.2	<0.2	
Azinphos-methyl	LB016949	µg/L	0.2	<0.2	

Surrogates

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
d14-p-terphenyl (Surrogate)	LB016949	%	-	84%	80%
d5-nitrobenzene (Surrogate)	LB016949	%	-	74%	70%
2-fluorobiphenyl (Surrogate)	LB016949	%	-	78%	78%

pH in water Method: ME-(AU)-(ENV)AN101

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
pH**	LB016951	pH Units	0.1	5.8	0 - 1%	100%

Total and Volatile Suspended Solids (TSS / VSS) Method: ME-(AU)-(ENV)AN114

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Total Suspended Solids Dried at 103-105°C	LB016941	mg/L	1	<1	2 - 4%	112%

METHOD

METHODOLOGY SUMMARY

- AN083 Separatory funnels are used for aqueous samples and extracted by transferring an appropriate volume (mass) of liquid into a separatory funnel and adding 3 serial aliquots of dichloromethane. Samples receive a single extraction at pH 7 to recover base / neutral analytes and two extractions at pH < 2 to recover acidic analytes. QC samples are prepared by spiking organic free water with target analytes and extracting as per samples.
- AN101 pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode (glass plus reference electrode) and is calibrated against 3 buffers purchased commercially. For soils, an extract with water is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.
- AN106 Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as $\mu\text{mhos/cm}$ or $\mu\text{S/cm}$ @ 25°C. For soils, an extract with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Total Dissolved Salts can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. SGS use 0.6. Reference APHA 2520 B.
- AN114 Total Suspended and Volatile Suspended Solids: The sample is homogenised by shaking and a known volume is filtered through a pre-weighed GF/C filter paper and washed well with deionised water. The filter paper is dried and reweighed. The TSS is the residue retained by the filter per unit volume of sample. Reference APHA 2540 D. Internal Reference AN114
- AN245 Anions by Ion Chromatography: A water sample is injected into an eluent stream that passes through the ion chromatographic system where the anions of interest ie Br, Cl, NO₂, NO₃ and SO₄ are separated on their relative affinities for the active sites on the column packing material. Changes to the conductivity and the UV-visible absorbance of the eluent enable identification and quantitation of the anions based on their retention time and peak height or area. APHA 4110 B
- AN277/WC250.312 Nitrite ions, when reacted with a reagent containing sulphanilamide and N-(1-naphthyl)-ethylenediamine dihydrochloride produce a highly coloured azo dye that is measured photometrically at 540nm.
- AN279/AN293 The sample is digested with Sulphuric acid, K₂SO₄ and CuSO₄. All forms of phosphorus are converted into orthophosphate. The digest is cooled and placed on the discrete analyser for colorimetric analysis.
- AN281 An unfiltered water or soil sample is first digested in a block digester with sulphuric acid, K₂SO₄ and CuSO₄. The ammonia produced following digestion is then measured colourimetrically using the Aquakem 250 Discrete Analyser. A portion of the digested sample is buffered to an alkaline pH, and interfering cations are complexed. The ammonia then reacts with salicylate and hypochlorite to give a blue colour whose absorbance is measured at 660nm and compared with calibration standards. This is proportional to the concentration of Total Kjeldahl Nitrogen in the original sample.
- AN400 OC and OP Pesticides by GC-ECD: The determination of organochlorine (OC) and organophosphorus (OP) pesticides and polychlorinated biphenyls (PCBs) in soils, sludges and groundwater. (Based on USEPA methods 3510, 3550, 8140 and 8080.)
- AN420 SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	This analysis is not covered by the scope of accreditation.	QFH	QC result is above the upper tolerance
**	Indicative data, theoretical holding time exceeded.	QFL	QC result is below the lower tolerance
^	Performed by outside laboratory.	-	The sample was not analysed for this analyte
		NVL	Not Validated

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here:
<http://www.sgs.com.au/~media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf>

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Order
Project Mungindi Discharge Event Monitoring

Sample Name BE011177.001 BE011177.002 BE011177.003
Description MG Site 3 Drainage MG Site 4 Sediment MG Site 5 Sedimentation Pond W Module Yard
Sample Date 8/12/2014 8/12/2014 8/12/2014

Job Number	Method Name	Analyte Name	Units	Reporting Limit			Result		
				Matrix	Water	Water	Water	Water	Water
BE011177	pH in water	pH**	pH Units	0.1	6.5	6.6	6.8		
BE011177	Conductivity and TDS by Calcul	Conductivity @ 25 C	µS/cm	5	130	58	210		
BE011177	Total and Volatile Suspended St	Total Suspended Sol	mg/L	1	250	1800	160		
BE011177	TKN Kjeldahl Digestion by Discr	Total Nitrogen (calc)	mg/L	0.05	2.3	2.0	4.4		
BE011177	Total Phosphorus by Kjeldahl Di	Total Phosphorus (K	mg/L	0.01	0.86	1.0	1.0		
BE011177	OC Pesticides in Water	Alpha BHC	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	Hexachlorobenzene	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	Beta BHC	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	Lindane (gamma BH	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	Delta BHC	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	Heptachlor	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	Aldrin	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	Heptachlor epoxide	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	Isodrin	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	Gamma Chlordane	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	Alpha Chlordane	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	Alpha Endosulfan	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	p,p'-DDE	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	Dieldrin	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	Endrin	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	Beta Endosulfan	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	p,p'-DDD	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	Endosulfan sulphate	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	p,p'-DDT	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	Endrin ketone	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	Methoxychlor	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	Mirex	µg/L	0.1 <0.1	<0.1	<0.1	<0.1		
BE011177	OC Pesticides in Water	d14-p-terphenyl (Sur %		0	56	50	40		
BE011177	OC Pesticides in Water	2-fluorobiphenyl (Sur %		0	54	48	38		
BE011177	OC Pesticides in Water	d5-nitrobenzene (Sur %		0	60	60	40		
BE011177	OP Pesticides in Water	Dichlorvos	µg/L	1 <1	<1	<1	<1		
BE011177	OP Pesticides in Water	Dimethoate	µg/L	1 <1	<1	<1	<1		
BE011177	OP Pesticides in Water	Diazinon (Dimpylate)	µg/L	0.5 <0.5	<0.5	<0.5	<0.5		
BE011177	OP Pesticides in Water	Fenitrothion	µg/L	0.2 <0.2	<0.2	<0.2	<0.2		
BE011177	OP Pesticides in Water	Malathion	µg/L	0.2 <0.2	<0.2	<0.2	<0.2		
BE011177	OP Pesticides in Water	Chlorpyrifos (Chlorp)	µg/L	0.2 <0.2	<0.2	<0.2	<0.2		
BE011177	OP Pesticides in Water	Parathion-ethyl (Para	µg/L	0.2 <0.2	<0.2	<0.2	<0.2		
BE011177	OP Pesticides in Water	Bromophos Ethyl	µg/L	0.2 <0.2	<0.2	<0.2	<0.2		
BE011177	OP Pesticides in Water	Methidathion	µg/L	0.5 <0.5	<0.5	<0.5	<0.5		
BE011177	OP Pesticides in Water	Ethion	µg/L	0.2 <0.2	<0.2	<0.2	<0.2		
BE011177	OP Pesticides in Water	Azinphos-methyl	µg/L	0.2 <0.2	<0.2	<0.2	<0.2		
BE011177	OP Pesticides in Water	d14-p-terphenyl (Sur %		0	56	50	40		
BE011177	OP Pesticides in Water	d5-nitrobenzene (Sur %		0	54	48	38		
BE011177	OP Pesticides in Water	2-fluorobiphenyl (Sur %		0	60	60	40		