

CLIENT DETAILS

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Project **Mungindi Discharge Event Monitoring**
 Order Number **(Not specified)**
 Samples **3**
 Date Started **24 Jun 2015**

LABORATORY DETAILS

Manager **Andrew Tomlins**
 Laboratory **SGS Brisbane Environmental**
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SGS Reference **BE013439 R0**
 Report Number **0000041018**
 Date Reported **30 Jun 2015**
 Date Received **23 Jun 2015**

COMMENTS

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

Additional OC subcontracted to SGS Leeder Consulting, 4-5/18 Redland Drive, Mitcham VIC, NATA Accreditation Number 2562, Site number 14420, M151427.

OCOP: The Limit of Reporting (LOR) has been raised due to interferences from the sample matrix (emulsion layer present)

SIGNATORIES



Caroline McDermid
Inorganics Supervisor



Michael Morrison
Organics Supervisor

Parameter	Units	LOR	BE013439.001 Sample Number Sample Matrix Sample Name Drainage Channel NE of N Module Yard	BE013439.002 Sample Number Sample Matrix Sample Name Sedimentation Pond E Module Yard	BE013439.003 Sample Number Sample Matrix Sample Name Sedimentation Pond W Module Yard
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pH in water Method: AN101 Tested: 23/6/2015

pH**	pH Units	0.1	6.7	6.7	6.7
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Conductivity and TDS by Calculation - Water Method: AN106 Tested: 23/6/2015

Conductivity @ 25 C	µS/cm	5	150	150	150
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Total and Volatile Suspended Solids (TSS / VSS) Method: AN114 Tested: 24/6/2015

Total Suspended Solids Dried at 103-105°C	mg/L	1	270	320	410
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Total Phosphorus by Kjeldahl Digestion DA in Water Method: AN279/AN293 Tested: 25/6/2015

Total Phosphorus (Kjeldahl Digestion)	mg/L	0.01	0.41	0.48	0.49
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Calculated Nitrogen Forms - TN, organic N, inorganic N Method: AN281/292 Tested: -

Total Nitrogen (calc)	mg/L	0.05	1.6	1.7	1.7
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OC Pesticides in Water Method: AN400/AN420 Tested: 23/6/2015

OC Pesticides	µg/L	0.1	<0.4†	<0.4†	<0.4†
Alpha BHC	µg/L	0.1	<0.4†	<0.4†	<0.4†
Hexachlorobenzene (HCB)	µg/L	0.1	<0.4†	<0.4†	<0.4†
Beta BHC	µg/L	0.1	<0.4†	<0.4†	<0.4†
Lindane (gamma BHC)	µg/L	0.1	<0.4†	<0.4†	<0.4†
Delta BHC	µg/L	0.1	<0.4†	<0.4†	<0.4†
Heptachlor	µg/L	0.1	<0.4†	<0.4†	<0.4†
Aldrin	µg/L	0.1	<0.4†	<0.4†	<0.4†
Heptachlor epoxide	µg/L	0.1	<0.4†	<0.4†	<0.4†
Isodrin	µg/L	0.1	<0.4†	<0.4†	<0.4†
Gamma Chlordane	µg/L	0.1	<0.4†	<0.4†	<0.4†
Alpha Chlordane	µg/L	0.1	<0.4†	<0.4†	<0.4†
Alpha Endosulfan	µg/L	0.1	<0.4†	<0.4†	<0.4†
p,p'-DDE	µg/L	0.1	<0.4†	<0.4†	<0.4†
Dieldrin	µg/L	0.1	<0.4†	<0.4†	<0.4†
Endrin	µg/L	0.1	<0.4†	<0.4†	<0.4†
Beta Endosulfan	µg/L	0.1	<0.4†	<0.4†	<0.4†
p,p'-DDD	µg/L	0.1	<0.4†	<0.4†	<0.4†
Endosulfan sulphate	µg/L	0.1	<0.4†	<0.4†	<0.4†
p,p'-DDT	µg/L	0.1	<0.4†	<0.4†	<0.4†
Endrin ketone	µg/L	0.1	<0.4†	<0.4†	<0.4†
Methoxychlor	µg/L	0.1	<0.4†	<0.4†	<4.0†
Mirex	µg/L	0.1	<0.4†	<0.4†	<0.4†

	Sample Number	BE013439.001	BE013439.002	BE013439.003
	Sample Matrix	Water	Water	Water
	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
Parameter	Units	LOR	Yard	Yard

OC Pesticides in Water Method: AN400/AN420 Tested: 23/6/2015 (continued)

Surrogates

d14-p-terphenyl (Surrogate)	%	-	42	76	58
2-fluorobiphenyl (Surrogate)	%	-	48	84	66
d5-nitrobenzene (Surrogate)	%	-	58	68	72

OP Pesticides in Water Method: AN400/AN420 Tested: 23/6/2015

Dichlorvos	µg/L	1	<2†	<2†	<2†
Dimelhoate	µg/L	1	<2†	<2†	<2†
Diazinon (Dimpylate)	µg/L	0.5	<2.0†	<2.0†	<2.0†
Fenitrothion	µg/L	0.2	<0.8†	<0.8†	<0.8†
Malathion	µg/L	0.2	<0.8†	<0.8†	<0.8†
Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.8†	<0.8†	<0.8†
Parathion-ethyl (Parathion)	µg/L	0.2	<0.8†	<0.8†	<0.8†
Bromophos Ethyl	µg/L	0.2	<0.8†	<0.8†	<0.8†
Methidathion	µg/L	0.5	<2.0†	<2.0†	<2.0†
Elhion	µg/L	0.2	<0.8†	<0.8†	<0.8†
Azinphos-methyl	µg/L	0.2	<0.8†	<0.8†	<0.8†

Surrogates

d14-p-terphenyl (Surrogate)	%	-	42	76	58
d5-nitrobenzene (Surrogate)	%	-	48	84	66
2-fluorobiphenyl (Surrogate)	%	-	58	68	72

Sample Subcontracted Method: Tested: -

Sample Subcontracted*	No unit	-	Report Attached	Report Attached	Report Attached
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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.

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

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Conductivity @ 25 C	LB020132	µS/cm	5	<5	1%	99 - 100%

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

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Alpha BHC	LB020131	µg/L	0.1	<0.1	0%	
Hexachlorobenzene (HCB)	LB020131	µg/L	0.1	<0.1	0%	
Beta BHC	LB020131	µg/L	0.1	<0.1	0%	
Lindane (gamma BHC)	LB020131	µg/L	0.1	<0.1	0%	63%
Delta BHC	LB020131	µg/L	0.1	<0.1	0%	
Heptachlor	LB020131	µg/L	0.1	<0.1	0%	67%
Aldrin	LB020131	µg/L	0.1	<0.1	0%	60%
Heptachlor epoxide	LB020131	µg/L	0.1	<0.1	0%	
Isodrin	LB020131	µg/L	0.1	<0.1	0%	61%
Gamma Chlordane	LB020131	µg/L	0.1	<0.1	0%	63%
Alpha Chlordane	LB020131	µg/L	0.1	<0.1	0%	
Alpha Endosulfan	LB020131	µg/L	0.1	<0.1	0%	
p,p'-DDE	LB020131	µg/L	0.1	<0.1	0%	62%
Dieldrin	LB020131	µg/L	0.1	<0.1	0%	62%
Endrin	LB020131	µg/L	0.1	<0.1	0%	70%
Beta Endosulfan	LB020131	µg/L	0.1	<0.1	0%	
p,p'-DDD	LB020131	µg/L	0.1	<0.1	0%	
Endosulfan sulphate	LB020131	µg/L	0.1	<0.1	0%	
p,p'-DDT	LB020131	µg/L	0.1	<0.1	0%	
Endrin ketone	LB020131	µg/L	0.1	<0.1	0%	
Methoxychlor	LB020131	µg/L	0.1	<0.1	0%	
Mirex	LB020131	µg/L	0.1	<0.1	0%	60%

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
d14-p-terphenyl (Surrogate)	LB020131	%	-	76%	7%	42%
2-fluorobiphenyl (Surrogate)	LB020131	%	-	84%	11%	46%
d5-nitrobenzene (Surrogate)	LB020131	%	-	68%	11%	50%

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.

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

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Dichlorvos	LB020131	µg/L	1	<1	0%	
Dimethoate	LB020131	µg/L	1	<1	0%	
Diazinon (Dimpylate)	LB020131	µg/L	0.5	<0.5	0%	77%
Fenitrothion	LB020131	µg/L	0.2	<0.2	0%	
Malathion	LB020131	µg/L	0.2	<0.2	0%	
Chlorpyrifos (Chlorpyrifos Ethyl)	LB020131	µg/L	0.2	<0.2	0%	62%
Parathion-ethyl (Parathion)	LB020131	µg/L	0.2	<0.2	0%	55%
Bromophos Ethyl	LB020131	µg/L	0.2	<0.2	0%	
Methidathion	LB020131	µg/L	0.5	<0.5	0%	62%
Elthion	LB020131	µg/L	0.2	<0.2	0%	
Azinphos-methyl	LB020131	µg/L	0.2	<0.2	0%	

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
d14-p-terphenyl (Surrogate)	LB020131	%	-	76%	7%	42%
d5-nitrobenzene (Surrogate)	LB020131	%	-	84%	11%	46%
2-fluorobiphenyl (Surrogate)	LB020131	%	-	68%	11%	50%

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

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
pH**	LB020132	pH Units	0.1	5.9 - 6.0	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	LB020142	mg/L	1	<1	0%	104%

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.

Total Phosphorus by Kjeldahl Digestion DA in Water Method: ME-(AU)-[ENV]AN279/AN293

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Total Phosphorus (Kjeldahl Digestion)	LB020161	mg/L	0.01	<0.01	1-3%	99%	105%

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
- AN258** Nitrate and Nitrite by FIA: In an acidic medium, nitrate is reduced quantitatively to nitrite by cadmium metal. This nitrite plus any original nitrite is determined as an intense red-pink azo dye at 540 nm following diazotisation with sulphanilamide and subsequent coupling with N-(1-naphthyl) ethylenediamine dihydrochloride. Without the cadmium reduction only the original nitrite is determined. Reference APHA 4500-NO3- F.
- 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 sulfuric 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.
- AN281/292** Calculation of total nitrogen and organic nitrogen.
- 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.)
- 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 BE013439.001 BE013439.002 BE013439.003
Description MG Site 3 Drainage MG Site 4 Sedime MG Site 5 Sedimentation Pond W Module Yard
Sample Date

Job Number	Method Name	Analyte Name	Units	Matrix		Water		Water	
				Reporting Limit	Result	Result	Result		
BE013439	pH in water	pH**	pH Unit	0.1	6.7	6.7	6.7	6.7	
BE013439	Conductivity and TDS by Calcul	Conductivity @ 25 C	µS/cm	5	150	150	150	150	
BE013439	Total and Volatile Suspended Sol	Total Suspended Sol	mg/L	1	270	320	410		
BE013439	Total Phosphorus by Kjeldahl Di	Total Phosphorus (K)	mg/L	0.01	0.41	0.48	0.49		
BE013439	Calculated Nitrogen Forms - TN,	Total Nitrogen (calc)	mg/L	0.05	1.6	1.7	1.7		
BE013439	OC Pesticides in Water	Alpha BHC	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	Hexachlorobenzene	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	Beta BHC	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	Lindane (gamma BH	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	Delta BHC	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	Heptachlor	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	Aldrin	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	Heptachlor epoxide	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	Isodrin	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	Gamma Chlordane	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	Alpha Chlordane	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	Alpha Endosulfan	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	p,p'-DDE	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	Dieldrin	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	Endrin	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	Beta Endosulfan	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	p,p'-DDD	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	Endosulfan sulphate	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	p,p'-DDT	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	Endrin ketone	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	Methoxychlor	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	Mirex	µg/L	0.1	<0.4	<0.4	<0.4		
BE013439	OC Pesticides in Water	d14-p-terphenyl (Sur %		0	42	76	58		
BE013439	OC Pesticides in Water	2-fluorobiphenyl (Su		0	48	84	66		
BE013439	OC Pesticides in Water	d5-nitrobenzene (Su		0	58	68	72		
BE013439	OP Pesticides in Water	Dichlorvos	µg/L	1	<2	<2	<2		
BE013439	OP Pesticides in Water	Dimethoate	µg/L	1	<2	<2	<2		
BE013439	OP Pesticides in Water	Diazinon (Dimpylate)	µg/L	0.5	<2	<2	<2		
BE013439	OP Pesticides in Water	Fenitrothion	µg/L	0.2	<0.8	<0.8	<0.8		
BE013439	OP Pesticides in Water	Malathion	µg/L	0.2	<0.8	<0.8	<0.8		
BE013439	OP Pesticides in Water	Chlorpyrifos (Chlorp)	µg/L	0.2	<0.8	<0.8	<0.8		
BE013439	OP Pesticides in Water	Parathion-ethyl (Par	µg/L	0.2	<0.8	<0.8	<0.8		
BE013439	OP Pesticides in Water	Bromophos-ethyl	µg/L	0.2	<0.8	<0.8	<0.8		
BE013439	OP Pesticides in Water	Methidathion	µg/L	0.5	<2	<2	<2		
BE013439	OP Pesticides in Water	Ethion	µg/L	0.2	<0.8	<0.8	<0.8		
BE013439	OP Pesticides in Water	Azinphos-methyl	µg/L	0.2	<0.8	<0.8	<0.8		
BE013439	OP Pesticides in Water	d14-p-terphenyl (Sur %		0	42	76	58		
BE013439	OP Pesticides in Water	d5-nitrobenzene (Su		0	48	84	66		
BE013439	OP Pesticides in Water	2-fluorobiphenyl (Su		0	58	68	72		
BE013439	Sample Subcontracted	Sample Subcontract	No unit	0	Report Attached	Report Attached	Report Attached		