

CLIENT DETAILS

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Project **Mungindi Discharge Event Monitoring**  
 Order Number **(Not specified)**  
 Samples **3**  
 Date Started **07 Jul 2015**

LABORATORY DETAILS

Manager **Andrew Tomlins**  
 Laboratory **SGS Brisbane Environmental**  
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SGS Reference **BE013583 R0**  
 Report Number **0000041521**  
 Date Reported **16 Jul 2015**  
 Date Received **06 Jul 2015**

COMMENTS

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

OC/OP subcontracted to SGS Sydney, Unit 16 33 Maddox St Alexandria NSW 2015, NATA Accreditation Number: 2562, Site Number: 4354, SE141129 R0.

TP: The Limit of Reporting (LOR) has been raised for samples 2 and 3 due to matrix interference.

SIGNATORIES



**Caroline McDermid**  
 Inorganics Supervisor

	Sample Number	BE013583.001	BE013583.002	BE013583.003
	Sample Matrix	Water	Water	Water
	Sample Date	01 Jul 2015	01 Jul 2015	01 Jul 2015
	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		

pH in water Method: AN101 Tested: 6/7/2015

pH**	pH Units	0.1	7.0	6.9	7.0
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Conductivity and TDS by Calculation - Water Method: AN106 Tested: 6/7/2015

Conductivity @ 25 C	µS/cm	5	180	180	180
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Total and Volatile Suspended Solids (TSS / VSS) Method: AN114 Tested: 7/7/2015

Total Suspended Solids Dried at 103-105°C	mg/L	1	240	260	260
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Total Phosphorus by Kjeldahl Digestion DA in Water Method: AN279/AN293 Tested: 10/7/2015

Total Phosphorus (Kjeldahl Digestion)	mg/L	0.01	0.27	0.20	0.23
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Calculated Nitrogen Forms - TN, organic N, inorganic N Method: AN281/292 Tested: -

Total Nitrogen (calc)	mg/L	0.05	2.1	2.7	2.2
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OC Pesticides in Water Method: AN400/AN420 Tested: -

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	BE013583.001	BE013583.002	BE013583.003
Sample Matrix	Water	Water	Water
Sample Date	01 Jul 2015	01 Jul 2015	01 Jul 2015
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 Tested: - (continued)

Surrogates

Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	20000	24667	20667
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OP Pesticides in Water Method: AN400/AN420 Tested: -

Dichlorvos	µg/L	1	<1	<1	<1
Dimelhoate	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)	%	-	42	42	40
d5-nitrobenzene (Surrogate)	%	-	42	40	50
2-fluorobiphenyl (Surrogate)	%	-	40	40	46

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	LCS %Recovery
Conductivity @ 25 C	LB020303	µS/cm	5	<5	98%

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

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
pH**	LB020303	pH Units	0.1	5.8	101%

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	LB020306	mg/L	1	<1	0 - 3%	100 - 106%

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)	LB020359	mg/L	0.01	0.01 - 0.02	0 - 24%	93 - 94%	96%

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, K <sub>2</sub> SO <sub>4</sub> and CuSO <sub>4</sub> . 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, K <sub>2</sub> SO <sub>4</sub> and CuSO <sub>4</sub> . 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
*	NATA accreditation does not cover the performance of this service.	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 BE013583.001 BE013583.002 BE013583.003  
 Description MG Site 3 Drainage MG Site 4 Sediment MG Site 5 Sedimentation Pond W Module Yard  
 Sample Date 1/7/2015 1/7/2015 1/7/2015  
 Matrix Water Water Water

Job Number	Method Name	Analyte Name	Units	Reporting Limit	Result	Result	Result
BE013583	pH in water	pH**	pH Unit	0,1	7,0	6,9	7,0
BE013583	Conductivity and TDS by Calcul	Conductivity @ 25 C	µS/cm	5	180	180	180
BE013583	Total and Volatile Suspended Sol	Total Suspended Sol	mg/L	1	240	260	260
BE013583	Total Phosphorus by Kjeldahl Di	Total Phosphorus (K)	mg/L	0,01	0,27	0,20	0,23
BE013583	Calculated Nitrogen Forms - TN,	Total Nitrogen (calc)	mg/L	0,05	2,1	2,7	2,2
BE013583	OC Pesticides in Water	Alpha BHC	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	Hexachlorobenzene	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	Beta BHC	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	Lindane (gamma BH	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	Delta BHC	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	Heptachlor	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	Aldrin	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	Heptachlor epoxide	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	Isodrin	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	Gamma Chlordane	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	Alpha Chlordane	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	Alpha Endosulfan	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	p,p'-DDE	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	Dieldrin	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	Endrin	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	Beta Endosulfan	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	p,p'-DDD	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	Endosulfan sulphate	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	p,p'-DDT	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	Endrin ketone	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	Methoxychlor	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	Mirex	µg/L	0,1 <0,1	<0,1	<0,1	<0,1
BE013583	OC Pesticides in Water	Tetrachloro-m-xylene %	%	0	20000	24667	20667
BE013583	OP Pesticides in Water	Dichlorvos	µg/L	1 <1	<1	<1	<1
BE013583	OP Pesticides in Water	Dimethoate	µg/L	1 <1	<1	<1	<1
BE013583	OP Pesticides in Water	Diazinon (Dimpylate)	µg/L	0,5 <0,5	<0,5	<0,5	<0,5
BE013583	OP Pesticides in Water	Fenitrothion	µg/L	0,2 <0,2	<0,2	<0,2	<0,2
BE013583	OP Pesticides in Water	Malathion	µg/L	0,2 <0,2	<0,2	<0,2	<0,2
BE013583	OP Pesticides in Water	Chlorpyrifos (Chlorp)	µg/L	0,2 <0,2	<0,2	<0,2	<0,2
BE013583	OP Pesticides in Water	Parathion-ethyl (Para	µg/L	0,2 <0,2	<0,2	<0,2	<0,2
BE013583	OP Pesticides in Water	Bromophos Ethyl	µg/L	0,2 <0,2	<0,2	<0,2	<0,2
BE013583	OP Pesticides in Water	Methidathion	µg/L	0,5 <0,5	<0,5	<0,5	<0,5
BE013583	OP Pesticides in Water	Ethion	µg/L	0,2 <0,2	<0,2	<0,2	<0,2
BE013583	OP Pesticides in Water	Azinphos-methyl	µg/L	0,2 <0,2	<0,2	<0,2	<0,2
BE013583	OP Pesticides in Water	d14-p-terphenyl (Sur %	%	0	42	42	40
BE013583	OP Pesticides in Water	d5-nitrobenzene (Sur %	%	0	42	40	50
BE013583	OP Pesticides in Water	2-fluorobiphenyl (Sur %	%	0	40	40	46