



ANALYTICAL REPORT



Accreditation No. 2562

CLIENT DETAILS

Contact John Fox  
Client NAMOI COTTON CO-OPERATIVE LTD  
Address PO BOX 1333  
TOOWOOMBA QLD 4350

Telephone 0429 903 079  
Facsimile 61 7 46316184  
Email jfox@namoicotton.com.au

Project ~~Woolbag~~ <sup>Ashley</sup> Discharge Event Monitoring  
Order Number 40102  
Samples 1

LABORATORY DETAILS

Manager Matthew Goodwin  
Laboratory SGS Brisbane Environmental  
Address 59 Bancroft Road  
PINKENBA QLD 4008

Telephone +61 7 3622 4700  
Facsimile +61 7 3622 4799  
Email au.environmental.brisbane@sgs.com

SGS Reference BE018131 R0  
Date Received 16 Sep 2016  
Date Reported 26 Sep 2016

COMMENTS

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

SIGNATURES

Caroline McDermid  
Inorganics Supervisor

Michael Morrison  
Organics Supervisor

Sample Number	BE018131.001
Sample Matrix	Water
Sample Date	14 Sep 2016
Sample Name	A Site 11 Northern Discharge

Parameter: pH in water Method: AN101 Tested: 16/9/2016

Parameter	Units	LOR	Result
pH**	pH Units	0.1	7.1

Conductivity and TDS by Calculation - Water Method: AN106 Tested: 16/9/2016

Conductivity @ 25 C	µS/cm	5	140
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Total and Volatile Suspended Solids (TSS / VSS) Method: AN114 Tested: 23/9/2016

Total Suspended Solids Dried at 103-105°C	mg/L	1	340
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Calculated Nitrogen Forms - TN, organic N, inorganic N Method: AN281/292 Tested: 26/9/2016

Total Nitrogen (calc)	mg/L	0.05	5.0
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Total Phosphorus by Kjeldahl Digestion DA in Water Method: AN279/AN283(Sydney only) Tested: 23/9/2016

Total Phosphorus (Kjeldahl Digestion)	mg/L	0.01	0.85
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OC Pesticides in Water Method: AN400/AN420 Tested: 19/9/2016

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



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Sample Number	BE018131.001
Sample Matrix	Water
Sample Date	14 Sep 2016
Sample Name	A Site 11 Northern Discharge

Parameter	Units	LOR	
OC Pesticides in Water Method: AN400/AN420 Tested: 19/9/2016 (continued)			
Surrogates			
d14-p-terphenyl (Surrogate)	%	-	98
2-fluorobiphenyl (Surrogate)	%	-	90
d5-nitrobenzene (Surrogate)	%	-	62

Parameter	Units	LOR	
OP Pesticides in Water Method: AN400/AN420 Tested: 19/9/2016			
Dichlorvos	µg/L	1	<1
Dimethoate	µg/L	1	<1
Diazinon (Dimpylate)	µg/L	0.5	<0.5
Fenitrothion	µg/L	0.2	<0.2
Malathion	µg/L	0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2
Parathion-ethyl (Parathion)	µg/L	0.2	<0.2
Bromophos Ethyl	µg/L	0.2	<0.2
Methidathion	µg/L	0.5	<0.5
Ethion	µg/L	0.2	<0.2
Azinphos-methyl	µg/L	0.2	<0.2

Parameter	Units	LOR	
Surrogates			
d14-p-terphenyl (Surrogate)	%	-	98
d5-nitrobenzene (Surrogate)	%	-	90
2-fluorobiphenyl (Surrogate)	%	-	62

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) (FNV)AN106

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Conductivity @ 25 C	LB028154	µS/cm	5	<5	NVL	104 - 105%

QC Pesticides in Water Method: ME (AU) (ERV)AN400/AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Alpha BHC	LB028180	µg/L	0.1	<0.1	0%	NA	NA
Hexachlorobenzene (HCB)	LB028180	µg/L	0.1	<0.1	0%	NA	NA
Beta BHC	LB028180	µg/L	0.1	<0.1	0%	NA	NA
Lindane (gamma BHC)	LB028180	µg/L	0.1	<0.1	0%	107%	116%
Delta BHC	LB028180	µg/L	0.1	<0.1	0%	NA	NA
Heptachlor	LB028180	µg/L	0.1	<0.1	0%	90%	102%
Aldrin	LB028180	µg/L	0.1	<0.1	0%	85%	86%
Heptachlor epoxide	LB028180	µg/L	0.1	<0.1	0%	NA	NA
Isodrin	LB028180	µg/L	0.1	<0.1	0%	96%	NA
Gamma Chlordane	LB028180	µg/L	0.1	<0.1	0%	90%	91%
Alpha Chlordane	LB028180	µg/L	0.1	<0.1	0%	NA	NA
Alpha Endosulfan	LB028180	µg/L	0.1	<0.1	0%	NA	NA
p,p'-DDE	LB028180	µg/L	0.1	<0.1	0%	79%	79%
Dieldrin	LB028180	µg/L	0.1	<0.1	0%	78%	78%
Endrin	LB028180	µg/L	0.1	<0.1	0%	82%	97%
Beta Endosulfan	LB028180	µg/L	0.1	<0.1	0%	NA	NA
p,p'-DDD	LB028180	µg/L	0.1	<0.1	0%	NA	NA
Endosulfan sulphate	LB028180	µg/L	0.1	<0.1	0%	NA	NA
p,p'-DDT	LB028180	µg/L	0.1	<0.1	0%	NA	NA
Endrin ketone	LB028180	µg/L	0.1	<0.1	0%	NA	NA
Methoxychlor	LB028180	µg/L	0.1	<0.1	0%	NA	NA
Mirex	LB028180	µg/L	0.1	<0.1	0%	93%	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
d14-p-terphenyl (Surrogate)	LB028180	%	-	108%	2%	106%	100%
2-fluorobiphenyl (Surrogate)	LB028180	%	-	116%	2%	118%	118%
d5-nitrobenzene (Surrogate)	LB028180	%	-	102%	4%	112%	52%

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  $\frac{\text{the absolute difference of the two results divided by the average of the two results as a percentage}}$  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	MS %Recovery
Dichlorvos	LB028180	µg/L	1	<1	0%	NA	NA
Dimethoate	LB028180	µg/L	1	<1	0%	NA	NA
Diazinon (Dimpylate)	LB028180	µg/L	0.5	<0.5	0%	85%	86%
Fenitrothion	LB028180	µg/L	0.2	<0.2	0%	NA	NA
Melathion	LB028180	µg/L	0.2	<0.2	0%	NA	NA
Chlorpyrifos (Chlorpyrifos Ethyl)	LB028180	µg/L	0.2	<0.2	0%	85%	86%
Parathion-ethyl (Parathion)	LB028180	µg/L	0.2	<0.2	0%	78%	86%
Bromophos Ethyl	LB028180	µg/L	0.2	<0.2	0%	NA	NA
Methidathion	LB028180	µg/L	0.5	<0.5	0%	82%	85%
Ethion	LB028180	µg/L	0.2	<0.2	0%	NA	NA
Azinphos-methyl	LB028180	µg/L	0.2	<0.2	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
d14-p-terphenyl (Surrogate)	LB028180	%	-	108%	2%	106%	100%
d5-nitrobenzene (Surrogate)	LB028180	%	-	116%	2%	118%	118%
2-fluorobiphenyl (Surrogate)	LB028180	%	-	102%	4%	112%	52%

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

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
pH**	LB028154	pH Units	0.1	6.1 - 6.4	NVL	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	LB028291	mg/L	1	<1	0 - 8%	95%



QC SUMMARY

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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 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  $\frac{\text{the absolute difference of the two results}}{\text{the average of the two results}}$  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)AN2P9AN29 (Sydney only)

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Total Phosphorus (Kjeldahl Digestion)	LB028221	mg/L	0.01	<0.01	0 - 12%	111 - 112%	109 - 111%

METHOD

METHODOLOGY SUMMARY

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 2510 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(Sydney)	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.)
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
*	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
		-	The sample was not analysed for this analyte
		NVL	Not Validated

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

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the "Total" LOR will be the sum of those two LORs.

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

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.

Note that in terms of units of radioactivity:

- a. 1 Bq is equivalent to 27 pCi
- b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

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/2010/Documents/41F-AU-ENV-QU-012\\_0203A-QAQC-COPLAN.pdf](http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical/2010/Documents/41F-AU-ENV-QU-012_0203A-QAQC-COPLAN.pdf)

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