

CLIENT DETAILS

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Project **Ashley Discharge Event Monitoring**
 Order Number **41933**
 Samples **1**

LABORATORY DETAILS

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SGS Reference **SE171455 R0**
 Date Received **17 Oct 2017**
 Date Reported **23 Oct 2017**

COMMENTS

Accredited for compliance with ISO/IEC 17025- Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES



Dong Liang
 Metals/Inorganics Team Leader



Ly Kim Ha
 Organic Section Head

Sample Number	SE171455.001
Sample Matrix	Water
Sample Date	12 Oct 2017
Sample Name	A Site 11 Northern Discharge

Parameter	Units	LOR	
OC Pesticides in Water Method: AN420 Tested: 18/10/2017			
Hexachlorobenzene (HCB)	µg/L	0.1	<0.1
Alpha BHC	µg/L	0.1	<0.1
Lindane (gamma BHC)	µg/L	0.1	<0.1
Heptachlor	µg/L	0.1	<0.1
Aldrin	µg/L	0.1	<0.1
Beta BHC	µg/L	0.1	<0.1
Delta BHC	µg/L	0.1	<0.1
Heptachlor epoxide	µg/L	0.1	<0.1
o,p'-DDE	µg/L	0.1	<0.1
Alpha Endosulfan	µg/L	0.1	<0.1
Gamma Chlordane	µg/L	0.1	<0.1
Alpha Chlordane	µg/L	0.1	<0.1
trans-Nonachlor	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
o,p'-DDD	µg/L	0.1	<0.1
o,p'-DDT	µg/L	0.1	<0.1
Beta Endosulfan	µg/L	0.1	<0.1
p,p'-DDD	µg/L	0.1	<0.1
p,p'-DDT	µg/L	0.1	<0.1
Endosulfan sulphate	µg/L	0.1	<0.1
Endrin aldehyde	µg/L	0.1	<0.1
Methoxychlor	µg/L	0.1	<0.1
Endrin ketone	µg/L	0.1	<0.1
Isodrin	µg/L	0.1	<0.1
Mirex	µg/L	0.1	<0.1

Surrogates

Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	43
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OP Pesticides in Water Method: AN420 Tested: 18/10/2017

Dichlorvos	µg/L	0.5	<0.5
Dimethoate	µg/L	0.5	<0.5
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

	Sample Number	SE171455.001
	Sample Matrix	Water
	Sample Date	12 Oct 2017
	Sample Name	A Site 11 Northern Discharge
Parameter	Units	LOR

OP Pesticides in Water Method: AN420 Tested: 18/10/2017 (continued)

Surrogates

2-fluorobiphenyl (Surrogate)	%	-	46
d14-p-terphenyl (Surrogate)	%	-	60

pH in water Method: AN101 Tested: 17/10/2017

pH**	No unit	-	6.8
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Conductivity and TDS by Calculation - Water Method: AN106 Tested: 17/10/2017

Conductivity @ 25 C	µS/cm	2	77
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Anions by Ion Chromatography in Water Method: AN245 Tested: 18/10/2017

Nitrate Nitrogen, NO3-N	mg/L	0.005	1.4
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Nitrite in Water Method: AN277 Tested: 18/10/2017

Nitrite Nitrogen, NO2 as N	mg/L	0.005	0.16
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TKN Kjeldahl Digestion by Discrete Analyser Method: AN281/AN292(Sydney only) Tested: 23/10/2017

Total Kjeldahl Nitrogen	mg/L	0.05	2.3
Total Nitrogen (calc)	mg/L	0.05	3.9



ANALYTICAL REPORT

SE171455 R0

	Sample Number	SE171455.001
	Sample Matrix	Water
	Sample Date	12 Oct 2017
	Sample Name	A Site 11 Northern Discharge
Parameter	Units	LOR

Total Phosphorus by Kjeldahl Digestion DA in Water Method: AN279/AN293(Sydney only) Tested: 23/10/2017

Total Phosphorus (Kjeldahl Digestion)	mg/L	0.02	1.4
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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 : *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.

Anions by Ion Chromatography in Water Method: ME-(AU)-[ENV]AN245

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery	MS %Recovery
Nitrate Nitrogen, NO3-N	LB134619	mg/L	0.005	<0.005	96%	103%

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

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Conductivity @ 25 C	LB134571	µS/cm	2	<2	0%	98%

Nitrite in Water Method: ME-(AU)-[ENV]AN277

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Nitrite Nitrogen, NO2 as N	LB134634	mg/L	0.005	0.005	2%	102%

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

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Hexachlorobenzene (HCB)	LB134686	µg/L	0.1	<0.1	NA
Alpha BHC	LB134686	µg/L	0.1	<0.1	NA
Lindane (gamma BHC)	LB134686	µg/L	0.1	<0.1	NA
Heptachlor	LB134686	µg/L	0.1	<0.1	114%
Aldrin	LB134686	µg/L	0.1	<0.1	107%
Beta BHC	LB134686	µg/L	0.1	<0.1	NA
Delta BHC	LB134686	µg/L	0.1	<0.1	104%
Heptachlor epoxide	LB134686	µg/L	0.1	<0.1	NA
o,p'-DDE	LB134686	µg/L	0.1	<0.1	NA
Alpha Endosulfan	LB134686	µg/L	0.1	<0.1	NA
Gamma Chlordane	LB134686	µg/L	0.1	<0.1	NA
Alpha Chlordane	LB134686	µg/L	0.1	<0.1	NA
trans-Nonachlor	LB134686	µg/L	0.1	<0.1	NA
p,p'-DDE	LB134686	µg/L	0.1	<0.1	NA
Dieldrin	LB134686	µg/L	0.1	<0.1	109%
Endrin	LB134686	µg/L	0.1	<0.1	100%
o,p'-DDD	LB134686	µg/L	0.1	<0.1	NA
o,p'-DDT	LB134686	µg/L	0.1	<0.1	NA
Beta Endosulfan	LB134686	µg/L	0.1	<0.1	NA
p,p'-DDD	LB134686	µg/L	0.1	<0.1	NA
p,p'-DDT	LB134686	µg/L	0.1	<0.1	121%
Endosulfan sulphate	LB134686	µg/L	0.1	<0.1	NA
Endrin aldehyde	LB134686	µg/L	0.1	<0.1	NA
Methoxychlor	LB134686	µg/L	0.1	<0.1	NA
Endrin ketone	LB134686	µg/L	0.1	<0.1	NA
Isodrin	LB134686	µg/L	0.1	<0.1	NA
Mirex	LB134686	µg/L	0.1	<0.1	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB134686	%	-	60%	60%

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]AN420

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Dichlorvos	LB134686	µg/L	0.5	<0.5	115%
Dimethoate	LB134686	µg/L	0.5	<0.5	NA
Diazinon (Dimpylate)	LB134686	µg/L	0.5	<0.5	108%
Fenitrothion	LB134686	µg/L	0.2	<0.2	NA
Malathion	LB134686	µg/L	0.2	<0.2	NA
Chlorpyrifos (Chlorpyrifos Ethyl)	LB134686	µg/L	0.2	<0.2	109%
Parathion-ethyl (Parathion)	LB134686	µg/L	0.2	<0.2	NA
Bromophos Ethyl	LB134686	µg/L	0.2	<0.2	NA
Methidathion	LB134686	µg/L	0.5	<0.5	NA
Ethion	LB134686	µg/L	0.2	<0.2	68%
Azinphos-methyl	LB134686	µg/L	0.2	<0.2	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
2-fluorobiphenyl (Surrogate)	LB134686	%	-	74%	82%
d14-p-terphenyl (Surrogate)	LB134686	%	-	86%	102%

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

Parameter	QC Reference	Units	LOR	DUP %RPD	LCS %Recovery
pH**	LB134571	No unit	-	1%	100%

TKN Kjeldahl Digestion by Discrete Analyser Method: ME-(AU)-[ENV]AN281/AN292(Sydney only)

Parameter	QC Reference	Units	LOR	DUP %RPD
Total Kjeldahl Nitrogen	LB134924	mg/L	0.05	0 - 4%

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(Sydney only)

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Total Phosphorus (Kjeldahl Digestion)	LB134924	mg/L	0.02	<0.02	0%	109 - 110%

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.
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, NO ₂ , NO ₃ and SO ₄ 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(Sydney)	The sample is digested with Sulphuric acid, K ₂ SO ₄ and CuSO ₄ . 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 ₂ SO ₄ and CuSO ₄ . 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.
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%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf>

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Project Ashley Discharge Event Monitoring

Sample Name SE171455.001
 Description A Site 11 Northern Discharge
 Sample Date 12/10/2017
 Matrix Water

Job Number	Method Name	Analyte Name	Units	Reporting Limit	Result
SE171455	OC Pesticides in Water	Hexachlorobenzene (HCB)	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Alpha BHC	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Lindane (gamma BHC)	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Heptachlor	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Aldrin	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Beta BHC	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Delta BHC	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Heptachlor epoxide	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	o,p'-DDE	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Alpha Endosulfan	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Gamma Chlordane	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Alpha Chlordane	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	trans-Nonachlor	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	p,p'-DDE	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Dieldrin	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Endrin	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	o,p'-DDD	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	o,p'-DDT	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Beta Endosulfan	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	p,p'-DDD	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	p,p'-DDT	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Endosulfan sulphate	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Endrin aldehyde	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Methoxychlor	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Endrin ketone	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Isodrin	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Mirex	µg/L	0.1 <0.1	
SE171455	OC Pesticides in Water	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	0	43
SE171455	OP Pesticides in Water	Dichlorvos	µg/L	0.5 <0.5	
SE171455	OP Pesticides in Water	Dimethoate	µg/L	0.5 <0.5	
SE171455	OP Pesticides in Water	Diazinon (Dimpylate)	µg/L	0.5 <0.5	
SE171455	OP Pesticides in Water	Fenitrothion	µg/L	0.2 <0.2	
SE171455	OP Pesticides in Water	Malathion	µg/L	0.2 <0.2	
SE171455	OP Pesticides in Water	Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2 <0.2	
SE171455	OP Pesticides in Water	Parathion-ethyl (Parathion)	µg/L	0.2 <0.2	
SE171455	OP Pesticides in Water	Bromophos Ethyl	µg/L	0.2 <0.2	
SE171455	OP Pesticides in Water	Methidathion	µg/L	0.5 <0.5	
SE171455	OP Pesticides in Water	Ethion	µg/L	0.2 <0.2	
SE171455	OP Pesticides in Water	Azinphos-methyl	µg/L	0.2 <0.2	
SE171455	OP Pesticides in Water	2-fluorobiphenyl (Surrogate)	%	0	46
SE171455	OP Pesticides in Water	d14-p-terphenyl (Surrogate)	%	0	60
SE171455	pH in water	pH**	No unit	0	6.8
SE171455	Conductivity and TDS by Calculation - Water	Conductivity @ 25 C	µS/cm	2	77
SE171455	Anions by Ion Chromatography in Water	Nitrate Nitrogen, NO3-N	mg/L	0.005	1.4
SE171455	Nitrite in Water	Nitrite Nitrogen, NO2 as N	mg/L	0.005	0.16
SE171455	TKN Kjeldahl Digestion by Discrete Analyser	Total Kjeldahl Nitrogen	mg/L	0.05	2.3
SE171455	TKN Kjeldahl Digestion by Discrete Analyser	Total Nitrogen (calc)	mg/L	0.05	3.9
SE171455	Total Phosphorus by Kjeldahl Digestion DA in Water	Total Phosphorus (Kjeldahl Digestion)	mg/L	0.02	1.4