



ANALYSIS REPORT

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Client:	Nova Energy	Lab No:	1025896	SPV1
Contact:	J Miller	Date Registered:	13-Jul-2012	
	C/- Nova Energy	Date Reported:	27-Jul-2012	
	PO Box 10141	Quote No:	50099	
	WELLINGTON 6143	Order No:		
		Client Reference:	Surface Water	
		Submitted By:	J Miller	

Sample Type: Aqueous

Sample Name:		NPWTP Res 2 Outlet 12-Jul-2012 3:45 pm				
Lab Number:		1025896.1				
Individual Tests						
Apparent Hazen Colour	Hazen units	< 5	-	-	-	-
Turbidity	NTU	0.32	-	-	-	-
pH	pH Units	7.9	-	-	-	-
Phenolphthalein Alkalinity	g/m ³ as CaCO ₃	< 1.0	-	-	-	-
Total Alkalinity	g/m ³ as CaCO ₃	74	-	-	-	-
Carbonate	g/m ³ at 25°C	< 1.0	-	-	-	-
Bicarbonate	g/m ³ at 25°C	90	-	-	-	-
Electrical Conductivity (EC)	mS/m	20.3	-	-	-	-
Total Suspended Solids	g/m ³	< 3	-	-	-	-
Total Dissolved Solids (TDS)	g/m ³	131	-	-	-	-
Sample Temperature*	°C	20	-	-	-	-
Dissolved Aluminium	g/m ³	0.019	-	-	-	-
Total Aluminium	g/m ³	0.033	-	-	-	-
Dissolved Arsenic	g/m ³	< 0.0010	-	-	-	-
Dissolved Barium	g/m ³	0.0141 #1	-	-	-	-
Total Barium	g/m ³	0.0138 #1	-	-	-	-
Dissolved Boron	g/m ³	0.014	-	-	-	-
Dissolved Calcium	g/m ³	21	-	-	-	-
Dissolved Copper	g/m ³	0.0016	-	-	-	-
Total Copper	g/m ³	0.00196	-	-	-	-
Dissolved Iron	g/m ³	< 0.02	-	-	-	-
Total Iron	g/m ³	< 0.021	-	-	-	-
Dissolved Magnesium	g/m ³	6.8	-	-	-	-
Dissolved Manganese	g/m ³	< 0.0005	-	-	-	-
Total Manganese	g/m ³	0.00057	-	-	-	-
Dissolved Potassium	g/m ³	2.4	-	-	-	-
Total Dissolved Silica	g/m ³ as SiO ₂	28	-	-	-	-
Dissolved Sodium	g/m ³	8.3	-	-	-	-
Dissolved Strontium	g/m ³	0.084	-	-	-	-
Total Strontium	g/m ³	0.087	-	-	-	-
Total Sulphur	g/m ³	3.1	-	-	-	-
Dissolved Zinc	g/m ³	< 0.0010	-	-	-	-
Total Zinc	g/m ³	< 0.0011	-	-	-	-
Total Cyanide	g/m ³	< 0.0010	-	-	-	-
Chloride	g/m ³	14.4	-	-	-	-
Fluoride	g/m ³	0.08	-	-	-	-

Sample Type: Aqueous						
Sample Name:		NPWTP Res 2 Outlet 12-Jul-2012 3:45 pm				
Lab Number:		1025896.1				
Individual Tests						
Total Ammoniacal-N	g/m ³	< 0.010	-	-	-	-
Silicon	g/m ³	12.9	-	-	-	-
Nitrite-N	g/m ³	< 0.002	-	-	-	-
Nitrate-N	g/m ³	0.181	-	-	-	-
Nitrate-N + Nitrite-N	g/m ³	0.182	-	-	-	-
Dissolved Reactive Phosphorus	g/m ³	< 0.004	-	-	-	-
Phosphate	g/m ³	< 0.02	-	-	-	-
Total Phosphorus	g/m ³	0.007	-	-	-	-
Reactive Silica	g/m ³ as SiO ₂	29	-	-	-	-
Un-ionised hydrogen sulphide	g/m ³	< 0.002	-	-	-	-
Total Sulphide	g/m ³	< 0.005 #2	-	-	-	-
Sulphite	g/m ³	< 2	-	-	-	-
Sulphate	g/m³	9.3	-	-	-	-
Carbonaceous Biochemical Oxygen Demand (cBOD ₅)	g O ₂ /m ³	< 2	-	-	-	-
Chemical Oxygen Demand (COD)	g O ₂ /m ³	< 6	-	-	-	-
Total Organic Carbon (TOC)	g/m ³	1.7	-	-	-	-
Oil and Grease	g/m ³	< 4	-	-	-	-
Heterotrophic Plate Count 22°C (72 hrs)	cfu / 100mL	< 50	-	-	-	-
Heterotrophic Plate Count 35°C (48 hrs)	cfu / 100mL	< 50	-	-	-	-
Chlorine, Free & Combined						
Free Chlorine	g/m³	0.97	-	-	-	-
Combined Chlorine	g/m ³	< 0.08	-	-	-	-
Chloramines						
Monochloramine*	g/m ³	< 0.05	-	-	-	-
Dichloramine*	g/m ³	< 0.05	-	-	-	-
Trichloramine*	g/m ³	< 0.05	-	-	-	-

Analyst's Comments

#1 It has been noted that the result for the dissolved fraction was greater than that for the total fraction, but within analytical variation of the methods.

#2 Insufficient sample required that a dilution be performed prior to analysis of samples 1025896/1, resulting in a detection limit higher than that normally achieved for the Total Sulphide analysis.

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Samples
Chlorine, Free & Combined	DPD Colorimetric	-	1
Chloramines*	Colorimetric	-	1
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter.	-	1
Total Digestion	Boiling nitric acid digestion. APHA 3030 E 21 st ed. 2005.	-	1
Total Phosphorus Digestion	Acid persulphate digestion.	-	1
Total Cyanide Distillation	Distillation following the addition of sulphuric acid, alkaline trapping solution. APHA 4500-CN- C & E 21 st ed. 2005.	-	1
Apparent Hazen Colour	Determined on original sample without filtration or centrifugation, determination by Lovibond colorimeter. APHA 2120 B 21 st ed. 2005.	5 Hazen units	1
Turbidity	Analysis using a Hach 2100N, Turbidity meter. APHA 2130 B 21 st ed. 2005.	0.05 NTU	1
pH	pH meter. APHA 4500-H+ B 21 st ed. 2005.	0.1 pH Units	1

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Samples
Phenolphthalein Alkalinity	Titration to pH 8.3, Autotitrator. (P-Alkalinity). APHA 2320 B (modified) 21 st ed. 2005.	1.0 g/m ³ as CaCO ₃	1
Total Alkalinity	Titration to pH 4.5 (M-alkalinity), autotitrator. APHA 2320 B (Modified for alk <20) 21 st ed. 2005.	1.0 g/m ³ as CaCO ₃	1
Carbonate	Calculation: from alkalinity and pH, valid where TDS is not >500 mg/L and alkalinity is almost entirely due to hydroxides, carbonates or bicarbonates. APHA 4500-CO ₂ D 21 st ed. 2005.	1.0 g/m ³ at 25°C	1
Bicarbonate	Calculation: from alkalinity and pH, valid where TDS is not >500 mg/L and alkalinity is almost entirely due to hydroxides, carbonates or bicarbonates. APHA 4500-CO ₂ D 21 st ed. 2005.	1.0 g/m ³ at 25°C	1
Electrical Conductivity (EC)	Conductivity meter, 25°C. APHA 2510 B 21 st ed. 2005.	0.1 mS/m	1
Total Suspended Solids	Filtration using Whatman 934 AH, Advantec GC-50 or equivalent filters (nominal pore size 1.2 - 1.5µm), gravimetric determination. APHA 2540 D 21 st ed. 2005.	3 g/m ³	1
Total Dissolved Solids (TDS)	Filtration through GF/C (1.2 µm), gravimetric. APHA 2540 C (modified; drying temperature of 103 - 105°C used rather than 180 ± 2°C) 21 st ed. 2005.	10 g/m ³	1
Sample Temperature*	Supplied by customer, otherwise 20°C.	0.10 °C	1
Filtration for dissolved metals analysis	Sample filtration through 0.45µm membrane filter and preservation with nitric acid. APHA 3030 B 21 st ed. 2005.	-	1
Dissolved Aluminium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.003 g/m ³	1
Total Aluminium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005 / US EPA 200.8.	0.0032 g/m ³	1
Dissolved Arsenic	Filtered sample, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.0010 g/m ³	1
Dissolved Barium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.00010 g/m ³	1
Total Barium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005 / US EPA 200.8.	0.00011 g/m ³	1
Dissolved Boron	Filtered sample, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.005 g/m ³	1
Dissolved Calcium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.05 g/m ³	1
Dissolved Copper	Filtered sample, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.0005 g/m ³	1
Total Copper	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005 / US EPA 200.8.	0.00053 g/m ³	1
Dissolved Iron	Filtered sample, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.02 g/m ³	1
Total Iron	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.021 g/m ³	1
Dissolved Magnesium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.02 g/m ³	1
Dissolved Manganese	Filtered sample, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.0005 g/m ³	1
Total Manganese	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005 / US EPA 200.8.	0.00053 g/m ³	1
Dissolved Potassium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.05 g/m ³	1
Total Dissolved Silica	Calculation: Silicon x 2.14.	0.010 g/m ³ as SiO ₂	1
Dissolved Sodium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.02 g/m ³	1
Dissolved Strontium	Filtered sample, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.0005 g/m ³	1
Total Strontium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.00053 g/m ³	1
Total Sulphur	Nitric acid digestion, ICP-OES (method may not fully account for H ₂ S due to volatilisation during digestion). All forms of oxidised and organic sulphur will be determined by this method.	0.5 g/m ³	1
Dissolved Zinc	Filtered sample, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.0010 g/m ³	1
Total Zinc	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B 21 st ed. 2005 / US EPA 200.8.	0.0011 g/m ³	1
Total Cyanide	Distillation, colorimetry. APHA 4500-CN- C & E 21st ed. 2005 (modified).	0.0010 g/m ³	1
Chloride	Filtered sample. Ferric thiocyanate colorimetry. Discrete Analyser. APHA 4500 Cl- E (modified from continuous flow analysis) 21 st ed. 2005.	0.5 g/m ³	1

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Samples
Fluoride	Direct measurement, ion selective electrode. APHA 4500-F ⁻ C (modified from manual analysis) 21 st ed. 2005.	0.05 g/m ³	1
Total Ammoniacal-N	Filtered sample. Phenol/hypochlorite colorimetry. Discrete Analyser. (NH ₄ -N = NH ₄ ⁺ -N + NH ₃ -N). APHA 4500-NH ₃ F (modified from manual analysis) 21 st ed. 2005.	0.010 g/m ³	1
Silicon	Analysed as received (filtration, if required), ICP-MS, trace level. APHA 3125 B 21 st ed. 2005.	0.005 g/m ³	1
Nitrite-N	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO ₃ ⁻ I (Modified) 21 st ed. 2005.	0.002 g/m ³	1
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO ₂ N.	0.002 g/m ³	1
Nitrate-N + Nitrite-N	Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO ₃ ⁻ I (Modified) 21 st ed. 2005.	0.002 g/m ³	1
Dissolved Reactive Phosphorus	Filtered sample. Molybdenum blue colorimetry. Discrete Analyser. APHA 4500-P E (modified from manual analysis) 21 st ed. 2005.	0.004 g/m ³	1
Phosphate from DRP	Calculation: from Dissolved Reactive Phosphorus * 3.065.	0.02 g/m ³	1
Total Phosphorus	Total phosphorus digestion, ascorbic acid colorimetry. Discrete Analyser. APHA 4500-P E (modified from manual analysis) 21 st ed. 2005.	0.004 g/m ³	1
Reactive Silica	Filtered sample. Heteropoly blue colorimetry. Discrete analyser. APHA 4500-SiO ₂ F (modified from flow injection analysis) 21 st ed. 2005.	0.10 g/m ³ as SiO ₂	1
Un-ionised hydrogen sulphide	Calculation from Total Sulphide, Electrical Conductivity, pH and Temperature*. *Note: For accurate calculation of the un-ionised Hydrogen Sulphide the sample temperature should be taken using a calibrated thermometer at the time of sampling and recorded on the paperwork submitted with the sample. If a sample temperature is not supplied, a nominal temperature of 20°C will show in the results table above and be used in the calculation. In this case, please interpret the un-ionised Hydrogen Sulphide result with caution. APHA 4500-S²⁻ H 21st ed. 2005.	0.002 g/m ³	1
Sulphide Distillation	Acid distillation of sample into alkaline trapping solution using Simple Distillation system. APHA 4500-S ²⁻ I 21 st ed. 2005.	-	1
Total Sulphide	Sulphide distillation. Automated methylene blue colorimetry, discrete analyser. APHA 4500-S ²⁻ I 21 st ed. 2005 (modified).	0.002 g/m ³	1
Sulphite	KI/I ₂ Titrimetric. APHA 4500-SO ₃ ²⁻ B 21 st ed. 2005.	2 g/m ³	1
Sulphate	Filtered sample. Ion Chromatography. APHA 4110 B 21 st ed. 2005.	0.5 g/m ³	1
Carbonaceous Biochemical Oxygen Demand (cBOD ₅)	Incubation 5 days, DO meter, nitrification inhibitor added, dilutions, seeded. Analysed at Hill Laboratories - Microbiology; 1 Clow Place, Hamilton. APHA 5210 B 21 st ed. 2005.	2 g O ₂ /m ³	1
Chemical Oxygen Demand (COD), trace level	Dichromate/sulphuric acid digestion in Hach tubes, colorimetry. Trace Level method. APHA 5220 D 21 st ed. 2005.	6 g O ₂ /m ³	1
Total Organic Carbon (TOC)	Catalytic oxidation, IR detection, for Total C. Acidification, purging for Total Inorganic C. TOC = TC - TIC. APHA 5310 B 21 st ed. 2005.	0.5 g/m ³	1
Oil and Grease	Sample filtration through filter aid, Soxhlet extraction, gravimetric determination of extracted Oil & Grease. APHA 5520 D 21 st ed. 2005.	4 g/m ³	1
Heterotrophic Plate Count 22°C (72 hrs)	Count on Plate count agar, Incubated at 22°C for 72 hours. Analysed at Hill Laboratories - Microbiology; 1 Clow Place, Hamilton. APHA 9215 B, 21 st ed. 2005.	50 cfu / 100mL	1
Heterotrophic Plate Count 35°C (48 hrs)	Count on Plate count agar, Incubated at 35°C for 48 hours. Analysed at Hill Laboratories - Microbiology; 1 Clow Place, Hamilton. APHA 9215 21 st ed. 2005.	50 cfu / 100mL	1

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

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A handwritten signature in blue ink, consisting of several overlapping loops and a long horizontal stroke extending to the right.

Ara Heron BSc (Tech)
Client Services Manager - Environmental Division