



25<sup>th</sup> May, 2015

Mark Rust  
Senior Environmental Officer  
Office of the Environmental Protection Authority  
Locked Bag 10, East Perth  
WA - 6892

Attention: **Mark Rust**

**Sub: Report to OEPA for groundwater monitoring result as per Conditions 8-4 of Ministerial Statement No. 870 for month of April,15.**

Dear Mark Rust,

Condition 8-4 of Ministerial Statement No. 870 requires YPNPL to sample/monitor all groundwater bores every six months as per Condition 8-3 on a biannual basis. The condition sets a trigger value of 10% above the baseline contaminant concentrations as established based on the 2011 data. In accordance with Condition 8-5 of Ministerial Statement No. 870, YPNPL are required to report findings to the CEO of the OEPA within 7 days of the exceedance being identified.

This letter is intended to inform OEPA on the outcomes of the latest groundwater monitoring event (GME) which was undertaken by ERM on behalf of YPNPL at the five existing bores on 29-30.04.2015, using the consistent sampling methodology applied for the last GMEs (i.e. peristaltic low –flow).

In general the results of the recent GME display similar conditions to those documented in the previous GMEs and there were few exceedances of the trigger values in April 2015 and in most cases these are considered to be reflective of a natural variability rather than a result of site related potential contamination sources as a result of ongoing construction activities. More specific, in April 2015 reactive phosphorus, manganese, total alkalinity and sulphate were detected at concentrations slightly above trigger values and in a conservative approach implied exceedances were considered for alkalinity as hydroxide and manganese. Due to high salinity of water in samples from MW4 and MW5 the detection limit for specific parameters had to be raised (dilution required) by the laboratory. The details of the exceedances are outlined below:

#### **Reactive Phosphorus as P**

- Exceedance at MW1 – 0.014 mg/L compared to the maximum acceptable baseline value of 0.011 mg/L. Historical results have been below the maximum acceptable baseline value with concentrations between <0.002 and 0.018 mg/L, with a previous exceedance of 0.018 mg/L in Oct 2014 .
- Exceedance at MW3 – 0.02 mg/L compared to the maximum acceptable baseline value of 0.011 mg/L. Historical results have been below the maximum acceptable baseline value with concentrations between <0.001 and 0.021 mg/L, with a previous exceedance of 0.021 mg/L in Oct 2014 .
- Exceedance at MW5 – 0.016 mg/L compared to the maximum acceptable baseline value of 0.011 mg/L. Historical results have been in general below the maximum acceptable

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baseline value with concentrations between 0.002 and 0.014 mg/L and two previous exceedances: 0.014mg/L in Apr 2013 and 0.013 mg/L in Oct 2014.

#### Manganese (Filtered)

- Exceedance at MW4, 3.29mg/L compared to the maximum acceptable baseline value of 0.242 mg/L Historical results have been generally below the maximum acceptable baseline value with concentrations between 0.0029 and 0.277 mg/L, with a previous exceedance of 0.277 mg/L in Oct 2013.

#### Sulfate as SO<sub>4</sub>

- Exceedance (marginal) at MW4, 5960 mg/L compared to the maximum acceptable baseline value of 5720 mg/L. Historical results have been in general below the maximum acceptable baseline value with concentrations between 280 and 3540 mg/L.

#### Total alkalinity

- Exceedance (marginal) at MW3, 570 mg/L compared to the maximum acceptable baseline value of 561 mg/L. Historical results have been in general below the maximum acceptable baseline value with concentrations between 400 and 560 mg/L.

#### Aluminium (filtered)

- Implied exceedance (in a conservative approach) as unable to verify results at MW4 as the detection limit of 0.025 mg/L is higher compared to the maximum acceptable baseline value of 0.0209 mg/L. Historical results have been similar with concentrations between <0.005 and 0.031 mg/L and implied exceedances of the trigger value in Mar 2013, and exceedances in Apr 2013, Oct 2013 and Oct 2014. It should be noted that in April 2015, the detection limit at this sample for the analysis for the metals was raised by the laboratory due to very high salinity.

#### Alkalinity (hydroxide) as CaCO<sub>3</sub>

- Implied exceedance (in a conservative approach) as unable to screen results at all wells (MW1, MW2, MW3, MW4 and MW5) for this analyte as the detection limit of 1000 mg/L is higher compared to the maximum acceptable baseline value of 693 mg/L. Total alkalinity concentration is below the maximum acceptable baseline in four of five wells (except MW3).

In general other analytes were at concentrations similar to those recorded in the previous monitoring events. The quality conditions at one particular well (MW4) appear to be different to previously documented levels for some parameters with an increase in concentration of up to three times in April 2015 compared to Oct 2014 for salinity, total dissolved solids, hardness, magnesium, calcium, sodium. This change could be related to hypersaline waters and likely precipitation on well screen. These compounds/elements are not listed as trigger parameters in the Construction Environmental Management Plan.

In conclusion, the GME April 2015 results continue to support the fact that the observed variability in the groundwater chemistry with no clear trends suggests the results depict a combination of natural variability in groundwater chemistry and off site contributions as opposed to increasing concentrations of analytes associated with site activities. None of the analytes observed exceeding the trigger levels are regarded as directly attributed to current on site activities.

The full GME report is in preparation by ERM and if required by the OEPA this can be provided as further reference to the above stated facts.

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Attached to this letter is the summary table showing the April 2014 groundwater monitoring results as well as well as the historical monitoring data, to enable a review of the variability of the discussed parameters over time since 2011.

Yours sincerely,  
**Yara Pilbara Nitrates Pty. Ltd.**

*Rajan Sinha*  
Rajan Sinha  
Technical Services & Business Development Manager

Attachment: Full groundwater monitoring results

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Well ID	Gauging Date	Coord. Easting (MGA94)	Coord. Northing (MGA94)	Depth of Well (mbTOC)	Depth to Water (mbTOC)	Depth to Water (mAHD)*	DO (mg/L)	EC (mScm <sup>-1</sup> )	pH	Eh (mV)	TEMP (°C)	TDS (mg/L)	Method of sampling	Purge Volume (L)	Comments
Trigger value								6.0-8.4				143000			
MW1**	11-Oct-12	477747.17	7719628.2	8.72			3.78	2.30	7.09	149.60	29.8	1495	Bailer	19.0	Slightly turbid, pale grey, becoming turbid at 15L, slight light brown. Dry purged sampled upon recovery
	6-Mar-13	477747.17	7719628.2	8.74			1.82	2.66	7.26	78.50	30.7	1729	Bailer	22.5	Slight cloudy no odour,
	17-Apr-14	477747.17	7719628.2	8.74			0.58	1.56	6.71	2.69	32.4	1016	Low flow peristaltic pump	4.0	
	17-Oct-13	477660.51	7719656.72	17.40	6.440	4.400	0.30	1.74	5.60	81.40	31.2	1131	Low flow peristaltic pump	3.5	Clear, colourless no odour
	9-Apr-14	477660.51	7719656.72	17.56	5.861	4.979	0.64	1.88	7.13	40.20	32.6	1222	Low flow peristaltic pump	2.5	Clear, no odour
	29-Oct-14	477660.51	7719656.72	17.40	6.297	4.543	1.01	2.05	7.44	-6.30	32.1	1333	Low flow peristaltic pump	1.7	Clear, no odour, the drawdown was higher than 10 cm at a flow rate of 150 ml/min
	30-Apr-15	477660.51	7719656.72	17.35	6.260	4.580	0.30	1.96	7.31	-20.40	30.2	1274	Low flow peristaltic pump	3.5	Clear, no odour
MW2	11-Oct-12	477982.18	7719632.25	8.20	4.481		2.22	4.29	7.12	142.50	29.2	2789	Bailer	24.0	Turbid, pale brown, no odour, moderate recharge, good yield
	6-Mar-13	477982.18	7719632.25	8.20	4.432		1.65	4.21	7.28	37.90	32.0	2737	Bailer	21.0	Turbid, slightly brown no odour
	17-Apr-14	477982.18	7719632.25	8.21	4.600		3.44	4.69	6.90	101.00	32.2	3049	Bailer	33.0	
	17-Oct-13	477982.18	7719632.25	8.19	5.800		1.17	3.51	5.34	158.60	29.9	2282	Low flow peristaltic pump	3.0	Clear, colourless no odour
	9-Apr-14	477982.18	7719632.25	8.21	3.906		0.49	3.10	6.98	66.90	34.7	2015	Low flow peristaltic pump	3.0	Clear, no odour
	29-Oct-14	477982.18	7719632.25	8.20	4.145		0.90	3.31	7.14	4.80	30.1	2148	Low flow peristaltic pump	1.7	Clear, no odour, good recharge, low drawdown
	30-Apr-15	477982.18	7719632.25	6.80	2.772	2.698	0.45	3.48	7.19	32.10	31.3	2262	Low flow peristaltic pump	4.0	Clear, no odour, good recharge, low drawdown
MW3	11-Oct-12	478228.57	7719614.88	8.17	2.867	1.983	2.88	14.05	7.47	75.30	28.0	9133	Bailer	44.0	Slightly turbid, grey becoming pale brown, moderate recharge
	6-Mar-13	478228.57	7719614.88	7.18	2.801	2.049	1.49	20.90	7.32	33.20	31.1	13585	Bailer	24.0	Turbid, Pale brown, no odour
	17-Apr-14	478228.57	7719614.88	8.19	3.010	1.840	1.78	17.95	7.19	27.50	31.9		Bailer	33.0	
	17-Oct-13	478228.57	7719614.88	8.17	2.020	2.830	1.75	14.70	6.17	145.90	29.3	9555	Low flow peristaltic pump	3.5	Clear, colourless no odour
	9-Apr-14	478228.57	7719614.88	8.12	2.446	2.404	1.67	16.08	7.50	73.10	29.3	10452	Low flow peristaltic pump	3.5	Clear, no odour
	29-Oct-14	478228.57	7719614.88	8.12	2.577	2.273	6.16	14.15	7.97	11.90	30.3	9198	Low flow peristaltic pump	2.3	Clear, no odour, good recharge, low drawdown
	29-Apr-15	478228.57	7719614.88	8.18	2.854	1.996	0.33	12.74	7.36	-6.50	31.6	8281	Low flow peristaltic pump	3.0	Clear, no odour, good recharge, low drawdown
MW4**	11-Oct-12	47717.79	7719296.04	4.64	1.519		2.06	126.60	7.66	123.20	28.7	82290	Bailer	24.0	Highly turbid, silty, orange, no odour, fast recharge
	6-Mar-13	47717.79	7719296.04	7.21	3.949		-	-	-	-	-	-	-	-	Unable to be sampled due to curve in PVC Pipe extension
	17-Apr-14	47717.79	7719296.04	7.35	4.070		0.13	67.40	7.17	15.72	33.9	43810	Low flow peristaltic pump	2.5	Turbid, red brown
	17-Oct-13	477794.2	7719237.25	14.40	3.820	2.480	1.99	124.40	4.32	135.00	31.0	80860	Low flow peristaltic pump	4.5	Clear, colourless no odour
	9-Apr-14	477794.2	7719237.25	14.53	3.840	2.460	1.30	118.10	6.99	62.90	33.0	76765	Low flow peristaltic pump	3.0	Clear, no odour
	29-Oct-14	477794.2	7719237.25	13.96	4.265	2.035	3.56	68.90	7.15	41.80	31.5	44785	Low flow peristaltic pump	2.0	clear, no odour, good recharge, well head partially damaged
	30-Apr-15	477794.2	7719237.25	13.94	4.220	2.080	0.07	168.20	6.81	11.40	30.1	109330	Low flow peristaltic pump	6.0	slightly cloudy, some suspended solids, no odour, good recharge
MW5	11-Oct-12	477976.98	7719306.26	5.01	1.054	5.636	1.73	145.70	6.90	193.20	29.3	94705	Bailer	24.0	Slightly turbid, pale brown, no odour, recharge becoming turbid, red-brown
	6-Mar-13	25-Aug-08	7719306.26	5.07	0.905	5.785	0.99	141.20	6.84	135.90	34.3	91780	Bailer	24.0	Turbid, cream to pale colour, no odour
	17-Apr-14	25-Aug-08	7719306.26	5.97	2.020	4.670	2.24	147.30	6.77	210.70	34.4	95745	Bailer	33.0	
	17-Oct-13	25-Aug-08	7719306.26	8.95	4.530	2.160	0.51	104.00	6.21	125.60	30.3	67600	Low flow peristaltic pump	5.5	Clear, no odour
	9-Apr-14	477976.98	7719306.26	9.01	4.415	2.275	1.03	70.80	7.08	69.20	32.0	46020	Low flow peristaltic pump	2.5	Clear, no odour
	28-Oct-14	477976.98	7719306.26	9.00	4.505	2.185	0.78	69.70	7.24	46.00	31.6	45305	Low flow peristaltic pump	1.1	clear, no odour, good recharge
	29-Apr-15	477976.98	7719306.26	9.00	4.470	2.220	0.17	44.78	7.25	-20.30	30.0	29107	Low flow peristaltic pump	3.0	slightly cloudy, some solids in suspension, no odour, good recharge

**Notes:**

\*\*MW1 and MW4 Were Replaced in September 2013

\* Calculations based on data from April 2015 survey (Handley surveyors)

	BTEX										PAH										TPH									
	Benzene	Ethylbenzene	Toluene	Total BTEX	Xylene (m & p)			Xylene (o)	Xylene Total		C6-C10 less BTEX (F1)	Naphthalene	C10-C16	C16-C34	C34-C40	F2-NAPHTHALENE	C6 - C9	C10 - C14	C15 - C28	C29-C36	+C10 - C36 (Sum of total)	C10 - C40 (Sum of total)	C6-C10							
	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L						
EQL	1	2	2	0.001	2	2	2	0.02	5	0.1	0.1	0.1	0.1	0.1	0.1	20	50	100	50	50	50	100	0.02							
Trigger Values ( Max Baseline + 10%)																														
LocCode	Sampled Date-Time																													
MW1	30/04/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<40	<50	<200	<200	<450	-	-	-	-	-	-				
	17/10/2013	<1	<2	<2	<0.001	<2	<2	<2	<0.02	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.02								
	9/04/2014	<1	<2	<2	<0.001	<2	<2	<2	<0.02	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.02								
	30/10/2014	<1	<2	<2	<0.001	<2	<2	<2	<0.02	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.02								
	30/04/2015	<1	<2	<2	<0.001	<2	<2	<2	<0.02	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.02								
MW2	30/04/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<40	<50	<200	<200	<450	-	-	-	-	-	-				
	17/10/2013	<1	<2	<2	<0.001	<2	<2	<2	<0.02	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.02								
	9/04/2014	<1	<2	<2	<0.001	<2	<2	<2	<0.02	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.02								
	29/10/2014	<1	<2	<2	<0.002	<2	<2	<2	<0.03	<6	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.03								
	30/04/2015	<1	<2	<2	<0.001	<2	<2	<2	<0.02	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.02								
MW3	30/04/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<40	<50	<200	<200	<450	-	-	-	-	-	-				
	17/10/2013	<1	<2	<2	<0.001	<2	<2	<2	<0.02	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.02								
	9/04/2014	<1	<2	<2	<0.001	<2	<2	<2	<0.02	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.02								
	29/10/2014	<1	<2	<2	<0.001	<2	<2	<2	<0.02	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.02								
	29/04/2015	<1	<2	<2	<0.001	<2	<2	<2	<0.02	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.02								
MW4	30/04/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<40	<50	<200	<200	<450	-	-	-	-	-	-				
	17/10/2013	<1	<2	<2	<0.001	<2	<2	<2	<0.02	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.02								
	9/04/2014	<1	<2	<2	<0.001	<2	<2	<2	<0.02	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.02								
	30/10/2014	<1	<2	<2	<0.001	<2	<2	<2	<0.02	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.02								
	30/04/2015	<1	<2	<2	<0.001	<2	<2	<2	<0.02	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.02								
MW5	30/04/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<40	81	<200	<200	281	-	-	-	-	-	-				
	17/10/2013	<1	<2	<2	<0.001	<2	<2	<2	<0.02	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.02								
	9/04/2014	<1	<2	<2	<0.001	<2	<2	<2	<0.02	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.02								
	30/10/2014	<1	<2	<2	<0.001	<2	<2	<2	<0.02	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.02								
	29/04/2015	<1	<2	<2	<0.001	<2	<2	<2	<0.02	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<20	<50	<100	<50	<50	<100	<0.02								

	Inorganics																																															
	Alkalinity (Bicarbonate as CaCO <sub>3</sub> )		Alkalinity (Carbonate as CaCO <sub>3</sub> )		Alkalinity(Hydroxide) as CaCO <sub>3</sub>		Alkalinity (total) as CaCO <sub>3</sub>		Ammonia as N		Anions Total		Cations Total		Chloride		Fluoride		Hydrogen sulfide		Ionic Balance		Kjeldahl Nitrogen Total		Nitrate (as N)		Nitrite (as N)		Nitrite (as NO <sub>2</sub> -)		Nitrogen (Total Oxidised)		Nitrogen (Total)		Reactive Phosphorus as P		Sodium (Filtered)		Sulphate as SO <sub>4</sub>		Sulphide		TDS		Hardness as CaCO <sub>3</sub> (Filtered)		TSS	
	mg/L	mg/L	μg/L	mg/L	μg/L	meq/L	meq/L	mg/L	mg/L	mg/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L														
EQL	1	1	1000	1	5	0.01	0.01	1	0.1	0.5	-100	0.05	0.002	0.002	0.05	0.002	50	0.001	0.5	1	0.1	10	1	5																								
Trigger Values (Max Baseline + 10%)*			693	561	40	-	-	95,700	1.65	N/A	-	2.97	9.67	N/A	-	3.63	5610	0.011	62,700	5720	N/A	143,000	20,900	2090																								
LocCode	Sampled Date-Time																																															
MW1	30/04/2011	-	-	-	350	38	-	-	780	-	<0.5	-	-	1.7	<0.005	-	1.7	2500	<0.002	350	170	-	2000	-	-	-	-	-	-	-	-	-	-	-														
	20/09/2011	-	-	-	320	18	-	-	710	0.4	-	-6	0.28	-	-	-	3.1	3400	0.008	300	150	<0.5	-	-	180																							
	27/02/2012	-	-	-	300	<5	-	-	670	0.5	-	-	0.17	2	<0.005	<0.05	2	2100	<0.002	340	140	<0.5	-	-	220																							
	11/10/2012	-	-	-	300	53	-	-	600	0.4	-	1	0.49	1.1	<0.005	<0.05	1.1	1500	0.003	290	100	<0.5	-	-	520																							
	6/03/2013	-	-	-	300	15	-	-	570	0.5	<0.5	-	0.14	1.9	0.025	0.08	1.9	2000	0.003	280	100	<0.5	-	-	2900																							
	17/04/2013	-	-	-	290	<5	-	-	560	0.4	-	-	0.15	2.2	0.022	0.07	2.2	2400	0.004	270	120	<0.5	-	-	16																							
	17/10/2013	367	<1	<1000	367	32	17.2	17.5	300	0.8	-	0.87	0.15	0.086	<0.002	-	0.086	240	0.007	265	-	<0.1	940	284	25																							
	9/04/2014	358	<1	<1000	358	114	18.1	17.3	345	0.8	-	2.42	0.49	1.6	0.004	-	1.6	2090	0.006	267	59	<0.1	995	270	<5																							
	30/10/2014	361	<1	<1000	361	<5	19.1	17.1	366	0.6	-	5.42	2.46	0.162	<0.002	-	0.162	2620	0.018	226	75	<0.1	981	352	<5																							
	30/04/2015	272	<1	<1000	272	31	18.5	18.8	374	0.6	<0.1	0.72	2.24	0.079	-	2.32	3040	0.014	258	119	<0.1	1010	366	<5																								
MW2	30/04/2011	-	-	-	280	200	-	-	930	-	<0.5	-	3.3	<0.005	-	3.3	3900	0.004	570	170	-	2000	-	-	-	-	-	-	-	-	-	-	-	-	-													
	20/09/2011	-	-	-	290	<5	-	-	1200	0.6	-	-3	0.2	-	-	-	1.2	1400	0.004	610	210	<0.5	-	-	190																							
	27/02/2012	-	-	-	300	30	-	-	1400	0.7	-	-	0.26	0.62	<0.005	<0.05	0.62	880	<0.002	1000	220	<0.5	-	-	84																							
	11/10/2012	-	-	-	370	<5	-	-	1300	0.5	-	-5	0.51	0.63	<0.005	<0.05	0.63	1100	<0.002	600	180	<0.5	-	-	440																							
	6/03/2013	-	-	-	360	<5	-	-	1000	0.6	<0.5	-	0.1	0.6	<0.005	<0.05	0.6	700	<0.002	580	170	<0.5	-	-	320																							
	17/10/2013	281	<1	-	281	<5	31.4	34.4	811	0.6	-	3.95	0.42	2.28	<0.002	-	2.28	2700	0.003	507	-	<0.1	2040	593	10																							
	17/04/2013	-	-	<1000	340	<5	-	-	1100	0.6	-	-	0.21	0.51	<0.005	<0.05	0.51	720	0.003	610	200	<0.5	-	-	290																							
	9/04/2014	250	<1	<1000	250	<5	28.4	28.8	730	0.8	-	0.7	<0.05	4.94	0.007	-	4.95	4960	0.007	463	135	<0.1	1550	412	<5																							
	29/10/2014	276	<1	<1000	276	<5	30.1																																									

	Metals																																									
	Lead (Filtered)		Aluminium		Aluminium (Filtered)		Arsenic (Filtered)		Cadmium (Filtered)		Calcium (Filtered)		Chromium (hexavalent)		Chromium IV (Filtered)		Chromium (III+VI) (Filtered)		Copper (Filtered)		Iron		Iron (Filtered)		Magnesium (Filtered)		Manganese (Filtered)		Mercury		Nickel (Filtered)		Phosphorus		Potassium (Filtered)		Selenium (Filtered)		Silicon (Filtered)		Zinc (Filtered)	
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L						
EQL	0.0001	0.005	0.001	0.0002	0.00005	0.2	0.002	0.001	0.0002	0.001	0.0005	0.005	0.002	0.1	0.0005	0.00005	0.0005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005								
Trigger Values ( Max Baseline + 10)	N/A	-	0.0209	N/A	N/A	1210	N/A	N/A	N/A	N/A	N/A	143	0.264	5170	0.242	0.0001	N/A	0.869	2310	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.052						

LocCode      Sampled\_Date-Ti

MW1	30/04/2011	<0.001	-	0.01	<0.001	<0.0001	200	<0.002	-	<0.001	-	-	-	0.008	63	0.17	<0.00005	-	0.06	10	<0.002	14,000	0.016
	20/09/2011	-	1.8	0.002	<0.001	<0.0001	170	-	-	<0.001	-	-	1.8	<0.005	54	0.046	-	<0.001	0.05	7.9	<0.002	13,000	0.027
	27/02/2012	-	3.6	0.002	<0.001	<0.0001	180	-	-	<0.001	-	-	4.2	<0.005	53	0.088	-	<0.001	0.08	7.7	<0.002	-	0.038
	11/10/2012	-	21	0.005	<0.001	<0.0001	170	-	-	<0.001	-	-	30	0.009	51	0.038	-	<0.001	10	8.6	<0.002	-	0.008
	6/03/2013	-	10	<0.005	<0.001	<0.0001	160	-	-	<0.001	-	-	14	<0.005	49	0.17	-	<0.001	<0.01	8.2	<0.002	15,000	0.01
	17/04/2013	<0.001	0.33	<0.005	<0.001	0.0004	160	-	-	<0.001	-	0.001	0.39	<0.005	49	0.087	-	<0.001	0.02	8.2	<0.002	16,000	0.01
	17/10/2013	<0.0001	0.38	0.006	0.0008	<0.00005	66	-	<0.001	<0.0002	<0.001	<0.0005	1.47	0.437	29	0.425	<0.0001	0.001	0.015	13	0.0005	14,800	0.005
	9/04/2014	<0.0001	0.06	<0.005	0.0008	<0.00005	57	-	<0.001	<0.0002	<0.001	<0.0005	0.57	0.43	31	0.272	<0.0001	<0.0005	0.049	10	0.001	17,500	<0.001
	30/10/2014	<0.0001	0.03	0.018	0.0006	<0.00005	88	-	<0.001	<0.0002	<0.001	<0.0005	0.33	0.052	32	0.204	<0.0001	0.0008	0.034	11	0.0006	17,100	0.009
	30/04/2015	<0.0001	0.09	0.006	0.0004	<0.00005	92	<0.001	<0.0002	<0.0001	<0.0005	0.32	0.044	33	0.08	<0.0001	0.0007	0.046	9	0.001	18000	0.003	
MW2	30/04/2011	<0.001	-	0.005	<0.001	<0.0001	99	<0.002	-	<0.001	-	-	<0.005	66	<0.005 - 0.005	<0.00005	-	0.09	19	0.003	12,000	0.013	
	20/09/2011	-	4.2	0.002	<0.001	<0.0001	150	-	-	<0.001	-	-	6	<0.005	98	0.001	-	<0.001	0.06	20	<0.002	11,000	0.021
	27/02/2012	-	3.6	0.005	<0.001	<0.0001	240	-	-	<0.001	-	-	4.6	0.24	140	0.22	-	<0.001	0.03	24	<0.002	-	0.047
	11/10/2012	-	9.2	0.002	<0.001	<0.0001	160	-	-	<0.001	-	-	12	<0.005	94	0.01	-	<0.001	0.17	21	<0.002	-	0.021
	6/03/2013	-	10	0.006	<0.001	<0.0001	150	-	-	<0.001	-	-	15	<0.005	87	0.012	-	<0.001	<0.01	21	<0.002	13,000	0.017
	17/10/2013	<0.0001	0.04	<0.005	<0.0002	<0.00005	112	-	<0.001	<0.0002	<0.001	<0.0005	0.06	<0.002	76	<0.0005	<0.0001	<0.0005	0.008	18	0.0031	10,600	<0.001
	17/04/2013	<0.001	3.5	<0.005	<0.001	0.0003	160	-	-	<0.001	-	5.2	<0.005	100	0.012	-	<0.001	0.1	23	<0.002	13,000	0.012	
	9/04/2014	<0.0001	0.02	<0.005	<0.0002	<0.00005	71	-	<0.001	<0.0002	<0.001	<0.0005	<0.05	<0.002	57	0.0009	<0.0001	<0.0005	0.032	17	0.0011	11,700	<0.001
	29/10/2014	<0.0001	0.01	0.017	<0.0002	<0.00005	98	-	<0.001	<0.0002	<0.001	<0.0005	<0.05	<0.002	64	0.0024	<0.0001	<0.0005	0.039	18	0.0016	10,800	0.006
	30/04/2015	0.0001	0.1	<0.005	0.0002	<0.00005	103	<0.001	<0.0002	<0.0001	<0.0005	0.14	0.004	66	0.001	<0.0001	0.0005	0.019	18	0.0025	13,900	0.021	
MW3	30/04/2011	<0.0																					

Field Duplicates (WATER)  
 Filter: SDG in('ALSE-Perth 01-May-15')

SDG	ALSE-Perth 01-May-15	ALSE-Perth 01-May-15	RPD
Field_ID	MW4	DUP01	
Sampled_Date-Time	30/04/2015 11:27	30/04/2015 11:27	

Chem_Group	ChemName	Units	EQL			
	Silicon as SiO <sub>2</sub> (Filtered)	mg/l	0.1	14.3	15.5	8
	Sulfate as SO <sub>4</sub> - Turbidimetric (Filtered)	mg/l	1	5960.0	5650.0	5
	Unionized Hydrogen Sulfide	mg/l	0.1	<0.1	<0.1	NA
BTEX	Benzene	µg/L	1	<1.0	<1.0	NA
	Ethylbenzene	µg/L	2	<2.0	<2.0	NA
	Toluene	µg/L	2	<2.0	<2.0	NA
	Total BTEX	mg/l	0.001	<0.001	<0.001	NA
	Xylene (m & p)	µg/L	2	<2.0	<2.0	NA
	Xylene (o)	µg/L	2	<2.0	<2.0	NA
	Xylene Total	µg/L	2	<2.0	<2.0	NA
	C6-C10 less BTEX (F1)	mg/l	0.02	<0.02	<0.02	NA
Inorganics	Alkalinity (Bicarbonate as CaCO <sub>3</sub> )	mg/l	1	118.0	118.0	0
	Alkalinity (Carbonate as CaCO <sub>3</sub> )	mg/l	1	<1.0	<1.0	NA
	Alkalinity (Hydroxide) as CaCO <sub>3</sub>	µg/l	1000	<1000.0	<1000.0	NA
	Alkalinity (total) as CaCO <sub>3</sub>	mg/l	1	118.0	118.0	0
	Ammonia as N	µg/l	5	<5.0	<5.0	NA
	Anions Total	meq/L	0.01	2480.0	2560.0	3
	Cations Total	meq/L	0.01	2680.0	2740.0	2
	Chloride	mg/l	1	83600.0	86600.0	4
	Fluoride	mg/l	0.1	0.2	0.2	0
	Kjeldahl Nitrogen Total	mg/l	0.05	<0.05	<0.05	NA
	Nitrate (as N)	mg/l	0.002	0.441	0.446	1
	Nitrite (as N)	mg/l	0.002	<0.002	<0.002	NA
	Nitrogen (Total Oxidised)	mg/l	0.002	0.441	0.446	1
	Nitrogen (Total)	µg/l	50	410.0	430.0	5
	Reactive Phosphorus as P	mg/l	0.001	0.004	0.004	0
	Sodium (Filtered)	mg/l	1	50400.0	51700.0	3
	Sulphide	mg/l	0.1	<0.1	<0.1	NA
	TDS	mg/l	10	134000.0	135000.0	1
	Hardness as CaCO <sub>3</sub> (Filtered)	mg/l	1	21700.0	22200.0	2
	TSS	mg/l	5	201.0	210.0	4
Lead	Lead (Filtered)	mg/l	0.0002	<0.001	<0.001	NA
Metals	Aluminium (Filtered)	mg/l	0.005	<0.025	<0.025	NA
	Aluminium	mg/l	0.01	4.8	5.24	9
	Arsenic (Filtered)	mg/l	0.0005	<0.0025	<0.0025	NA
	Cadmium (Filtered)	mg/l	0.0001	<0.001	<0.001	NA
	Calcium (Filtered)	mg/l	1	1120.0	1150.0	3
	Chromium (hexavalent) (Filtered)	mg/l	0.001	<0.01	<0.01	NA
	Chromium (III+VI) (Filtered)	mg/l	0.0005	0.004	0.0045	12
	Chromium (Trivalent)	mg/l	0.001	<0.01	<0.01	NA
	Copper (Filtered)	mg/l	0.001	<0.005	<0.005	NA
	Iron (Filtered)	mg/l	0.005	<0.025	<0.025	NA
	Iron	mg/l	0.05	6.76	6.6	2
	Magnesium (Filtered)	mg/l	1	4590.0	4690.0	2
	Manganese (Filtered)	mg/l	0.0005	3.29	3.37	2
	Mercury	mg/l	0.0001	<0.0001	<0.0001	NA
	Nickel (Filtered)	mg/l	0.0005	0.037	0.0386	4
	Phosphorus	mg/l	0.005	<0.005	<0.005	NA
	Potassium (Filtered)	mg/l	1	1970.0	2030.0	3
	Selenium (Filtered)	mg/l	0.002	<0.01	<0.01	NA
	Silicon (Filtered)	µg/l	50	6670.0	7240.0	8
	Zinc (Filtered)	mg/l	0.005	<0.025	<0.025	0
PAH/Phenols	Naphthalene	µg/L	5	<5.0	<5.0	0
TPH	C10-C16	mg/l	0.1	<0.1	<0.1	0
	C16-C34	mg/l	0.1	<0.1	<0.1	0
	C34-C40	mg/l	0.1	<0.1	<0.1	0
	F2-NAPHTHALENE	mg/l	0.1	<0.1	<0.1	0
	C6 - C9	µg/L	20	<20.0	<20.0	0
	C10 - C14	µg/L	50	<50.0	<50.0	0
	C15 - C28	µg/L	100	<100.0	<100.0	0
	C29-C36	µg/L	50	<50.0	<50.0	0
	+C10 - C36 (Sum of total)	µg/L	50	<50.0	<50.0	0
	C10 - C40 (Sum of total)	µg/L	100	<100.0	<100.0	0
	C6-C10	mg/l	0.02	<0.02	<0.02	0

\*RPDs have only been considered where a concentration is greater than 1 times the EQL.

\*\*High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 30 (1-10 x EQL); 30 (10-30 x EQL); 30 (> 30 x EQL))

NA- RPD cannot be calculated as both concentrations are below laboratory detection limits

## Field Blanks (WATER)

Filter: SDG in('ALSE-Perth 01-May-15')

SDG	ALSE-Perth 01-May-15	ALSE-Perth 01-May-15
Field_ID	RIN01	Trip blank
Sampled_Date-Time	30/04/2015	30/04/2015
Sample_Type	Rinsate	Trip_B

Chem_Group	ChemName	Units	EQL		
	Sulfate as SO4 - Turbidimetric (Filtered)	mg/l	1	<1	
BTEX	Benzene	µg/L	1		<1
	Ethylbenzene	µg/L	2		<2
	Toluene	µg/L	2		<2
	Total BTEX	mg/l	0.001		<0.001
	Xylene (m & p)	µg/L	2		<2
	Xylene (o)	µg/L	2		<2
	Xylene Total	µg/L	2		<2
	C6-C10 less BTEX (F1)	mg/l	0.02		<0.02
PAH	Naphthalene	µg/L	5		<5
TPH	C6 - C9	µg/L	20		<20
	C6-C10	mg/l	0.02		<0.02
Inorganics	Alkalinity (Bicarbonate as CaCO3)	mg/l	1	<1	
	Alkalinity (Carbonate as CaCO3)	mg/l	1	<1	
	Alkalinity (Hydroxide) as CaCO3	µg/l	1000	<1000	
	Alkalinity (total) as CaCO3	mg/l	1	<1	
	Anions Total	meq/L	0.01	<0.01	
	Cations Total	meq/L	0.01	<0.01	
	Chloride	mg/l	1	<1	
	Fluoride	mg/l	0.1	<0.1	
	Sodium (Filtered)	mg/l	1	<1	
	Hardness as CaCO3 (Filtered)	mg/l	1	<1	
Metals	Lead (Filtered)	mg/l	0.0001	<0.0001	
	Aluminium (Filtered)	mg/l	0.005	<0.005	
	Arsenic (Filtered)	mg/l	0.0002	<0.0002	
	Cadmium (Filtered)	mg/l	0.00005	<0.00005	
	Calcium (Filtered)	mg/l	1	<1	
	Chromium (III+VI) (Filtered)	mg/l	0.0002	<0.0002	
	Copper (Filtered)	mg/l	0.0005	<0.0005	
	Iron (Filtered)	mg/l	0.002	<0.002	
	Magnesium (Filtered)	mg/l	1	<1	
	Manganese (Filtered)	mg/l	0.0005	<0.0005	
	Nickel (Filtered)	mg/l	0.0005	<0.0005	
	Potassium (Filtered)	mg/l	1	<1	
	Selenium (Filtered)	mg/l	0.0002	<0.0002	
	Zinc (Filtered)	mg/l	0.001	<0.001	