

AMBIENT AIR QUALITY MONITORING REPORT – OCTOBER 2010

Prepared by:



Document History and Status

Revision	Prepared	Reviewed	Approved	Date	Description
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1. INTRODUCTION

1.1 Licence reporting conditions

Esperance Ports Sea & Land (EPSL) was issued Licence L5099/1974/12 ('the licence') on the 6th of January 2009 and has recently been amended on the 16th of September 2010. This licence expires on the 6th of March 2011. This report is compiled and issued in compliance with Condition 9 and includes data analysis consistent with requirements of Condition 7. Licence L5099/1974/12 is available on the DEC website.

1.2 Location of monitoring stations

As required by the licence, ambient monitoring is being undertaken at four locations surrounding the port operations (**Figure 2**) and one location in the community approximately 1.6 km from the ESPL. The monitor locations were chosen in consultation with the Department of Environment and Conservation (DEC) and the Department of Health (DoH).

For a detailed explanation, please refer to the EPSL website:

<http://www.esperanceport.com.au/envmon.asp>

The devices installed at each of these locations (**Figure 2**) are referred to as Sites 1 - 5 and each consists of;

- A Tapered Element Oscillating Microbalance (TEOM) unit recording PM₁₀; and
- A High volume Air Sampler (HVAS) unit monitoring total suspended particulates (TSP). The HVAS filter papers according to the license (License 5099/1974/12) are analysed daily during the period of October to March for TSP and every third day for iron, nickel, lead and Sulphur. Metals and Sulphur are also analysed when there is any exceedance of 90ug/m³ criteria and/or when winds are greater than 10m/s in three consecutive hours while in the 45 -180 degree wind arch (refer to Table 2, row 3 and 4 of License).

The Site 5 community monitor consists of a HVAS unit measuring TSP. The port also reports on air quality from the following (as stipulated in the licence):

- Sixteen dust deposition gauges with eleven co-located rainwater tanks. The total deposition rate is calculated and the dust collected is speciated into nickel, lead, iron and sulphur to allow a deposition rate for these contaminants to be determined. The concentration of these contaminants in the rainwater tanks is also analysed; and
- Two dust deposition gauges located within the port facility (analysed as per the above gauges).

EPSL has commissioned an Australian Standards compliant meteorological monitoring station at the E-Sampler 7 monitoring site adjacent to berth 3 at the port (**Figure 2**). The data recorded at this station is recorded in 5 minute measurements and it is then used to calculate hourly wind speed, wind direction and to produce the wind roses in **Figure 1**.

This report documents the monitoring data from each of these monitors for the 1st to the 31st of October 2010 and compares the results to the applicable impact assessment criteria.

2. IMPACT ASSESSMENT CRITERIA

For the purposes of this report, the following criteria have been used for comparison to the measured concentrations of contaminants in air and dust deposition rates. The criteria are applicable at all sensitive receptors located outside the port boundary. They are as follows:

- 50µg/m³ as a maximum 24-hour average concentration for PM₁₀ (based on the NEPM PM₁₀ Standard and Licence LF099/1974/12);
- 0.5µg/m³ as an annual concentration for lead (based on the NEPM Standard).
- 90µg/m³ as a maximum 24-hour average concentration target for TSP (from Licence LF099/1974/12);
- 0.14µg/m³ as a maximum 24-hour average concentration target for nickel (from Licence LF099/1974/12);
- Note that although a TSP standard exists for lead and nickel none exist for sulphur or iron; and
- 4 000 mg/m²/month maximum allowable insoluble dust deposition rate (based on the NSW EPA Dust Deposition Standard for insoluble dust).
- Note that although a dust deposition guideline exists for total deposited insoluble dust; there are no guidelines for other deposited contaminants such as lead, nickel, sulphur and iron.

In addition to the above, the following Drinking Water Guidelines (DWG) has been used for comparison of the results of the rainwater tank monitoring:

- 0.02 mg/L for nickel in drinking water (Australian DWG (NHMRC/NRMMC, 2004));
- 0.01 mg/L for lead in drinking water (NHMRC/NRMMC, 2004); and
- 2 mg/L for iron in drinking water (World Health Organisation (WHO)).

3. METEOROLOGY

During October the wind directions were offshore (SW to NNE) winds for 71% of the period, with light to fresh wind speeds (<10 m/s) for about 91% of the time and only becoming strong (>10 m/s) for 9% of the period. The winds were recorded from each compass point in the wind rose ranging from 2.5% to 8.5% each as presented in **Figure 1**.

The maximum hourly average wind speed of 12.9 m/s (46.4 km/h) was recorded from the west at 0900 on the 28th of October 2010. The 'Beaufort Wind Force Scale' is a measure of understanding wind speeds in descriptive terminology. A wind speed of 12.9 m/s is described as a 'strong winds' (BOM, 2010). The hourly wind direction and wind speed for October 2010 are plotted in **Appendix A**.

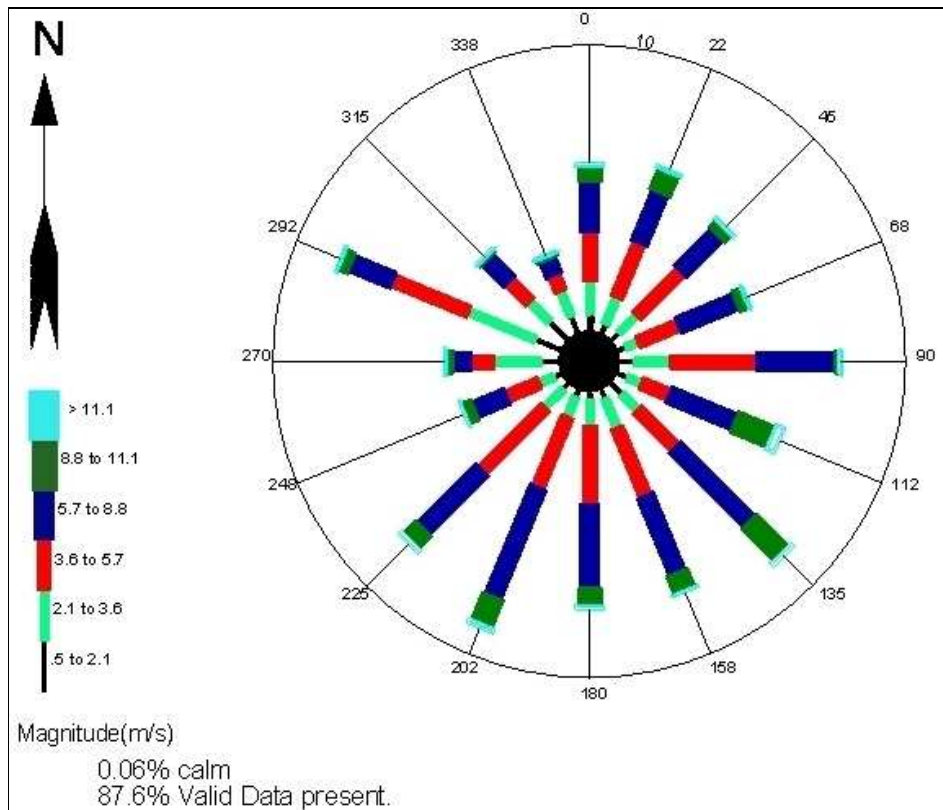


Figure 1: October 2010 wind rose from E-Sampler 7 meteorological station, Esperance Port.

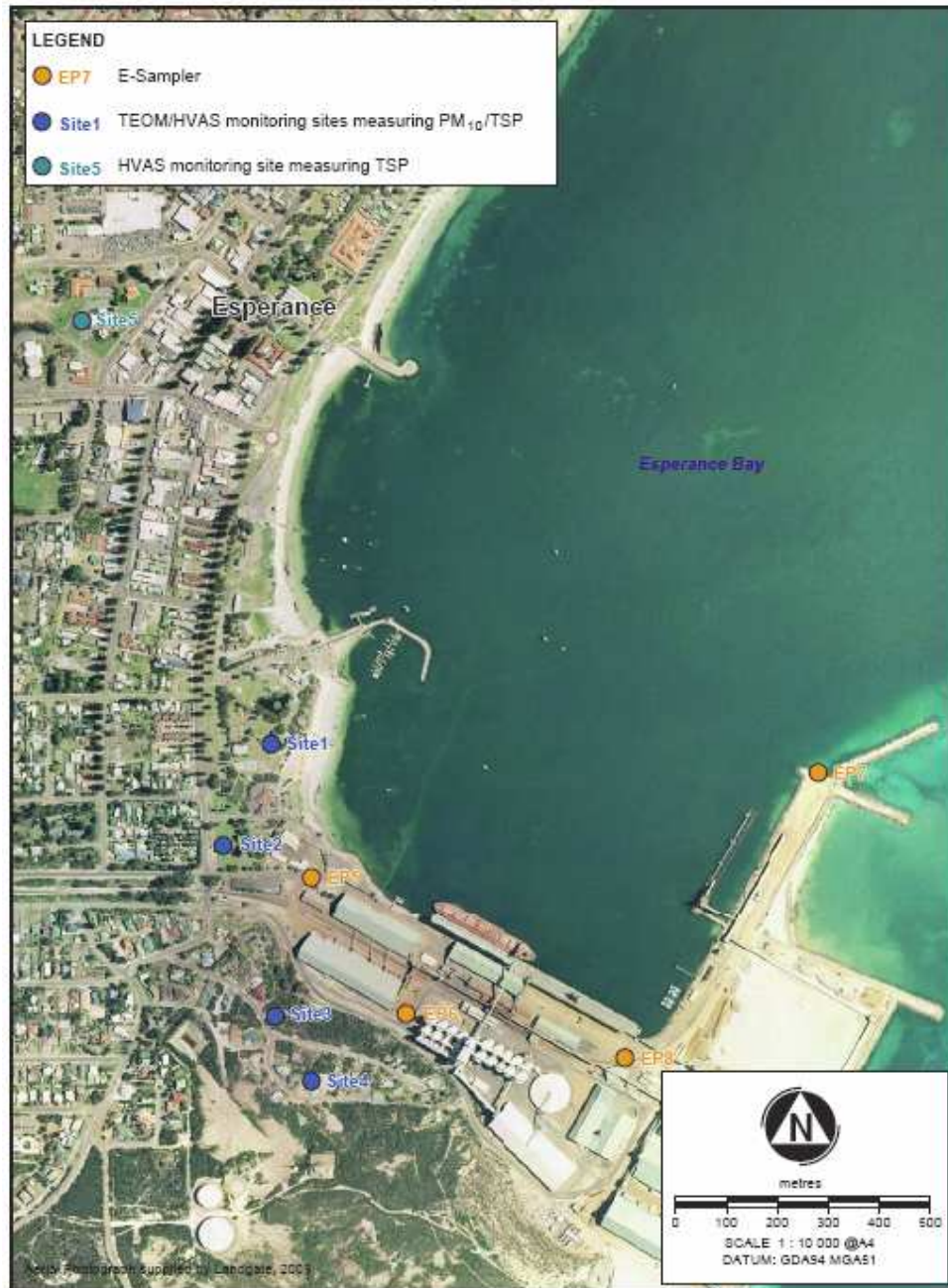


Figure 2: Location of E-Sampler 7 meteorological station, Esperance Port, relative to E-Samplers 5, 6 and 8, TEOM/HVAS monitoring sites 1 to 4 and HVAS monitoring site 5.

4. PORT ACTIVITIES

EPSL had a total throughput of approximately 880,919 tonnes of various products during October 2010. Of this, approximately 849,556 Tonnes (96%) were exported and approximately 31,363 tonnes (4%) were imported. The date and time of each ship arrival and departure during October, as well as the associated tonnage and berth number are presented in **Table 1**.

During October 2010 EPSL also received:

- 769,076 tonnes of iron ore averaged across 87 trains consistently throughout the month, and
- There were no nickel sulphide concentrate transported to the Port via kibbles on trucks or by trains.

Table 1: October 2010 Shipping Log for EPSL

Ship Name	Date in	Time in	Date out	Time Out	Commodity	Tonnage	Import/ Export	Berth
CAPE SUN	07-Oct-10	7:25	09-Oct-10	19:50	IRON ORE FINES/LUMP	165000	EXPORT	Berth 3
OCEAN PHOENIX	09-Oct-10	6:08	10-Oct-10	21:10	WHEAT	42000	EXPORT	Berth 1
OCEAN DRAGON	14-Oct-10	20:16	17-Oct-10	5:48	IRON ORE FINES/LUMP	147984	EXPORT	Berth 3
THALASSA	17-Oct-10	7:55	18-Oct-10	18:45	IRON ORE LUMP	71612	EXPORT	Berth 3
NORD OBSERVER	17-Oct-10	10:06	18-Oct-10	18:18	GAS OIL	20005	IMPORT	Berth 2
ATROMITOS	18-Oct-10	4:45	19-Oct-10	15:00	WHEAT	27500	EXPORT	Berth 1
SEMINOLE PRINCESS	19-Oct-10	16:48	22-Oct-10	4:00	NIL	0		Berth 1
GENCO CLAUDIUS	20-Oct-10	6:16	23-Oct-10	8:16	IRON ORE FINES	165000	EXPORT	Berth 1
CHANG HANG KAI TUO	21-Oct-10	11:10	22-Oct-10	10:25	GAS OIL	9506	IMPORT	Berth 2
					UNLEADED PETROL	1209	IMPORT	Berth 2
SANMAR PHOENIX	22-Oct-10	5:45	24-Oct-10	15:12	WHEAT	52500	EXPORT	Berth 1
ANANGEL DESTINY	23-Oct-10	10:30	25-Oct-10	18:46	IRON ORE LUMP	150960	EXPORT	Berth 3
SEMINOLE PRINCESS	24-Oct-10	16:48	26-Oct-10	20:00	WHEAT	27000	EXPORT	Berth 1
MCP PAPHOS	31-Oct-10	19:18	01-Nov-10	9:00	CONTAINERS EMPTY	643	IMPORT	Berth 2

5. DATA ANALYSIS

5.1 Sampling times and date stamping

Samples are collected from the network of air quality monitoring stations (refer to **Figures 2 and 3**) according to the following:

- Daily PM10 average concentrations are calculated from 5-minute averages generated by validated data from Ecotech, approximately midday to midday (**Table 2**);
- Daily TSP results are based on 24 hour averages since filter papers are changed at approximately 1200 hrs every day (**Table 3**);
- Daily TSP samples are analysed for concentrations of metals (**Table 4**);
- Dust deposition gauge samples are collected approximately every 30 (+/- 2) days. The results from the sampling period are then corrected to a standard month. Dust deposition and associated speciation deposition rates are reported in mg/m²/month (**Table 5-6**); and
- Rainwater tank samples are collected with the dust deposition gauge samples, and are sent to the laboratory for analysis (**Table 7**).

5.2 Dust as PM10

The daily average monitoring results from the four TEOMs for October 2010 are presented in Table 2, together with the approximate tonnage loaded on each day. There were no exceedences of the 24-hour average PM10 assessment criterion.

The highest 24-hour average PM10 concentration of 36.1µg/m³ was measured at Site 2 on 18 October 2010. This represents approximately 72.2% of the assessment criterion (50µg/m³).

Table 2: 24-hour (midday to midday) average PM₁₀ concentrations for October 2010, with approximate daily port throughput

Start Date	End Date	Site 1 PM10 (µg/m ³)	Site 2 PM10 (µg/m ³)	Site 3 PM10 (µg/m ³)	Site 4 PM10 (µg/m ³)	Daily port throughput (tonnes)
1/10/10 12:00	2/10/10 12:00	14.4	17.2	21.2	19.3	0
2/10/10 12:00	3/10/10 12:00	19.1	20.9	20.8	19.5	0
3/10/10 12:00	4/10/10 12:00	13.9	16.0	12.9	13.3	0
4/10/10 12:00	5/10/10 12:00	15.0	16.0	14.6	14.6	0
5/10/10 12:00	6/10/10 12:00	32.4	32.9	29.2	30.3	0
6/10/10 12:00	7/10/10 12:00	27.1	23.5	21.3	21.0	0
7/10/10 12:00	8/10/10 12:00	22.5	18.0	17.3	15.7	45290
8/10/10 12:00	9/10/10 12:00	24.7	24.9	23.2	21.4	65545
9/10/10 12:00	10/10/10 12:00	24.7	24.9	23.7	22.7	73390
10/10/10 12:00	11/10/10 12:00	17.1	18.0	15.7	17.3	22775
11/10/10 12:00	12/10/10 12:00	12.1	12.9	11.2	12.3	0
12/10/10 12:00	13/10/10 12:00	14.8	14.8	13.0	13.2	0
13/10/10 12:00	14/10/10 12:00	17.6	19.9	17.5	17.7	0
14/10/10 12:00	15/10/10 12:00	22.2	22.5	21.1	23.8	9603
15/10/10 12:00	16/10/10 12:00	20.5	19.7	17.9	19.7	61731
16/10/10 12:00	17/10/10 12:00	24.3	22.1	20.6	21.2	61731
17/10/10 12:00	18/10/10 12:00	21.9	19.9	18.1	19.8	56619
18/10/10 12:00	19/10/10 12:00	24.8	36.1	28.3	29.4	65373
19/10/10 12:00	20/10/10 12:00	26.4	20.7	19.5	18.2	12044
20/10/10 12:00	21/10/10 12:00	30.7	34.2	30.3	28.5	39541
21/10/10 12:00	22/10/10 12:00	15.5	16.3	14.1	15.7	59428
22/10/10 12:00	23/10/10 12:00	14.4	11.6	9.9	10.6	74992
23/10/10 12:00	24/10/10 12:00	30.3	24.1	25.2	19.7	76584
24/10/10 12:00	25/10/10 12:00	27.9	23.3	21.6	20.1	82078
25/10/10 12:00	26/10/10 12:00	15.1	15.5	14.3	14.9	63006
26/10/10 12:00	27/10/10 12:00	23.3	20.4	16.8	17.3	10547
27/10/10 12:00	28/10/10 12:00	16.9	18.4	19.5	20.5	0
28/10/10 12:00	29/10/10 12:00	20.2	21.9	20.5	22.0	0
29/10/10 12:00	30/10/10 12:00	15.6	16.3	20.0	17.4	0
30/10/10 12:00	31/10/10 12:00	13.2	13.3	11.8	13.3	0
31/10/10 12:00	1/11/10 12:00	16.1	13.5	13.1	12.2	221

Bold - Exceedance of the 24hr target criteria (50µg/m3)

5.3 Dust as TSP

The monitoring results from the five HVAS sites for October 2010 are presented in **Table 3**, the laboratory results for which are presented in **Appendix B**. Note that the laboratory reports these results to two significant figures.

A sampling error occurred when the samples for the period midday 14/10/2010 to midday 15/10/2010 were taken out of the HVAS machine and re-sampled on the period midday 16/10/2010 to midday 17/10/2010. This occurred during a change over in sampling personnel and due to miscommunication the used papers were put into the machines again. Therefore please note that the results for the sampling period from midday 14th of October to 15th of October and midday 16th of October and 17th of October correspond to a 48hr period and not a 24hr.

There was no exceedance of the 24-hour TSP assessment criterion during October 2010. The highest TSP concentration of $72\mu\text{g}/\text{m}^3$ was recorded at Site 2 between 1200 on the 18 of October 2010 and 1200 on the 19 October 2010. This concentration represents approximately 80.0% of the assessment criterion ($90\mu\text{g}/\text{m}^3$). There was also a $72\mu\text{g}/\text{m}^3$ for the 48hr period 14 to 15 October 2010 and 16 to 17 October.

Table 3: TSP concentrations for October 2010, showing approximate daily port throughput

Start Date and Time (WST)	End Date and Time (WST)	Site 1	Site 2	Site 3	Site 4	Site 5	Approximate daily port throughput (tonnes)
		TSP (µg/m ³)	TSP (µg/m ³)	TSP (µg/m ³)	TSP (µg/m ³)	TSP (µg/m ³)	
1/10/2010 12:00	2/10/2010 12:00	15	14	27	21	16	0
2/10/2010 12:00	3/10/2010 12:00	30	38	35	32	23	0
3/10/2010 12:00	4/10/2010 12:00	18	27	17	15	20	0
4/10/2010 12:00	5/10/2010 12:00	17	27	24	25	19	0
5/10/2010 12:00	6/10/2010 12:00	53	72	51	62	48	0
6/10/2010 12:00	7/10/2010 12:00	48	40	33	32	33	0
7/10/2010 12:00	8/10/2010 12:00	33	23	34	32	25	45290
8/10/2010 12:00	9/10/2010 12:00	40	32	45	43	39	65545
9/10/2010 12:00	10/10/2010 12:00	29	39	35	38	32	73390
10/10/2010 12:00	11/10/2010 12:00	48	32	21	28	15	22775
11/10/2010 12:00	12/10/2010 12:00	4.9	16	5.6	17	15	0
12/10/2010 12:00	13/10/2010 12:00	48	28	16	11	17	0
13/10/2010 12:00	14/10/2010 12:00	31	44	34	33	31	0
14/10/2010 12:00 & 16/10/2010 12:00	15/10/2010 12:00 & 17/10/2010 12:00	72	69	60	68	56	9603 61731
15/10/2010 12:00	16/10/2010 12:00	35	35	30	29	31	61731
17/10/2010 12:00	18/10/2010 12:00	39	43	40	37	27	56619
18/10/2010 12:00	19/10/2010 12:00	54	72	54	53	37	65373
19/10/2010 12:00	20/10/2010 12:00	48	42	36	46	37	12044
20/10/2010 12:00	21/10/2010 12:00	50	65	56	54	49	39541
21/10/2010 12:00	22/10/2010 12:00	25	29	21	20	22	59428
22/10/2010 12:00	23/10/2010 12:00	30	20	15	14	20	74992
23/10/2010 12:00	24/10/2010 12:00	65	54	67	41	24	76584
24/10/2010 12:00	25/10/2010 12:00	41	42	30	26	30	82078
25/10/2010 12:00	26/10/2010 12:00	31	29	24	20	23	63006
26/10/2010 12:00	27/10/2010 12:00	43	42	33	31	30	10547
27/10/2010 12:00	28/10/2010 12:00	2.7	35	33	32	26	0
28/10/2010 12:00	29/10/2010 12:00	34	43	64	34	30	0
29/10/2010 12:00	30/10/2010 12:00	22	26	45	21	18	0
30/10/2010 12:00	31/10/2010 12:00	18	19	17	17	13	0
31/10/2010 12:00	1/11/2010 12:00	32	31	24	16	18	221

Data based on the number of loading/unloading days and total tonnes loaded/unloaded. Daily averages correspond with date on when HVAS filter papers were removed.

Bold - Exceedance of the 24hr target criteria (90µg/m³)

Bold – HVAS filter papers sampled for the 14-15 were mistakenly used again for the 16-17 of October due to human error. The data is for a 48hour period for both sampling days of 14-15 and 16-17 of October 2010.

6. TSP METAL SPECIATION ANALYSES

The laboratory reports for metal speciation in the filtered particulates (TSP) are provided in **Table 4** and **Appendix B**. Please note that the samples for midday 14/10/2010 to midday 15/10/2010 and midday 16/10/2010 to midday 17/10/2010 are for a 48hr period as explained in section 5.3. During the sampling period of midday 18/10/2010 to midday 19/10/2010 EPSL preformed a trial using PVC filters papers. The aim was to collect dust on PVC papers that MPL Laboratories can test for total organic carbon in addition to the metals and sulphur analyses. MPL laboratories were successful in analyzing for total organic carbon in addition to the metals and Sulphur from PVC papers.

The results are summarised as follows:

6.1 Nickel

The limit of detection for nickel in air is $0.002\mu\text{g}/\text{m}^3$.

The highest 24-hour average concentration of nickel during October 2010 was $0.020\mu\text{g}/\text{m}^3$ recorded at:

- Site 1 on the 19th of October 2010
- Site 2 on the 18th of October 2010 and
- Site 4 on the 19th of October

The concentration of $0.020\mu\text{g}/\text{m}^3$ ranges from 0.02% to 0.04% of the TSP concentration recorded for the period as stated and is seven fold below the license criterion (**Table 4**). There was no bulk nickel ship loading events or in loading of nickel from kibbles during the above periods.

6.2 Iron

The limit of detection for iron in air is $0.01\mu\text{g}/\text{m}^3$.

The highest 24-hour average concentration of iron during October 2010 was $1.7\mu\text{g}/\text{m}^3$ recorded at Site 4 from 1200 on 18 October 2010 and 1200 hrs on 19 October 2010. There was an iron ore ship loading for 6 hours of the monitoring period. There are no assessment criteria for iron in air. The concentration of $1.7\mu\text{g}/\text{m}^3$ represents 2.4% of the TSP concentration recorded at Site 2 for the period ($72\mu\text{g}/\text{m}^3$).

6.3 Sulfur

The limit of detection for sulfur in air is $0.03\mu\text{g}/\text{m}^3$.

The highest 24-hour average sulfur concentration during October 2010 was $1.4\mu\text{g}/\text{m}^3$ recorded at Site 4 1200 on the 7 October 2010 and 1200 hrs on 8 October 2010. The

concentration of $1.4\mu\text{g}/\text{m}^3$ represents 4.4% of the TSP concentration recorded at Site 4 for the period ($32\mu\text{g}/\text{m}^3$). Also, note that the sulphur concentration for the 48hr period was $2.6\mu\text{g}/\text{m}^3$ for site 5 (midday 14/10/2010 to midday 15/10/2010 and midday 16/10/2010 to midday 17/10/2010). There has been no import or export of sulphur since September 2009 and there are no assessment criteria for sulfur in air.

6.4 Lead

The limit of detection for lead in air is $0.003\mu\text{g}/\text{m}^3$. The 24-hour average lead concentration during October 2010 was below detection limit for all sites. The Port does not import or export lead concentrate.

Table 4: HVAS metal speciation results for October

Sampling start date ¹	Sampling finish date ¹	Site 1				Site 2				Site 3				Site 4				Site 5			
		Fe	Ni	Pb	S	Fe	Ni	Pb	S	Fe	Ni	Pb	S	Fe	Ni	Pb	S	Fe	Ni	Pb	S
1/10/2010 12:00	2/10/2010 12:00	0.16	<0.002	<0.003	0.47	0.19	<0.002	<0.003	0.48	0.21	<0.002	<0.003	0.51	0.17	<0.002	<0.003	0.51	0.14	<0.002	<0.003	0.52
2/10/2010 12:00	3/10/2010 12:00																				
3/10/2010 12:00	4/10/2010 12:00																				
4/10/2010 12:00	5/10/2010 12:00	0.32	<0.002	<0.003	0.85	0.54	<0.002	<0.003	0.86	0.24	<0.002	<0.003	0.82	0.20	<0.002	<0.003	0.84	0.27	<0.002	<0.003	0.83
5/10/2010 12:00	6/10/2010 12:00																				
6/10/2010 12:00	7/10/2010 12:00																				
7/10/2010 12:00	8/10/2010 12:00	0.63	<0.002	<0.003	0.93	0.85	0.01	<0.003	1.10	0.93	0.01	<0.003	1.40	0.44	<0.002	<0.003	1.60	0.48	<0.002	<0.003	1.00
8/10/2010 12:00	9/10/2010 12:00																				
9/10/2010 12:00	10/10/2010 12:00																				
10/10/2010 12:00	11/10/2010 12:00	0.35	<0.002	<0.003	0.88	0.41	<0.002	<0.003	0.82	0.14	<0.002	<0.003	0.86	0.13	<0.002	<0.003	0.87	0.14	<0.002	<0.003	0.64
11/10/2010 12:00	12/10/2010 12:00																				
12/10/2010 12:00	13/10/2010 12:00																				
13/10/2010 12:00	14/10/2010 12:00	0.29	<0.002	<0.003	0.99	0.70	0.01	<0.003	0.98	0.31	<0.002	<0.003	1.00	0.23	<0.002	<0.003	0.88	0.29	<0.002	<0.003	1.00
<i>14/10/2010 12:00</i>	<i>15/10/2010 12:00</i>	1.30	0.01	<0.003	2.40	1.40	0.01	<0.003	1.80	0.80	<0.002	<0.003	1.80	0.68	<0.002	<0.003	2.00	0.48	0.01	<0.003	2.60
<i>16/10/2010 12:00</i>	<i>16/10/2010 12:00</i>																				
15/10/2010 12:00	16/10/2010 12:00																				
17/10/2010 12:00	18/10/2010 12:00																				
18/10/2010 12:00	19/10/2010 12:00	1.20	0.01	<0.003	0.24	1.60	0.02	<0.003	0.15	1.20	0.01	<0.003	0.17	1.70	0.01	<0.003	0.18	0.97	<0.002	<0.003	0.20
19/10/2010 12:00	20/10/2010 12:00	1.10	0.02	<0.003	1.20	0.92	0.01	<0.003	1.20	0.80	0.01	<0.003	1.00	0.87	0.02	<0.003	1.10	0.57	<0.002	<0.003	1.20
20/10/2010 12:00	21/10/2010 12:00																				
21/10/2010 12:00	22/10/2010 12:00																				
22/10/2010 12:00	23/10/2010 12:00	0.53	0.01	<0.003	0.89	0.67	0.01	<0.003	0.80	0.21	<0.002	<0.003	0.79	0.21	<0.002	<0.003	0.84	0.41	<0.002	<0.003	0.76
23/10/2010 12:00	24/10/2010 12:00																				
24/10/2010 12:00	25/10/2010 12:00																				
25/10/2010 12:00	26/10/2010 12:00	0.48	<0.002	<0.003	0.87	0.81	0.01	<0.003	0.96	0.27	<0.002	<0.003	0.94	0.17	<0.002	<0.003	0.87	0.39	<0.002	<0.003	0.92
26/10/2010 12:00	27/10/2010 12:00																				
27/10/2010 12:00	28/10/2010 12:00																				
28/10/2010 12:00	29/10/2010 12:00	0.19	<0.002	<0.003	0.87	0.44	<0.002	<0.003	0.91	0.88	0.01	<0.003	1.10	0.16	<0.002	<0.003	0.84	0.18	<0.002	<0.003	0.73
29/10/2010 12:00	30/10/2010 12:00																				
30/10/2010 12:00	31/10/2010 12:00																				
31/10/2010 12:00	1/11/2010 12:00	0.65	<0.002	<0.003	0.68	0.54	<0.002	<0.003	0.73	0.30	<0.002	<0.003	0.67	0.23	<0.002	<0.003	0.70	0.29	<0.002	<0.003	0.68

Bold – Exceedance of the 24hr target criteria; Ni (0.14ug/m3)

Bold – Licence condition 7(a), Column 3 and Row 4

Italic – HVAS filter papers sampled for the 14-15 were mistakenly used again for the 16-17 of October due to human error. The data is for a 48hour period for both sampling days of 14-15 and 16-17 of October 2010.

Italic – Sampling trial to test whether the laboratory can measure total organic carbon using PVC papers

6.5 Dust deposition

EPSL operates 16 dust deposition gauges (DG) throughout Esperance (refer to **Figure 3**). These are referred to as off-site or community gauges, and comprise of DG1, DG3 to DG8, and DG11 to DG19. Two additional gauges are located on the port premises (DG9 and DG10), and are referred to as on-site or peak gauges. The assessment criteria are not applicable to DG9 and DG10 as these are located within the Port boundary and are not ambient monitoring stations.

The dust deposition rates measured during October 2010 are presented in **Table 5**, the complete laboratory reports are contained in **Appendix D** and time series plots of nickel concentrations on the deposited dust are also provided in **Appendix E**. The contaminant analyses from the October 2010 dust deposition samples are presented in **Table 6**.

There are no deposition criteria for nickel and iron. The data for each contaminant is presented in **Table 6** and are comprised of a soluble and insoluble component, each of which has different laboratory detection limits. Results have been rounded off to the nearest appropriate order of magnitude where applicable.

6.5.1 Summary of the results

Insoluble dust deposition rate of 4000 mg/m²/month (NSW standard)

- The maximum allowable insoluble dust deposition rate was exceeded at DG6 (4500mg/m²/month) during October 2010 (**Table 5**). DG6 experienced moderate to strong winds 57% of the time from the south east to south west wind arc. Therefore the dust was mobilized from the West Beach peninsula as supported by the qualitative visual analysis (50% of sand).

Please note results of the Ports' internal dust gauges DG9 and DG10 should not be compared to the NSW standard, they are situated within the ports' boundaries; they are not community monitors.

Summary of results

- DG8 detected insoluble nickel above the **laboratory detection limits (LDL)**, DG1 detected soluble/insoluble nickel above the laboratory detection limits while all other dust gauges detected soluble and insoluble nickel below the LDL.
- All dust gauges recorded below LDL for insoluble sulfur.
- All dust gauges recorded above LDL for soluble sulfur.
- All dust gauges recorded insoluble iron deposition rates above LDL.
- All dust gauges recorded soluble iron above deposition rates below LDL.
- Lead (soluble and insoluble) was below LDL for all gauges.

The overall value of community Dust Gauges has become extremely limited given that over 90% of all values in 2010 are below detection for nickel.

The nickel deposition rates at all dust gauges are all below detection except for DG1 and DG8 for the month of October. The long-term dust gauge data (**Appendix E**) shows that nickel deposition rates at DG9 within the in loading area of the Port (trucks unload kibbles of nickel within three metres of DG9 for 9), has remained low for the last five months less than 24mg/m²/month. Nickel deposition at DG9 correlated to the average number of trucks that passed through the Port between January and May 2010 was 110 trucks per month, 37 for June, none for July, 24 trucks for August and 37 for September and none for October. This is not surprising given that DG9 is located less than 3m from kibble unloading activities. There were no ships loading events for bulk nickel in October (refer to **Table 1**). The nickel deposition for DG10 went up to 52 mg/m²/October month from 8 mg/m²/September month; in relation to preceding data this is a relative low measurement (**Appendix E**).

Table 5: Dust deposition rates measured during October 2010

Station Classification	Dust deposition gauge	Total dust (mg/m ² /month)	Soluble dust (mg/m ² /month)	Insoluble dust (mg/m ³ /month)	Qualitative analysis ¹							
					Deposition	Dirt	Coal	Sand	Sulfur	Grain	Insect	Vegetation
Off-site "neighbourhood"	DG1	4800	2900	1900								
	DG3	3500	3100	400								
	DG4	23300	21000	2300								
	DG5	3600	2800	800								
	DG6	9200	4700	4500	Heavy	5%		50%		40%	5%	
	DG7	1900	1200	700								
	DG8	5100	3800	1300								
	DG11	4700	3700	1000								
	DG12	4900	4400	500								
	DG13	7100	6500	600								
	DG14	5600	4900	700								
	DG15	6000	4300	1700								
	DG16	4100	3100	1000								
	DG17	4400	3800	600								
DG18	6700	3600	3100									
DG19	3600	3100	500									
On-site "peak"	DG9	12900	3000	9900	Very Heavy	30%		50%		10%	5%	5%
	DG10	9300	4400	4900	Heavy	20%		20%		10%	10%	40%
Assessment Criteria				4000								

¹ Qualitative analysis¹ is defined as semi-quantitative microscopic examination

Bold - exceedance of the assessment criteria (4000 mg/m²/month)

Table 6: Speciated Dust Deposition Rates for October 2010

Station Classification	Dust deposition gauge	Nickel (mg/m ² /month)		Sulfur (mg/m ² /month)		Iron (mg/m ² /month)		Lead (mg/m ² /month)	
		Soluble	Insoluble	Soluble	Insoluble	Soluble	Insoluble	Soluble	Insoluble
Off-site "neighbourhood"	DG1	0.9		60.7		6.0		BDL	
	DG3	BDL		38.8		7.3		BDL	
	DG4	BDL		376.0		6.8		BDL	
	DG5	BDL		20.0		6.4		BDL	
	DG6	BDL		62.4		12.7		BDL	
	DG7	BDL		23.7		7.0		BDL	
	DG8	2.0		42.4		18.6		BDL	
	DG11	BDL		77.8		6.0		BDL	
	DG12	BDL		70.4		6.0		BDL	
	DG13	BDL		146.0		7.3		BDL	
	DG14	BDL		96.7		6.8		BDL	
	DG15	BDL		66.9		6.4		BDL	
	DG16	BDL		60.7		12.7		BDL	
	DG17	BDL		66.2		7.0		BDL	
	DG18	BDL		71.6		18.6		BDL	
On-site "peak"	DG9	12.8		51.1		131.9		0.9	
	DG10	52.6		201.3		288.0		3.7	
Detection limits*		0.006	0.3	0.06	30	0.003	0.6	0.006	0.6

BDL - Below Detection Limit

6.6 Rainwater tank monitoring

Eleven residential rainwater tanks are monitored on a monthly basis, these tanks are located at DG3, DG5, DG8, DG11, DG12, and DG14 to DG19 (**Figure 3**). The laboratory analytical reports for rainwater tank monitoring are shown in **Appendix F** and the October 2010 metal concentration monitoring results for the rainwater tanks and co-located dust deposition gauges are presented in **Table 7**. Results from the rainwater tank monitoring are compared with the Australian Drinking Water Guidelines (ADWG) and the World Health Organisation (WHO) Guidelines.

- The ADWG for nickel (0.02 mg/L) was not exceeded in October at any site. All the rainwater tanks are above **laboratory detection limits (LDL)** but below the ADWG for nickel.
- The ADWG for lead (0.01 mg/L) was exceeded at DG11 (0.018 mg/L). The rainwater tanks at DG3, DG5, DG8, DG17 and DG18 were above LDL, but did not exceed the ADWG. The lead concentrations for all other tanks were below LDL.
- The WHO drinking water guideline for iron (2 mg/L) DG11 as not exceeded in September 2010 at any site. All the rainwater tanks are below LDL.
- There are no assessment criteria for sulfur in drinking water. At all sites DG3, DG8, and DG14 to DG18 detected sulfur concentrations at 1 to 2 mg/L. All other sites detected LDL.

Exceedences at DG11 (lead)

As reported previously in the October 2009 report, the concentrations measured at DG11 (lead) may be due to localised sources of contamination within the tanks or the roofs. Lead at DG11 may be from lead flashing on the roof. The Esperance Cleanup Recovery Project is conducting isotopic analyses to determine if the lead is from the Magellan mine and the results are pending.

The Port has proposed to relocate DG11. Proposed locations to the DEC include either 5 or 7 Smith Street. However, continued monitoring of lead is becoming redundant since monitoring results for the last two years do not substantiate any environmental risk or continued significant emissions from the Port.

There is no correlation between the dust gauges and rainwater tanks across all locations (refer to **Figure 4**). This is based on data from the 2008/2009 annual report in addition to the 2009/2010 report. This indicates inputs of airborne metals are likely to be a minor source of metals within the rainwater tanks for all sites. Localised sources of nickel dominate measured concentrations of nickel in the rainwater tanks.

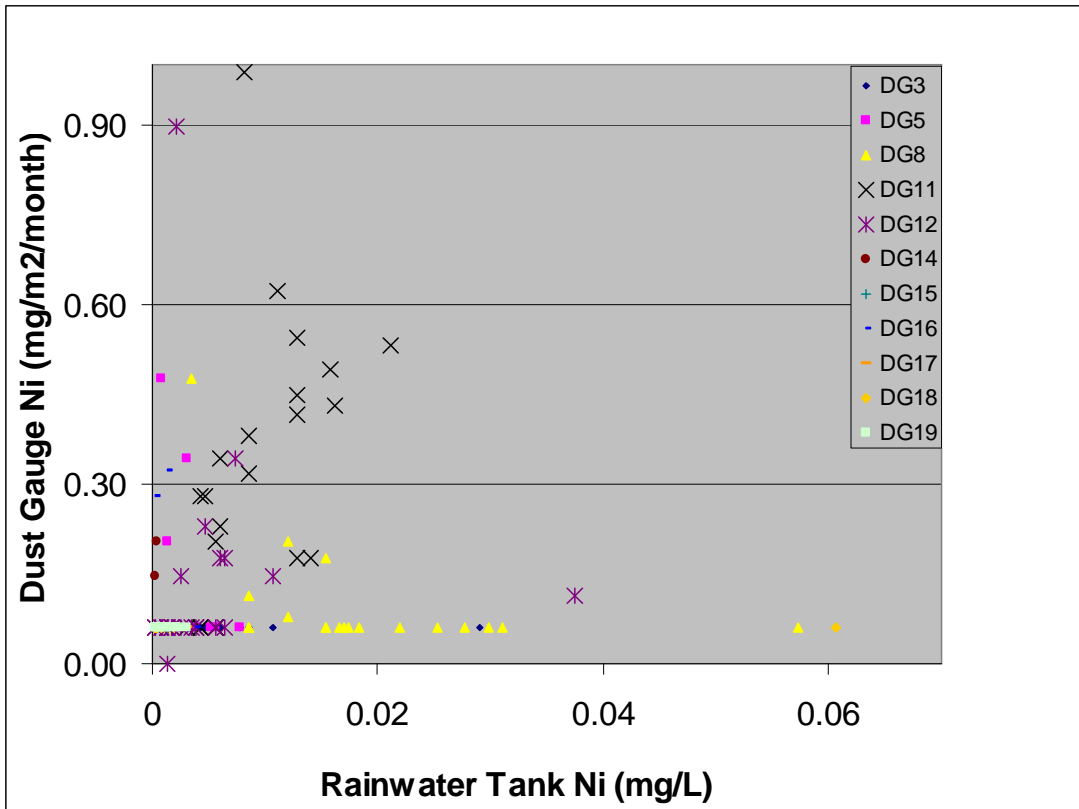


Figure 4: No relationship between Nickel in dust gauges and nickel in rainwater for measurements between 2008 and 2010

Some patterns of metal concentrations measured in the rainwater tanks may be explained by the following:

- potential difference in rainwater tank construction material (galvanized iron, concrete, etc.);
- differences in rainwater tank design may affect the sampling;
- differences in roof materials and roof construction methods (e.g. lead flashing) may affect concentrations;
- the ability and extent to which a tank may be ‘flushed’;
- cleanliness of the roof and gutters before sampling; and
- Rate of water change in each tank.

Huston *et al* (2009) quantified the impact of dry and wet atmospheric pollution deposition on rainwater tank contaminant concentrations in the greater Brisbane area. The deposition samplers were based on the Australian standard for dust deposition (AS/NZS 3580.10.2 2003). Thirteen locations with concurrent dust deposition and rainwater tank monitoring were sampled for a period of one year. The study used the ADWG recommended levels

as a maximum limit to assess potential health risk of consuming collected deposition. It was found that:

- lead concentrations in the deposition samples exceeded the ADWG in 10.3% of the samples;
- lead concentration in the rainwater tanks exceeded the ADWG in 14.2% of the samples;
- the highest lead concentration measured in a rainwater tank was 84.7µg/L (or 0.0847 mg/L) (for context, note that this exceeds the ADWG of 0.01 mg/L by more than eight times); and
- The bulk deposition concentrations were always less than the tank water concentrations.

Huston's study concluded that:

- roof runoff contains elevated heavy metals such as lead, with the roof often acting as a source of the metals;
- one implication of the study's results is that there are major sources of lead to the tank other than atmospheric deposition (e.g. roof tile lead flashing, old paint, lead-stabilised PVC drain pipes, etc); and
- Atmospheric deposition does contribute to contaminants in rainwater in urban environments; however, the quality of water collected in a tank may not reflect that of the rainwater.

Given the rainwater tank monitoring is not indicative of the Port emissions, the Port has requested its licence be amended to remove rainwater tank monitoring.

Table 7: October 2010 rainwater tank results with co-located dust deposition gauge results

Location	Nickel		Sulfur		Iron		Lead	
	Dust (mg/m ² /month)	Water (mg/L)	Dust (mg/m ² /month)	Water (mg/L)	Dust (mg/m ² /month)	Water (mg/L)	Dust (mg/m ² /month)	Water (mg/L)
DG3	BDL	0.009	38.8	1.0	7.3	BDL	BDL	0.001
DG5	BDL	0.004	20.0	1.0	6.4	BDL	BDL	0.001
DG8	2	0.006	42.4	2.0	18.6	BDL	BDL	0.001
DG11	BDL	0.014	77.8	BDL	6.0	BDL	BDL	0.017
DG12	BDL	0.005	70.4	1.0	6.0	BDL	BDL	BDL
DG14	BDL	0.002	96.7	2.0	6.8	BDL	BDL	BDL
DG15	BDL	0.002	66.9	1.0	6.4	BDL	BDL	0.001
DG16	BDL	0.010	60.7	1.0	12.7	BDL	BDL	BDL
DG17	BDL	0.008	66.2	1.0	7.0	BDL	BDL	0.001
DG18	BDL	0.001	71.6	1.0	18.6	BDL	BDL	BDL
DG19	BDL	BDL	39.2	BDL	6.0	BDL	BDL	BDL
Detection limits	0.3	0.001	30	1.0	0.6	0.001	0.6	0.001
Assessment Criteria	-	0.02	-	-	-	2	-	0.01

BDL – below laboratory limits of detection

Bold - exceedance of the assessment criteria for nickel (0.02mg/L), iron (2mg/L) and lead (0.01mg/L)

7. CONCLUSIONS

There were no exceedences of any air quality criteria during October 2010. Nickel dust concentrations remained low relative to trends over the last two years in samples from both the high volume air samplers and the dust gauges. This is largely due to a combination of light offshore winds, low numbers of trucks unloading nickel kibbles and no bulk nickel ship loading events. The frequency of high values from the HVAS recorded mainly at site 2 in summer, autumn and early winter 2008/09, have been reduced for the same periods in 2009/10. Once seasonal patterns are recognised in the dust gauge results, a reduction in nickel deposition rates over the last few years is evident.

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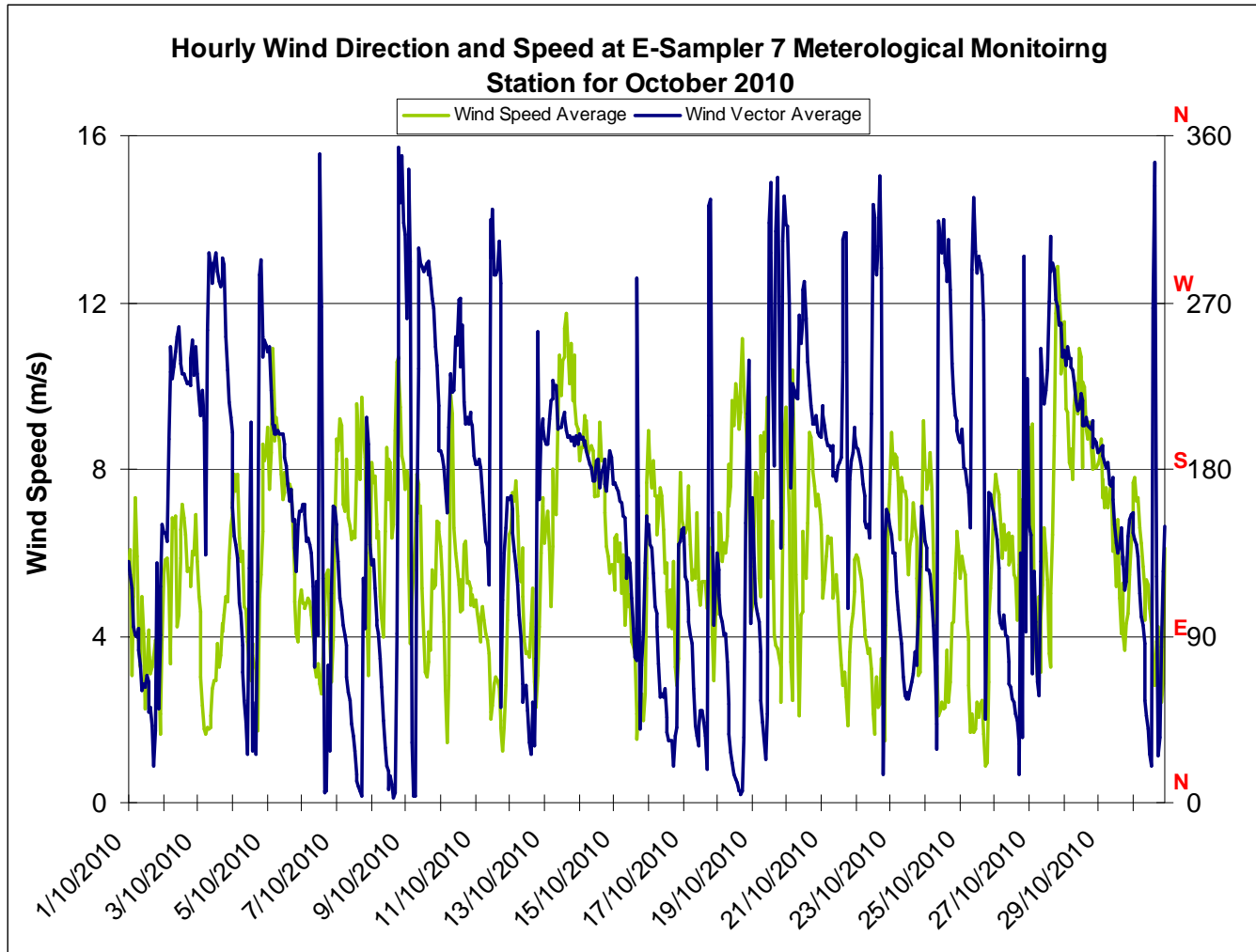
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APPENDIX A HOURLY WIND DIRECTION AND SPEED AT E-SAMPLER 7 METEROLOGICAL MONITORING STATION FOR OCTOBER 2010



APPENDIX B HVAS LABORATORY REPORTS: MPL LABORATORIES



Part of the EnviroLab Group



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CERTIFICATE OF ANALYSIS 105978

Client:
Esperance Ports - Sea and Land
 PO Box 35
 Esperance
 WA 6450

Attention: C Magana

Sample log in details:

Your Reference: Dust Analysis
 No. of samples: 24 High Volume Filters
 Date samples received: 6/10/10
 Date completed instructions received: 6/10/10
 Location:

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
 Samples were analysed as received from the client. Results relate specifically to the samples as received.

Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: 8/10/10
 Date of Preliminary Report: Not issued
 Issue Date: 11/10/10
 NATA accreditation number 9804. This document shall not be reproduced except in full.
 This document is issued in accordance with NATA's accreditation requirements.
 Accredited for compliance with ISO/IEC 17025.
 Tests not covered by NATA are denoted with *.

Results Approved By:


 Dr Monika Berger
 Supervisor - Micro, Asbestos, Dust

Client Reference: Dust Analysis

Metals in High Volume Filters	UNITS	PQL	105978-1	105978-2	105978-3	105978-4	105978-5
Our Reference:	--	--	EPS890	EPS860	EPS861	EPS862	EPS863
Your Reference	--	--	Site 4	Site 3	Site 2	Site 1	Site 5
Location	--	--	28/09/10	28/09/10	28/09/10	28/09/10	28/09/10
Date Sampled							
Dust	mg/liter	0.1	19	26	44	55	25
Dust in Air	µg/m ³	0.1	12	16	28	36	16
Iron	µg/liter	20	790	920	1,100	800	370
Iron in Air	µg/m ³	0.01	0.49	0.57	0.67	0.51	0.24
Nickel	µg/liter	5	7.7	9.5	9.8	<5.0	<5.0
Nickel in Air	µg/m ³	0.002	<0.002	0.010	0.010	<0.002	<0.002
Lead	µg/liter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lead in Air	µg/m ³	0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Lithium	µg/liter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lithium in Air	µg/m ³	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sulfur	µg/liter	50	1,500	1,400	1,000	880	850
Sulfur in Air	µg/m ³	0.03	0.93	0.89	0.65	0.56	0.54

Metals in High Volume Filters	UNITS	PQL	105978-6	105978-7	105978-8	105978-9	105978-10
Our Reference:	--	--	EPS864	EPS877	EPS878	EPS879	EPS880
Your Reference	--	--	Blank	Site 4	Site 3	Site 2	Site 1
Location	--	--		1/10/10	1/10/10	1/10/10	1/10/10
Date Sampled							
Dust	mg/liter	0.1	0.70	36	46	24	25
Dust in Air	µg/m ³	0.1	[NA]	21	27	14	15
Iron	µg/liter	20	140	290	360	320	280
Iron in Air	µg/m ³	0.01	[NA]	0.17	0.21	0.19	0.16
Nickel	µg/liter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Nickel in Air	µg/m ³	0.002	[NA]	<0.002	<0.002	<0.002	<0.002
Lead	µg/liter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lead in Air	µg/m ³	0.003	[NA]	<0.003	<0.003	<0.003	<0.003
Lithium	µg/liter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lithium in Air	µg/m ³	0.002	[NA]	<0.002	<0.002	<0.002	<0.002
Sulfur	µg/liter	50	440	860	850	810	800
Sulfur in Air	µg/m ³	0.03	[NA]	0.51	0.51	0.46	0.47

Client Reference: Dust Analysis

Metals in High Volume Filters	UNITS	PQL	105978-11	105978-12	105978-13	105978-14	105978-15
Our Reference:	--	--	EPS881	EPS882	EPS883	EPS884	EPS885
Your Reference:	--	--	Site 5	Blank	Site 4	Site 3	Site 2
Location	--	--	1/10/10		2/10/10	2/10/10	2/10/10
Date Sampled							
Dust	mg/liter	0.1	27	1.0	49	53	56
Dust in Air	µg/m ³	0.1	16	[NA]	32	35	38
Iron	µg/liter	20	240	170	170	180	470
Iron in Air	µg/m ³	0.01	0.14	[NA]	0.11	0.12	0.31
Nickel	µg/liter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Nickel in Air	µg/m ³	0.002	<0.002	[NA]	<0.002	<0.002	<0.002
Lead	µg/liter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lead in Air	µg/m ³	0.003	<0.003	[NA]	<0.003	<0.003	<0.003
Lithium	µg/liter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lithium in Air	µg/m ³	0.002	<0.002	[NA]	<0.002	<0.002	<0.002
Sulfur	µg/liter	50	890	560	1,100	1000	1,200
Sulfur in Air	µg/m ³	0.03	0.52	[NA]	0.72	0.66	0.78

Metals in High Volume Filters	UNITS	PQL	105978-16	105978-17	105978-18	105978-19	105978-20
Our Reference:	--	--	EPS886	EPS887	EPS888	EPS889	EPS890
Your Reference:	--	--	Site 1	Site 5	Blank	Site 4	Site 3
Location	--	--	2/10/10	2/10/10		3/10/10	3/10/10
Date Sampled							
Dust	mg/liter	0.1	45	35	1.7	26	28
Dust in Air	µg/m ³	0.1	30	23	[NA]	15	17
Iron	µg/liter	20	260	200	150	230	240
Iron in Air	µg/m ³	0.01	0.17	0.13	[NA]	0.14	0.14
Nickel	µg/liter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Nickel in Air	µg/m ³	0.002	<0.002	<0.002	[NA]	<0.002	<0.002
Lead	µg/liter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lead in Air	µg/m ³	0.003	<0.003	<0.003	[NA]	<0.003	<0.003
Lithium	µg/liter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lithium in Air	µg/m ³	0.002	<0.002	<0.002	[NA]	<0.002	<0.002
Sulfur	µg/liter	50	1,000	910	480	920	770
Sulfur in Air	µg/m ³	0.03	0.69	0.60	[NA]	0.55	0.47

MPL Reference: 105978
Revision No: R 00

MPL Reference: 105978
Revision No: R 00



Part of the EnviroLab Group



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 www.envirolabservices.com.au
 EnviroLab Services (WA) Pty Ltd ABN 53 140 099 207

CERTIFICATE OF ANALYSIS 106355

Client:

Esperance Ports - Sea and Land

PO Box 35
 Esperance
 WA 6450

Attention: C Magana

Sample log in details:

Your Reference: Dust Analysis, Suite A & B
 No. of samples: 78 High Volume Filters
 Date samples received: 20/10/10
 Date completed instructions received: 20/10/10
 Location:

Analysis Details:

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Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: 22/10/10
 Date of Preliminary Report: Not Issued
 Issue Date: 25/10/10

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Results Approved By:



Sue Nash
 Approved Signatory

MPL Reference: 106355
 Revision No: R 00

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Client Reference: Dust Analysis, Suite A & B

Metals in High Volume Filters							
Our Reference:	UNITS	PQL	106355-1	106355-2	106355-3	106355-4	106355-5
Your Reference	--	--	EPS895	EPS896	EPS897	EPS898	EPS899
Location	--	--	Site 4	Site 3	Site 2	Site 1	Site 5
Date Sampled			4/10/10	4/10/10	4/10/10	4/10/10	4/10/10
Dust	mg/Filter	0.1	41	39	43	28	31
Dust in Air	µg/m ³	0.1	25	24	27	17	19
Iron	µg/Filter	20	340	400	880	520	460
Iron in Air	µg/m ³	0.01	0.20	0.24	0.54	0.32	0.27
Nickel	µg/Filter	5	<5.0	<5.0	6.2	<5.0	<5.0
Nickel in Air	µg/m ³	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Lead	µg/Filter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lead in Air	µg/m ³	0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Lithium	µg/Filter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lithium in Air	µg/m ³	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sulfur	µg/Filter	50	1,400	1,300	1,400	1,400	1,400
Sulfur in Air	µg/m ³	0.03	0.84	0.82	0.86	0.85	0.83

Metals in High Volume Filters							
Our Reference:	UNITS	PQL	106355-6	106355-7	106355-8	106355-9	106355-10
Your Reference	--	--	EPS900	EPS901	ITC344	EPS902	EPS903
Location	--	--	Blank	Site 4	Site 3	Site 2	Site 1
Date Sampled			5/10/10	5/10/10	5/10/10	5/10/10	5/10/10
Dust	mg/Filter	0.1		100	84	120	87
Dust in Air	µg/m ³	0.1	[NA]	62	51	72	53
Iron	µg/Filter	20	160	[NA]	[NA]	[NA]	[NA]
Nickel	µg/Filter	5	<5.0	[NA]	[NA]	[NA]	[NA]
Lead	µg/Filter	5	<5.0	[NA]	[NA]	[NA]	[NA]
Lithium	µg/Filter	5	<5.0	[NA]	[NA]	[NA]	[NA]
Sulfur	µg/Filter	50	810	[NA]	[NA]	[NA]	[NA]

Metals in High Volume Filters							
Our Reference:	UNITS	PQL	106355-11	106355-12	106355-13	106355-14	106355-15
Your Reference	--	--	EPS904	EPS905	EPS906	EPS907	EPS908
Location	--	--	Site 5	Blank	Site 4	Site 3	Site 2
Date Sampled			5/10/10	6/10/10	6/10/10	6/10/10	6/10/10
Dust	mg/Filter	0.1	79	2.2	56	57	69
Dust in Air	µg/m ³	0.1	48	[NA]	32	33	40

Metals in High Volume Filters							
Our Reference:	UNITS	PQL	106355-16	106355-17	106355-18	106355-19	106355-20
Your Reference	--	--	EPS909	EPS910	EPS911	EPS912	EPS913
Location	--	--	Site 1	Site 5	Blank	Site 4	Site 3
Date Sampled			6/10/10	6/10/10	7/10/10	7/10/10	7/10/10
Dust	mg/Filter	0.1	83	57	0.60	50	52
Dust in Air	µg/m ³	0.1	48	33	[NA]	32	34
Iron	µg/Filter	20	[NA]	[NA]	[NA]	680	1,400

MPL Reference: 106355
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Client Reference: Dust Analysis, Suite A & B

Metals in High Volume Filters	UNITS	PQL	106355-16	106355-17	106355-18	106355-19	106355-20
Our Reference:	--	--	EPS909	EPS910	EPS911	EPS912	EPS913
Your Reference:	--	--	Site 1	Site 5	Blank	Site 4	Site 3
Location	--	--	6/10/10	6/10/10		7/10/10	7/10/10
Date Sampled							
Iron in Air	µg/m ³	0.01	[NA]	[NA]	[NA]	0.44	0.93
Nickel	µg/Filter	5	[NA]	[NA]	[NA]	5.5	12
Nickel in Air	µg/m ³	0.002	[NA]	[NA]	[NA]	<0.002	0.010
Lead	µg/Filter	5	[NA]	[NA]	[NA]	<5.0	<5.0
Lead in Air	µg/m ³	0.003	[NA]	[NA]	[NA]	<0.003	<0.003
Lithium	µg/Filter	5	[NA]	[NA]	[NA]	<5.0	<5.0
Lithium in Air	µg/m ³	0.002	[NA]	[NA]	[NA]	<0.002	<0.002
Sulfur	µg/Filter	50	[NA]	[NA]	[NA]	2,500	2,200
Sulfur in Air	µg/m ³	0.03	[NA]	[NA]	[NA]	1.6	1.4

Metals in High Volume Filters	UNITS	PQL	106355-21	106355-22	106355-23	106355-24	106355-25
Our Reference:	--	--	EPS914	EPS915	EPS916	EPS917	EPS918
Your Reference:	--	--	Site 2	Site 1	Site 5	Blank	Site 4
Location	--	--	7/10/10	7/10/10	7/10/10		8/10/10
Date Sampled							
Dust	mg/Filter	0.1	36	50	38	0.70	63
Dust in Air	µg/m ³	0.1	23	33	25	[NA]	43
Iron	µg/Filter	20	1,300	980	740	180	[NA]
Iron in Air	µg/m ³	0.01	0.85	0.63	0.48	[NA]	[NA]
Nickel	µg/Filter	5	9.5	<5.0	<5.0	<5.0	[NA]
Nickel in Air	µg/m ³	0.002	0.010	<0.002	<0.002	[NA]	[NA]
Lead	µg/Filter	5	<5.0	<5.0	<5.0	<5.0	[NA]
Lead in Air	µg/m ³	0.003	<0.003	<0.003	<0.003	[NA]	[NA]
Lithium	µg/Filter	5	<5.0	<5.0	<5.0	<5.0	[NA]
Lithium in Air	µg/m ³	0.002	<0.002	<0.002	<0.002	[NA]	[NA]
Sulfur	µg/Filter	50	1,700	1,400	1,600	740	[NA]
Sulfur in Air	µg/m ³	0.03	1.1	0.93	1.0	[NA]	[NA]

MPL Reference: 106355
Revision No: R 00

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Client Reference: Dust Analysis, Suite A & B

Metals in High Volume Filters	UNITS	PQL	106355-26	106355-27	106355-28	106355-29	106355-30
Our Reference:	--	--	EPS919	EPS920	EPS921	EPS922	EPS923
Your Reference:	--	--	Site 3	Site 2	Site 1	Site 5	Blank
Location	--	--	8/10/10	8/10/10	8/10/10	8/10/10	
Date Sampled							
Dust	mg/Filter	0.1	65	46	59	56	2.6
Dust in Air	µg/m ³	0.1	45	32	40	39	[NA]

Metals in High Volume Filters	UNITS	PQL	106355-31	106355-32	106355-33	106355-34	106355-35
Our Reference:	--	--	EPS924	EPS925	EPS926	EPS927	EPS928
Your Reference:	--	--	Site 4	Site 3	Site 2	Site 1	Site 5
Location	--	--	9/10/10	9/10/10	9/10/10	9/10/10	9/10/10
Date Sampled							
Dust	mg/Filter	0.1	62	57	63	47	52
Dust in Air	µg/m ³	0.1	38	35	39	29	32

Metals in High Volume Filters	UNITS	PQL	106355-36	106355-37	106355-38	106355-39	106355-40
Our Reference:	--	--	EPS929	EPS930	EPS931	EPS932	EPS933
Your Reference:	--	--	Blank	Site 4	Site 3	Site 2	Site 1
Location	--	--		10/10/10	10/10/10	10/10/10	10/10/10
Date Sampled							
Dust	mg/Filter	0.1	2.5	44	33	50	75
Dust in Air	µg/m ³	0.1	[NA]	28	21	32	48
Iron	µg/Filter	20	[NA]	210	220	640	550
Iron in Air	µg/m ³	0.01	[NA]	0.13	0.14	0.41	0.35
Nickel	µg/Filter	5	[NA]	<5.0	<5.0	<5.0	<5.0
Nickel in Air	µg/m ³	0.002	[NA]	<0.002	<0.002	<0.002	<0.002
Lead	µg/Filter	5	[NA]	<5.0	<5.0	<5.0	<5.0
Lead in Air	µg/m ³	0.003	[NA]	<0.003	<0.003	<0.003	<0.003
Lithium	µg/Filter	5	[NA]	<5.0	<5.0	<5.0	<5.0
Lithium in Air	µg/m ³	0.002	[NA]	<0.002	<0.002	<0.002	<0.002
Sulfur	µg/Filter	50	[NA]	1,400	1,300	1,300	1,400
Sulfur in Air	µg/m ³	0.03	[NA]	0.87	0.86	0.82	0.88

MPL Reference: 106355
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Client Reference Dust Analysis, Suite A & B

Metals in High Volume Filters							
Our Reference:	UNITS	PQL	106355-41	106355-42	106355-43	106355-44	106355-45
Your Reference:	--	--	EPS934	EPS935	EPS936	EPS937	EPS938
Location:	--	--	Site 5	Blank	Site 4	Site 3	Site 2
Date Sampled			10/10/10		11/10/10	11/10/10	11/10/10
Dust	mg/Filter	0.1	23	<0.10	28	9.1	25
Dust in Air	µg/m ³	0.1	15	[NA]	17	5.6	16
Iron	µg/Filter	20	220	150	[NA]	[NA]	[NA]
Iron in Air	µg/m ³	0.01	0.14	[NA]	[NA]	[NA]	[NA]
Nickel	µg/Filter	5	<5.0	<5.0	[NA]	[NA]	[NA]
Nickel in Air	µg/m ³	0.002	<0.002	[NA]	[NA]	[NA]	[NA]
Lead	µg/Filter	5	<5.0	<5.0	[NA]	[NA]	[NA]
Lead in Air	µg/m ³	0.003	<0.003	[NA]	[NA]	[NA]	[NA]
Lithium	µg/Filter	5	<5.0	<5.0	[NA]	[NA]	[NA]
Lithium in Air	µg/m ³	0.002	<0.002	[NA]	[NA]	[NA]	[NA]
Sulfur	µg/Filter	50	1,000	590	[NA]	[NA]	[NA]
Sulfur in Air	µg/m ³	0.03	0.64	[NA]	[NA]	[NA]	[NA]

Metals in High Volume Filters							
Our Reference:	UNITS	PQL	106355-46	106355-47	106355-48	106355-49	106355-50
Your Reference:	--	--	EPS939	EPS940	EPS941	EPS942	EPS943
Location:	--	--	Site 1	Site 5	Blank	Site 4	Site 3
Date Sampled			11/10/10	11/10/10		12/10/10	12/10/10
Dust	mg/Filter	0.1	7.9	25	1.3	18	26
Dust in Air	µg/m ³	0.1	4.9	15	[NA]	11	16

Metals in High Volume Filters							
Our Reference:	UNITS	PQL	106355-51	106355-52	106355-53	106355-54	106355-55
Your Reference:	--	--	EPS944	EPS945	EPS946	EPS947	EPS948
Location:	--	--	Site 2	Site 1	Site 5	Blank	Site 4
Date Sampled			12/10/10	12/10/10	12/10/10		13/10/10
Dust	mg/Filter	0.1	46	76	28	0.10	49
Dust in Air	µg/m ³	0.1	28	48	17	[NA]	33
Iron	µg/Filter	20	[NA]	[NA]	[NA]	[NA]	340
Iron in Air	µg/m ³	0.01	[NA]	[NA]	[NA]	[NA]	0.23
Nickel	µg/Filter	5	[NA]	[NA]	[NA]	[NA]	<5.0
Nickel in Air	µg/m ³	0.002	[NA]	[NA]	[NA]	[NA]	<0.002
Lead	µg/Filter	5	[NA]	[NA]	[NA]	[NA]	<5.0
Lead in Air	µg/m ³	0.003	[NA]	[NA]	[NA]	[NA]	<0.003
Lithium	µg/Filter	5	[NA]	[NA]	[NA]	[NA]	<5.0
Lithium in Air	µg/m ³	0.002	[NA]	[NA]	[NA]	[NA]	<0.002
Sulfur	µg/Filter	50	[NA]	[NA]	[NA]	[NA]	1,300
Sulfur in Air	µg/m ³	0.03	[NA]	[NA]	[NA]	[NA]	0.88

Client Reference Dust Analysis, Suite A & B

Metals in High Volume Filters							
Our Reference:	UNITS	PQL	106355-56	106355-57	106355-58	106355-59	106355-60
Your Reference:	--	--	EPS949	EPS950	EPS951	EPA1	EPA2
Location:	--	--	Site 3	Site 2	Site 1	Site 5	Blank
Date Sampled			13/10/10	13/10/10	13/10/10	13/10/10	
Dust	mg/Filter	0.1	51	67	48	48	1.8
Dust in Air	µg/m ³	0.1	34	44	31	31	[NA]
Iron	µg/Filter	20	480	1,100	440	450	110
Iron in Air	µg/m ³	0.01	0.31	0.70	0.29	0.29	[NA]
Nickel	µg/Filter	5	<5.0	12	<5.0	<5.0	<5.0
Nickel in Air	µg/m ³	0.002	<0.002	0.010	<0.002	<0.002	[NA]
Lead	µg/Filter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lead in Air	µg/m ³	0.003	<0.003	<0.003	<0.003	<0.003	[NA]
Lithium	µg/Filter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lithium in Air	µg/m ³	0.002	<0.002	<0.002	<0.002	<0.002	[NA]
Sulfur	µg/Filter	50	1,500	1,500	1,500	1,800	480
Sulfur in Air	µg/m ³	0.03	1.0	0.98	0.99	1.0	[NA]

Metals in High Volume Filters							
Our Reference:	UNITS	PQL	106355-61	106355-62	106355-63	106355-64	106355-65
Your Reference:	--	--	EPA3	EPA4	EPA5	EPA6	EPA7
Location:	--	--	Site 4	Site 3	Site 2	Site 1	Site 5
Date Sampled			14/10/10	14/10/10	14/10/10	14/10/10	14/10/10
Dust	mg/Filter	0.1	110	99	110	120	95
Dust in Air	µg/m ³	0.1	68	60	69	72	56
Iron	µg/Filter	20	1,100	1,300	2,400	2,200	810
Iron in Air	µg/m ³	0.01	0.88	0.80	1.4	1.3	0.48
Nickel	µg/Filter	5	7.5	7.1	16	14	9.2
Nickel in Air	µg/m ³	0.002	<0.002	<0.002	0.010	0.010	0.010
Lead	µg/Filter	5	<5.0	<5.0	5.9	<5.0	<5.0
Lead in Air	µg/m ³	0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Lithium	µg/Filter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lithium in Air	µg/m ³	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sulfur	µg/Filter	50	3,300	3,000	2,900	3,900	4,500
Sulfur in Air	µg/m ³	0.03	2.0	1.8	1.8	2.4	2.6

Client Reference Dust Analysis, Suite A & B

Metals in High Volume Filters		UNITS	PQL	106355-66	106355-67	106355-68	106355-69	106355-70
Our Reference:		--	--	EPA8	EPA9	EPA10	EPA11	EPA12
Your Reference:		--	--	Blank	Site 4	Site 3	Site 2	Site 1
Location:		--	--		15/10/10	15/10/10	15/10/10	15/10/10
Date Sampled								
Dust	mg/Filter	0.1	1.4	47	48	55	58	58
Dust in Air	µg/m ³	0.1	[NA]	29	30	35	35	35
Iron	µg/Filter	20	91	[NA]	[NA]	[NA]	[NA]	[NA]
Nickel	µg/Filter	5	<5.0	[NA]	[NA]	[NA]	[NA]	[NA]
Lead	µg/Filter	5	<5.0	[NA]	[NA]	[NA]	[NA]	[NA]
Lithium	µg/Filter	5	<5.0	[NA]	[NA]	[NA]	[NA]	[NA]
Sulfur	µg/Filter	50	400	[NA]	[NA]	[NA]	[NA]	[NA]

Metals in High Volume Filters		UNITS	PQL	106355-71	106355-72	106355-73	106355-74	106355-75
Our Reference:		--	--	EPA13	EPA14	EPA15	EPA16	EPA17
Your Reference:		--	--	Site 5	Blank	Site 4	Site 3	Site 2
Location:		--	--					
Date Sampled				15/10/10		17/10/10	17/10/10	17/10/10
Dust	mg/Filter	0.1	48	32	58	62	67	67
Dust in Air	µg/m ³	0.1	31	[NA]	37	40	43	43

Metals in High Volume Filters		UNITS	PQL	106355-76	106355-77	106355-78	106355-79
Our Reference:		--	--	EPA18	EPA19	EPA20	Lab Blank
Your Reference:		--	--	Site 1	Site 5	Blank	Lot TD08011
Location:		--	--				
Date Sampled				17/10/10	17/10/10		
Dust	mg/Filter	0.1	61	42	12	[NA]	[NA]
Dust in Air	µg/m ³	0.1	39	27	[NA]	[NA]	[NA]
Iron	µg/Filter	20	[NA]	[NA]	[NA]	180	[NA]
Nickel	µg/Filter	5	[NA]	[NA]	[NA]	<5.0	[NA]
Lead	µg/Filter	5	[NA]	[NA]	[NA]	<5.0	[NA]
Lithium	µg/Filter	5	[NA]	[NA]	[NA]	<5.0	[NA]
Sulfur	µg/Filter	50	[NA]	[NA]	[NA]	930	[NA]



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CERTIFICATE OF ANALYSIS 106356

Client:

Esperance Ports - Sea and Land
 PO Box 35
 Esperance
 WA 6450

Attention: C Magana

Sample log in details:

Your Reference:	Dust Analysis
No. of samples:	5 High Volume Filters
Date samples received:	20/10/10
Date completed instructions received:	20/10/10
Location:	

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
 Samples were analysed as received from the client. Results relate specifically to the samples as received.

Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by:	2/11/10
Date of Preliminary Report:	Not issued
Issue Date:	3/11/10

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Results Approved By:


 Dr Monika Berger
 Supervisor - Micro, Asbestos, Dust

Client Reference: Dust Analysis

Combustible Dust Our Reference: Your Reference Location Date Sampled Filter No	UNITS	PQL	106356-1 PVCHV1 Site 4 18/10/10 PVCHV1	106356-2 PVC HV2 Site 3 18/10/10 PVC HV2	106356-3 PVCHV3 Site 2 18/10/10 PVCHV3	106356-4 PVCHV4 Site 1 18/10/10 PVCHV4	106356-5 PVCHV5 Site 5 18/10/10 PVCHV5
Dust	mg/ftiter	0.1	85	86	110	85	59
Dust in Air	µg/m ³	0.1	53	54	72	53	37
Combustible Dust	mg/ftiter	0.1	48	82	72	47	26
Combustible Dust in Air	µg/m ³	0.1	30	52	45	30	16

Client Reference: Dust Analysis

Metals in High Volume Filters							
Our Reference: Your Reference Location Date Sampled Filter No	UNITS	PQL	106356-1 PVCHV1 Site 4 18/10/10 PVCHV1	106356-2 PVC HV2 Site 3 18/10/10 PVC HV2	106356-3 PVCHV3 Site 2 18/10/10 PVCHV3	106356-4 PVCHV4 Site 1 18/10/10 PVCHV4	106356-5 PVCHV5 Site 5 18/10/10 PVCHV5
Dust	mg/ftiter	0.1	85	86	110	85	59
Dust in Air	µg/m ³	0.1	53	54	72	54	37
Iron	µg/ftiter	20	2,700	1,900	2,500	2,000	1,600
Iron in Air	µg/m ³	0.01	1.7	1.2	1.6	1.2	0.97
Nickel	µg/ftiter	5	19	10	28	24	7.9
Nickel in Air	µg/m ³	0.002	0.010	0.010	0.020	0.010	<0.002
Lead	µg/ftiter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lead in Air	µg/m ³	0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Lithium	µg/ftiter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lithium in Air	µg/m ³	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sulfur	µg/ftiter	50	280	280	280	380	310
Sulfur in Air	µg/m ³	0.03	0.18	0.17	0.15	0.24	0.20

Metals in High Volume Filters			
Our Reference: Your Reference Location Date Sampled Filter No	UNITS	PQL	106356-6 Lab Blank
Iron	µg/ftiter	20	<20
Nickel	µg/ftiter	5	<5.0
Lead	µg/ftiter	5	<5.0
Lithium	µg/ftiter	5	<5.0
Sulfur	µg/ftiter	50	<50



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CERTIFICATE OF ANALYSIS 106493

Client:
Esperance Ports - Sea and Land
 PO Box 35
 Esperance
 WA 6450

Attention: C Magana

Sample log in details:

Your Reference: **Dust Analysis**
 No. of samples: 36 High Volume Filters
 Date samples received: 26/10/10
 Date completed instructions received: 26/10/10
 Location:

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
 Samples were analysed as received from the client. Results relate specifically to the samples as received.

Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: 26/10/10
 Date of Preliminary Report: Not Issued
 Issue Date: 8/12/10

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Results Approved By:


 Dr Monika Berger
 Supervisor - Micro, Asbestos, Dust

MPL Reference: 106493
 Revision No: R 01

Client Reference: Dust Analysis

Metals in High Volume Filters							
Our Reference:	UNITS	PQL	106493-1	106493-2	106493-3	106493-4	106493-5
Your Reference	--	--	EPA21	EPA22	EPA23	EPA24	EPA25
Location	--	--	Site 4	Site 3	Site 2	Site 1	Site 5
Date Sampled			19/10/10	19/10/10	19/10/10	19/10/10	19/10/10
Dust	mg/liter	0.1	68	54	62	72	54
Dust in Air	µg/m ³	0.1	46	36	42	48	37
Iron	µg/liter	20	1,300	1,200	1,400	1,700	860
Iron in Air	µg/m ³	0.01	0.87	0.80	0.92	1.1	0.57
Nicke I	µg/liter	5	25	8.4	18	23	6.7
Nickel in Air	µg/m ³	0.002	0.020	0.010	0.010	0.020	<0.002
Lead	µg/liter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lead in Air	µg/m ³	0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Lithium	µg/liter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lithium in Air	µg/m ³	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sulfur	µg/liter	50	1,600	1,600	1,800	1,900	1,800
Sulfur in Air	µg/m ³	0.03	1.1	1.0	1.2	1.2	1.2

Metals in High Volume Filters							
Our Reference:	UNITS	PQL	106493-6	106493-7	106493-8	106493-9	106493-10
Your Reference	--	--	EPA26	EPA27	EPA28	EPA29	EPA30
Location	--	--	Blank	Site 4	Site 3	Site 2	Site 1
Date Sampled			20/10/10	20/10/10	20/10/10	20/10/10	20/10/10
Dust	mg/liter	0.1	3.0	86	88	100	79
Dust in Air	µg/m ³	0.1	[NA]	54	56	65	50
Iron	µg/liter	20	190	[NA]	[NA]	[NA]	[NA]
Nicke I	µg/liter	5	<5.0	[NA]	[NA]	[NA]	[NA]
Lead	µg/liter	5	<5.0	[NA]	[NA]	[NA]	[NA]
Lithium	µg/liter	5	<5.0	[NA]	[NA]	[NA]	[NA]
Sulfur	µg/liter	50	770	[NA]	[NA]	[NA]	[NA]

Metals in High Volume Filters							
Our Reference:	UNITS	PQL	106493-11	106493-12	106493-13	106493-14	106493-15
Your Reference	--	--	EPA31	EPA32	EPA33	EPA34	EPA35
Location	--	--	Site 5	Blank	Site 4	Site 3	Site 2
Date Sampled			20/10/10		21/10/10	21/10/10	21/10/10
Dust	mg/liter	0.1	79	0.70	32	32	45
Dust in Air	µg/m ³	0.1	49	[NA]	20	21	29

Metals in High Volume Filters							
Our Reference:	UNITS	PQL	106493-16	106493-17	106493-18	106493-19	106493-20
Your Reference	--	--	EPA36	EPA37	EPA38	EPA39	EPA40
Location	--	--	Site 1	Site 5	Blank	Site 4	Site 3
Date Sampled			21/10/10	21/10/10		22/10/10	22/10/10
Dust	mg/liter	0.1	38	34	0.90	23	25
Dust in Air	µg/m ³	0.1	25	22	[NA]	14	15
Iron	µg/liter	20	[NA]	[NA]	[NA]	350	350

MPL Reference: 106493
 Revision No: R 01

Client Reference Dust Analysis

Metals in High Volume Filters	UNITS	PQL	106493-16	106493-17	106493-18	106493-19	106493-20
Our Reference:	--	--	EPA36	EPA37	EPA38	EPA39	EPA40
Your Reference	--	--	Site 1	Site 5	Blank	Site 4	Site 3
Location	--	--	Site 1	Site 5	Blank	Site 4	Site 3
Date Sampled			21/10/10	21/10/10		22/10/10	22/10/10
Iron in Air	µg/m ³	0.01	[NA]	[NA]	[NA]	0.21	0.21
Nickel	µg/liter	5	[NA]	[NA]	[NA]	<5.0	<5.0
Nickel in Air	µg/m ³	0.002	[NA]	[NA]	[NA]	<0.002	<0.002
Lead	µg/liter	5	[NA]	[NA]	[NA]	<5.0	<5.0
Lead in Air	µg/m ³	0.003	[NA]	[NA]	[NA]	<0.003	<0.003
Lithium	µg/liter	5	[NA]	[NA]	[NA]	<5.0	<5.0
Lithium in Air	µg/m ³	0.002	[NA]	[NA]	[NA]	<0.002	<0.002
Sulfur	µg/liter	50	[NA]	[NA]	[NA]	1,400	1,300
Sulfur in Air	µg/m ³	0.03	[NA]	[NA]	[NA]	0.84	0.79

Metals in High Volume Filters	UNITS	PQL	106493-21	106493-22	106493-23	106493-24	106493-25
Our Reference:	--	--	EPA41	EPA42	EPA43	EPA44	EPA45
Your Reference	--	--	Site 2	Site 1	Site 5	Blank	Site 4
Location	--	--	Site 2	Site 1	Site 5	Blank	Site 4
Date Sampled			22/10/10	22/10/10	22/10/10		23/10/10
Dust	mg/liter	0.1	34	50	34	0.50	65
Dust in Air	µg/m ³	0.1	20	30	20	[NA]	41
Iron	µg/liter	20	1,100	890	890	180	[NA]
Iron in Air	µg/m ³	0.01	0.67	0.53	0.41	[NA]	[NA]
Nickel	µg/liter	5	9.5	10	8.0	<5.0	[NA]
Nickel in Air	µg/m ³	0.002	0.010	0.010	<0.002	[NA]	[NA]
Lead	µg/liter	5	<5.0	<5.0	<5.0	<5.0	[NA]
Lead in Air	µg/m ³	0.003	<0.003	<0.003	<0.003	[NA]	[NA]
Lithium	µg/liter	5	<5.0	<5.0	<5.0	<5.0	[NA]
Lithium in Air	µg/m ³	0.002	<0.002	<0.002	<0.002	[NA]	[NA]
Sulfur	µg/liter	50	1,300	1,500	1,300	620	[NA]
Sulfur in Air	µg/m ³	0.03	0.80	0.88	0.76	[NA]	[NA]

Client Reference Dust Analysis

Metals in High Volume Filters	UNITS	PQL	106493-26	106493-27	106493-28	106493-29	106493-30
Our Reference:	--	--	EPA46	EPA47	EPA48	EPA49	EPA50
Your Reference	--	--	Site 3	Site 2	Site 1	Site 5	Blank
Location	--	--	Site 3	Site 2	Site 1	Site 5	Blank
Date Sampled			23/10/10	23/10/10	23/10/10	23/10/10	
Dust	mg/liter	0.1	110	91	100	39	3.8
Dust in Air	µg/m ³	0.1	67	54	65	24	[NA]

Metals in High Volume Filters	UNITS	PQL	106493-31	106493-32	106493-33	106493-34	106493-35
Our Reference:	--	--	EPA51	EPA52	EPA53	EPA54	EPA55
Your Reference	--	--	Site 4	Site 3	Site 2	Site 1	Site 5
Location	--	--	Site 4	Site 3	Site 2	Site 1	Site 5
Date Sampled			24/10/10	24/10/10	24/10/10	24/10/10	24/10/10
Dust	mg/liter	0.1	41	46	61	63	47
Dust in Air	µg/m ³	0.1	26	30	42	41	30

Metals in High Volume Filters	UNITS	PQL	106493-36	106493-37
Our Reference:	--	--	EPA56	Lab Blank
Your Reference	--	--	Blank	Lot T01454
Location	--	--	Blank	Lot T01454
Date Sampled				
Dust	mg/liter	0.1	0.30	[NA]
Iron	µg/liter	20	[NA]	170
Nickel	µg/liter	5	[NA]	<5.0
Lead	µg/liter	5	[NA]	<5.0
Lithium	µg/liter	5	[NA]	<5.0
Sulfur	µg/liter	50	[NA]	660



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CERTIFICATE OF ANALYSIS 106693

Client:

Esperance Ports - Sea and Land

PO Box 35
 Esperance
 WA 6460

Attention: C Magana

Sample log in details:

Your Reference:	<u>Dust Analysis</u>
No. of samples:	36 High Volume Filters
Date samples received:	3/11/10
Date completed instructions received:	3/11/10
Location:	

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
 Samples were analysed as received from the client. Results relate specifically to the samples as received.

Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by:	10/11/10
Date of Preliminary Report:	Not issued
Issue Date:	9/11/10

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Results Approved By:


 Dr Monika Berger
 Supervisor - Micro, Asbestos, Dust

MPL Reference: 106693
 Revision No: R 00

Client Reference: Dust Analysis

Metals in High Volume Filters	UNITS	PQL	106693-1	106693-2	106693-3	106693-4	106693-5
Our Reference:	--	--	EPA67	EPA68	EPA69	EPA70	EPA71
Your Reference:	--	--	Site 4	Site 3	Site 2	Site 1	Site 5
Location	--	--	25/10/10	25/10/10	25/10/10	25/10/10	25/10/10
Date Sampled							
Dust	mg/filter	0.1	32	40	47	50	36
Dust in Air	µg/m ³	0.1	20	24	29	31	23
Iron	µg/filter	20	270	430	1,300	780	620
Iron in Air	µg/m ³	0.01	0.17	0.27	0.81	0.48	0.39
Nickel	µg/filter	5	<5.0	<5.0	11	5.4	<5.0
Nickel in Air	µg/m ³	0.002	<0.002	<0.002	0.010	<0.002	<0.002
Lead	µg/filter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lead in Air	µg/m ³	0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Lithium	µg/filter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lithium in Air	µg/m ³	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sulfur	µg/filter	50	1,400	1,500	1,600	1,400	1,500
Sulfur in Air	µg/m ³	0.03	0.87	0.94	0.96	0.87	0.92

Metals in High Volume Filters	UNITS	PQL	106693-6	106693-7	106693-8	106693-9	106693-10
Our Reference:	--	--	EPA62	EPA63	EPA64	EPA65	EPA66
Your Reference:	--	--	Blank	Site 4	Site 3	Site 2	Site 1
Location	--	--	Blank	26/10/10	26/10/10	26/10/10	26/10/10
Date Sampled							
Dust	mg/filter	0.1	0.30	52	56	72	74
Dust in Air	µg/m ³	0.1	[NA]	31	33	42	43
Iron	µg/filter	20	190	[NA]	[NA]	[NA]	[NA]
Nickel	µg/filter	5	<5.0	[NA]	[NA]	[NA]	[NA]
Lead	µg/filter	5	<5.0	[NA]	[NA]	[NA]	[NA]
Lithium	µg/filter	5	<5.0	[NA]	[NA]	[NA]	[NA]
Sulfur	µg/filter	50	810	[NA]	[NA]	[NA]	[NA]

Metals in High Volume Filters	UNITS	PQL	106693-11	106693-12	106693-13	106693-14	106693-15
Our Reference:	--	--	EPA67	EPA68	EPA69	EPA70	EPA71
Your Reference:	--	--	Site 5	Blank	Site 4	Site 3	Site 2
Location	--	--	28/10/10	Blank	27/10/10	27/10/10	27/10/10
Date Sampled							
Dust	mg/filter	0.1	51	0.20	48	50	53
Dust in Air	µg/m ³	0.1	30	[NA]	32	33	35

Metals in High Volume Filters	UNITS	PQL	106693-16	106693-17	106693-18	106693-19	106693-20
Our Reference:	--	--	EPA72	EPA73	EPA74	EPA75	EPA76
Your Reference:	--	--	Site 1	Site 5	Blank	Site 4	Site 3
Location	--	--	27/10/10	27/10/10	Blank	28/10/10	28/10/10
Date Sampled							
Dust	mg/filter	0.1	4.1	39	0.50	52	98
Dust in Air	µg/m ³	0.1	2.7	26	[NA]	34	64
Iron	µg/filter	20	[NA]	[NA]	[NA]	240	1,300

MPL Reference: 106693
 Revision No: R 00

Client Reference: Dust Analysis

Metals in High Volume Filters							
Our Reference:	UNITS	PQL	106693-16	106693-17	106693-18	106693-19	106693-20
Your Reference:	--	--	EPA72	EPA73	EPA74	EPA75	EPA76
Location:	--	--	Site 1	Site 5	Blank	Site 4	Site 3
Date Sampled			27/10/10	27/10/10		28/10/10	28/10/10
Iron in Air	µg/m ³	0.01	[NA]	[NA]	[NA]	0.16	0.88
Nickel	µg/liter	5	[NA]	[NA]	[NA]	<5.0	12
Nickel in Air	µg/m ³	0.002	[NA]	[NA]	[NA]	<0.002	0.010
Lead	µg/liter	5	[NA]	[NA]	[NA]	<5.0	6.2
Lead in Air	µg/m ³	0.003	[NA]	[NA]	[NA]	<0.003	<0.003
Lithium	µg/liter	5	[NA]	[NA]	[NA]	<5.0	<5.0
Lithium in Air	µg/m ³	0.002	[NA]	[NA]	[NA]	<0.002	<0.002
Sulfur	µg/liter	50	[NA]	[NA]	[NA]	1,300	1,600
Sulfur in Air	µg/m ³	0.03	[NA]	[NA]	[NA]	0.84	1.1

Metals in High Volume Filters							
Our Reference:	UNITS	PQL	106693-21	106693-22	106693-23	106693-24	106693-25
Your Reference:	--	--	EPA77	EPA78	EPA79	EPA80	EPA81
Location:	--	--	Site 2	Site 1	Site 5	Blank	Site 4
Date Sampled			28/10/10	28/10/10	28/10/10		28/10/10
Dust	mg/liter	0.1	66	52	47	0.60	33
Dust in Air	µg/m ³	0.1	43	34	30	[NA]	21
Iron	µg/liter	20	670	300	270	150	[NA]
Iron in Air	µg/m ³	0.01	0.44	0.19	0.18	[NA]	[NA]
Nickel	µg/liter	5	6.8	<5.0	<5.0	<5.0	[NA]
Nickel in Air	µg/m ³	0.002	<0.002	<0.002	<0.002	[NA]	[NA]
Lead	µg/liter	5	<5.0	<5.0	<5.0	<5.0	[NA]
Lead in Air	µg/m ³	0.003	<0.003	<0.003	<0.003	[NA]	[NA]
Lithium	µg/liter	5	<5.0	<5.0	<5.0	<5.0	[NA]
Lithium in Air	µg/m ³	0.002	<0.002	<0.002	<0.002	[NA]	[NA]
Sulfur	µg/liter	50	1,400	1,300	1,100	620	[NA]
Sulfur in Air	µg/m ³	0.03	0.91	0.87	0.73	[NA]	[NA]

Client Reference: Dust Analysis

Metals in High Volume Filters							
Our Reference:	UNITS	PQL	106693-26	106693-27	106693-28	106693-29	106693-30
Your Reference:	--	--	EPA82	EPA83	EPA84	EPA85	EPA86
Location:	--	--	Site 3	Site 2	Site 1	Site 5	Blank
Date Sampled			29/10/10	29/10/10	29/10/10	29/10/10	
Dust	mg/liter	0.1	75	43	36	30	<0.10
Dust in Air	µg/m ³	0.1	45	26	22	18	[NA]

Metals in High Volume Filters						
Our Reference:	UNITS	PQL	106693-31	106693-32	106693-33	106693-34
Your Reference:	--	--	EPA87	EPA88	EPA89	EPA90
Location:	--	--	Site 4	Site 3	Site 2	Site 1
Date Sampled			30/10/10	30/10/10	30/10/10	30/10/10
Dust	mg/liter	0.1	26	26	29	29
Dust in Air	µg/m ³	0.1	17	17	19	18

Metals in High Volume Filters				
Our Reference:	UNITS	PQL	106693-36	106693-37
Your Reference:	--	--	EAP2	Lab Blank
Location:	--	--	Blank	
Date Sampled				
Dust	mg/liter	0.1	0.10	[NA]
Iron	µg/liter	20	[NA]	110
Nickel	µg/liter	5	[NA]	<5.0
Lead	µg/liter	5	[NA]	<5.0
Lithium	µg/liter	5	[NA]	<5.0
Sulfur	µg/liter	50	[NA]	480



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 www.envirolabservices.com.au
 EnviroLab Services (WA) Pty Ltd ABN 53 140 099 207

CERTIFICATE OF ANALYSIS 106846

Client:

Esperance Ports - Sea and Land
 PO Box 35
 Esperance
 WA 6460

Attention: C Magana

Sample log in details:

Your Reference: Dust Analysis
 No. of samples: 41 High Volume Filters
 Date samples received: 9/11/10
 Date completed instructions received: 9/11/10
 Location:

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
 Samples were analysed as received from the client. Results relate specifically to the samples as received.

Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: 11/11/10
 Date of Preliminary Report: Not issued
 Issue Date: 15/11/10
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Results Approved By:


 Dr Monika Berger
 Supervisor – Micro, Asbestos, Dust

Client Reference Dust Analysis

Metals in High Volume Filters	UNITS	PQL	106846-1	106846-2	106846-3	106846-4	106846-5
Our Reference:	--	--	EAP3	EAP4	EAP5	EAP6	EAP7
Your Reference	--	--	Site 4	Site 3	Site 2	Site 1	Site 5
Location	--	--					
Date Sampled			31/10/10	31/10/10	31/10/10	31/10/10	31/10/10
Air Volume	m ³		1,635	1,622	1,617	1,626	1,634
Weight of Filter (initial)	mg	0.02	3504.20	3512.80	3501.10	3507.80	3525.50
Weight of Filter (final)	mg	0.02	3,531.00	3552.10	3551.50	3559.90	3554.30
Dust	mg/Filter	0.1	27	39	50	52	29
Dust in Air	µg/m ³	0.1	16	24	31	32	18
Iron	µg/Filter	20	380	490	870	1,000	470
Iron in Air	µg/m ³	0.01	0.23	0.30	0.54	0.65	0.29
Nickel	µg/Filter	5	<5.0	<5.0	7.0	<5.0	<5.0
Nickel in Air	µg/m ³	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Lead	µg/Filter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lead in Air	µg/m ³	0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Lithium	µg/Filter	5	<5.0	<5.0	<5.0	<5.0	<5.0
Lithium in Air	µg/m ³	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Sulfur	µg/Filter	50	1,100	1,100	1,200	1,100	1,100
Sulfur in Air	µg/m ³	0.03	0.70	0.67	0.73	0.68	0.68

Metals in High Volume Filters	UNITS	PQL	106846-6	106846-7	106846-8	106846-9	106846-10
Our Reference:	--	--	EAP8	EAP9	EAP10	EAP11	EAP12
Your Reference	--	--	Blank	Site 4	Site 3	Site 2	Site 1
Location	--	--					
Date Sampled				1/11/10	1/11/10	1/11/10	1/11/10
Air Volume	m ³		[NA]	1,538	1,530	1,524	1,530
Weight of Filter (initial)	mg	0.02	3516.30	3520.70	3531.60	3564.50	3567.10
Weight of Filter (final)	mg	0.02	3521.10	3552.90	3570.60	3601.60	3606.80
Dust	mg/Filter	0.1	4.8	32	39	37	40
Dust in Air	µg/m ³	0.1	[NA]	21	25	24	26
Iron	µg/Filter	20	130	[NA]	[NA]	[NA]	[NA]
Nickel	µg/Filter	5	<5.0	[NA]	[NA]	[NA]	[NA]
Lead	µg/Filter	5	<5.0	[NA]	[NA]	[NA]	[NA]
Lithium	µg/Filter	5	<5.0	[NA]	[NA]	[NA]	[NA]
Sulfur	µg/Filter	50	710	[NA]	[NA]	[NA]	[NA]

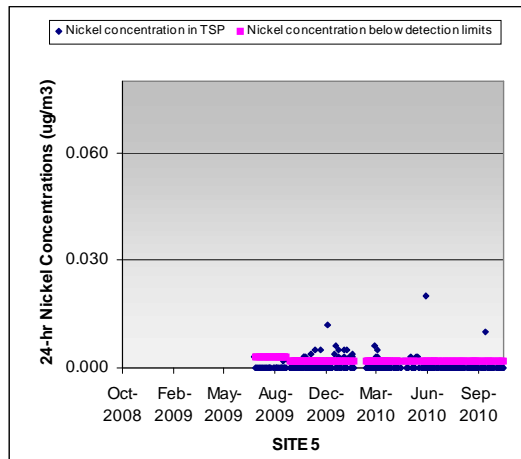
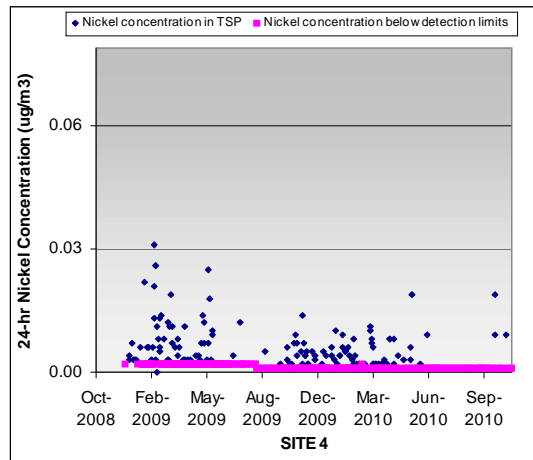
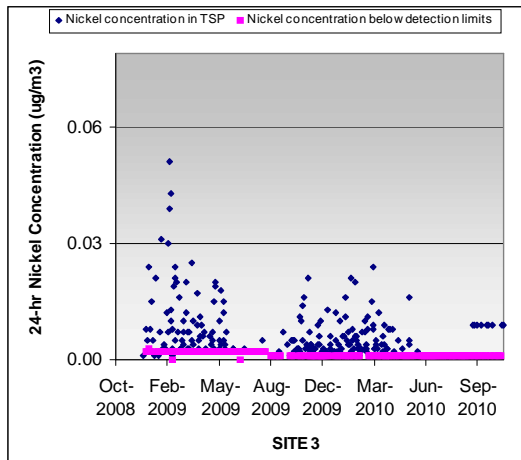
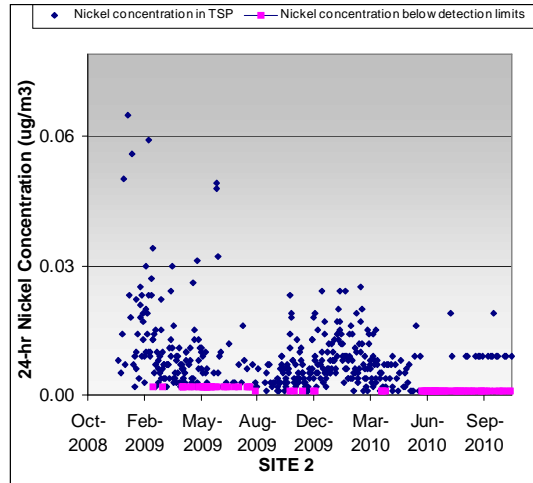
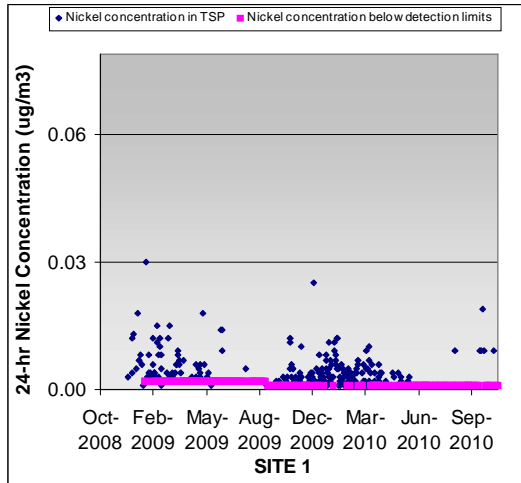
MPL Reference: 106846
 Revision No: R 00

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MPL Reference: 106846
 Revision No: R 00

Page 2 of 7

APPENDIX C DAILY NICKEL CONCENTRATIONS (HVAS) GRAPHED OVER TIME



Concentrations of nickel in total suspended particulate measured in High Volume Air Samplers. Sites 1 to 4 are on the border of Esperance Port. Site 5 is located within the community at the Shire offices.

APPENDIX D DUST DEPOSITION LABORATORY REPORTS ALS LABORATORY

ALS Laboratory Group
 ANALYTICAL CHEMISTRY & TESTING SERVICES



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	EN1002670	Page	: 1 of 6
Client	ESPERANCE PORTS - SEA & LAND	Laboratory	: Environmental Division Newcastle
Contact	RESULTS ADDRESS	Contact	: Peter Keyte
Address	PO BOX 35 ESPERANCE WA, AUSTRALIA 6450	Address	: 5 Rosegum Road Warabrook NSW Australia 2304
E-mail	: port.env@eps.com.au	E-mail	: peter.keyte@als.com.au
Telephone	: +61 0419941116	Telephone	: 61-2-4968-9433
Facsimile	: +61 08 90711312	Facsimile	: +61-2-4968 0349
Project	: ENV08-566	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ---	Date Samples Received	: 05-NOV-2010
C.O.C number	: ---	Issue Date	: 22-NOV-2010
Sampler	: CLAUDIA MAGANA	No. of samples received	: 18
Site	: ---	No. of samples analysed	: 18
Quote number	: ---		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Celine Conceicao	Spectroscopist	Inorganics
Peter Keyte	Newcastle Manager	Newcastle

Environmental Division Newcastle
 Part of the **ALS Laboratory Group**
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 A Campbell Brothers Limited Company

Page : 2 of 6
 Work Order : EN1002670
 Client : ESPERANCE PORTS - SEA & LAND
 Project : ENV08-566



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key: CAS Number = CAS registry number from database maintained by Chemical Abstracts Service. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- Analysis as per AS3980.10.1:2003. Samples passed through a 1mm sieve prior to analysis. NATA accreditation is not held for results reported in g/m².mh.
- EA144: The metal concentration in the filter is reported in µg/filter on a total filter basis calculated up from the proportion of the filter paper provided by the client.
- No copper sulfate correction was applied to samples.



Analytical Results

Sub-Matrix: DUST				Client sam ple ID				
				Client sam pling date / time				
				DG1	DG3	DG4	DG5	DG6
				02-NOV-2010 15:00	02-NOV-2010 15:00	02-NOV-2010 15:00	02-NOV-2010 15:00	02-NOV-2010 15:00
Com pound	CAS Num ber	LOR	Unit	EN1002670-001	EN1002670-002	EN1002670-003	EN1002670-004	EN1002670-005
E A120: Ash Content								
Ash Content	....	0.1	g/m ² .month	1.1	0.3	1.6	0.7	3.9
Ash Content (mg)	....	1	mg	22	6	32	13	76
E A125: Combustible Matter								
Combustible Matter	....	0.1	g/m ² .month	0.8	0.1	0.7	0.1	0.6
Combustible Matter (mg)	....	1	mg	14	2	13	2	12
E A130: Volume								
Volume	....	1	mL	393	377	730	389	303
E A139: Total Soluble Matter								
Total Soluble Matter	....	0.1	g/m ² .month	2.9	3.1	21.0	2.8	4.7
Total Soluble Matter (mg)	....	1	mg	56	60	407	54	91
E A141: Total Insoluble Matter								
Total Insoluble Matter	....	0.1	g/m ² .month	1.9	0.4	2.3	0.8	4.5
Total Insoluble Matter (mg)	....	1	mg	36	8	45	15	88
E A142: Total Solids								
Total Solids	....	0.1	g/m ² .month	4.8	3.5	23.3	3.6	9.2
Total Solids (mg)	....	1	mg	92	68	452	69	179
E A144: Particulate Base Metals in Filter Papers								
Lithium	7439-93-2	0.5	ug/filter paper	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel	7440-02-0	5	ug/filter	6	<5	<5	<5	<5
^ Sulfur as S	63705-05-6	500	ug/filter	<500	<500	<500	<500	<500
Iron	7439-89-6	10	ug/filter	542	208	245	133	191
Lead	7439-92-1	10	ug/filter	<10	<10	<10	<10	<10
E G005F: Dissolved Metals by ICP-AES								
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	7439-92-1	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	7440-02-0	0.01	mg/L	0.03	<0.01	<0.01	<0.01	<0.01
^ Sulfur as S	63705-05-6	1	mg/L	3	2	10	1	4
E G020F: Dissolved Metals by ICP-MS								
Lithium	7439-93-2	0.001	mg/L	<0.001	<0.001	0.002	<0.001	<0.001

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Analytical Results

Sub-Matrix: DUST				Client sam ple ID				
				Client sam pling date / time				
				DG7	DG8	DG11	DG12	DG13
				02-NOV-2010 15:00	02-NOV-2010 15:00	02-NOV-2010 15:00	02-NOV-2010 15:00	02-NOV-2010 15:00
Com pound	CAS Num ber	LOR	Unit	EN1002670-006	EN1002670-007	EN1002670-008	EN1002670-009	EN1002670-010
E A120: Ash Content								
Ash Content	....	0.1	g/m ² .month	0.5	0.8	0.7	0.3	0.4
Ash Content (mg)	....	1	mg	9	16	13	6	7
E A125: Combustible Matter								
Combustible Matter	....	0.1	g/m ² .month	0.2	0.5	0.3	0.2	0.2
Combustible Matter (mg)	....	1	mg	4	9	6	3	4
E A130: Volume								
Volume	....	1	mL	230	412	378	342	406
E A139: Total Soluble Matter								
Total Soluble Matter	....	0.1	g/m ² .month	1.2	3.8	3.7	4.4	6.5
Total Soluble Matter (mg)	....	1	mg	23	74	72	86	127
E A141: Total Insoluble Matter								
Total Insoluble Matter	....	0.1	g/m ² .month	0.7	1.3	1.0	0.5	0.6
Total Insoluble Matter (mg)	....	1	mg	13	25	19	9	11
E A142: Total Solids								
Total Solids	....	0.1	g/m ² .month	1.9	5.1	4.7	4.9	7.1
Total Solids (mg)	....	1	mg	36	99	91	95	138
E A144: Particulate Base Metals in Filter Papers								
Lithium	7439-93-2	0.5	ug/filter paper	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel	7440-02-0	5	ug/filter	<5	<5	<5	<5	<5
^ Sulfur as S	63705-05-6	500	ug/filter	<500	<500	<500	<500	<500
Iron	7439-89-6	10	ug/filter	177	242	233	117	142
Lead	7439-92-1	10	ug/filter	<10	<10	<10	<10	<10
E G005F: Dissolved Metals by ICP-AES								
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	7439-92-1	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	7440-02-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
^ Sulfur as S	63705-05-6	1	mg/L	2	2	4	4	7
E G020F: Dissolved Metals by ICP-MS								
Lithium	7439-93-2	0.001	mg/L	<0.001	<0.001	<0.001	0.002	0.001

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Analytical Results

Sub-Matrix: DUST

Compound	CAS Number	LOR	Unit	Client sam ple ID				
				Client sam pling date / time				
				DG14	DG15	DG16	DG17	DG18
				02-NOV-2010 15:00	02-NOV-2010 15:00	02-NOV-2010 15:00	02-NOV-2010 15:00	02-NOV-2010 15:00
				EN1002670-011	EN1002670-012	EN1002670-013	EN1002670-014	EN1002670-015
E A120: Ash Content								
Ash Content	....	0.1	g/m ² .month	0.3	0.4	0.4	0.4	2.8
Ash Content (mg)	....	1	mg	6	7	8	7	54
E A125: Combustible Matter								
Combustible Matter	....	0.1	g/m ² .month	0.4	1.3	0.6	0.2	0.3
Combustible Matter (mg)	....	1	mg	7	26	12	5	7
E A130: Volume								
Volume	....	1	mL	376	325	393	429	348
E A139: Total Soluble Matter								
Total Soluble Matter	....	0.1	g/m ² .month	4.9	4.3	3.1	3.8	3.6
Total Soluble Matter (mg)	....	1	mg	95	83	61	73	71
E A141: Total Insoluble Matter								
Total Insoluble Matter	....	0.1	g/m ² .month	0.7	1.7	1.0	0.6	3.1
Total Insoluble Matter (mg)	....	1	mg	13	33	20	12	61
E A142: Total Solids								
Total Solids	....	0.1	g/m ² .month	5.6	6.0	4.1	4.4	6.7
Total Solids (mg)	....	1	mg	108	116	81	85	132
E A144: Particulate Base Metals in Filter Papers								
Lithium	7439-93-2	0.5	ug/filter paper	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel	7440-02-0	5	ug/filter	<5	<5	<5	<5	<5
^ Sulfur as S	63705-05-5	500	ug/filter	<500	<500	<500	<500	<500
Iron	7439-89-6	10	ug/filter	152	125	247	136	362
Lead	7439-92-1	10	ug/filter	<10	<10	<10	<10	<10
E G005F: Dissolved Metals by ICP-AES								
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	7439-92-1	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel	7440-02-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
^ Sulfur as S	63705-05-5	1	mg/L	5	4	3	3	4
E G020F: Dissolved Metals by ICP-MS								
Lithium	7439-93-2	0.001	mg/L	0.001	<0.001	<0.001	<0.001	<0.001

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Analytical Results

Sub-Matrix: DUST

Compound	CAS Number	LOR	Unit	Client sam ple ID			
				Client sam pling date / time			
				DG9	DG9	DG10	....
				02-NOV-2010 15:00	02-NOV-2010 15:00	02-NOV-2010 15:00	....
				EN1002670-016	EN1002670-017	EN1002670-018	....
E A120: Ash Content							
Ash Content	....	0.1	g/m ² .month	0.3	7.6	3.4	....
Ash Content (mg)	....	1	mg	6	147	66	....
E A125: Combustible Matter							
Combustible Matter	....	0.1	g/m ² .month	0.2	2.3	1.5	....
Combustible Matter (mg)	....	1	mg	4	45	29	....
E A130: Volume							
Volume	....	1	mL	381	331	334	....
E A139: Total Soluble Matter							
Total Soluble Matter	....	0.1	g/m ² .month	3.1	3.0	4.4	....
Total Soluble Matter (mg)	....	1	mg	80	58	86	....
E A141: Total Insoluble Matter							
Total Insoluble Matter	....	0.1	g/m ² .month	0.5	9.9	4.9	....
Total Insoluble Matter (mg)	....	1	mg	10	192	96	....
E A142: Total Solids							
Total Solids	....	0.1	g/m ² .month	3.6	12.9	9.3	....
Total Solids (mg)	....	1	mg	70	250	181	....
E A144: Particulate Base Metals in Filter Papers							
Lithium	7439-93-2	0.5	ug/filter paper	<0.5	0.6	<0.5	....
Nickel	7440-02-0	5	ug/filter	<5	162	418	....
^ Sulfur as S	63705-05-5	500	ug/filter	<500	<500	900	....
Iron	7439-89-6	10	ug/filter	117	2630	5590	....
Lead	7439-92-1	10	ug/filter	<10	17	68	....
E G005F: Dissolved Metals by ICP-AES							
Iron	7439-89-6	0.05	mg/L	<0.05	0.11	<0.05	....
Lead	7439-92-1	0.01	mg/L	<0.01	<0.01	0.04	....
Nickel	7440-02-0	0.01	mg/L	<0.01	0.20	1.81	....
^ Sulfur as S	63705-05-5	1	mg/L	2	3	9	....
E G020F: Dissolved Metals by ICP-MS							
Lithium	7439-93-2	0.001	mg/L	<0.001	<0.001	0.002

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ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES



Environmental Division

Certificate of Analysis

LABORATORY REPORT NO: EN1002670NN
CLIENT REFERENCE: ENV-08-566
CLIENT: Esperance Port Authority
PO Box 35
ESPERANCE WA 6450
ATTENTION: Ms Claudia Magana
DATE REPORTED: 18/11/2010
DATE RECEIVED: 5/11/2010
TITLE: Dust deposition analysis
SAMPLES: 18 dust deposition gauges

Please find results for the above samples.

Sampled by Esperance Port Authority, analysed as received.

Please do not hesitate to contact us if we can be of assistance.

Yours faithfully

Australian Laboratory Services Pty Ltd

Authorising Chemist
Dianne Blane

Australian Laboratory Services Pty Ltd
ABN 84 009 930 028
Part of the **ALS Laboratory Group**
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Phone +61 2 4968 9433 Fax +61 2 4968 0349 www.alsglobal.com
A Campbell Brothers Limited Company

Page 1 of 4

INORGANIC ANALYSIS

Report No: EN1002670NN

Client Reference: ENV-08-566



Sample	EN1002670/1	EN1002670/2	EN1002670/3	EN1002670/4	EN1002670/5	EN1002670/6	EN1002670/7	EN1002670/8
Client ID	DG1	DG3	DG4	DG5	DG6	DG7	DG8	DG11
Date Sampled	30/09/10-02/11/10	30/09/10-02/11/10	30/09/10-02/11/10	30/09/10-02/11/10	30/09/10-02/11/10	30/09/10-02/11/10	30/09/10-02/11/10	30/09/10-02/11/10
Date Received	05/11/10	05/11/10	05/11/10	05/11/10	05/11/10	05/11/10	05/11/10	05/11/10
METHOD	ANALYSIS DESCRIPTION	UNITS	LOR	Dust	Dust	Dust	Dust	Dust
EA144-MS	Lithium	mg/m ² .month	0.03	<0.03	<0.03	<0.03	<0.03	<0.03
EA144-AES	Nickel	mg/m ² .month	0.3	0.3	<0.3	<0.3	<0.3	<0.3
EA144-AES	Sulphur as S	mg/m ² .month	30	<30	<30	<30	<30	<30
EA144-AES	Iron	mg/m ² .month	0.6	27.9	10.7	12.6	6.8	9.8
EA144-AES	Lead	mg/m ² .month	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
EG005F	Iron	mg/m ² .month	0.003	<0.003	<0.003	<0.003	<0.003	<0.003
EG005F	Lead	mg/m ² .month	0.006	<0.006	<0.006	<0.006	<0.006	<0.006
EG005F	Nickel	mg/m ² .month	0.006	0.61	<0.006	<0.006	<0.006	<0.006
EG005F	Sulphur as S	mg/m ² .month	0.06	60.7	38.8	376	20.0	62.4
EG020A-F	Lithium	mg/m ² .month	0.0001	<0.0001	<0.0001	0.0751	<0.0001	<0.0001

Authorising Chemist:


 Dianne Blane

Date: 18-Nov-10

Page 2 of 4

ALS Environmental

Australian Laboratory Services Pty Ltd (ABN 84 009 936 029)

INORGANIC ANALYSIS

Report No: EN1002670NN

Client Reference: ENV-08-566



Sample	EN1002670/9	EN1002670/10	EN1002670/11	EN1002670/12	EN1002670/13	EN1002670/14	EN1002670/15	EN1002670/16
Client ID	DG12	DG13	DG14	DG15	DG16	DG17	DG18	DG19
Date Sampled	30/09/10-02/11/10	30/09/10-02/11/10	30/09/10-02/11/10	30/09/10-02/11/10	30/09/10-02/11/10	30/09/10-02/11/10	30/09/10-02/11/10	30/09/10-02/11/10
Date Received	05/11/10	05/11/10	05/11/10	05/11/10	05/11/10	05/11/10	05/11/10	05/11/10
METHOD	ANALYSIS DESCRIPTION	UNITS	LOR	Dust	Dust	Dust	Dust	Dust
EA144-MS	Lithium	mg/m ² .month	0.03	<0.03	<0.03	<0.03	<0.03	<0.03
EA144-AES	Nickel	mg/m ² .month	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
EA144-AES	Sulphur as S	mg/m ² .month	30	<30	<30	<30	<30	<30
EA144-AES	Iron	mg/m ² .month	0.6	6.0	7.3	6.8	6.4	12.7
EA144-AES	Lead	mg/m ² .month	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
EG005F	Iron	mg/m ² .month	0.003	<0.003	<0.003	<0.003	<0.003	<0.003
EG005F	Lead	mg/m ² .month	0.006	<0.006	<0.006	<0.006	<0.006	<0.006
EG005F	Nickel	mg/m ² .month	0.006	<0.006	<0.006	<0.006	<0.006	<0.006
EG005F	Sulphur as S	mg/m ² .month	0.06	70.4	146	96.7	66.9	60.7
EG020A-F	Lithium	mg/m ² .month	0.0001	0.0352	0.0209	0.0193	<0.0001	<0.0001

Authorising Chemist:


 Dianne Blane

Date: 18-Nov-10

Page 3 of 4

ALS Environmental

Australian Laboratory Services Pty Ltd (ABN 84 009 936 029)

INORGANIC ANALYSIS

		Sample	EN1002670/17	EN1002670/18			QA/QC	
		Client ID	DG9	DG10			Blank	Spike/Control % Recovery
Report No: EN1002670NN		Date Sampled	30/09/10- 02/11/10	30/09/10- 02/11/10				
Client Reference: ENV-08-566		Date Received	05/11/10	05/11/10				
METHOD	ANALYSIS DESCRIPTION	UNITS	LOR	Dust	Dust			
EA144-MS	Lithium	mg/m ² .month	0.03	0.03	<0.03		<0.03	-
EA144-AES	Nickel	mg/m ² .month	0.3	9.4	21.5		<0.3	-
EA144-AES	Sulphur as S	mg/m ² .month	30	<30	46.3		<30	-
EA144-AES	Iron	mg/m ² .month	0.6	130	288		<0.6	-
EA144-AES	Lead	mg/m ² .month	0.6	<0.6	<0.7		<0.6	-
EG005F	Iron	mg/m ² .month	0.003	1.87	<0.003		<0.003	-
EG005F	Lead	mg/m ² .month	0.006	<0.006	0.687		<0.006	-
EG005F	Nickel	mg/m ² .month	0.006	3.41	31.1		<0.006	-
EG005F	Sulphur as S	mg/m ² .month	0.06	51.1	155		<0.06	-
EG020A-F	Lithium	mg/m ² .month	0.0001	<0.0001	0.0344		<0.0001	-

Authorising Chemist: 
Dianne Blane

Date: 18-Nov-10

Page 4 of 4

ALS Environmental

Australian Laboratory Services Pty Ltd (ABN 84 009 936 029)

VISUAL ANALYSIS

Report No: EN1002670NN
Client Reference: ENV-08-566

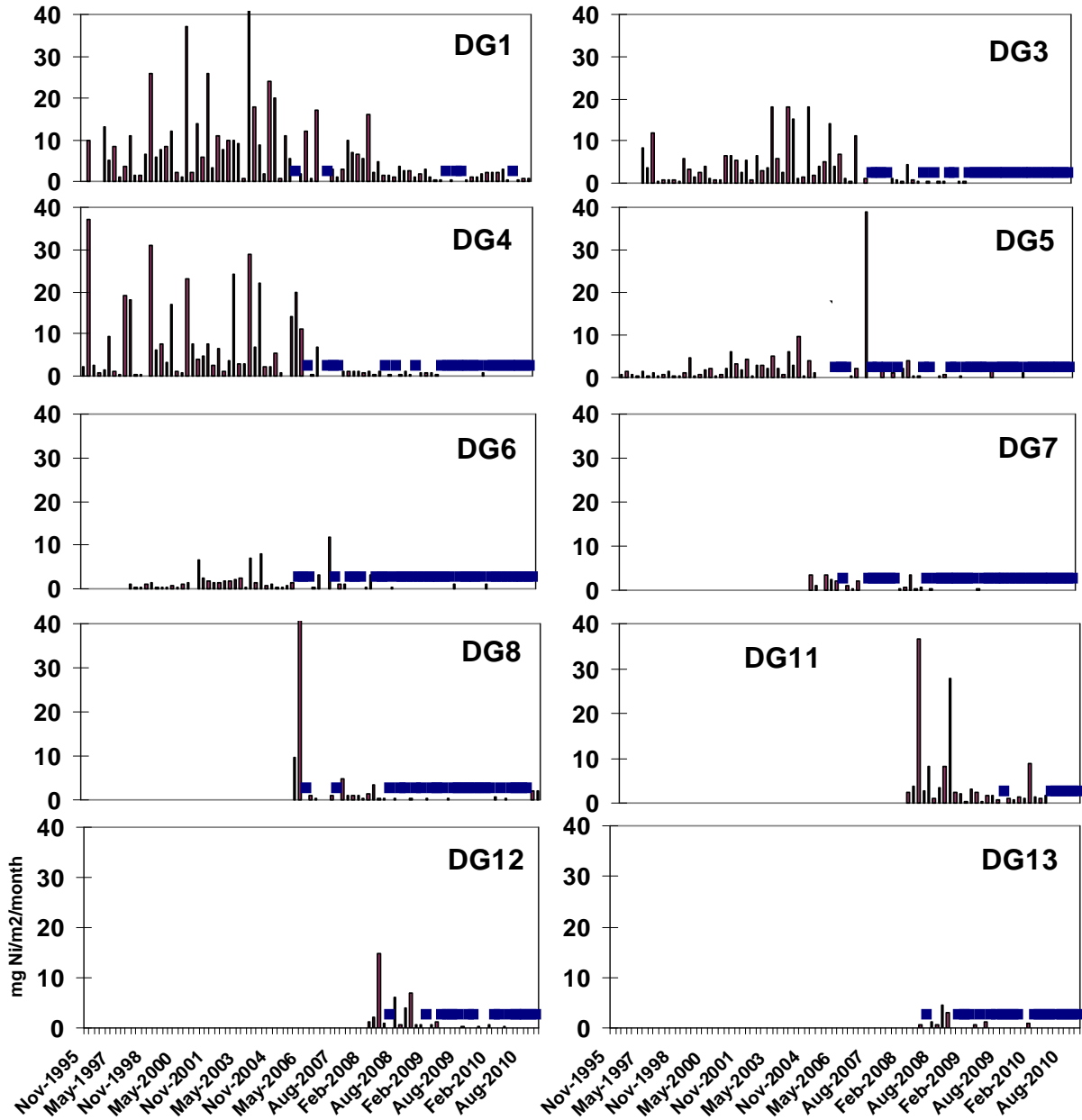
Laboratory Identification	Site	Deposition	Dirt	Ore/mineral	Sand	Grain	Insect	Vegetation
EN1002670-005	DG6	heavy	5%	-	50%	40%	5%	-
EN1002670-017	DG9	very heavy	30%	-	50%	10%	5%	5%
EN1002670-018	DG10	heavy	20%	-	20%	10%	10%	40%

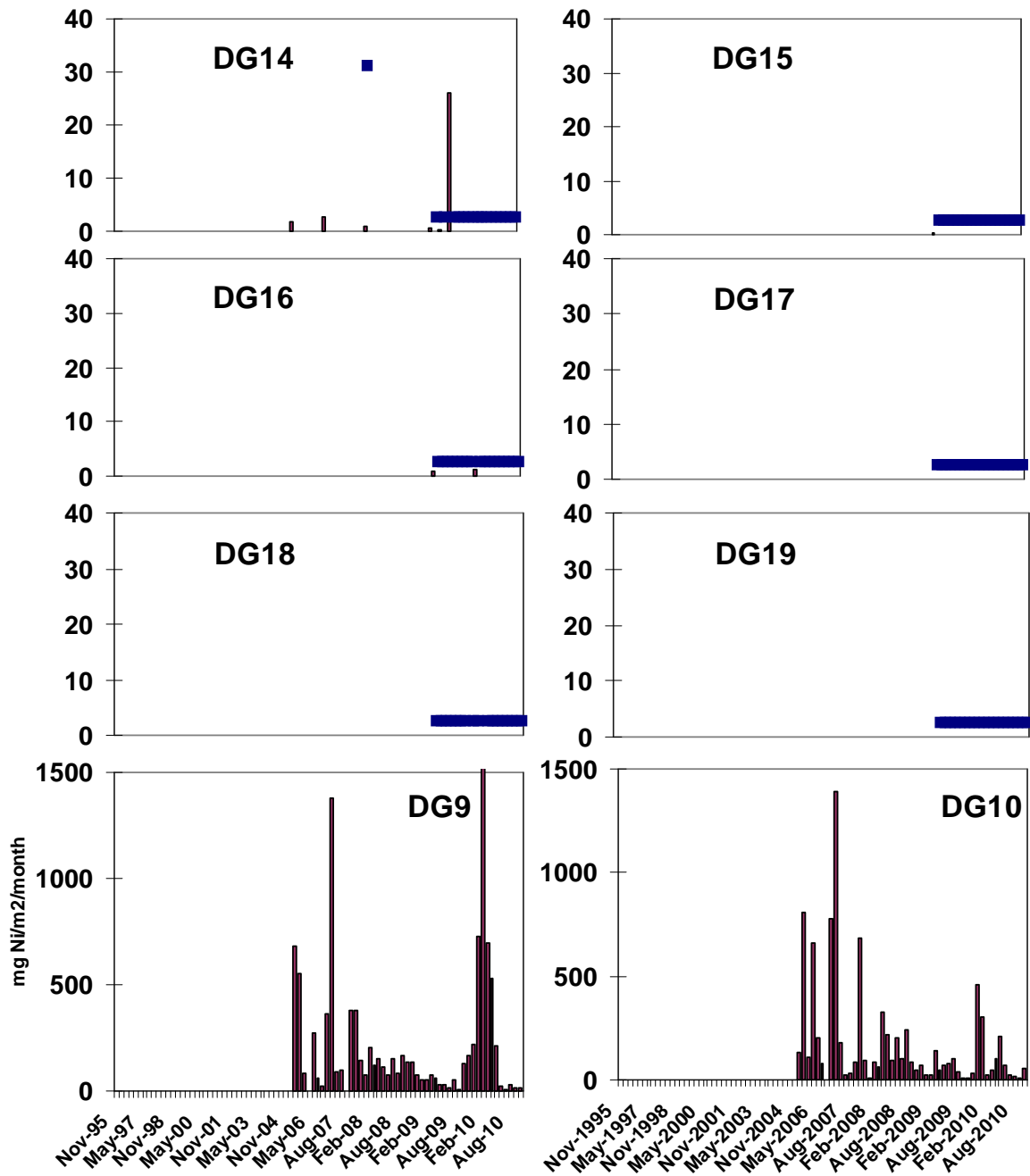
Visual analysis of deposited dust not covered by NATA scope of accreditation.

Date: 18-Nov-10

Page 1 of 1

**APPENDIX E CONCENTRATIONS OF NICKEL IN DUST DEPOSITED IN
ESPERANCE COMMUNITY DUST GAUGES**





APPENDIX F RAINWATER TANK LABORATORY REPORTS ALS LABORATORY

ALS Laboratory Group
 ANALYTICAL CHEMISTRY & TESTING SERVICES



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: EP1006684	Page	: 1 of 5
Client	: ESPERANCE PORTS - SEA & LAND	Laboratory	: Environmental Division Perth
Contact	: RESULTS ADDRESS	Contact	: Scott James
Address	: PO BOX 35 ESPERANCE WA, AUSTRALIA 6450	Address	: 10 Hod Way Malaga WA Australia 6090
E-mail	: port.enw@epsl.com.au	E-mail	: perth.enviro.services@alsglobal.com
Telephone	: +61 0419941116	Telephone	: +61-8-9209 7655
Facsimile	: +61 08 90711312	Facsimile	: +61-8-9209 7600
Project	: ENV08-565	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 03-NOV-2010
C-O-C number	: ----	Issue Date	: 09-NOV-2010
Sampler	: ----	No. of samples received	: 11
Site	: Rainwater Tanks	No. of samples analysed	: 11
Quote number	: EP-182-10 BQ		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics
Cicelia Bartels	Metals Instrument Chemist	Perth Inorganics

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 A Campbell Brothers Limited Company

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 Work Order : EP1006684
 Client : **ESPERANCE PORTS - SEA & LAND**
 Project : ENV08-565



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Service. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

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Analytical Results

Sub-Matrix: WATER				Client sample ID					
Client sampling date / time				Bostock St DG3	Crossland St DG5	Fallon St DG8	Smith St DG11	Phillip St DG12	
				02-NOV-2010 15:00	02-NOV-2010 15:00	02-NOV-2010 15:00	02-NOV-2010 15:00	02-NOV-2010 15:00	
Compound	CAS Num ber	LOR	Unit	EP 1006684-001	EP 1006684-002	EP 1006684-003	EP 1006684-004	EP 1006684-005	
ED040F: Dissolved Major Anions									
^ Sulfur as S									
	63705-05-5	1	mg/L	1	1	2	<1	1	
EG020T: Total Metals by ICP-MS									
Lead	7439-92-1	0.001	mg/L	0.001	0.001	0.001	0.017	<0.001	
Lithium	7439-93-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel	7440-02-0	0.001	mg/L	0.009	0.004	0.006	0.014	0.005	
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	

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Analytical Results

Sub-Matrix: WATER				Client sample ID					
Client sampling date / time				Millis PI DG14	Wildcherry Ave DG15	Driftwood Apart. DG16	Gull Street DG17	Langhan Lane DG18	
				02-NOV-2010 15:00	02-NOV-2010 15:00	02-NOV-2010 15:00	02-NOV-2010 15:00	02-NOV-2010 15:00	
Compound	CAS Num ber	LOR	Unit	EP 1006684-006	EP 1006684-007	EP 1006684-008	EP 1006684-009	EP 1006684-010	
ED040F: Dissolved Major Anions									
^ Sulfur as S									
	63705-05-5	1	mg/L	2	1	1	1	1	
EG020T: Total Metals by ICP-MS									
Lead	7439-92-1	0.001	mg/L	<0.001	0.001	<0.001	0.001	<0.001	
Lithium	7439-93-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.010	0.008	0.001	
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	

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Analytical Results

Sub-Matrix: WATER				Client sam ple ID	Scott SI DG19	---	---	---	---
				Client sam pling date / time	02-NDV-2010 15:00	---	---	---	---
Compound	CAS Num ber	LOR	Unit	EP1006684-011	---	---	---	---	---
ED048F: Dissolved Major Anions									
^ Sulfur as S	63705-05-6	1	mg/L	<1	---	---	---	---	---
EG920T: Total Metals by ICP-MS									
Lead	7439-92-1	0.001	mg/L	<0.001	---	---	---	---	---
Lithium	7439-93-2	0.001	mg/L	<0.001	---	---	---	---	---
Nickel	7440-02-0	0.001	mg/L	<0.001	---	---	---	---	---
Iron	7439-89-6	0.05	mg/L	<0.05	---	---	---	---	---