



**ESPERANCE PORTS**  
*Sea & Land*

## **ANNUAL AMBIENT AIR QUALITY MONITORING REPORT**

1 October 2010 to 30 September 2011

### **Document History and Status**

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## EXECUTIVE SUMMARY

This report fulfils the annual (1 October 2010 to 30 September 2011) ambient air quality reporting requirements of the Operating Licence (L5099/1974/13) issued to Esperance Ports Sea & Land (EPSL).

EPSL observed a total throughput of 10.74 Mt of various commodities similar to the previous year of 10.55 Mt. The exports consisted of approximately 8.3 Mt of iron ore and 1.5 Mt of grain. The only significant change in export was a doubling of nickel exports from 0.16 Mt in 2009/10 to 0.29 Mt in 2010-2011. This was mainly due to increases in nickel exported in containers that constituted 72% of total export, with the remainder as bulk nickel (22%) and bulker bags (4%).

Weather conditions in 2010/11 created a higher potential for dust than in 2009-2010. This was due to stronger onshore winds in the summer of 2010/11, but this effect may have been reduced by higher rainfall.

Detection of PM<sub>10</sub> dust concentrations were largely influenced by climatic factors (wind speed and direction towards TEOM units) and inland activities. Exceedances remained similar to last year with seven exceedances during the reporting period. Silica concentrations in PM10 were mostly below the limits of detection and several fold below the licence criteria.

Additional monitoring for the potential export of spodumene has gathered baseline data on lithium, zinc and silica quartz. This has shown that both lithium and silica quartz have low levels outside the Port, but zinc is variable and is likely not to be a suitable indicator for spodumene into the future.

The increased potential for dust in 2010/11 was reflected in a doubling of dust exceedances for concentrations of Total Suspended Particulate (TSP). TSP is measured using High Volume Air Samplers (HVAS). In addition to TSP, the HVAS samples enable laboratory determination of concentrations of metals and sulphur. There were 27 exceedances of TSP licence criteria in 2010/11, up from 13 in the previous year. Of the 27 exceedances, 13 were attributable to grain ship loading activities on Berth 1 and 14 to dust from the beach and unsealed areas of the Port. A fogging unit is being trialled by CBH on one of the five shiploaders to minimise grain dust emissions but further performance monitoring of the system is required.

In 2010/11, the depositional dust gauges located in the community had 12 exceedances of the NSW insoluble dust deposition criterion. Half of these exceedances, were at DG4 located less than 100m from the beach.

Despite the doubling in nickel export, there were further declines in nickel emissions in 2010-2011. These decreases included nickel concentrations in air measured both as TSP and as depositional nickel in dust gauges. This is likely to be due to the reduction in bulk nickel export, since this is the source of nickel dust emissions.

Iron ore constitutes the largest tonnage of product exported through EPSL but iron levels in TSP remain low constituting about 1.5% of total dust measured in TSP and in depositional gauges. Determining the reasons for changes in iron deposition rates in community dust gauges is difficult to pin point due to multiple sources of iron and the increased deposition of dust at sites located close to the beach.

Fewer rainwater samples had concentrations of nickel above the drinking water guidelines with three occurrences during 2010/11 down from 16 the previous year. The exceedances tended to be dominated by local sources of metals between the

roof and the rainwater tank and showed no correlations to levels of nickel in adjacent dust gauges. Declines in nickel deposition in community dust gauges was evident with 88% of all values recorded below the level of detect for the reporting period.

Measurements of sulphur, zinc, lithium, and lead in both HVAS and depositional gauges had no correlations to any port activities. All measurable sulphur was related to natural processes and levels of zinc are likely to be related to the use of galvanised materials. Levels of lithium and lead were predominantly below laboratory limits of detection.

EPSL is in the process of applying for amendments to its licence to remove nine dust gauges and associated rainwater tank monitoring since they are not returning measurable lead or nickel concentrations. Lastly, it is proposed to improve the efficiency of the HVAS sampling. The changes were presented to the Port Consultative Committee (PCC) and the Esperance Clean-up Recovery Project (ECRP) in September and no significant objections were raised.

## 1. INTRODUCTION

This report documents a suite of air quality data from a variety of monitoring stations for the reporting period and compares the results to the applicable impact assessment criteria.

### 1.1 Licence Reporting Conditions

Esperance Ports Sea & Land (EPSL) was issued Licence L5099/1974/13 ('the licence') on the 24<sup>th</sup> February 2011 (amended 28<sup>th</sup> July 2011) available on the EPSL website: ([www.epsl.com.au/envlic.asp](http://www.epsl.com.au/envlic.asp)) where this document can be downloaded. This report is compiled and issued in compliance with Condition 15 and the reporting requirements of Condition 16. Copies of laboratory reports are available in each of the respective monthly ambient air quality monitoring, bulk nickel shiploading and exceedance reports available for download from EPSL's website.

The report covers monitoring data collected from October 2010 to September 2011 and is referred to as the 'reporting period' for the duration of this report.

### 1.2 Location of Monitoring Stations

As required by the Licence, ambient air quality monitoring is being undertaken at four locations (Sites 1 to 4) surrounding the port operations (**Figure 1**) and one location in the community approximately 1.6 km from the Port (Site 5). These 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.epsl.com.au/envmon.asp>.

Dust monitoring devices are installed at each of these locations (**Figure 1**). The location of site 4, shown in **Figure 1**, is 36 Bostock Street, approximately 50 m from the Port boundary. It was moved there on 4 November 2010 from 12 Panorama Place, approximately 190m from the Port boundary. The devices installed at the monitoring locations consist of:

- Four Tapered Element Oscillating Microbalance (TEOM) units recording PM<sub>10</sub> at sites 1 to 4;
- Five High Volume Air Sampler (HVAS) units monitoring total suspended particulates (TSP) at sites 1 to 5;
- Three OPSIS SM200-series samplers for collecting PM<sub>10</sub> on a PVC filter for the analysis of silica quartz are also located at Sites 1, 2 and 4;
- Sixteen offsite, community dust deposition gauges (refer to **Figure 2**) that are used to collect dust and calculate total dust deposition and concentrations of nickel, lead, iron, sulphur, lithium and zinc in the dust (NATA, 2009b);
- Two dust deposition gauges located within the port facility (analysed as per the above gauges);

- Eleven rainwater tanks (refer to **Figure 2**) are co-located with some of the community dust deposition gauges and the concentrations of nickel, lead, iron and sulphur in the rainwater tanks is also analysed;
- A meteorological station at EP7 (compliant to AS 2923-1987) that records wind speed and wind direction and is used to assist in wind loading procedures during loading of bulk nickel ships; and
- Four MetOne E-Samplers (EP5, EP6, EP7 and EP8) installed in 2008 within the Port precinct to estimate TSP in real time using light scatter. At its own initiative, the Port uses data from these stations to help correlate loading times to dust emissions for grain loading activities of Berth 1 as part of its exceedance reporting.

### 1.3 Sampling Times and Frequencies

Samples are collected from the network of air quality monitoring stations (refer to **Figures 1 and 2**) according to the following regime:

- 24-hour average concentrations of TSP are measured on filter papers changed from HVAS machines at approximately 1200 hrs every day ( $\pm 2$  hrs). The HVAS filter papers are analysed daily during the 'summer' sampling period of October to March for TSP and every third day for TSP during the 'winter' sampling period of April to September. Metals (including iron, nickel, lead, lithium, zinc) and sulphur are analysed every third day (NATA, 2009a). Metals and sulphur are also analysed when there is any TSP exceedance of  $90 \mu\text{g}/\text{m}^3$  criteria and/or when winds are greater than 10m/s in three consecutive hours while in the  $45^\circ$  to  $180^\circ$  degree wind arc and during loading of bulk nickel ships;
- 24-hour average  $\text{PM}_{10}$  concentrations are calculated from 5-minute averages generated by validated data from Ecotech, approximately midday to midday to coincide with HVAS sampling times. A change was instituted on the 1<sup>st</sup> of February 2010, as previously the averages were calculated from midnight to midnight;
- 24-hour average concentrations of silica are measured on OPSIS filters from 1200 hours to 1200 hours at Sites 1, 2 and 4;
- Monthly dust deposition averages are collected by measuring total dust accumulated in dust gauges over approximately 30 ( $\pm 2$ ) days. The results from the sampling period are then corrected to a standard month. Dust deposition and associated metal and sulphur deposition rates are reported in  $\text{mg}/\text{m}^2/\text{month}$ ;
- Rainwater tank samples are collected monthly with the dust deposition gauge samples, and are sent to the laboratory for analysis for visual analysis, all soluble dust, insoluble dust, metals and sulphur and
- The meteorological monitoring station records wind data at 5 minute intervals. This data is then used to calculate hourly wind speed, wind direction and to produce the wind roses for reporting purposes e.g. **Figure 3**.

## 1.4 Laboratory Analysis

EPSL’s license condition 15(b) requests that the “licensee shall submit all monitoring samples, except for particle size distribution, to a laboratory with current NATA accreditation for the specified parameters for analysis”. All air quality samples are sent to National Association of Testing Authorities (NATA) accredited laboratories (see **Table 1**). PM<sub>10</sub> data downloaded from TEOM units is validated by Ecotech, who is also contracted by EPSL to service, calibrate and maintain all environmental monitoring equipment.

**Table 1: List of NATA Accredited Laboratories Used for Analysis**

Laboratory	NATA Accreditation Number	Sample Analysis
MPL Laboratories	9804	HVAS Filter Papers for TSP, iron, lead, nickel, sulphur, lithium and zinc  OPSIS filters – for silica quartz as PM <sub>10</sub>
ALS	825	Dust Gauges – dust deposition, visual analysis*, speciation iron, lead, nickel, sulphur, lithium and zinc  Rainwater Tank Samples – speciation of iron, lead, nickel and sulphur
Ecotech	14184	Validation of data PM <sub>10</sub> from TEOMs

\* Visual analysis of deposited dust samples is not covered under the scope of the NATA accreditation.

## 1.5 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:

- 50 µg/m<sup>3</sup> as a maximum 24-hour average concentration for PM<sub>10</sub> (NRPC, 2003 and Licence L5099/1974/13);
- 90 µg/m<sup>3</sup> as a maximum 24-hour average concentration target for TSP (from Licence L5099/1974/13);
- 0.14 µg/m<sup>3</sup> as a maximum 24-hour average concentration target for nickel (from Licence L5099/1974/13);

- 10 µg/m<sup>3</sup> as a maximum 24-hour average concentration target for silica quartz (from Licence L5099/1974/13);
- 0.5 µg/m<sup>3</sup> as an annual concentration for lead (NEPC, 2003) (not listed on the licence); and
- 4 000 mg/m<sup>2</sup>/month maximum allowable insoluble dust deposition rate (NSW EPA, 2005) (not listed on the licence).

Although a dust deposition guideline exists for total insoluble dust; there are no guidelines for other deposited contaminants such as lead, nickel, sulphur and iron.

In addition to the above, the following Australian Drinking Water Guidelines (ADWG) and World Health Organisation (WHO) standards are used for comparison of the rainwater tank monitoring results and these are:

- 0.02 mg/L for nickel in drinking water ((NHMRC/NRMMC, 2004);
- 0.01 mg/L for lead in drinking water (NHMRC/NRMMC, 2004); and
- 2 mg/L for iron in drinking water (WHO, 2006).



Figure 1: Location of EPSL's Air Quality Monitoring and Meteorological Stations



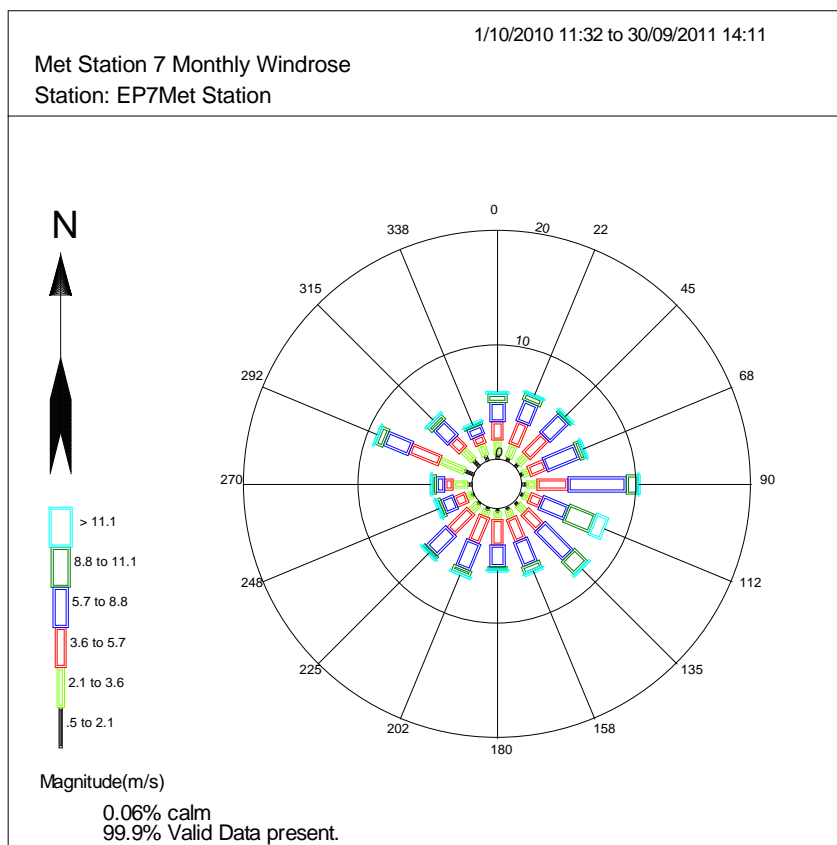
**Figure 2: Location of Dust Deposition Gauges and Rainwater Tanks**

## 2. METEOROLOGY

This section summarises the meteorological conditions during the reporting period.

### 2.1 Wind Speeds and Directions

The annual wind rose measured during the reporting period indicates variable wind directions throughout the year, with winds recorded at each compass point ranging from 4% to 11% (refer to **Figure 3**). The annual wind rose for 2010/11 had similar distribution of wind direction to the 2009/10 reporting period with less than 5% difference between each quadrant. The overall wind conditions between the two years are comparable, although seasonal differences in winds were apparent as described below.



**Figure 3: Annual Wind Rose from 1<sup>st</sup> October 2010 to 30<sup>th</sup> September 2011**

The seasonal wind roses for the monitoring period are presented in **Figures 4, 5, 6, 7** and **8**. The spring wind rose (**Figure 4**) incorporates data from the months of October and November 2010. The wind rose for September 2011 is shown separately (**Figure 8**) as it falls in a different calendar year, but is still within the reporting period (1<sup>st</sup> October 2010 to 30<sup>th</sup> September 2011).

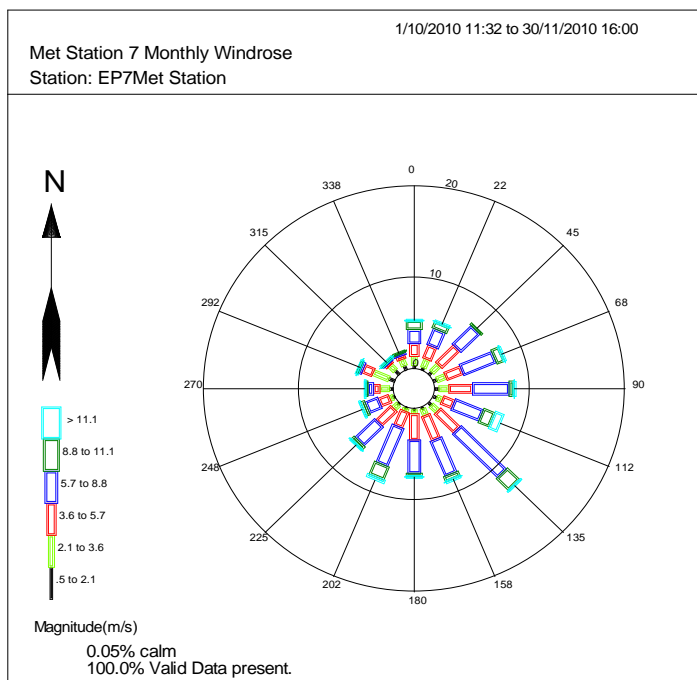
These figures show that in 2010/11 there was a clear shift in prevailing wind direction between the seasons, notably from the east to south-east in spring and

summer to a more westerly and northerly aspect in autumn, to a stronger north-westerly direction in winter.

Approximately 44% of the winds in spring 2010 (October and November) were in an arc from east to south with the remaining winds in the north-east and south-west (see **Figure 4**). In the corresponding months of the previous year these winds were more skewed to the south-west but were otherwise similar. Less than 15% of winds were above 8.8 m/s and were observed in most directions. The wind rose of the previous annual report can be viewed by downloading the document from the EPSL website.

In summer 2010/11 (December to February), over 50% of the winds were located between east and south-east and nearly half of these winds were above 8.8 m/s (see **Figure 5**). In these months for the preceding year, about 37% of the winds were within this sector with only a quarter being above 8.8 m/s. Winds blew more in the south and south-westerly in the preceding year.

Winds in autumn (March to May) and winter (June to August) 2011 were similar to the corresponding months of 2010 with no notable differences evident between the wind roses (see **Figures 6 and 7**). Winds in autumn were variable in direction with less than 8% of winds exceeding 8 m/s. Winds in winter were more north-westerly, but were again not as strong as summer with less than 10% of winds being more than 8 m/s.



**Figure 4: Spring Wind Rose (1<sup>st</sup> October to 30<sup>th</sup> November 2010)**

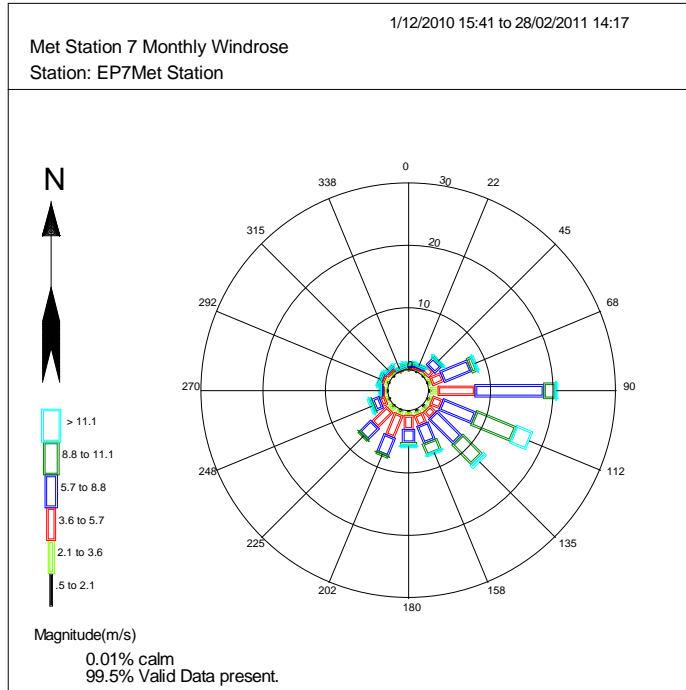


Figure 5: Summer Wind Rose (1<sup>st</sup> December 2010 to 28<sup>th</sup> February 2011)

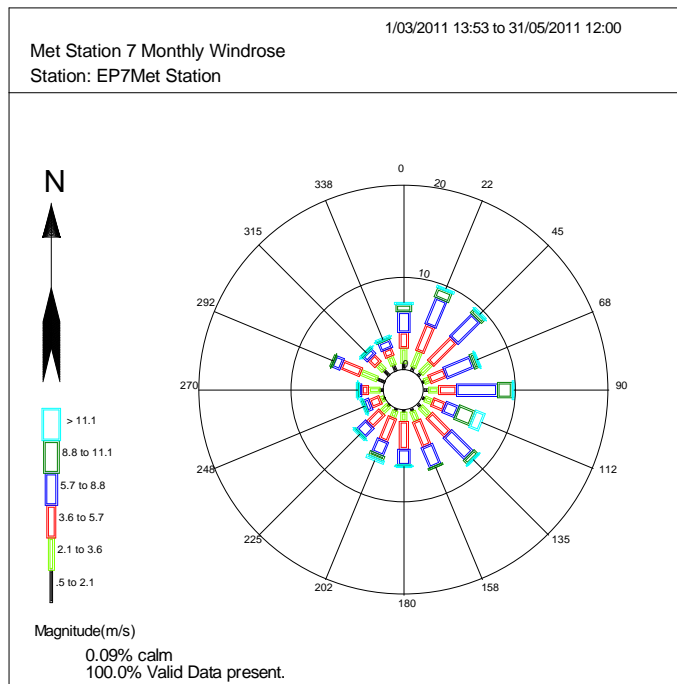


Figure 6: Autumn Wind Rose (1<sup>st</sup> March to 31<sup>st</sup> May 2011)

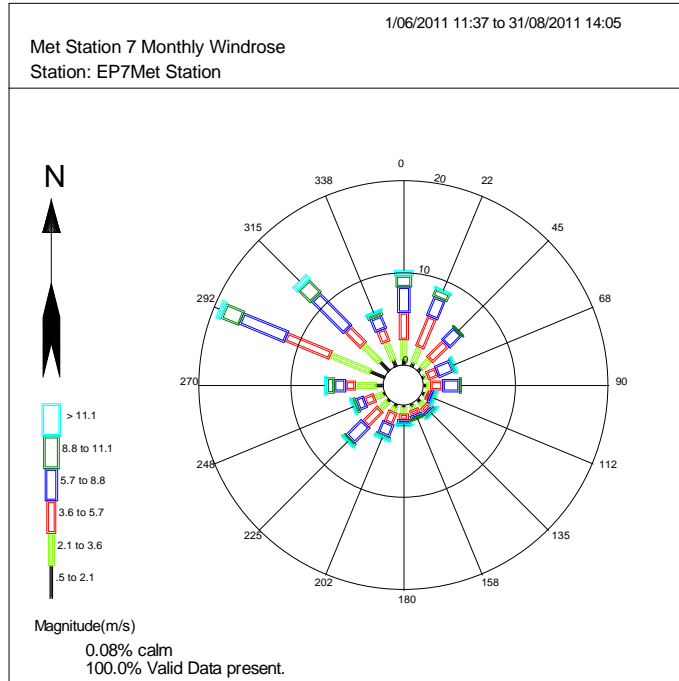


Figure 7: Winter Wind Rose (1<sup>st</sup> June to 31<sup>st</sup> August 2011)

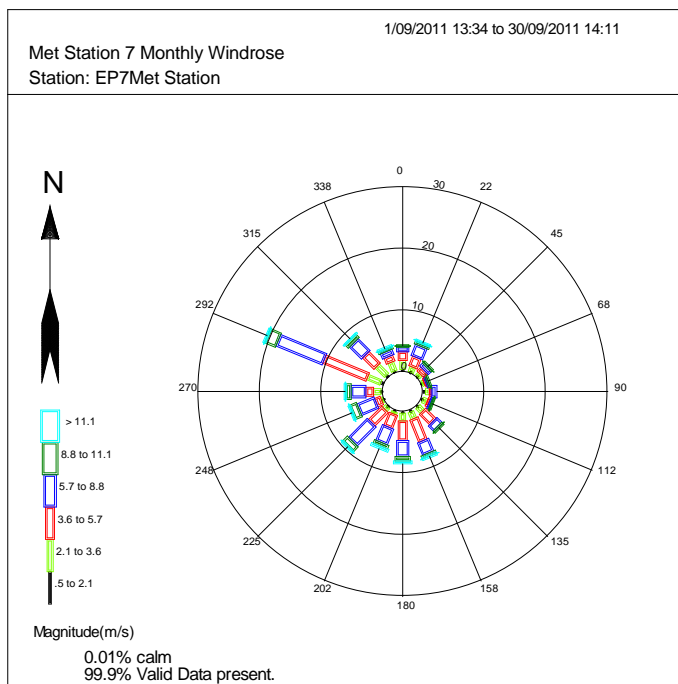
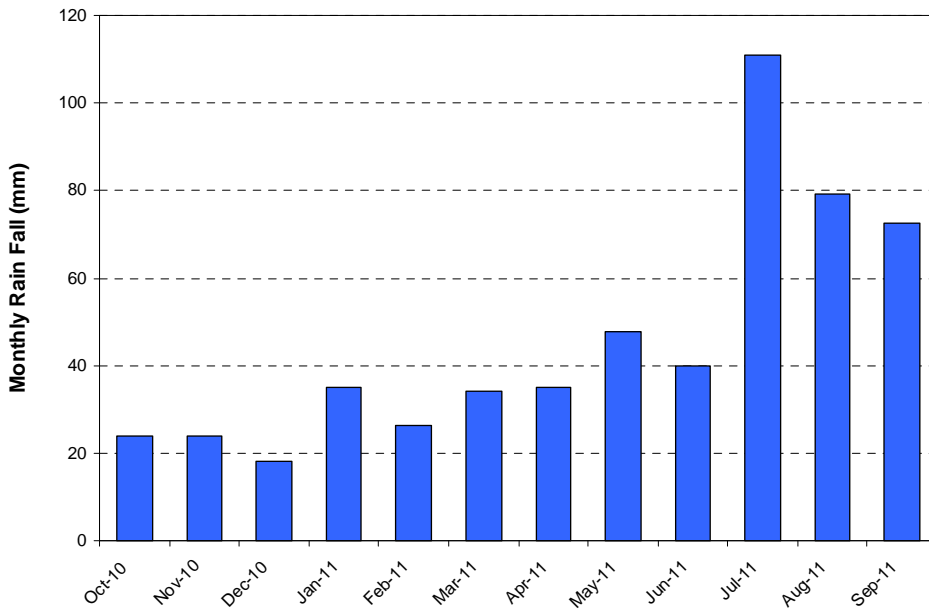


Figure 8: September 2011 Wind Rose (1<sup>st</sup> to 30<sup>th</sup> September 2011)

## 2.2 Rainfall

The annual rainfall recorded at the Fairfield Street Bureau of Meteorology (BOM) station at Esperance for 2010/2011 (547mm) (see **Figure 9**) was 74 mm more rain than in the previous period in 2009/2010 (473 mm). This was mainly due to the current reporting period having a wetter summer and autumn period compared to the previous year. Rainfall data of the previous annual report can be viewed by downloading the document from the EPSL website.



**Figure 9:** Monthly rainfall from Oct-10 to Sep-11 (from Fairfield Street BOM station)

### 3. ANNUAL PORT ACTIVITIES

This section presents summary data of EPSL's activities during the reporting period. Full details are reported in EPSL's shipping register (see **Appendix A**).

#### 3.1 Imports and Exports

During the reporting period EPSL observed a total throughput of 10.74 Mt of various commodities similar to the previous year (10.55Mt). A total of 10.27Mt was exported and 0.48Mt was imported products. Of the total exports, approximately 8.3 Mt was iron ore (8.5Mt in 2009/10) and 1.5 Mt was various grains (1.4Mt in 2009/10) . Nickel exports nearly doubled from 0.16 Mt in 2009/10 to 0.29 Mt in 2010/11. This was mainly due to increases in nickel exported in containers that constituted 72% of total export, with the remainder as bulk nickel (22%) and bulker bags (4%).

In February 2011 several conditions were added to EPSL's licence that potentially allowed the export of spodumene. Product quality issues in relation to two of these conditions and additional concerns relating to mica led to no export of spodumene during the reporting period.

The modes of transport into the Esperance Port are summarised by commodity (see **Table 2**) and the only changes have been to bulk nickel concentrate, which is no longer received as kibbles by train. Since January 2011 nickel concentrate has arrived from minesites in containers on trucks, been 'tipped' out via a container inloading system and then the bulk nickel transferred along conveyors via a storage shed and onto ships.

**Table 2: Transport Mode into EPSL by Commodity**

<b>Stevedore</b>	<b>Commodity</b>	<b>Transport Mode into Port</b>	<b>Transport Mode Out of Port</b>
Esperance Ports Sea and Land	Iron ore	Rail	Ship
	Gas oil	Ship	Pipeline
	Empty Containers, magnesia oxide)	Ship	Road
	Nickel concentrate (containers)	Road	Ship
	Nickel concentrate (bulker bags)	Road	Ship
	Magnesia oxide (containers)	Ship	Road
	Sulphur	Ship	Road
Patricks	Fertiliser (excluding urea)	Ship	Road
	Urea	Ship	Road
CBH	Peas	Road	Ship
	Canola	Road	Ship
	Barley	Road	Ship
	Wheat	Road	Ship
	Lupins	Road	Ship

## 4. MONITORING RESULTS

This section provides the ambient air quality and rainwater tank monitoring results measured during the annual reporting period.

Discussion of month to month comparisons and individual data points can be found in the respective monthly ambient air quality monitoring reports along with laboratory certificates of analysis on the EPSL website ([www.epsl.com.au/envmon.asp](http://www.epsl.com.au/envmon.asp)).

### 4.1 Dust as PM<sub>10</sub>

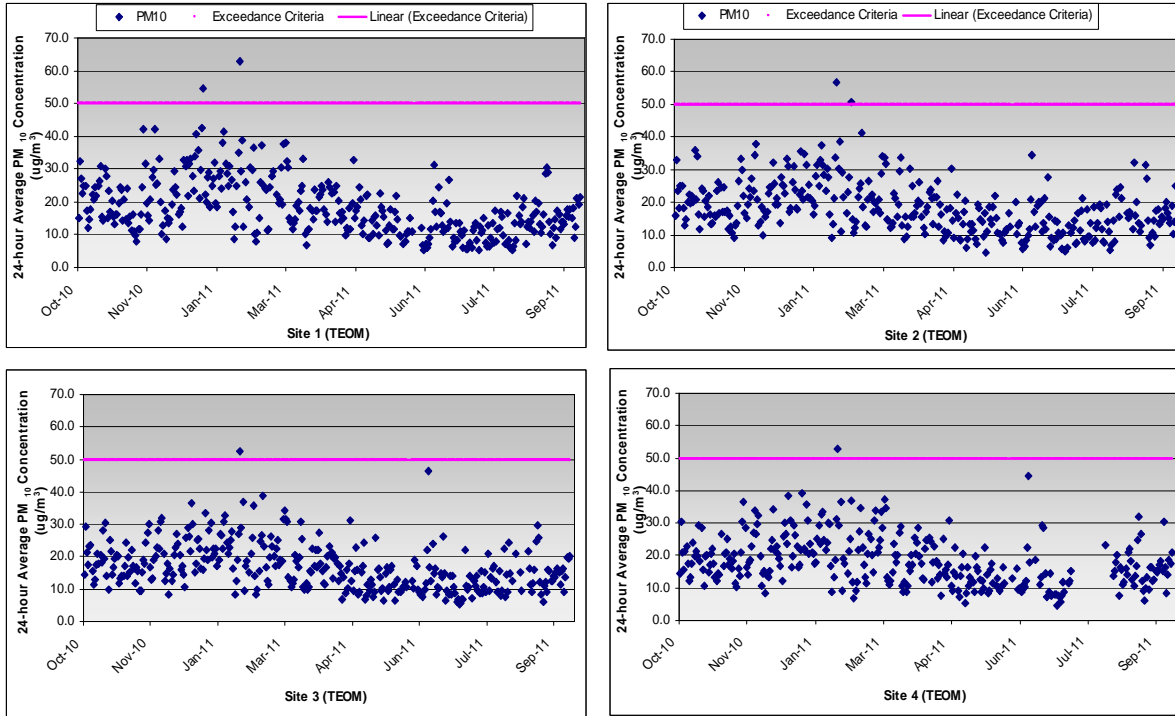
Average daily particulate matter <10 µg/m<sup>3</sup> (PM<sub>10</sub>) concentrations for the reporting period are presented as a time series scatter plot in **Figure 10**. Tabular results for average daily PM<sub>10</sub> concentrations are available in **Appendix B**.

The results show a seasonal trend with concentrations generally higher over the warmer, drier months of November through to April and lower in the wetter months of May through to September. The higher concentrations correlate with drier conditions and the prevalent summer winds in the south to easterly wind vector (onshore, with Port upwind of monitors) with proportionally more winds exceeding 8 m/s over this period (**Figures 4-6**). The lower concentrations correlate to the wetter conditions and the prevalent winter winds in the south west to northerly wind vector (offshore, with Port downwind of monitors) with less winds exceeding 8 m/s (**Figure 7**). Despite the higher PM<sub>10</sub> results being correlated to the Port being upwind, comparison of Port activities to PM<sub>10</sub> exceedances indicate climatic factors including marine aerosols have a large influence on PM<sub>10</sub> levels (see **Table 3** summarising PM<sub>10</sub> exceedance reports).

#### 4.1.1 Summary of PM<sub>10</sub> Exceedances

A summary of each recorded PM<sub>10</sub> exceedance event is provided in **Table 3** and describes possible causes of these exceedances. It is noted that, with the available meteorological data, none of the exceedances can categorically be attributed to prescribed shipping activities that are under the control of EPSL as the stevedore.

PM<sub>10</sub> exceedances increased slightly with seven exceedances at various sites over four days. Previous years have seen five exceedances over two days in 2009/10 and six exceedances over three days in 2008/09. Majority of these exceedances were due to climatic factors or from inland activities.



**Figure 10: Daily TEOM PM<sub>10</sub> Concentrations (µg/m<sup>3</sup>) from October 2010 to September 2011**  
**Silica Concentrations from December 2010 to September 2011**

**Table 3: Summary of 24-hour PM<sub>10</sub> Exceedance Events - October 2010 to September 2011**

Start Date	End Date	Site	PM10 Conc. (µg/m <sup>3</sup> )	Possible Cause of Exceedance & Evidence
2/01/2011 12:00	3/01/2011 12:00	1	54.7	Esperance foreshore beach (sand and sea spray). Wind direction and sources in the same direction
28/01/2011 12:00	29/01/2011 12:00	1	63.0	Source from Esperance town south to west of the Port. Wind direction and sources in the same direction as site.
		2	56.7	
		3	52.6	
		4	52.9	
7/02/2011 12:00	8/02/2011 12:00	2	50.8	Unsealed surfaces of Dempster Head, the reclaim area around sheds 3 and 4, and the CBH lease area. Gale force winds and wind direction and sources in the same direction
22/02/2011 12:00	23/02/2011 12:00	1	61.7	Esperance foreshore beach (sand and sea spray). Wind direction and sources in the same direction

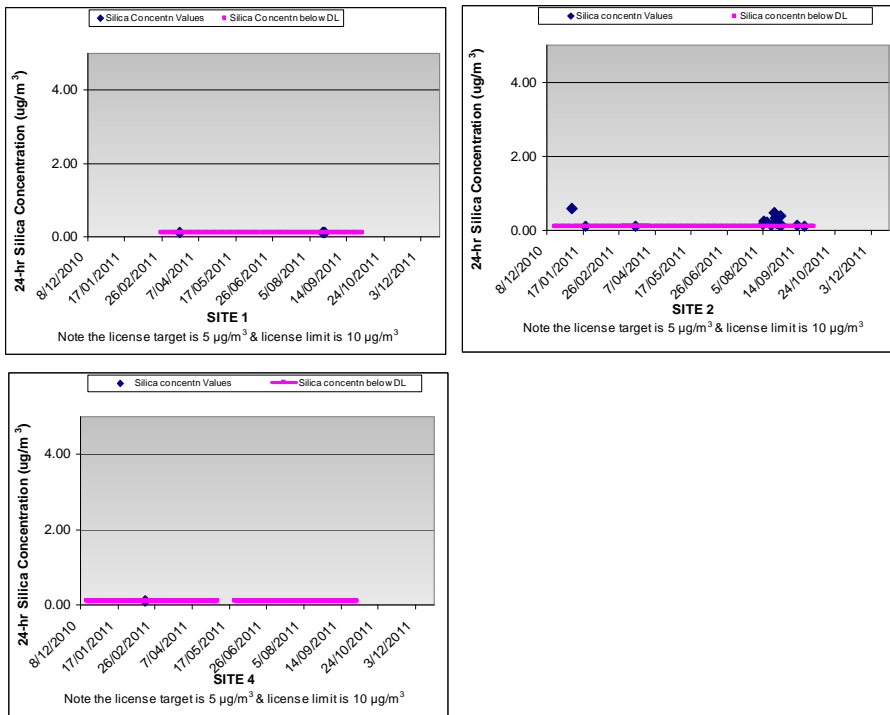
Note: All exceedance reports are available for download from the EPSL website at [www.epsl.com.au/envmon.asp](http://www.epsl.com.au/envmon.asp)

## 4.2 Silica Quartz as PM<sub>10</sub>

Silica as quartz was added to the licence on 27th January 2011 on the recommendation of DoH and DEC as a condition relating to the export of spodumene. Monitoring commenced on 15th December 2010 using three OPSIS machines at Sites 1, 2 and 4. They measure silica as quartz by analysis of particulate matter <10µg (PM<sub>10</sub>) (in µg/m<sup>3</sup>) on filter papers by a method adapted from occupational exposure sample analysis for silica (respirable quartz) (NATA, 2011);

Silica concentrations measured from December 2010 to September 2011 have been predominantly below the limit of detection (0.1 µg/m<sup>3</sup>) (refer to **Figure 11**). Majority of values recorded were below the limit of detection (<0.1 µg/m<sup>3</sup>), and therefore, below the licence criteria of 10µg/m<sup>3</sup>. The highest value during the monitoring period was 0.6 µg/m<sup>3</sup> on the 5<sup>th</sup> January 2011. All values were an order of magnitude below the maximum 24-hour average concentration target criteria of 5 µg/m<sup>3</sup>. The laboratory results can be found in **Appendix C**.

DEC approved sufficient baseline data for silica prior to handling of spodumene as 14 days in the Works Approval documentation. DEC now require Galaxy and EPSL to conduct the monitoring for a period of at least 12 months despite there being no export date on the horizon. Cessation of this monitoring at an earlier date can only be achieved if spodumene is removed from the licence. Galaxy was notified of this position and no response has been received to date.



**Figure 11: Silica Concentrations from December 2010 to September 2011**

Note: OPSIS machine at Site 1 was under repair between December 2010 and February 2011. Data missing during May 2011 at Site 4 was due to a machine fault.

### 4.3 Dust as TSP

Average daily Total Suspended Particulates (TSP) concentrations from February 2008 to 30<sup>th</sup> September 2011 are presented as a time series scatter plot (see **Figure 12**) and the results for the reporting period can be found in **Appendix D**. The results for the reporting period show a similar seasonal variation to the two previous years, with concentrations generally higher between the 'summer period' of October to March compared to the 'winter period' of April to September. The higher concentrations in the summer correlate with the drier condition and the prevalent south to easterly wind vector which reaches speeds exceeding 8 m/s for longer periods (onshore, with Port upwind of gauges) (see **Figures 4 to 6**). The lower concentrations correlate with the wetter conditions and the prevalent south west to northerly wind vector (offshore, with Port downwind of gauges) with proportionally less winds exceeding 8 m/s (see **Figure 7**).

#### 4.3.1 Summary of TSP Exceedances

A summary of each recorded TSP exceedance of the 24-hour assessment criterion is provided in **Table 4** and is intended to highlight the meteorological conditions and Port activities that contributed to these exceedances. The highest recorded concentration was  $240\mu\text{g}/\text{m}^3$  (Site 1) between the 2<sup>nd</sup> January 2011 1200hrs and 3<sup>rd</sup> January 1200hrs and coincided with 'near gale' force winds.

The 24-hour TSP assessment criterion of  $90\mu\text{g}/\text{m}^3$  was exceeded 27 times over 16 days between 20/11/2010 and 22/03/2011. This doubled the number of exceedances compared to 13 exceedances over 11 days in 2009/10. This is explained by differences in wind conditions, since the 2010-2011 summer period had stronger winds in the south to easterly vector as discussed previously in Section 2.1. Other reasons for additional exceedances may be due to additional works and upgrades being carried out on site and an extra 80 people being on site i.e. more vehicles generating more dust.

The source of the dust exceedances were split in half, with 14 exceedances associated with the beach and unsealed port areas and 13 associated with grain loading operations. These associations include significant relationships between real time TSP data from E-sampler 5, wind direction and grain loading times.

To reduce TSP emissions from unsealed port areas, in the 2010/11 reporting period EPSL maintained applications of a dust binding agent on unsealed surfaces and has encouraged their main leaseholder CBH to follow suit.

CBH has begun taking action in relation to controlling grain dust emissions in March 2011 when they began a fogging trial on one of their seven shiploaders. Anecdotally there has been a reduction in dust levels. However, progress has stalled with performance monitoring of this treatment delayed for over six months. This information would enable CBH to consider the benefits of expanding this treatment to the other four shiploaders.

It is evident that operations at Berth 1, which are not under the direct control of EPSL, have considerable impacts on TSP dust results reported by EPSL. EPSL is considering annexing this berth from its licence since grain loading is a non-prescribed activity and EPSL is not the occupier or controller of the site.

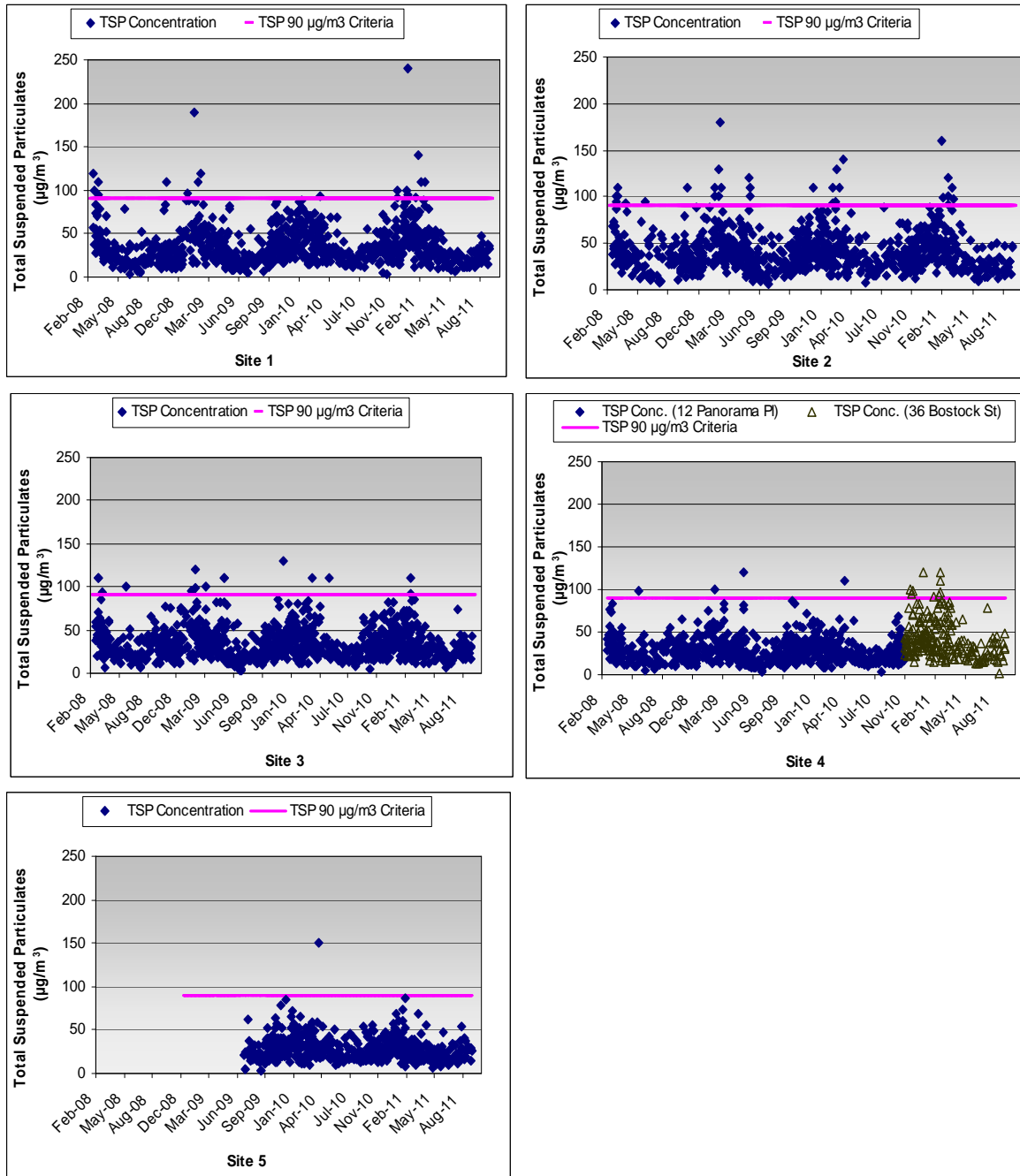


Figure 12: TSP Concentrations Measured by HVAS Sites 1 to 5 from February 2008 to September 2011

**Table 4:** Summary of 24-hour TSP Exceedance Events - October 2010 to September 2011

Start Date	End Date	Site	TSP Conc. (µg/m3)	Possible Cause of Exceedance & Evidence
20/11/2010 12:00	21/11/2010 12:00	4	100	Dust from unsealed surfaces between EPSL areas local to iron ore Shed 3, and the Summit and CBH lease areas. Wind direction, and sources in same direction
27/11/2010 12:00	28/11/2010 12:00	1	91	Due to 'strong' easterly and east south easterly winds mobilising dust from Port beach and unsealed surfaces.
		4	95	
28/11/2010 12:00	29/11/2010 12:00	1	100	Due to 'strong' easterly and east south easterly winds mobilising dust from Port beach and unsealed surfaces.
		4	98	
28/12/2010 12:00	29/12/2010 12:00	1	100	Esperance Port beach, unsealed areas and dust emissions from berth 1 grain loading. Correlation dust levels to wheat loading on berth 1
1/01/2011 12:00	2/01/2011 12:00	1	95	Beach and unsealed areas the Port adjacent to berth 3. Wind speed 'near gale', wind direction and sources in same direction
2/01/2011 12:00	3/01/2011 12:00	1	240	Beach and unsealed areas the Port adjacent to berth 3. Wind speed 'near gale', wind direction and sources in
		4	120	
28/01/2011 12:00	29/01/2011 12:00	1	91	Beach and unsealed areas the Port adjacent to berth 3. Wind speed 'near gale', wind direction and sources in same direction
7/02/2011 12:00	8/02/2011 12:00	1	140	Dempster Head, the reclaim area around sheds 3 and 4, and the CBH lease area. Wind speed 'near gale', wind direction and sources in same direction
		2	160	
		4	92	
13/02/2011 12:00	14/02/2011 12:00	1	110	Source thought to be Port beach. Wind speed 'near
15/02/2011 12:00	16/02/2011 12:00	2	99	Wheat dust from berth 1. Correlation dust levels to wheat loading on berth 1, wind described as fresh so not likely to mobilise beach sand
25/02/2011 12:00	26/02/2011 0:00	4	93	Unsealed surfaces of Dempster Head and the Port precinct. Wind direction, and sources in same direction
1/03/2011 12:00	2/03/2011 12:00	1	110	Unsealed surfaces of the Port, grain loading. Wind direction, and sources in same direction
		2	91	
		3	92	
		4	120	
2/03/2011 12:00	3/03/2011 12:00	2	120	Unsealed surfaces of the Port, grain loading. Wind direction, and sources in same direction
		3	110	
		4	96	
3/03/2011 12:00	4/03/2011 12:00	2	100	Unsealed surfaces of the Port, grain loading. Correlation of dust levels to wheat loading on berth 1
		4	110	
15/03/2011 12:00	16/03/2011 0:00	2	110	Unsealed surfaces of the Port, grain loading. Correlation of dust levels to wheat loading on berth 1
21/03/2011 12:00	22/03/2011 0:00	2	97	Wheat Loading, Berth 1 & unsealed surfaces of the Port. Correlation of dust levels to wheat loading on berth 1

#### 4.4 TSP Metal Speciation Analysis

The complete metal speciation results from the five HVAS monitors is presented in **Appendix E**.

The results for lithium, zinc, nickel, iron, sulphur and lead have been presented as time series scatter plots (refer to **Figures 13 to 19**) that show the concentration of the speciated metal as measured in total suspended particulate (TSP) by the High Volume Air Samplers (HVAS) at Sites 1, 2, 3, 4 and 5 and also the percentage of iron in TSP.

##### 4.4.1 Lithium

Lithium was identified by EPSL as an indicator for spodumene, which was added to the EPSL licence L5099/1974/13 on the 27<sup>th</sup> of January 2011 with monitoring commencing earlier on 19<sup>th</sup> May 2010. Lithium is a suitable indicator for spodumene due to relatively low background levels. No spodumene has been outloaded through the Port since monitoring commenced.

The lithium concentrations detected between May 2010 and September 2011 are marginally above the limits of detection, between 0.001 to 0.004  $\mu\text{g}/\text{m}^3$  (see **Figure 13**). Since monitoring commenced the laboratory detection limits have decreased from 0.004 to 0.001  $\mu\text{g}/\text{m}^3$  (for all raw data refer to **Appendix E**).

The two highest 24-hour concentrations between October 2010 and September 2011 were 0.004  $\mu\text{g}/\text{m}^3$  both at Site 4 on the 3/4/2011 to 4/4/2011 and 5/4/2011 and 6/4/2011. There are currently no health criteria for lithium in dust.

##### 4.4.2 Zinc

Zinc was required as another indicator of spodumene by a late amendment to the EPSL licence L5099/1974/13 on 27<sup>th</sup> January 2011. Monitoring commenced on the 1<sup>st</sup> of February 2011 and the average daily 24-hour concentrations of zinc are all above the detection limit of 0.002  $\mu\text{g}/\text{m}^3$  (see **Figure 14**).

The two maximum 24-hour average concentrations measured between October 2010 and September 2011 were 2.7  $\mu\text{g}/\text{m}^3$  occurring between the 31/7/2011 and 1/8/2011 at Site 2 and the 11/9/2011 and 12/9/2011 at Site 5 (see **Appendix E**).

The variability of zinc, raises the question of its sensitivity as an indicator of spodumene (see **Figure 14**). Zinc is used in galvanised materials throughout Esperance town and the Port, and is released as these materials corrode. This is supported by the distribution of zinc dust levels being similar at site 5 (the community site) to those levels measured at sites 1 to 4 on the border of the Port.

Zinc currently has no associated health criteria in dust and therefore no specified limit. The requirement for continued zinc monitoring and analyses will be reassessed once it is determined if handling of spodumene product will occur at EPSL in the future.

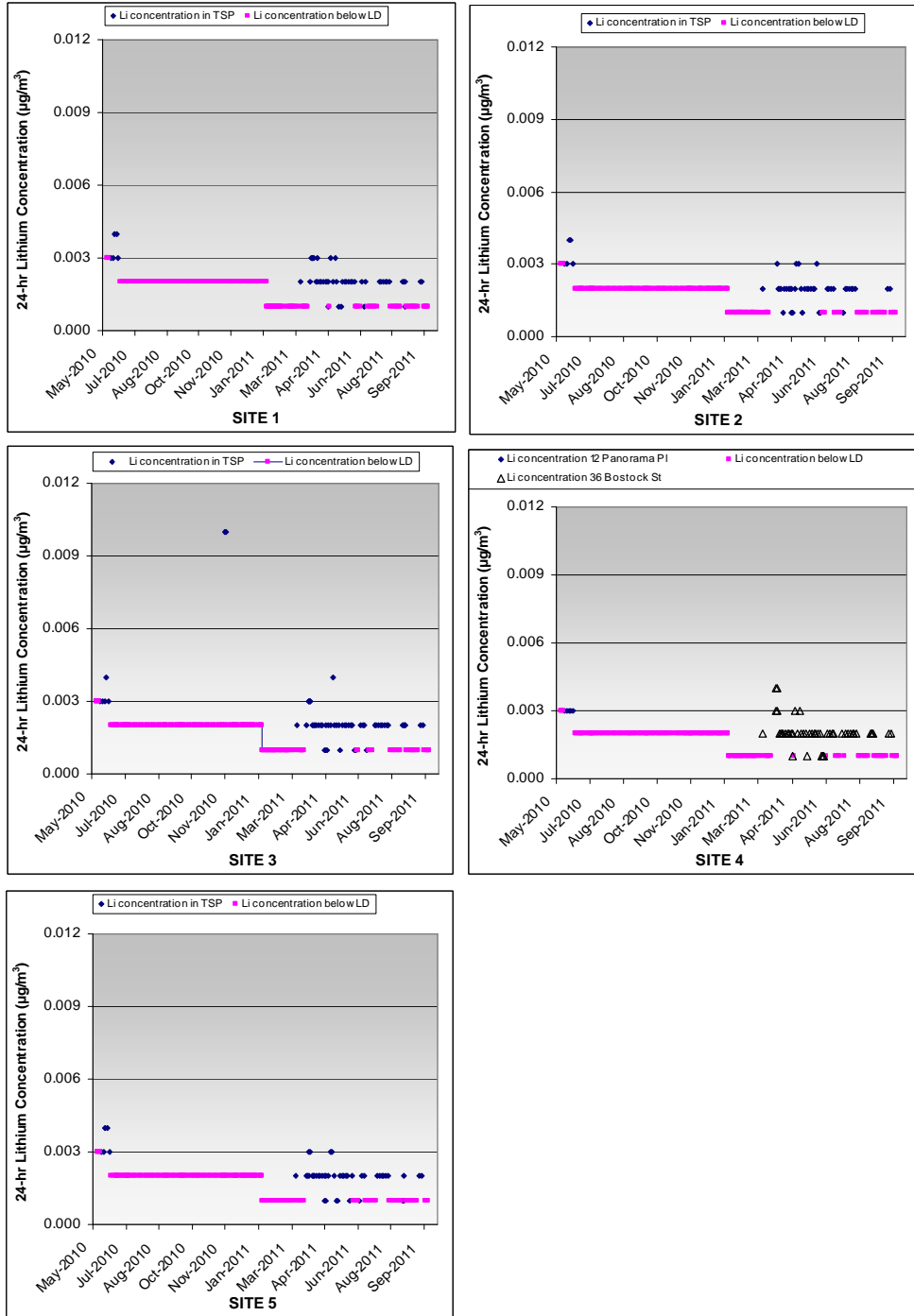


Figure 13: Concentrations of Lithium Measured in TSP by HVAS at Sites 1 to 5 from May 2010 to September 2011.

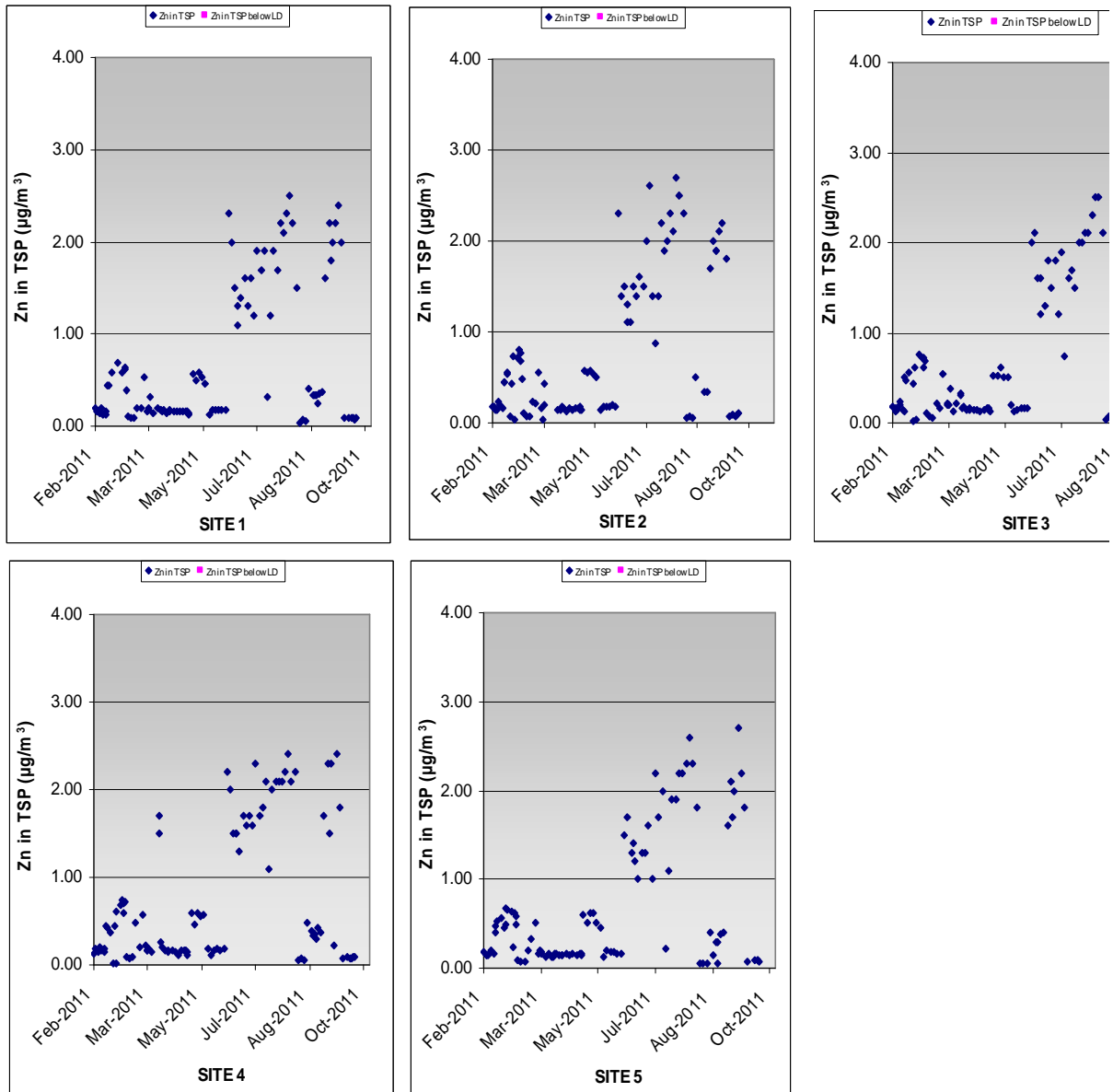


Figure 14: Concentrations of Zinc measured in TSP by HVAS at Sites 1 to 5 from February to September 2011

#### 4.4.3 Nickel

On the 12<sup>th</sup> of December 2008, EPSL implemented a wind loading protocol as part of the Heavy Metals Ship Loading Procedure that only allowed loading of bulk nickel ships in offshore winds. A scatter plot of concentrations of nickel as TSP from commencement of offshore wind loading protocol until the 30<sup>th</sup> of September 2011 (**Figure 15**) shows that nickel concentrations have declined demonstrating the effectiveness of the wind loading protocol and other improvements in the nickel circuit.

The maximum 24-hour nickel concentration of  $0.045\mu\text{g}/\text{m}^3$  was recorded during the reporting period was at site 4 from 3<sup>rd</sup> April to 4<sup>th</sup> April 2011 (see **Appendix E** for raw data). This was three times below the licence criterion ( $0.14\mu\text{g}/\text{m}^3$ ). Across the reporting period and across all five sites 45% of nickel concentrations were below laboratory detection limits ( $<0.002\mu\text{g}/\text{m}^3$ ).

Seventeen nickel values exceeded  $0.03\mu\text{g}/\text{m}^3$  between December 21<sup>st</sup> 2008 and 30<sup>th</sup> September 2009. For the previous reporting period in 2009/10, the number of values exceeding  $0.03\mu\text{g}/\text{m}^3$  had fallen to zero. For the current 2010/11 reporting period two values both at Site 4 exceeded  $0.03\mu\text{g}/\text{m}^3$  during April 2011 with an observable increase in overall nickel levels at this site. This is explained by the relocation of Site 4 HVAS 190m from 12 Panorama Place to 50m from the Port boundary at 36 Bostock Street on the 4<sup>th</sup> November 2010.

Across the reporting period it is evident that seasonal changes influenced  $\text{PM}_{10}$  and TSP levels along with particulates containing nickel and other metals. There was however an overall reduction in nickel emissions that may be attributed to a lower number of bulk nickel ships and increased containment following operation of the container tipper in January 2011. Wind conditions in 2010/2011 had stronger onshore winds in the summer period so this does not explain the decrease in nickel levels. The preceding three reporting periods had between 15 or 16 ships each year, but this reporting period there were only 7 bulk nickel ships loaded at the Port.

Since the nickel loading wind arc has become embedded in Port procedures and adherence to the procedure has been 100%, this supports a change in the operating licence to reporting by exception for the nickel ship loading events.

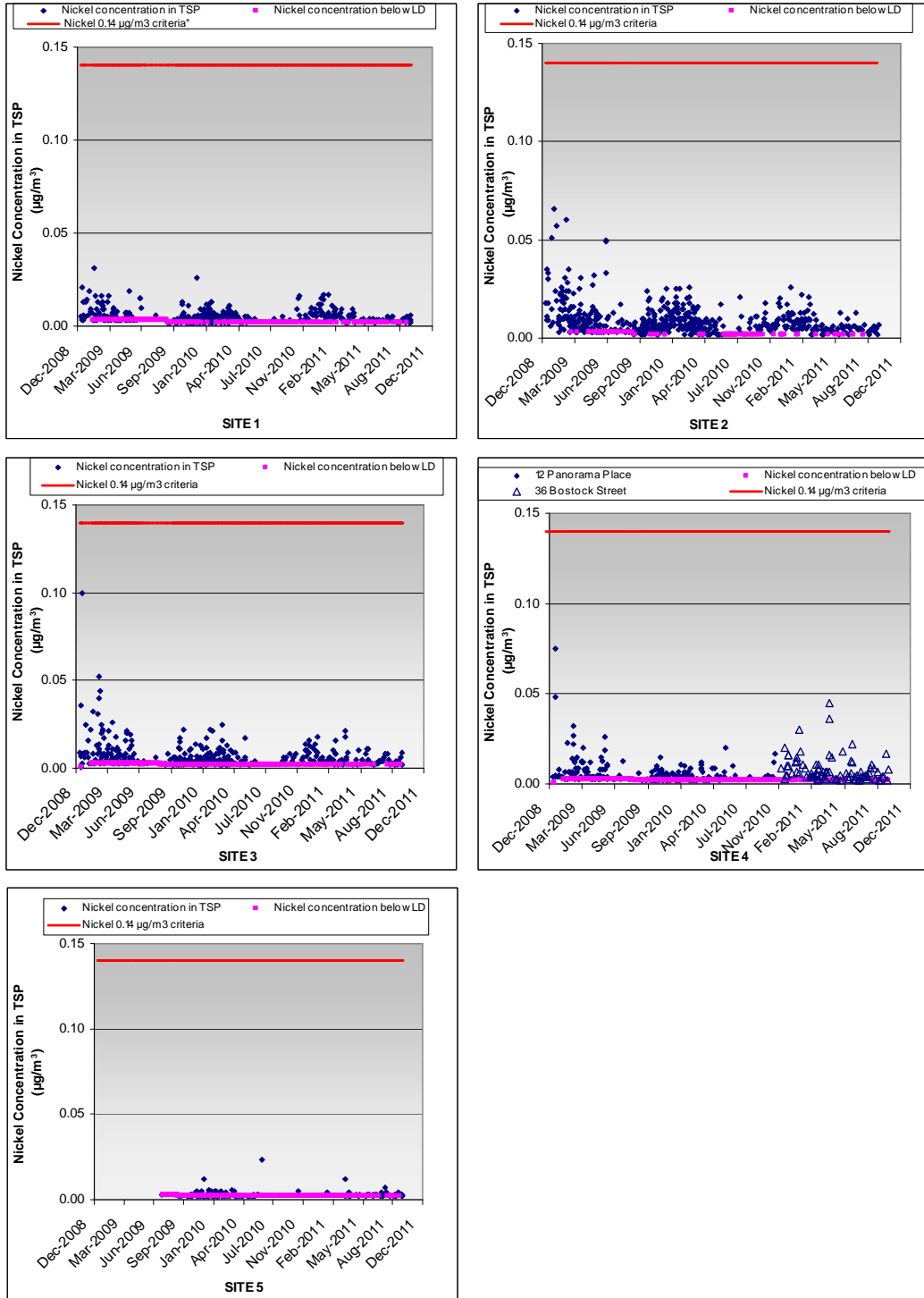


Figure 15: Concentrations of Nickel Measured in TSP by HVAS at Sites 1 to 5 from December 2008 to September 2011

#### 4.4.4 Iron

The overall average percentage iron (% Fe) in TSP for the last three years is 1.5% (see **Figure 16**). The average percentage iron in TSP is unchanged, despite an increase in iron ore export from 7.4 in 2007/08 to 8.0 in 2008/09 to 8.5 in 2009/10 and 8.3 million tonnes per annum in 2010/11.

The highest 24-hour average concentration of iron for the reporting period was  $4.3\mu\text{g}/\text{m}^3$  recorded at Site 4 from 2<sup>nd</sup> to 3<sup>rd</sup> January 2011 (see **Appendix E** for raw data). The concentration of  $4.3\mu\text{g}/\text{m}^3$  represents 3.6% of the TSP concentration recorded at Site 4 for the period ( $120\mu\text{g}/\text{m}^3$ ). There is no assessment criterion for iron in air.

Across the reporting period and in the preceding years, it is evident that the seasonal changes influenced  $\text{PM}_{10}$  and TSP levels along with particulates containing iron (see **Figure 17**).

A gradual reduction in iron concentrations (see **Figure 17**) has occurred at all sites, except Site 4, since December 2008 possibly due to the implementation of the offshore bulk nickel wind loading protocol as nickel concentrate consists as much as 30 to 60% of iron in the forms of pyrrhotite and pyrite. It is likely there are been an increase in iron concentrations at Site 4 due to relocation of the HVAS machine on the 4<sup>th</sup> of November 2010 from Panorama Place to Bostock Street, only 50m from the Port boundary.

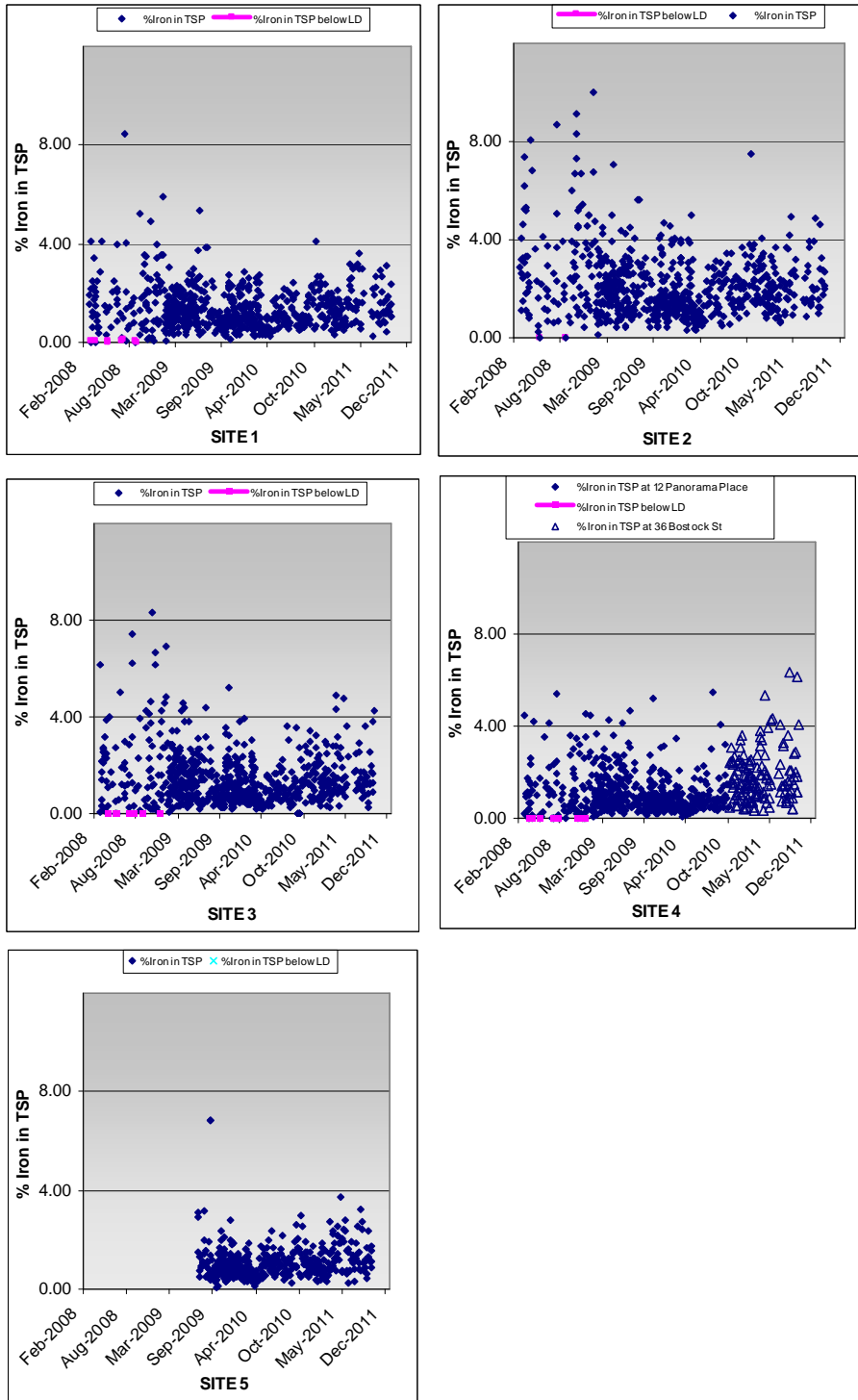


Figure 16: Percentage of Iron Measured in TSP by HVAS at Sites 1 to 5 from February 2008 to September 2011

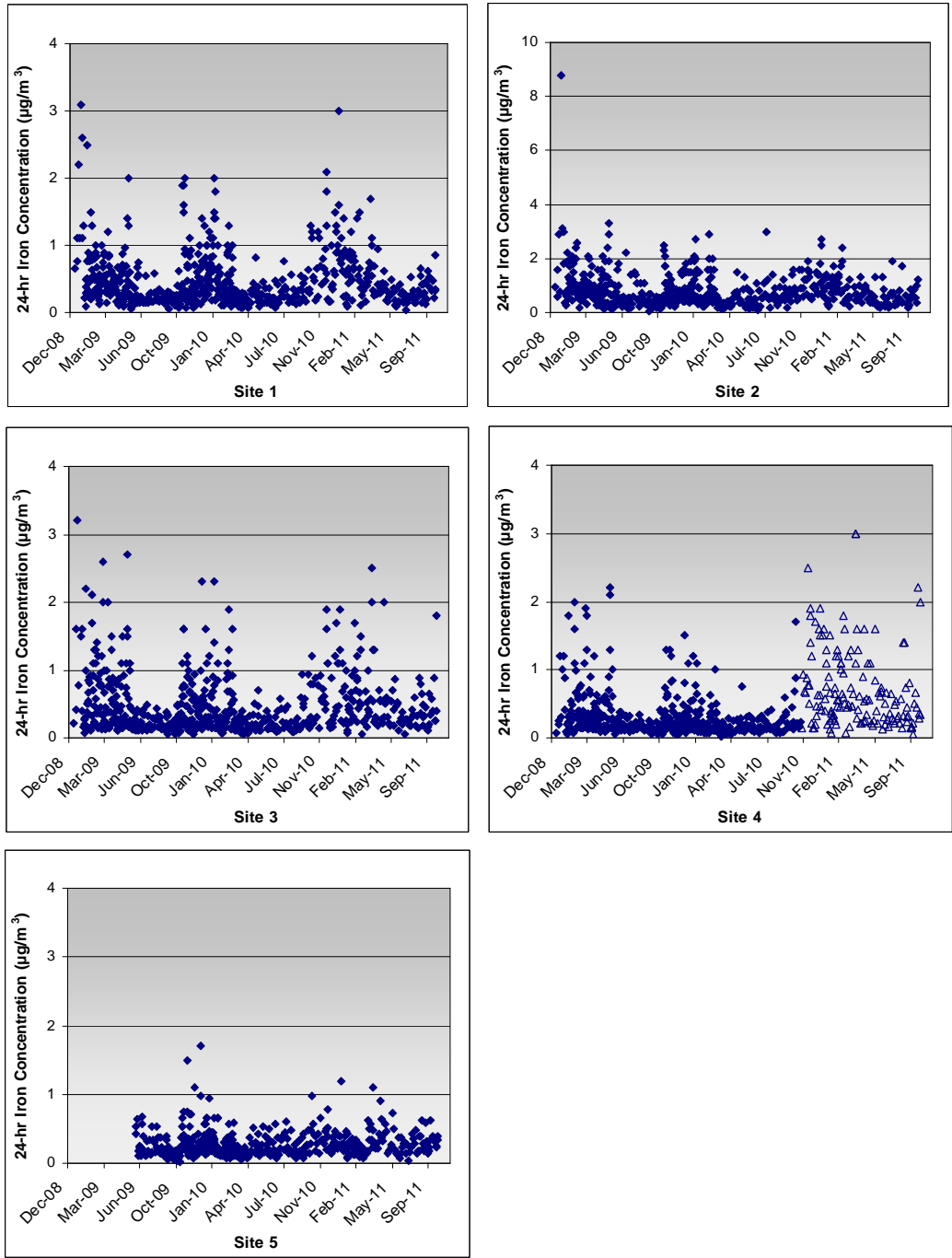


Figure 17: Concentrations of Iron Measured in TSP by HVAS at Sites 1 to 5 from December 2008 to September 2011

#### 4.4.5 Sulphur

Import of formed sulphur recommenced in July 2011 following no sulphur movements since September 2009. There was no inloading of sulphur during August or September 2011 but outloading of sulphur in trucks did occur during these months.

The highest 24-hour average total sulphur concentration for the reporting period from October 2010 to September 2011 was  $5.8 \mu\text{g}/\text{m}^3$  between the 17<sup>th</sup> and 18<sup>th</sup> of January 2011. This reading did not coincide with any sulphur shipping. There is no assessment criterion for sulphur in air.

Across the reporting period and in the preceding years, it is evident that the seasonal changes influenced  $\text{PM}_{10}$  and TSP levels along with particulates containing sulphur (see **Figure 18**). The sulphur concentrations are even more seasonally influenced than the metals due to sulphur being an abundant element commonly found in both marine and terrestrial environments. Sulphur concentrations in the summer months generally reach 1 to  $4 \mu\text{g}/\text{m}^3$  and in the winter months 0.1 to  $2 \mu\text{g}/\text{m}^3$ . Monitors situated close to the beach and marine environment are expected to measure higher levels of sulphur, as shown in the dust gauge results.

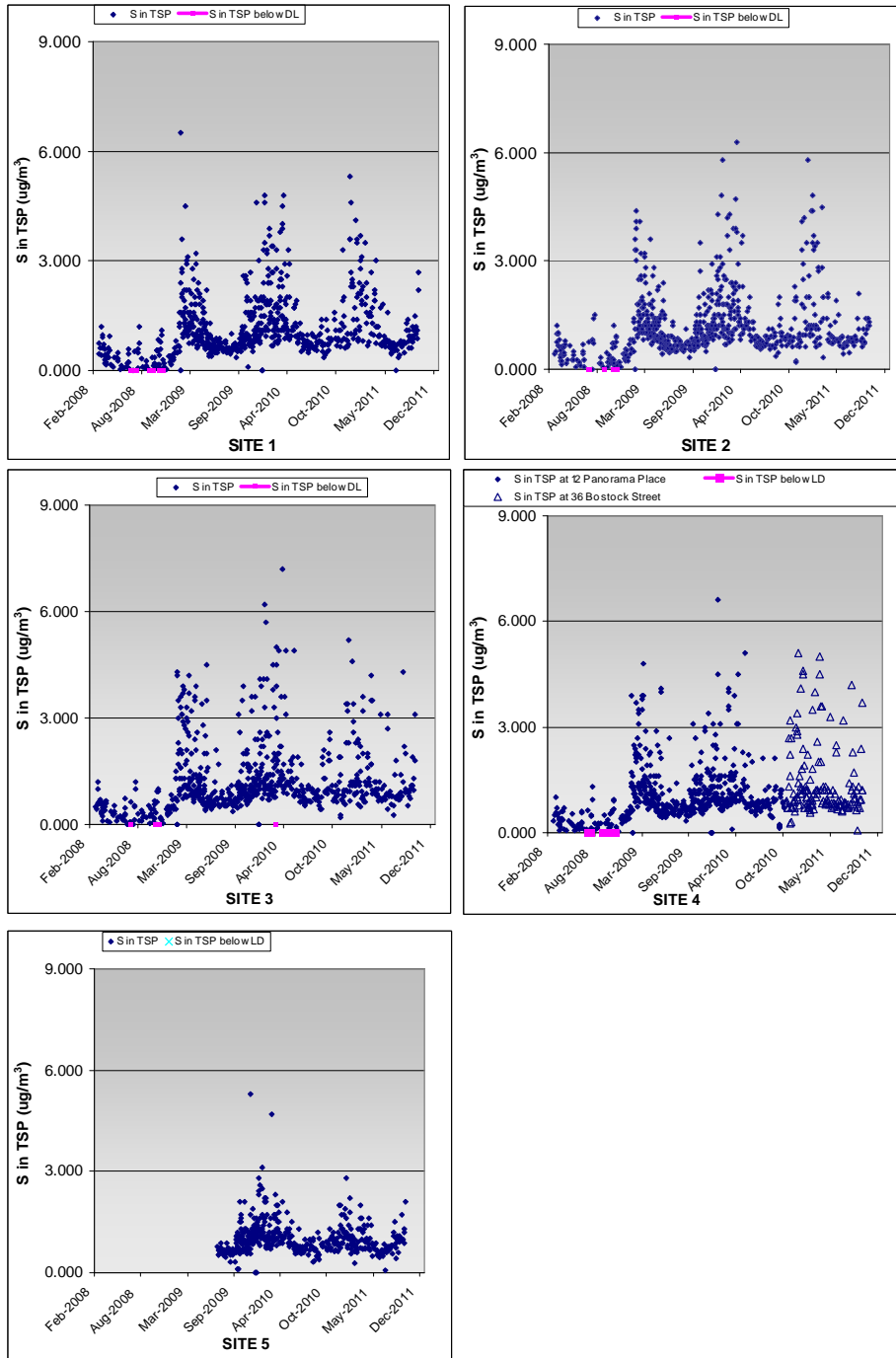


Figure 18: Concentrations of Sulphur measured in TSP by HVAS at Sites 1 to 5 from February 2008 to September 2011

#### 4.4.6 Lead

Bulk export of lead carbonate from EPSL, ceased in March 2007 and no lead was handled during the reporting period. Only 1% (10 values) of all samples were above laboratory detection limits compared to 10% in the previous reporting period. These 10 values of lead above detection limits were distributed across sites 1, 2 and 4 (see **Figure 19**). Sites 3 and 5 did not record any concentrations for lead above the detection limits for the entire reporting period.

The highest 24-hour average concentration from October 2010 to September 2011 was  $0.012\mu\text{g}/\text{m}^3$  at Site 4 from 3/4/2011 to 4/4/2011. The limit of detection for lead is  $0.005\mu\text{g}/\text{m}^3$  (recently been increased from  $0.003\mu\text{g}/\text{m}^3$ ).

The National Environment Protection Measure (NEPM) standard annual concentration for lead is  $0.5\mu\text{g}/\text{m}^3$ . Whilst this criterion is not part of EPSL's licence, the annual lead concentration for 2010/11 (September 2010 to October 2011) is  $0.005\mu\text{g}/\text{m}^3$  across all five sites and which is 100 times lower than the criteria (**Table 4**).

Site	Annual Concentration for Lead	Number of Sampling Days
1	0.0050	159
2	0.0051	152
3	0.0050	159
4	0.0050	159
5	0.0050	160
	<b>Annual Lead Criteria = 0.5000</b>	

**Table 5: Annual Lead Concentration ( $\mu\text{g}/\text{m}^3$ ) for HVAS Sites 1 to 5 for 2010/11**

The continued monitoring of lead dust as TSP four and a half years after the cessation of lead export from the Port cannot be justified by risk since there the levels demonstrate there is no continued risk presented to the surrounding community. The data supports the comprehensive clean up of the Port precinct by EPSL to residential criteria ( $<300\text{ mg}/\text{kg}$  soil) and the surrounding houses, rainwater tanks and businesses that been cleaned as part of the Esperance Cleanup Recovery Project (ECRP). The ECRP cleaning phase is starting to wind down and once complete EPSL will consider a licence amendment to remove lead as a monitoring parameter.

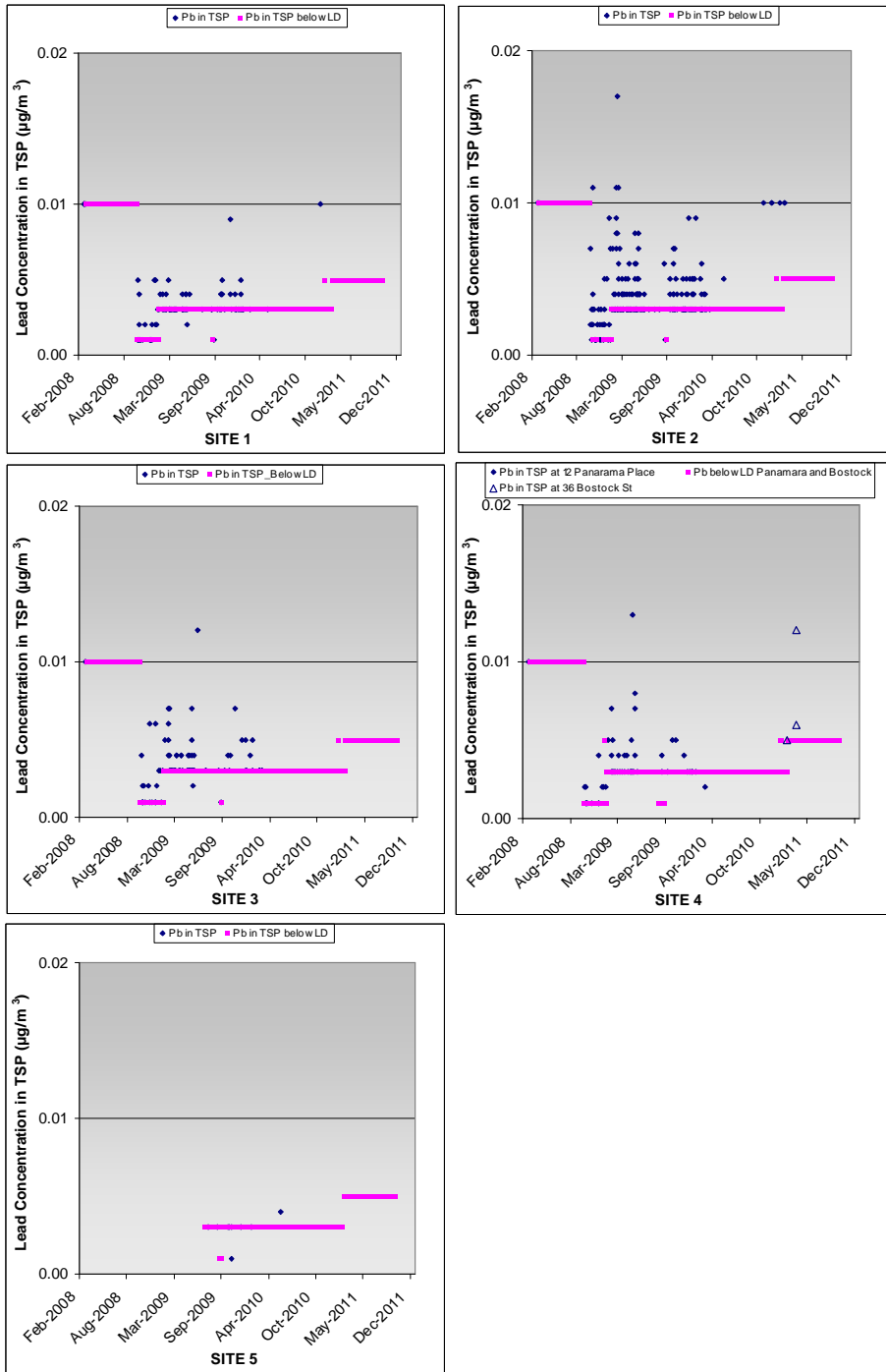


Figure 19: Concentrations of Lead Measured in TSP by (HVAS at Sites 1 to 5 from February 2008 to September 2011

#### 4.4.7 Proposed Licence Amendment

Based on reduced levels of nickel and lead, EPSL will consider amending its licence to focus more on annualised limits instead of 24-hour criteria for nickel. The major change is to leave filter papers in High Volume Air Samplers for a week, instead of changing them every day and analysing nickel on these papers every third day. This will mean the measurements of nickel will be a weekly average instead of daily averages recorded every third day. This is with exception to periods when bulk nickel shiploading is occurring and daily filter paper changes and analyses of nickel will continue. These proposed changes were presented to stakeholders at the Port Consultative Committee (PCC) and at progress meetings of the ECRP. There were been no significant objections to the proposed changes.

### 4.5 Dust Deposition

EPSL operates 18 dust deposition gauges (DG) throughout Esperance (refer to **Figure 2**). The 'community' gauges comprise of DG1, DG3 to DG8 and DG11 to DG19. Two additional 'on-site' or peak gauges are located within the nickel handling area of the Port (DG9 and DG10). The assessment criteria are not applicable to DG9 and DG10 as these are located within the Port boundary and are not ambient monitoring stations.

Raw data for the dust deposition measured by the dust gauges is contained in **Appendix F** but the main trends are discussed in the following section. There are no deposition criteria for nickel and iron and the data is limited to indicating temporal trends. The data for each contaminant is comprised of a soluble and insoluble component. The detection limits are the sum of the individual detection limits.

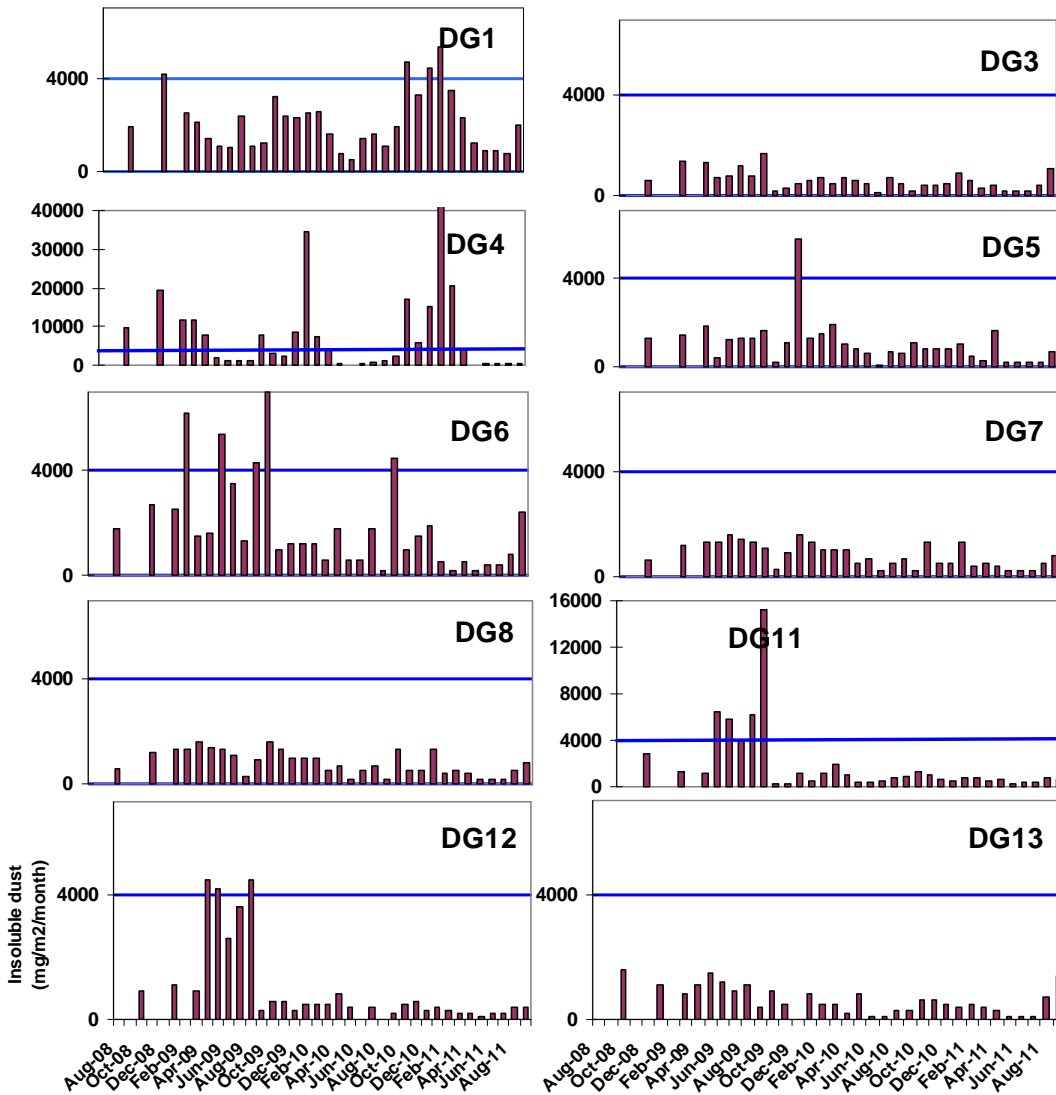
Twelve exceedances of the NSW EPA assessment criteria of 4000 mg/m<sup>2</sup>/month occurred across all dust gauge sites during the reporting period. This was higher than the 2009/10 reporting period when seven exceedances were recorded but lower than the 2008/09 period when sixteen exceedances were recorded. This assessment criterion has been adopted for comparative purposes only and is not enforceable in WA.

The highest insoluble dust deposition rate was 43,100 mg/m<sup>2</sup>/month recorded at DG4 during February 2011, a four fold increase in typical deposition rates at this site. DG4 accounted for six of the twelve exceedances of the NSW EPA assessment criterion.

The highest dust deposition rates occurred at DG4 during summer and peaked in February 2011 due to the predominant SE winds blowing sand from the beach located less than 100m away from the dust gauge. This is also consistent with the previous reporting period where the same dust gauge in the same month recorded the highest dust deposition rates. This increase in general dust was not associated with increased levels of nickel and iron.

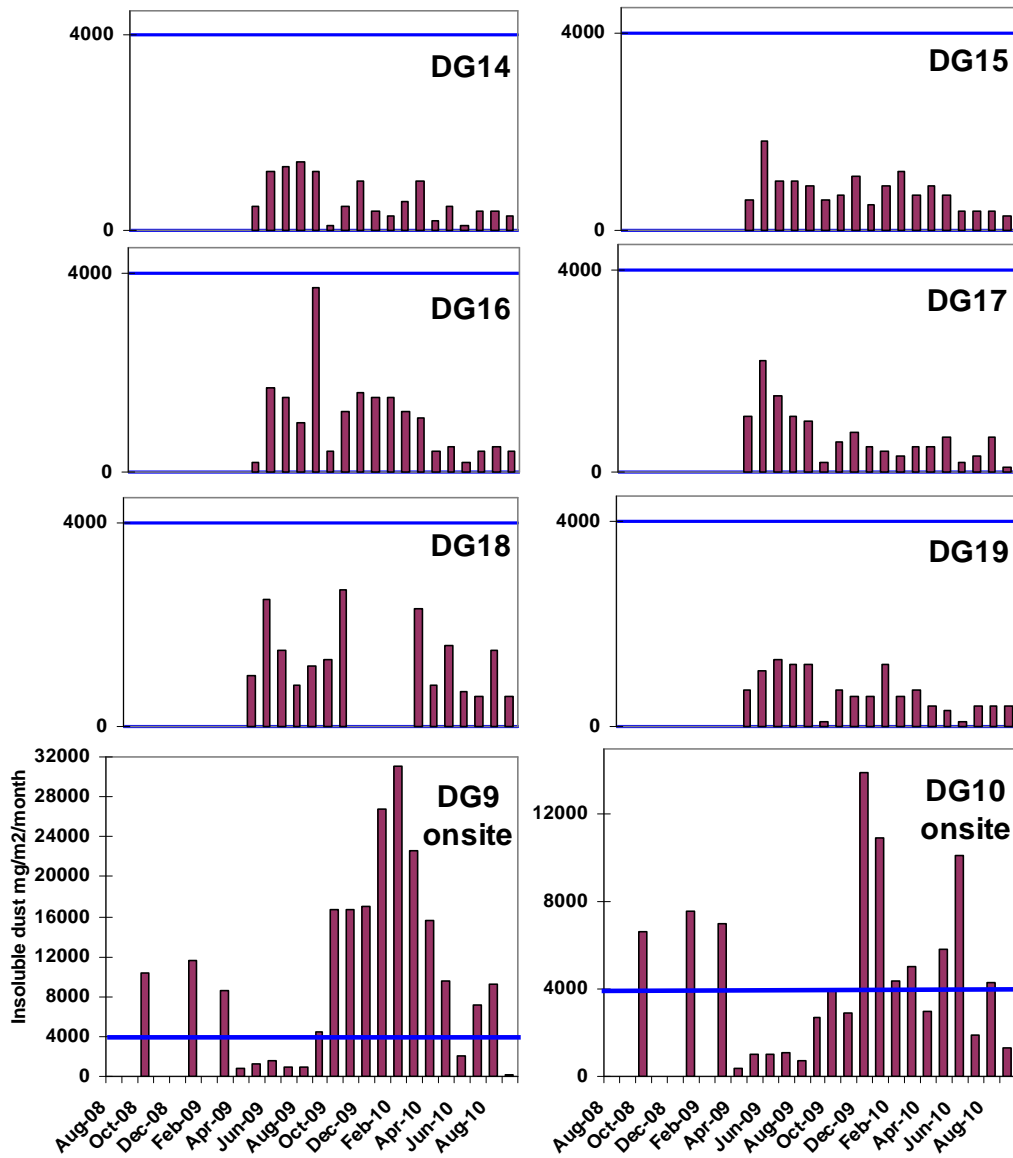
Declines in dust deposition occurred at some community dust gauges (DG11, DG12, DG16 and DG17) whereas dust deposition has increased at other locations (DG1, DG4 and DG18) and the remaining locations have similar rates of dust deposition (see **Figures 20** and **21**). Dust gauges reflect localised dust conditions and changes are likely to be due to a number of factors. Since these changes do

not include significant changes in metals relating to EPSL’s prescribed activities, an investigation into each of these changes is not warranted. Increases in dust deposition at DG1, DG4 and DG18 is likely due to increased mobilisation of beach sand since all three sites are within 100 to 150m of the beach. The beach-side DG4 had the highest dust deposition rates of any gauge. Deposition results from the two on-site gauges (DG9 and DG10) had generally higher deposition rates than the community monitors as would be expected in an industrial environment with unsealed roads and grain export.



**Figure 20: Monthly Insoluble Dust Deposition Rates for Dust Gauges DG1 to DG13 from August 2008 to September 2010.**

Note: NSW EPA assessment criteria of 4000 mg/m<sup>2</sup>/month insoluble dust is shown on each community dust gauge chart.



**Figure 19: Monthly Insoluble Dust Deposition Rates for Dust Gauges DG14 to DG19 and onsite DG9 and DG10 from October 2008 to September 2011**

Note: NSW EPA assessment criteria of 4000 mg/m<sup>2</sup>/month insoluble dust is shown on each community dust gauge chart.

Patterns in nickel, iron, lead, sulphur, lithium and zinc in dust gauges are discussed in detail for the reporting period.

#### 4.5.1 Nickel

The nickel dust gauge deposition bar charts show total nickel (through addition of both soluble and insoluble nickel) and this is plotted over time with some monitoring gauge data dating back to November 1995 (**Figures 22 and 23**). Raw data for nickel in dust gauges for the reporting period is shown in **Appendix G**.

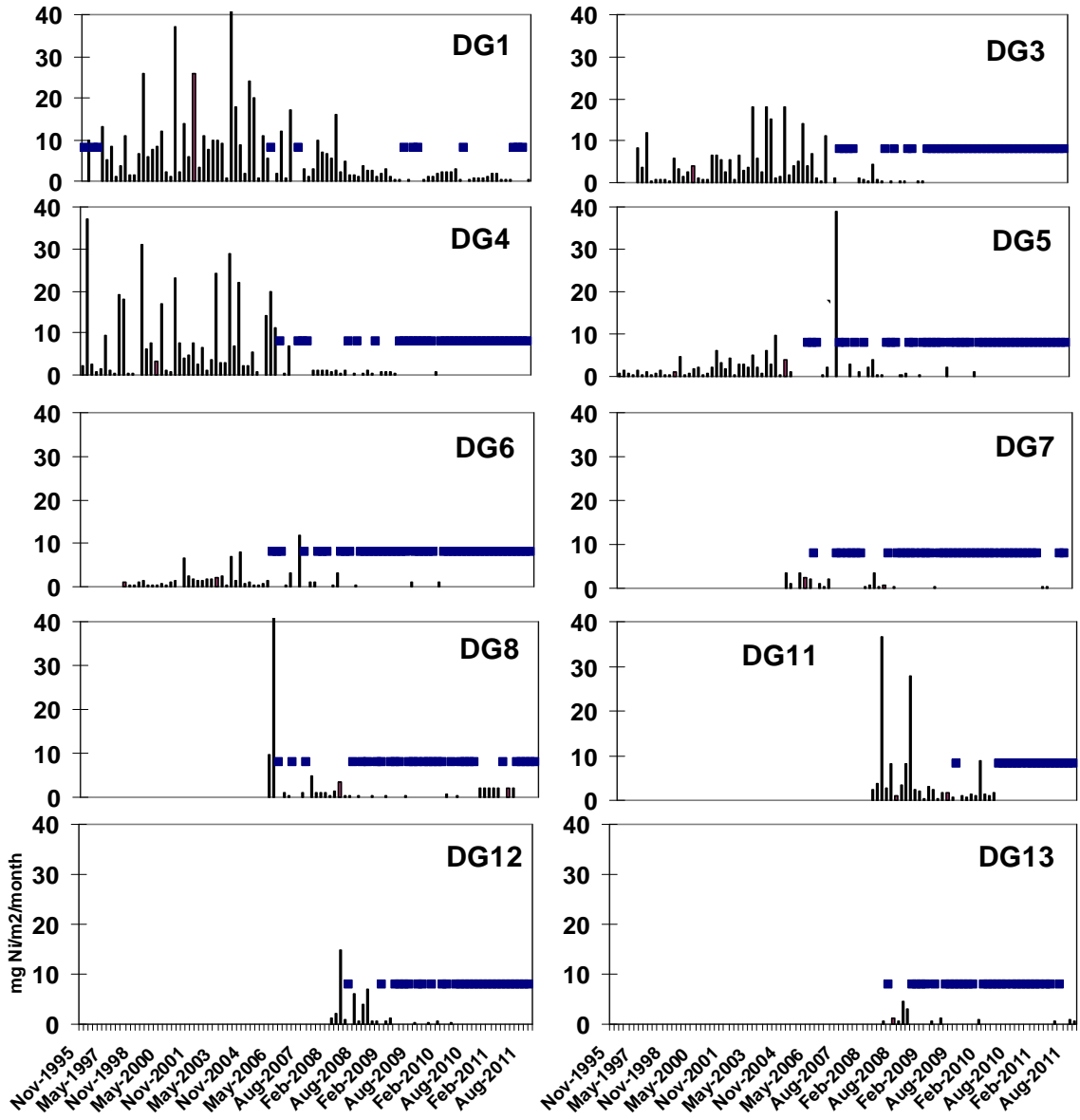
The nickel deposition rates at both the community and onsite dust gauges have significantly declined in the last three years (**Figures 22 and 23**) even though the amount of nickel product exported has nearly doubled from 0.16 to 0.29Mt since last reporting period. This is due to majority of the nickel (72%) now being exported in containers.

The declining trends are best shown at DG1 and DG4 since these gauges are in close proximity to the Port and are located either side of the HVAS monitoring stations Site 2 and Site 1 respectively. This trend is also supported by reductions in nickel concentrations recorded in TSP samples taken by the HVAS monitors.

DG9 and DG10 are situated onsite within the nickel handling area of the Port, and nickel handling occurs within metres of the gauges. The nickel deposition results for DG9 and DG10 are also declining. Although in the previous reporting period these onsite gauges indicate localised sources of nickel dust were a concern, the results of the external dust gauges and the HVAS monitoring stations indicate nickel dust was contained within the Port, due to effective industrial hygiene.

A decline in nickel dust in the onsite dust gauges DG9 and DG10 could be due to a decline in bulk nickel handling during the reporting period (only 22%) i.e. 7 bulk ships this reporting period compared to 16 the previous year, and an increase in containers (72%) and bulker bags (4%). The cessation in January 2011 of bulk nickel kibbles being inloaded into the Port and replacement by the more container inloading may also have improved nickel dust levels.

The overall value of community Dust Gauges has become extremely limited given that over 88% of all values in 2010/11 and 90% of all values in 2009/10 were below detection for nickel in dust gauges.



**Figure 20: Total Nickel Deposition Rates at Community Dust Gauges DG1 to DG13 from November 1995 to September 2011**

Note: Plotted squares (■) indicate values below detection limits (<0.3 mgNi/m<sup>2</sup>/month)

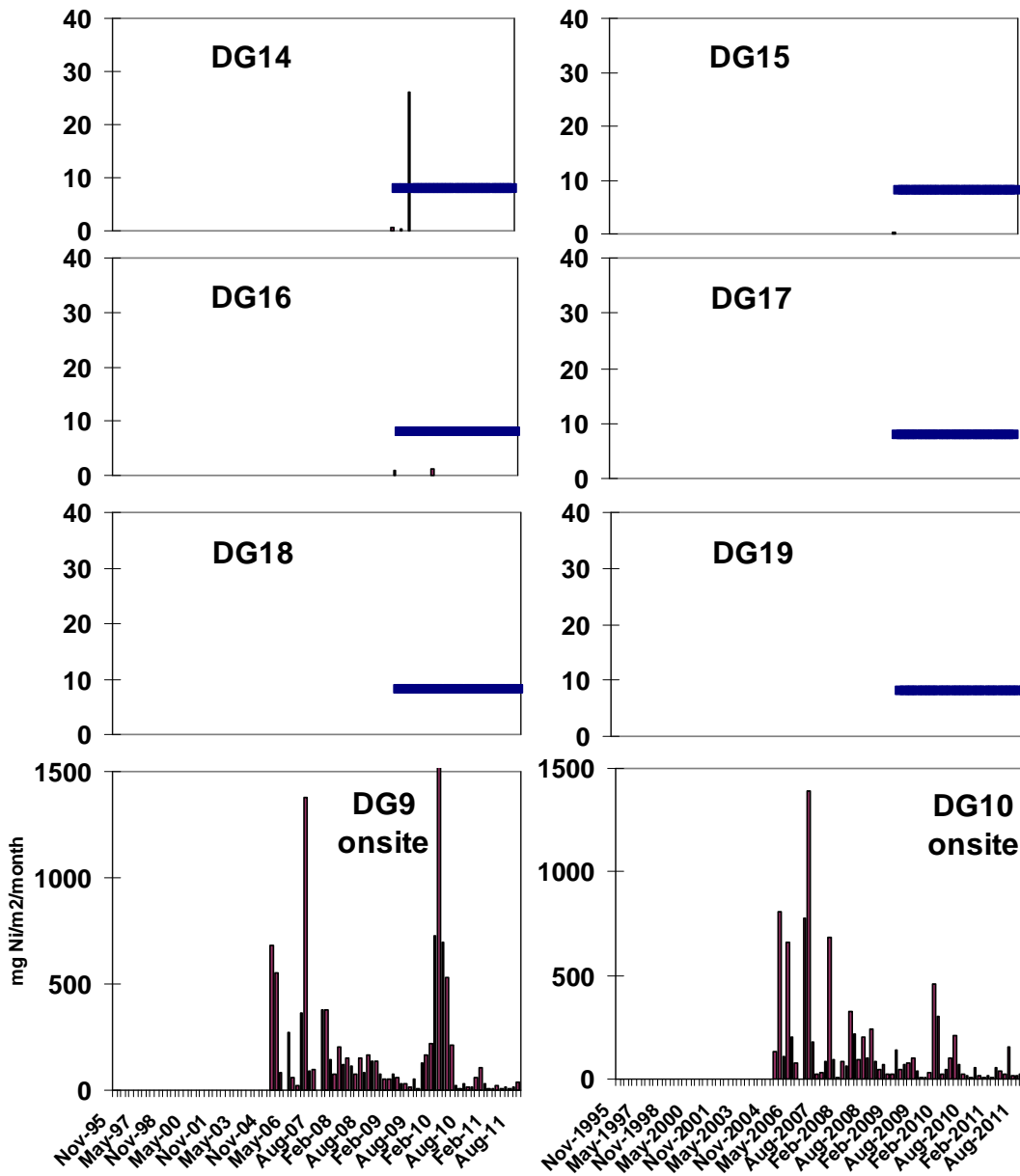


Figure 21: Total Nickel Deposition Rates at Community Dust Gauges DG14 to DG19 and Onsite Gauges DG9 and DG10 from November 1995 to September 2011

Note: Plotted squares (■) indicate values below detection limits (<0.3 mgNi/m<sup>2</sup>/month)

#### 4.5.2 Iron

Iron deposition rates varied between 1.2 and 49.5 mg/m<sup>2</sup>/month for all community deposition gauges for the reporting period (see **Appendix G** for all raw data). This is with exception of DG1 that had significantly higher iron deposition rates than the other community gauges and ranged from 6 to 136.26 mg/m<sup>2</sup>/month. Increased deposition was also observed at DG4 (see **Figures 24 and 25**). Both these increases are probably related to the increased deposition of beach sand at these gauges as previously discussed. If general dust deposition is increased, then deposition of iron will also be increased.

The deposition of iron at the onsite gauges DG9 and DG10, are correlated to nickel deposition rates and deposition declined at both gauges. The correlation is due to nickel concentrate containing a significant percentage (30 to 50%) of iron pyrrhotite and iron pyrite. DG9 had a dramatic decline in iron dust deposition due to the cessation of bulk nickel kibbles inloading into the Port in January 2011. This activity previously occurred only two metres from DG9. DG10 demonstrated a more moderate decline in iron dust deposition due to less bulk nickel ships in 2010/11.

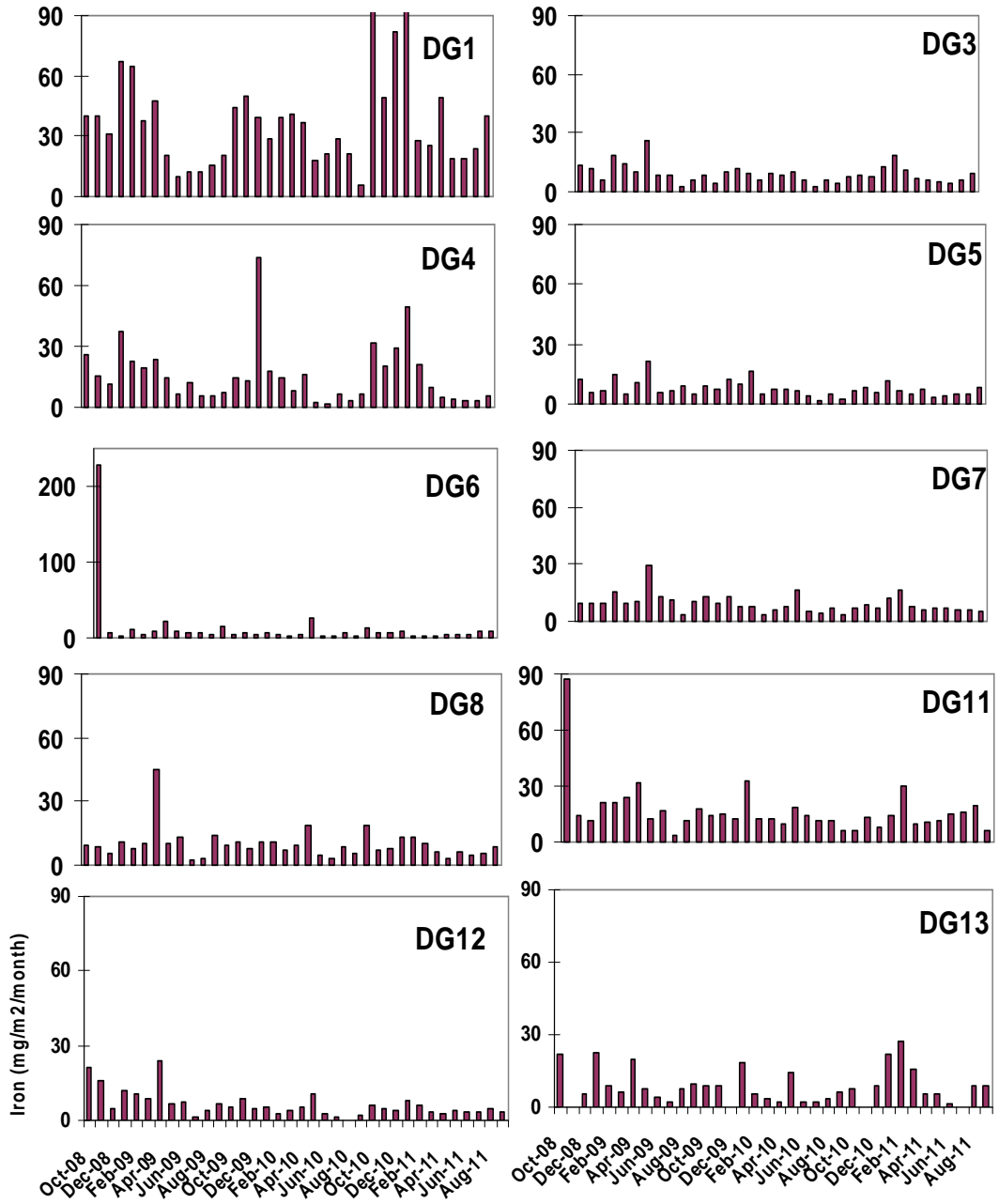


Figure 22: Iron Deposition Rates at Dust Gauges DG1 to DG13 to from October 2008 to September 2011

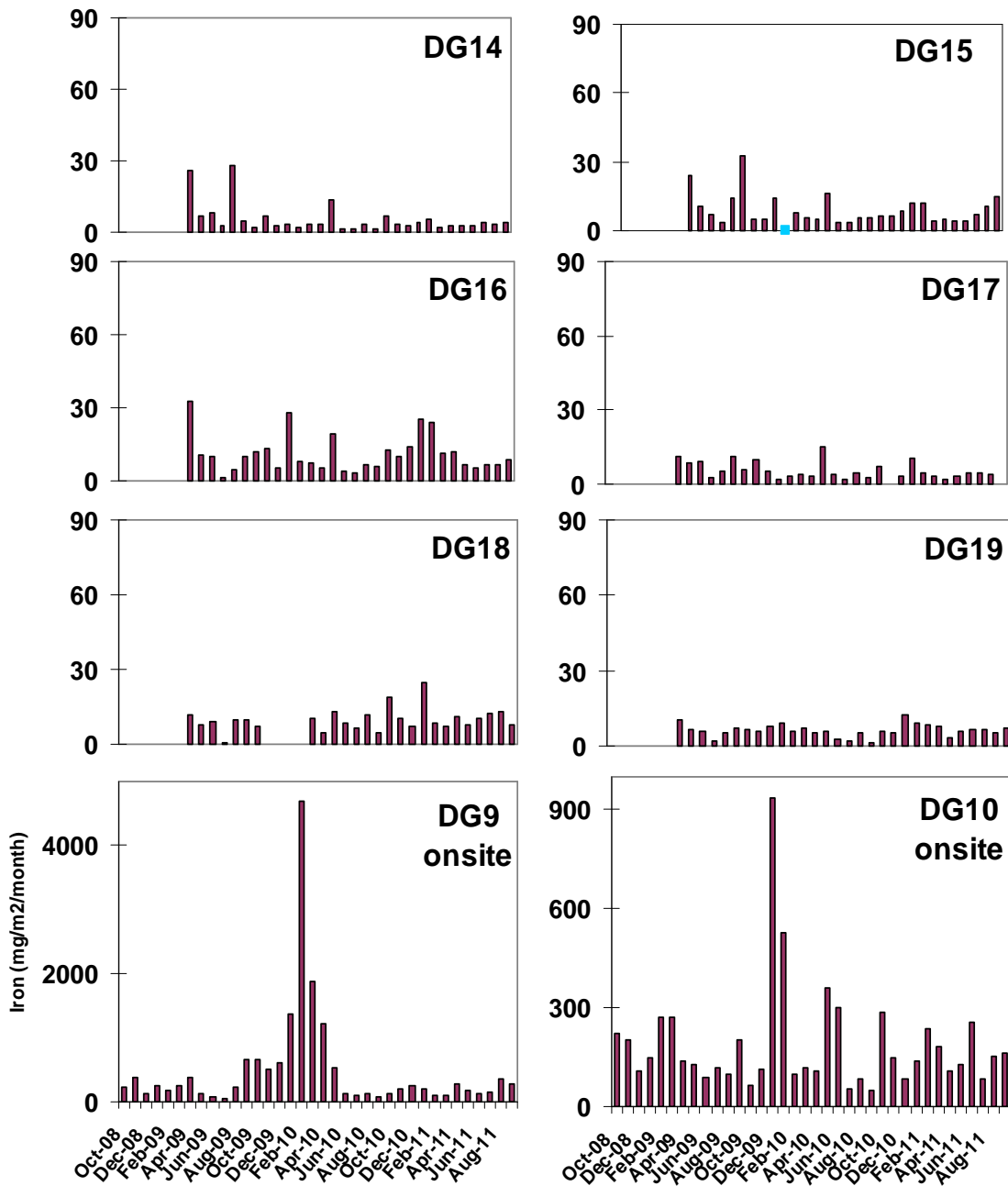


Figure 23: Iron Deposition Rates at Dust Gauges DG14 to DG19 and Onsite Gauges DG9 and DG10 from October 2008 to September 2011

#### 4.5.3 Lead

Total lead (soluble and insoluble) dust deposition was not detected at any of the community dust gauges (refer to raw data in **Appendix G**). Over 98% of all values in 2010/11 were below detection for lead in dust gauges. The 2% was accounted for by missing data and no real values were recorded at any of the 16 community dust gauges. Approximately half (46%) of lead deposition measurements at the onsite dust gauges DG9 and DG10 were below detection levels..

#### 4.5.4 Sulphur

Total sulphur levels (soluble and insoluble) were variable across the community gauges which reflects the variety of natural sources of this element (refer to raw data in **Appendix G**). Formed sulphur was imported in July 2011 for the first time in 22 months, but there was no correlation to this shipment. Consistent with sulphur in TSP sulphur levels were elevated in the summer period and lower in the winter period.

#### 4.5.5 Lithium

Total lithium (soluble and insoluble) dust deposition in all dust gauges has been monitored since May 2010 after an amendment to the licence was made on 27<sup>th</sup> January 2011 and reporting commenced in January 2011. Majority (94%) of the samples returned levels of lithium below the level of detect for the 9 months of monitoring (refer to raw data in **Appendix G**). Levels of lithium are generally above level of detect for onsite dust gauges DG9 and DG10.

#### 4.5.6 Zinc

Total zinc (soluble and insoluble) dust deposition in all dust gauges has been monitored since February 2011 after an amendment to the licence was made on 27<sup>th</sup> January 2011 and reporting commenced in February 2011. All levels of zinc recorded were above the level of detect for the 8 months of monitoring (refer to raw data in **Appendix G**). The zinc is likely to be from galvanized products commonly found around the Esperance town and is not a suitable indicator for spodumene.

#### 4.5.7 Proposed Licence Amendment

EPSL is in the process of applying for removal of nine of the eighteen dust gauges from the licence. These being dust gauges DG11, DG12, DG13, DG14, DG15, DG16, DG17, DG18 and DG19. These reasons for proposed changes to monitoring are due to:

- all nine dust gauges recording no measurable nickel or lead in the past 12 months, except DG13 which had two measurable values for nickel slightly above detection limits during that period;
- all nine dust gauges have less than three years of data;

- retention and continued monitoring of nine dust gauges established prior to 2008 providing more valuable long term nickel data with some showing measurable values;
- less nickel being detected in dust gauges due to implementation of offshore wind loading arc policy in December 2008;
- Esperance Clean-up and Recovery Project (ECRP) simultaneously monitoring nine community dust gauges (since October 2010) which will continue for a two year period (Department of Transport, 2011). For more information see <http://www.oncue.org.au>; and
- No objections to this proposal from community members of the Port Consultative Committee or from members of the ECRP steering committee.

#### 4.6 Rainwater Tank Monitoring

Monitoring of eleven residential rainwater tanks was originally established in January 2008, as a result of an environmental protection notice in relation to nickel and lead emissions from the Esperance Port. The majority of data for these metals are now below the levels of detection. The rainwater tanks are monitored on a monthly basis, these tanks are located at DG3, DG5, DG8, DG11, DG12, and DG14 to DG19 (**Figure 2**). The concentrations of metals in the rainwater are presented in **Appendix H**.

Results from the rainwater tank monitoring are compared with the Australian Drinking Water Guidelines (ADWG) (NHMRC/NRMMC, 2004) and the World Health Organisation (WHO) Guidelines (WHO, 2006).

There is a general lack of correlation between the dust gauges and rainwater tanks across all locations and this was established in the two previous annual reports. They indicated inputs of airborne metals were likely to be a minor source of metals within the rainwater tanks for all sites.

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

- potential difference in rainwater tank construction material (galvanized iron, plastic, 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.

The following overall trends for metals in rainwater tanks were noted:

- Overall decline in exceedances of ADWG and WHO standards with nickel in exceedances declining from 16 to 3, lead exceedances declining from 16 to 14 and iron exceedances declining for 2 to 0 in 2010/11 reporting period (see Section 4.6.1 below);
- A slight decline in lead levels found in rainwater tanks with 60% of results below level of detect (excluding DG11) compared to 52% the previous year
- A slight decline in nickel levels in rainwater tanks with 8% of results below level of detect compared to 1% the previous year;
- marked decline in iron levels found in rainwater tanks with the majority (89%) of results below level of detect (<0.05 mg/L) except for nine real values shown at DG19 and one real value at DG5 compared to 78% in the previous year;
- a slight decline in sulphur levels at all sites with concentrations 2 mg/L or less (with the exception of one month at DG3) compared to previous reporting period when they were 4mg/L or lower.

#### 4.6.1 Exceedances

The following exceedances of the ADWG and WHO guidelines were noted for the reporting period;

- The ADWG for nickel (0.02 mg/L) was exceeded 3 times within the reporting period, one month each at DG8, DG11 and DG15;
- The ADWG for lead (0.01 mg/L) was exceeded 14 times within the reporting period with 12 of these being at DG11 which exceeded in every monthly sample and twice at DG5;

##### Nickel

Nickel levels above the ADWG were found at three different sites – DG8 (0.038 mg/L), DG11 (0.024 mg/L) and DG15 (0.034 mg/L) representing a significant decline of concentrations above the ADWG from 16 in 2009/10, down to three in 2010/11. The exceedance at DG15 is likely to be coming from source within the catchment. This site was originally chosen as a control site and is the furthest site from the Port at Wildcherry Avenue in Castletown. Rainwater tank at DG8 exceeded once in the nine months it was monitored in 2010/11 compared to nine exceedances in the previous reporting period. Monitoring of the rainwater tank at DG8 ceased in July 2011 as the owner removed the rainwater tank as they no longer used it. DEC was notified of this change. DG11 exceeded nickel once which was lower than the 3 exceedances that were recorded in the previous reporting period.

##### Lead

There has been a decline in lead exceedances in rainwater tank samples from 18 the previous year to 14 this year.

As reported in the two previous annual reports, the concentrations measured at DG11 for lead in the rainwater tank are likely to be from lead flashing on the roof of the house, which is supported by the lack of any correlation to the depositional lead recorded in the dust gauge on the property and results of isotopic lead testing of rainwater at DG11.

Isotopic lead testing of rainwater tanks was conducted to determine if any lead concentrations detected were from Magellan Metals. EPSL undertook this testing during the April 2011 sampling of rainwater tanks. Ten of the eleven rainwater tanks were sampled (DG5 tank was dry) and sent for lead concentration and isotopic ratio analysis at the ChemCentre. Lead concentrations for six of the samples were below the detection limit (0.001 mg/L). Only samples close to the detection limit could be concentrated enough to determine the isotopic lead ratios. Rainwater tank samples from DG11, DG15, DG16 and DG19 were tested for isotopic ratio analysis. The results for all these rainwater tank samples was that *'the sample lies well away from Magellan type lead. The lead in this sample is not Magellan lead'*. DG11, which exceeded the lead criteria in rainwater every month for the past year, is thought to come from within the tank or the roof of this house.

The two exceedances in rainwater tank DG5 were marginally above the ADWG criteria of 0.01mg/L, during the months of November 2010 (0.019 mg/L) and September 2011 (0.012 mg/L). The tenants have been informed to discontinue drinking of the rainwater. Since rainwater tank monitoring commenced (in January 2008) there has been four exceedances for lead at DG5 but all were prior to October 2009. There have been no exceedances for 2 years. The rainwater tank and roof of the property were cleaned in 2010. The source of lead in the rainwater tank at DG5 is likely to be from within the roof catchment since there is no correlation between the levels of lead in the rainwater tank and the adjacent dust gauge.

#### Iron

No exceedances of the WHO drinking water guidelines (2mg/L) for iron were recorded for the reporting period down from two exceedances the previous reporting period.

#### Sulphur

There are no assessment criteria for sulphur in drinking water and therefore no standards to exceed.

### **4.6.2 Proposed Licence Amendment**

EPSL will propose its licence be amended to remove rainwater tank monitoring and dust gauge sites not returning measurable nickel or lead, from the EPSL licence. This is supported by:

- no exceedances for sulphur or iron in the past 12 months;
- lead exceedances for sampled rainwater tanks shown not be 'Magellan type lead';
- the EPSL onsite clean-up of lead, to residential criteria, is complete;

- all eleven rainwater tanks found to have high lead or nickel levels have been cleaned or replaced by the ECRP;
- there has been no bulk lead exported since 2007;
- proposed continuation of monitoring of nine dust gauge sites by EPSL returning measurable levels of lead and nickel; and
- No objections to this proposal from community members of the Port Consultative Committee or ECRP members

## 5. RECOMMENDATIONS

EPSL to:

- Consider future budgets to seal sections of road onsite to minimise dust;
- Encourage export of containerised nickel;
- Consider annexing Berth 1 from the licence since EPSL is not the occupier and grain loading is a non-prescribed activity;
- Continue to work towards continual improvement and minimising impacts to the environment and compliance with EPSL's environmental policy and EMP;
- Proceed with discussed licence amendments.

## 6. REFERENCES

DEC (2011), *Esperance Port Authority Conditions of Licence L5099/1974/13 for Environmental Protection Act 1986*, Department of Environment and Conservation, Perth, Western Australia.

Huston, R, Chan, YC, Gardner, T, Shaw, G & Chapman, H (2009), 'Characterisation of atmospheric deposition as a source of contaminants in urban rainwater tanks', *Water Research*, article in press.

National Health and Medical Research Council and Natural Resource Management Ministerial Council (NHMRC/NRMMC), (2004). *Australian Drinking Water Guidelines*, viewed 20 February 2010  
[http://www.nhmrc.gov.au/publications/synopses/\\_files/adwg\\_11\\_06.pdf](http://www.nhmrc.gov.au/publications/synopses/_files/adwg_11_06.pdf).

SKM (2009), Annual Air Quality Monitoring Report, Esperance WA.

World Health Organisation (WHO), (2006). *Guidelines for Drinking-Water Quality - first addendum to third edition*, vol 1, World Health Organisation Press, Geneva, Switzerland

**APPENDIX A**

**EPSL SHIPPING REGISTER**

Ship Name	Date in	Time in	Date out	Time Out	Commodity	Tonnage	Import/Export	Berth #	Berth Hrs
CAPE SUN	07-Oct-10	7:25	09-Oct-10	19:50	IRON ORE FINES	110000	EXPORT	3	60.42
					IRON ORE LUMP	55000	EXPORT	3	
OCEAN PHOENIX	09-Oct-10	6:08	10-Oct-10	21:10	WHEAT	42000	EXPORT	1	39.03
OCEAN DRAGON	14-Oct-10	20:16	17-Oct-10	5:48	IRON ORE FINES	99200	EXPORT	3	57.53
					IRON ORE LUMP	48784	EXPORT	3	
THALASSA	17-Oct-10	7:55	18-Oct-10	18:45	IRON ORE LUMP	71612	EXPORT	3	34.83
NORD OBSERVER	17-Oct-10	10:06	18-Oct-10	18:18	GAS OIL	20005	IMPORT	2	32.20
ATROMITOS	18-Oct-10	4:45	19-Oct-10	15:00	WHEAT	11750	EXPORT	1	34.25
					WHEAT	15750	EXPORT	1	
SEMINOLE PRINCESS	19-Oct-10	16:48	22-Oct-10	4:00	WHEAT	0	EXPORT	1	59.20
GENCO CLAUDIUS	20-Oct-10	6:16	23-Oct-10	8:16	IRON ORE FINES	165000	EXPORT	1	74.00
CHANG HANG KAI TUO	21-Oct-10	11:10	22-Oct-10	10:25	GAS OIL	9506	IMPORT	2	23.25
					UNLEADED PETROL	1209	IMPORT	2	
SANMAR PHOENIX	22-Oct-10	5:45	24-Oct-10	15:12	WHEAT	52500	EXPORT	1	57.45
ANANGEL DESTINY	23-Oct-10	10:30	25-Oct-10	18:46	IRON ORE LUMP	150960	EXPORT	3	56.27
SEMINOLE PRINCESS	24-Oct-10	16:48	26-Oct-10	20:00	WHEAT	27000	EXPORT	1	51.20
MCP PAPHOS	31-Oct-10	19:18	01-Nov-10	9:00	CONTAINERS EMPTY	347	IMPORT	2	13.70
					CONTAINERS EMPTY	233	IMPORT	2	

MONA LINDEN	08-Nov-10	12:30	11-Nov-10	5:00	IRON ORE LUMP	168673	EXPORT	3	64.50
HAL PRIDE	10-Nov-10	15:22	12-Nov-10	18:58	Nickel Conc. (cont)	15835	EXPORT	2	51.60
SONGA PEAK	11-Nov-10	7:12	13-Nov-10	17:06	IRON ORE FINES	26000	EXPORT	3	57.90
					IRON ORE LUMP	123702	EXPORT	3	57.90
EVER BRIGHT	14-Nov-10	7:15	16-Nov-10	17:42	IRON ORE FINES	120602	EXPORT	3	58.45
					IRON ORE LUMP	25000	EXPORT	3	
STX ACE 6	20-Nov-10	2:42	21-Nov-10	17:06	GAS OIL	28495	IMPORT	2	38.40
FRISIA ALLER	21-Nov-10	18:30	22-Nov-10	20:54	CONTAINERS EMPTY	881	IMPORT	2	26.40
CHINA PROGRESS	22-Nov-10	23:06	25-Nov-10	22:36	IRON ORE FINES	115549	EXPORT	3	71.50
					IRON ORE LUMP	55000	EXPORT	3	
EMMA BULKER	23-Nov-10	5:42	27-Nov-10	16:06	UREA	12135	IMPORT	2	106.40
VELOS	25-Nov-10	6:45	26-Nov-10	18:10	CANOLA	33124	EXPORT	1	35.42
CHS BRIGHT	25-Nov-10	0:48	28-Nov-10	9:18	IRON ORE FINES	103081	EXPORT	3	80.50
					IRON ORE LUMP	45000	EXPORT	3	
FRISIA ALLER	28-Nov-10	8:18	30-Nov-10	5:48	CONTAINERS EMPTY	6	IMPORT	2	45.50
					Nickel Conc. (cont)	12300	EXPORT	2	
SEA SWIFT	29-Nov-10	10:10	03-Dec-	14:55	WHEAT	33600	EXPORT	1	100.75

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			10						
BERGE ATLAS	01-Dec-10	14:36	04-Dec-10	20:18	IRON ORE FINES	122075	EXPORT	3	77.70
					IRON ORE LUMP	54901	EXPORT	3	
IVS SENTOSA	03-Dec-10	7:15	05-Dec-10	11:50	D.A.P.	5181	IMPORT	2	52.58
ALPHA EFFORT	06-Dec-10	5:45	09-Dec-10	12:55	CANOLA	58552	EXPORT	1	79.17
CAPE EUROPE	08-Dec-10	8:12	10-Dec-10	20:00	IRON ORE FINES	100344	EXPORT	3	59.80
					IRON ORE LUMP	49484	EXPORT	3	
SHANGHAI SPIRIT	14-Dec-10	4:57	15-Dec-10	12:57	NICKEL CONCENTRATE	7037	EXPORT	2	32.00
WAH SHAN	18-Dec-10	11:00	21-Dec-10	17:35	IRON ORE LUMP	172029	EXPORT	3	78.58
MCP LONDON	20-Dec-10	12:00	22-Dec-10	8:25	CONTAINERS EMPTY	1075	IMPORT	2	44.42
					Nickel Conc. (cont)	6708	EXPORT	2	
SAG BULK GERMANY	21-Dec-10	19:00	24-Dec-10	23:24	IRON ORE FINES	110000	EXPORT	3	76.40
					IRON ORE LUMP	61848	EXPORT	3	
BRITISH LIBERTY	22-Dec-10	9:48	22-Dec-10	22:00	GAS OIL	2706	IMPORT	2	12.20
					UNLEADED PETROL	894	IMPORT	2	
OPAL ADVANCE	23-Dec-10	7:30	27-Dec-10	4:00	CONTAINERS EMPTY	6	IMPORT	2	92.50
					Nickel Conc. (cont)	15320	EXPORT	2	

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MADEIRA	25-Dec-10	4:55	28-Dec-10	17:24	IRON ORE FINES	114655	EXPORT	3	84.48
					IRON ORE LUMP	55000	EXPORT	3	
KONKAR THEO	27-Dec-10	5:34	29-Dec-10	17:00	MAPSZC	4560	IMPORT	2	59.43
					MONO-AMMONIUM PHOSPHATE	2575	IMPORT	2	
					SUNDRY	11	IMPORT	2	
SEA SWIFT	28-Dec-10	6:45	29-Dec-10	17:45	WHEAT	33600	EXPORT	1	35.00
KALLIOPI L	28-Dec-10	18:50	30-Dec-10	5:55	IRON ORE LUMP	71670	EXPORT	3	35.08
M.T. RESOLVE	29-Dec-10	19:06	30-Dec-10	13:18	GAS OIL	9542	IMPORT	2	18.20
HEBEI LEGEND	31-Dec-10	17:34	03-Jan-11	22:32	IRON ORE FINES	117691	EXPORT	3	76.97
					IRON ORE LUMP	59833	EXPORT	3	
WEAVER ARROW	02-Jan-11	11:00	04-Jan-11	0:42	D.A.P.	3871	IMPORT	2	37.70
					MONO-AMMONIUM PHOSPHATE	4847	IMPORT	2	
ATHENA (CRUISE SHIP)	04-Jan-11	8:40	04-Jan-11	18:00	(NIL) CRUISE VESSEL	0		2	9.33
CAPE DARNLEY	04-Jan-11	19:12	06-Jan-11	1:54	Nickel Conc. (cont)	1384	EXPORT	2	30.70
					Nickel Conc. (cont)	4770	EXPORT	2	
OCEAN TRINITY	05-Jan-11	10:00	07-Jan-11	18:54	IRON ORE LUMP	150168	EXPORT	3	56.90
	07-Jan-11	9:36	08-Jan-11	18:45	UREA	3910	IMPORT	2	33.15
CHANG HANG HONG TU	12-Jan-11	7:48	14-Jan-11	12:12	GAS OIL	33763	IMPORT	2	52.40

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MADRISA	16-Jan-11	11:30	19-Jan-11	7:48	BARLEY	20600	EXPORT	1	68.30
PHENIX	16-Jan-11	14:48	19-Jan-11	3:12	IRON ORE FINES	97545	EXPORT	3	60.40
					IRON ORE LUMP	49647	EXPORT	3	
HAL PATRIOT	18-Jan-11	6:36	22-Jan-11	13:00	CONTAINERS EMPTY	1078	IMPORT	2	102.40
					Nickel Conc. (cont)	11443	EXPORT	2	
					NICKEL IN BULKER BAGS	3194	EXPORT	2	
UGLJAN	19-Jan-11	9:10	20-Jan-11	21:15	BARLEY	17511	EXPORT	1	36.08
					LUPINS	995	EXPORT	1	
ALPHA MELODY	20-Jan-11	22:30	26-Jan-11	5:00	CANOLA	61309	EXPORT	1	126.50
	21-Jan-11	16:48	24-Jan-11	11:40	IRON ORE FINES	109840	EXPORT	3	66.87
					IRON ORE LUMP	55000	EXPORT	3	
JIN SHA LING	26-Jan-11	6:35	27-Jan-11	22:50	WHEAT	23154	EXPORT	1	40.25
CLIPPER KIKUSHIO	28-Jan-11	0:31	29-Jan-11	15:57	WHEAT	27500	EXPORT	1	39.43
JIMFLUSH	01-Feb-11	6:15	02-Feb-11	18:13	WHEAT	32500	EXPORT	1	35.97
STAR CANOPUS	02-Feb-11	19:42	04-Feb-11	5:55	WHEAT	11000	EXPORT	1	34.22
IRON QUEEN	04-Feb-11	0:18	06-Feb-11	12:00	IRON ORE FINES	110000	EXPORT	3	59.70
					IRON ORE LUMP	47057	EXPORT	3	
SEA MAPLE	04-Feb-11	7:40	09-Feb-11	16:00	WHEAT	37926	EXPORT	2	128.33
ATHENA (CRUISE SHIP)	05-Feb-11	6:15	05-Feb-11	14:00	(NIL) CRUISE VESSEL	0		2	7.75

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SHANGHAI SPIRIT	05-Feb-11	15:24	06-Feb-11	16:54	ALLRICH	421	IMPORT	2	25.50
					GUSTO	1164	IMPORT	2	
					SINGLE SUPER PHOSPHATE	1189	IMPORT	2	
GCL ARGENTINA	07-Feb-11	8:12	10-Feb-11	12:18	IRON ORE FINES	84033	EXPORT	3	76.10
					IRON ORE LUMP	88000	EXPORT	3	
ATHENA (CRUISE SHIP)	09-Feb-11	9:05	09-Feb-11	18:00	(NIL) CRUISE VESSEL	0		2	8.92
MCP VIENNA	09-Feb-11	18:42	11-Feb-11	10:00	CONTAINERS EMPTY	1280	IMPORT	2	39.30
					CONTAINERS EMPTY	6	EXPORT	2	
					Nickel Conc. (cont)	6620	EXPORT	2	
BAO SHAN	10-Feb-11	14:36	13-Feb-11	12:00	IRON ORE FINES	112556	EXPORT	3	69.40
					IRON ORE LUMP	60297	EXPORT	3	69.40
BRITISH UNITY	11-Feb-11	11:24	12-Feb-11	12:48	GAS OIL	12472	IMPORT	2	25.40
					UNLEADED PETROL	1309	IMPORT	2	
BOGASARI LIMA	14-Feb-11	10:49	16-Feb-11	15:50	WHEAT	40100	EXPORT	1	53.02
HAL PRIDE	15-Feb-11	15:32	16-Feb-11	22:00	CONTAINERS EMPTY	2227	IMPORT	2	30.47
HAL PENDANT	18-Feb-11	14:56	20-Feb-11	1:48	Nickel Conc. (cont)	11383	EXPORT	2	34.87
DYNA GLOBE	20-Feb-11	0:15	21-Feb-11	15:50	IRON ORE LUMP	97251	EXPORT	3	39.58

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AGIOS KONSTANTINOS	22-Feb-11	8:00	23-Feb-11	13:00	CANOLA	28319	EXPORT	1	29.00
TIAN YANG HAI	23-Feb-11	16:20	26-Feb-11	8:39	IRON ORE FINES	110560	EXPORT	3	64.32
					IRON ORE LUMP	54994	EXPORT	3	
CAPE NORTHVILLE	01-Mar-11	6:34	04-Mar-11	1:06	IRON ORE FINES	82500	EXPORT	3	66.53
					IRON ORE LUMP		EXPORT	3	
PEACE TRAFFIC	02-Mar-11	7:17	03-Mar-11	20:43	BARLEY	29951	EXPORT	1	37.43
THEOFYLAKTOS	03-Mar-11	22:55	05-Mar-11	8:10	BARLEY	15750	EXPORT	1	33.25
STX ACE 6	06-Mar-11	7:00	08-Mar-11	2:00	GAS OIL	30561	IMPORT	2	43.00
OPAL BRILLIANCE	08-Mar-11	14:54	10-Mar-11	11:54	CONTAINERS EMPTY	6	IMPORT	2	45.00
					Nickel Conc. (cont)	16011	EXPORT	2	
ALAM PERMAI	12-Mar-11	21:36	14-Mar-11	10:06	IRON ORE LUMP	81243	EXPORT	3	36.50
KEN RYU	12-Mar-11	23:25	14-Mar-11	14:05	BARLEY	25750	EXPORT	1	38.67
BOGASARI LIMA	14-Mar-11	15:08	16-Mar-11	11:54	WHEAT	9100	EXPORT	1	2.00
					WHEAT	31001	EXPORT	1	
ANANGEL PROSPERITY	15-Mar-11	6:05	17-Mar-11	23:25	IRON ORE FINES	171367	EXPORT	3	65.33
ROSCO PALM	16-Mar-11	13:30	19-Mar-11	20:00	BARLEY	30312	EXPORT	1	78.50

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ALIKI	19-Mar-11	15:00	22-Mar-11	1:36	IRON ORE FINES	110000	EXPORT	3	58.60
					IRON ORE LUMP	55000	EXPORT	3	
OCEAN GLORY	19-Mar-11	21:46	21-Mar-11	21:54	WHEAT	43050	EXPORT	1	48.13
MCL ALGER	20-Mar-11	7:05	21-Mar-11	20:40	Nickel Conc. (cont)	6712	EXPORT	2	37.58
GCL ARGENTINA	22-Mar-11	15:08	25-Mar-11	0:54	IRON ORE LUMP	150034	EXPORT	3	57.77
OCEAN FLOWER	22-Mar-11	17:35	24-Mar-11	15:10	NICKEL CONCENTRATE	12327	EXPORT	2	45.58
FULL SPRING	24-Mar-11	18:30	25-Mar-11	23:50	BARLEY	13500	EXPORT	1	29.33
HAL PRIDE	25-Mar-11	3:10	29-Mar-11	22:00	Nickel Conc. (cont)	12794	EXPORT	2	114.83
					NICKEL IN BULKER BAGS	291	EXPORT	2	
CAPTAIN HARRY	26-Mar-11	7:08	27-Mar-11	14:36	BARLEY	18540	EXPORT	1	31.47
BRITISH HARMONY	31-Mar-11	5:40	01-Apr-11	6:06	GAS OIL	10693	IMPORT	2	24.43
					UNLEADED PETROL	974	IMPORT	2	
FURNESS AUSTRALIA	02-Apr-11	9:06	05-Apr-11	23:36	MAPSZC	7082	IMPORT	2	86.50
					MONO-AMMONIUM PHOSPHATE	1145	IMPORT	2	
CHS CREATION	02-Apr-11	10:20	06-Apr-11	7:00	IRON ORE FINES & LUMP	82500	EXPORT	3	92.67
OPAL AMBER	07-Apr-11	7:50	08-Apr-11	10:45	CONTAINERS EMPTY	482	IMPORT	2	26.92
					Nickel Conc. (cont)	2397	EXPORT	2	

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B OCEANIA	08-Apr-11	6:11	11-Apr-11	8:40	WHEAT	51726	EXPORT	1	74.48
AQUA VENTURE	08-Apr-11	9:30	11-Apr-11	7:15	IRON ORE FINES & LUMP	82500	EXPORT	3	69.75
FURNESS ST KILDA	12-Apr-11	13:42	13-Apr-11	22:54	MONO-AMMONIUM PHOSPHATE	4007	IMPORT	2	33.20
NEW ACCORD	14-Apr-11	6:20	14-Apr-11	14:50	BARLEY	5775	EXPORT	1	8.50
KAYU EBONI	14-Apr-11	16:12	15-Apr-11	18:06	CANOLA	23142	EXPORT	1	25.90
BOGASARI LIMA	15-Apr-11	19:58	16-Apr-11	10:38	WHEAT	7101	EXPORT	1	14.67
PACIFIC CREATION	16-Apr-11	11:48	19-Apr-11	7:48	IRON ORE FINES	110000	EXPORT	3	68.00
					IRON ORE LUMP	57200	EXPORT	3	
ALAM GULA	18-Apr-11	16:50	20-Apr-11	1:00	PEAS	19998	EXPORT	1	32.17
OPAL HARMONY	23-Apr-11	1:03	24-Apr-11	10:00	Nickel Conc. (cont)	5925	EXPORT	2	32.95
KEN TEN	24-Apr-11	5:40	25-Apr-11	1:50	CANOLA	20779	EXPORT	1	20.17
YE CHI	24-Apr-11	11:40	25-Apr-11	18:06	GAS OIL	19955	IMPORT	2	30.43
TIANSHENGHAI	25-Apr-11	7:18	28-Apr-11	1:25	IRON ORE FINES	110000	EXPORT	3	66.12
					IRON ORE LUMP	55000	EXPORT	3	
MAPLE PIONEER	27-Apr-11	9:34	28-Apr-11	14:18	NICKEL CONCENTRATE	6985	EXPORT	2	28.73
ALIKI	28-Apr-11	3:30	30-Apr-11	23:40	IRON ORE FINES	110000	EXPORT	3	68.17
					IRON ORE LUMP	55000	EXPORT	3	
GRAND RODOSI	28-Apr-11	7:24	30-Apr-11	19:18	WHEAT	43175	EXPORT	1	59.90
TRANS FRIENDSHIP II	28-Apr-11	15:24	30-Apr-11	18:06	UREA	5470	IMPORT	2	50.70
AFRICAN SANDERLING	03-May-11	8:48	06-May-11	15:06	BARLEY	22000	EXPORT	1	78.30

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					WHEAT	33000	EXPORT	1	
AMALFI	07-May-11	5:48	08-May-11	14:54	BARLEY	3266	EXPORT	1	33.10
					WHEAT	6100	EXPORT	1	
AQUABEAUTY	08-May-11	7:20	12-May-11	5:12	IRON ORE FINES	110000	EXPORT	3	93.87
					IRON ORE LUMP	55000	EXPORT	3	
HAL PATRIOT	10-May-11	21:42	15-May-11	10:54	CONTAINERS EMPTY	1007	IMPORT	2	109.20
					CONTAINERS EMPTY	847	IMPORT	2	
					Nickel Conc. (cont)	11493	EXPORT	2	
					NICKEL IN BULKER BAGS	2571	EXPORT	2	
HUGO SELMER	12-May-11	7:05	15-May-11	0:00	IRON ORE FINES	110000	EXPORT	3	64.92
					IRON ORE LUMP	55000	EXPORT	3	
MAHA ROOS	13-May-11	6:42	15-May-11	0:40	WHEAT	27000	EXPORT	1	41.97
NENA J	16-May-11	10:41	18-May-11	5:00	BARLEY	16762	EXPORT	1	42.32
FUTURE PROSPERITY	16-May-11	17:36	18-May-11	10:48	GAS OIL	26555	IMPORT	2	41.20
MARY G	18-May-11	6:30	19-May-11	12:06	BARLEY	16365	EXPORT	1	29.60
CAPE CAMELLIA	18-May-11	19:00	22-May-11	6:06	IRON ORE LUMP	170740	EXPORT	3	83.10
MERCURY OCEAN	20-May-11	13:30	21-May-11	22:00	BARLEY	20411	EXPORT	1	32.50

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STX ACE 2	22-May-11	23:25	23-May-11	23:20	GAS OIL	8968	IMPORT	2	23.92
					UNLEADED PETROL	1326	IMPORT	2	
CREST VOYAGER	24-May-11	8:54	24-May-11	21:30	CANOLA	10944	EXPORT	1	12.60
BULK PEACE	26-May-11	8:50	30-May-11	0:45	IRON ORE FINES	108591	EXPORT	3	87.92
					IRON ORE LUMP	54409	EXPORT	3	
OPAL GALLANT	26-May-11	11:50	28-May-11	22:50	Nickel Conc. (cont)	10510	EXPORT	2	59.00
CSC BRAVE	29-May-11	18:06	30-May-11	10:12	GAS OIL	8949	IMPORT	2	16.10
GL XIUSHAN	30-May-11	3:10	31-May-11	16:27	IRON ORE LUMP	77000	EXPORT	3	37.28
ALADDIN RAINBOW	01-Jun-11	5:54	02-Jun-11	19:00	BARLEY	6180	EXPORT	1	37.10
					BARLEY	24415	EXPORT	1	
NEW SAILING STAR	04-Jun-11	13:06	07-Jun-11	0:48	UREA	4194	IMPORT	2	59.70
CAPTAIN T	04-Jun-11	14:52	05-Jun-11	10:24	BARLEY	5123	EXPORT	1	19.53
					BARLEY	7502	EXPORT	1	
RUBY STAR	08-Jun-11	13:06	13-Jun-11	0:30	UREA	7003	IMPORT	2	107.40
CAPE PROVIDENCE	10-Jun-11	9:06	13-Jun-11	3:15	IRON ORE FINES	116493	EXPORT	3	66.15
					IRON ORE LUMP	50007	EXPORT	3	
VOGE RENATE	13-Jun-11	2:24	14-Jun-11	2:00	NICKEL CONCENTRATE	9908	EXPORT	2	23.60
GREAT SUNRISE	13-Jun-11	5:40	16-Jun-11	22:10	IRON ORE LUMP	153489	EXPORT	3	88.50
HAL PENDANT	14-Jun-11	3:54	20-Jun-11	13:06	CONTAINERS EMPTY	1023	IMPORT	2	153.20

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					CONTAINERS EMPTY	1028	IMPORT	2	
					Nickel Conc. (cont)	11498	EXPORT	2	
					NICKEL IN BULKER BAGS	1899	EXPORT	2	
KING WHEAT	22-Jun-11	10:36	23-Jun-11	5:40	NICKEL CONCENTRATE	5966	EXPORT	2	19.07
STELLA ELTANIN	22-Jun-11	18:54	25-Jun-11	19:12	WHEAT	33000	EXPORT	1	72.30
BRITISH HARMONY	23-Jun-11	7:33	25-Jun-11	16:22	GAS OIL	14140	IMPORT	2	56.82
					UNLEADED PETROL	523	IMPORT	2	
CAPE SOPHIA	25-Jun-11	8:45	27-Jun-11	1:15	IRON ORE LUMP	95661	EXPORT	3	40.50
OPAL HARMONY	25-Jun-11	18:06	26-Jun-11	21:26	CONTAINERS EMPTY	8	IMPORT	2	27.33
					Nickel Conc. (cont)	6451	EXPORT	2	
MCL ALGER	26-Jun-11	22:30	28-Jun-11	16:15	Nickel Conc. (cont)	6623	EXPORT	2	41.75
KIRMAR	27-Jun-11	3:12	04-Jul-11	6:30	IRON ORE FINES	115025	EXPORT	3	171.30
					IRON ORE LUMP	45000	EXPORT	3	
TRANS FRIENDSHIP II	04-Jul-11	8:06	06-Jul-11	20:00	UREA	5045	IMPORT	2	59.60
VALOPOULA	08-Jul-11	10:40	13-Jul-11	7:40	SULPHUR	21828	IMPORT	2	117.00
WASHINGTON TRADER	13-Jul-11	6:12	17-Jul-11	6:00	WHEAT	52500	EXPORT	1	95.80
ADVANCE II	13-Jul-11	14:42	14-Jul-11	2:24	GAS OIL	5052	IMPORT	2	11.70
VALOPOULA	14-Jul-11	4:05	18-Jul-11	17:00	SULPHUR	19601	IMPORT	2	108.92
ANANGEL AMBITION	16-Jul-11	7:00	18-Jul-11	21:10	IRON ORE FINES	82500	EXPORT	3	62.17
					IRON ORE LUMP	77058	EXPORT	3	

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OPAL AMBER	20-Jul-11	3:30	21-Jul-11	21:35	CONTAINERS EMPTY	875	IMPORT	2	42.08
					Nickel Conc. (cont)	4533	EXPORT	2	
AQUABELLA	21-Jul-11	6:40	23-Jul-11	19:40	IRON ORE FINES	107917	EXPORT	3	61.00
					IRON ORE LUMP	50390	EXPORT	3	
PRO EMERALD	21-Jul-11	23:48	22-Jul-11	19:48	GAS OIL	11652	IMPORT	2	20.00
NEW LEGEND PEARL	22-Jul-11	21:30	25-Jul-11	11:30	UREA	4320	IMPORT	2	62.00
CHS SPLENDOR	23-Jul-11	22:06	27-Jul-11	4:00	IRON ORE FINES	112052	EXPORT	3	77.90
					IRON ORE LUMP	55000	EXPORT	3	
OPAL GALLANT	27-Jul-11	6:00	28-Jul-11	21:55	Nickel Conc. (cont)	7195	EXPORT	2	39.92
AURORA D	30-Jul-11	7:24	31-Jul-11	16:10	PEAS	12717	EXPORT	1	32.77
PRO JADE	30-Jul-11	18:15	01-Aug-11	2:05	GAS OIL	11407	IMPORT	2	31.83
					GAS OIL	2530	IMPORT	2	
NAVISION ALLIANCE	01-Aug-11	3:42	02-Aug-11	18:54	WHEAT	27389	EXPORT	1	39.20
FREEDOM LILY	04-Aug-11	7:42	06-Aug-11	23:54	BARLEY	48925	EXPORT	1	64.20
CIELO DI SAVONA	10-Aug-11	13:48	12-Aug-11	23:54	BARLEY	31500	EXPORT	1	58.10
PERCIVAL	13-Aug-11	7:00	17-Aug-11	10:18	IRON ORE FINES	116204	EXPORT	3	99.30
					IRON ORE LUMP	55000	EXPORT	3	
HAL PRIDE	13-Aug-11	10:42	19-Aug-11	1:48	CONTAINERS EMPTY	1227	IMPORT	2	135.10
					CONTAINERS EMPTY	1089	IMPORT	2	

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					Nickel Conc. (cont)	11503	EXPORT	2	
					NICKEL IN BULKER BAGS	3060	EXPORT	2	
CAPE OCEANIA	17-Aug-11	12:08	19-Aug-11	19:48	IRON ORE FINES	102103	EXPORT	3	55.67
					IRON ORE LUMP	48000	EXPORT	3	
QUI CHI	19-Aug-11	3:30	20-Aug-11	12:35	GAS OIL	15243	IMPORT	2	33.08
GENEROUS	19-Aug-11	22:00	23-Aug-11	3:00	IRON ORE FINES	110000	EXPORT	3	77.00
					IRON ORE LUMP	55000	EXPORT	3	
ASTRAL EXPRESS	20-Aug-11	14:12	21-Aug-11	20:36	GAS OIL	17094	IMPORT	2	30.40
OPAL HARMONY	21-Aug-11	22:06	23-Aug-11	15:06	CONTAINERS EMPTY	13	IMPORT	2	41.00
					Nickel Conc. (cont)	6505	EXPORT	2	
F DUCKLING	23-Aug-11	6:20	26-Aug-11	8:00	IRON ORE FINES	113839	EXPORT	3	73.67
					IRON ORE LUMP	55000	EXPORT	3	
SH BRIGHT	23-Aug-11	12:30	24-Aug-11	12:48	BARLEY	14250	EXPORT	1	24.30
KEN ZUI	23-Aug-11	19:50	24-Aug-11	18:45	NICKEL CONCENTRATE	8345	EXPORT	2	22.92
ANASTASIA S	28-Aug-11	6:45	29-Aug-11	23:06	WHEAT	44000	EXPORT	1	40.35
STX JASMINE	01-Aug-11	15:00	05-Aug-11	18:12	UREA	8371	IMPORT	2	99.20
GREAT SUNRISE	01-Sep-11	14:10	04-Sep-	13:00	IRON ORE LUMP	154702	EXPORT	3	70.83

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			11							
ZHU JIANG	06-Sep-11	20:55	08-Sep-11	6:10	GAS OIL	13238	IMPORT	2	33.25	
CHS COSMOS	08-Sep-11	8:35	11-Sep-11	7:48	IRON ORE FINES	110000	EXPORT	3	71.22	
					IRON ORE LUMP	54894	EXPORT	3		
UGO DE CARLINI	14-Sep-11	7:14	17-Sep-11	9:32	IRON ORE FINES	110000	EXPORT	3	74.30	
					IRON ORE LUMP	55000	EXPORT	3		
OCEAN PLUTO	16-Sep-11	15:51	17-Sep-11	20:10	GAS OIL	13129	IMPORT	2	28.32	
					UNLEADED PETROL	501	IMPORT	2		
TIANSHENGHAI	17-Sep-11	11:15	21-Sep-11	1:30	IRON ORE FINES	111700	EXPORT	3	86.25	
					IRON ORE LUMP	55000	EXPORT	3		
IKAN BILIS	21-Sep-11	2:55	22-Sep-11	12:54	IRON ORE LUMP	71107	EXPORT	3	33.98	
ARIADNE	22-Sep-11	15:17	25-Sep-11	10:25	IRON ORE LUMP	174425	EXPORT	3	67.13	
THOR DYNAMIC	23-Sep-11	7:00	23-Sep-11	20:55	WHEAT	15840	EXPORT	1	13.92	
PIONEER	23-Sep-11	13:06	26-Sep-11	10:00	CONTAINERS EMPTY	1905	IMPORT	2	68.90	
					Nickel Conc. (cont)	7078	EXPORT	2		
POS AMAZONIT	25-Sep-11	6:06	27-Sep-11	9:56	BARLEY	27980	EXPORT	1	51.67	
MCP GOTEBORG	26-Sep-11	17:05	28-Sep-11	7:00	CONTAINERS EMPTY	796	IMPORT	2	37.92	

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HENRY OLDENDORFF	28-Sep-11	8:48	04-Oct-11	13:42	NICKEL CONCENTRATE	10739	EXPORT	2	
MCP GOTEBOG	26-Sep-11	17:05	28-Sep-11	7:00	CONTAINERS EMPTY	796	IMPORT	2	37.92
HENRY OLDENDORFF	28-Sep-11	8:48	04-Oct-11	13:42	NICKEL CONCENTRATE	10739	EXPORT	2	
<b>Total Tonnes</b>						<b>10744514</b>			
<b>Export Tonnes</b>						<b>10265958</b>			
<b>Import Tonnes</b>						<b>478556</b>			

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**APPENDIX B**

**24-HR DAILY AVERAGE PM<sub>10</sub>**

Sampling Start Date	Sampling End Date	Site 1 PM10 (µg/m <sup>3</sup> )	Site 2 PM10 (µg/m <sup>3</sup> )	Site 3 PM10 (µg/m <sup>3</sup> )	Site 4 PM10 (µg/m <sup>3</sup> )
1/10/2010 12:00	2/10/2010 12:00	14.4	17.2	21.2	19.3
2/10/2010 12:00	3/10/2010 12:00	19.1	20.9	20.8	19.5
3/10/2010 12:00	4/10/2010 12:00	13.9	16.0	12.9	13.3
4/10/2010 12:00	5/10/2010 12:00	15.0	16.0	14.6	14.6
5/10/2010 12:00	6/10/2010 12:00	32.4	32.9	29.2	30.3
6/10/2010 12:00	7/10/2010 12:00	27.1	23.5	21.3	21.0
7/10/2010 12:00	8/10/2010 12:00	22.5	18.0	17.3	15.7
8/10/2010 12:00	9/10/2010 12:00	24.7	24.9	23.2	21.4
9/10/2010 12:00	10/10/2010 12:00	24.7	24.9	23.7	22.7
10/10/2010 12:00	11/10/2010 12:00	17.1	18.0	15.7	17.3
11/10/2010 12:00	12/10/2010 12:00	12.1	12.9	11.2	12.3
12/10/2010 12:00	13/10/2010 12:00	14.8	14.8	13.0	13.2
13/10/2010 12:00	14/10/2010 12:00	17.6	19.9	17.5	17.7
14/10/2010 12:00	15/10/2010 12:00	22.2	22.5	21.1	23.8
15/10/2010 12:00	16/10/2010 12:00	20.5	19.7	17.9	19.7
16/10/2010 12:00	17/10/2010 12:00	24.3	22.1	20.6	21.2
17/10/2010 12:00	18/10/2010 12:00	21.9	19.9	18.1	19.8
18/10/2010 12:00	19/10/2010 12:00	24.8	36.1	28.3	29.4
19/10/2010 12:00	20/10/2010 12:00	26.4	20.7	19.5	18.2
20/10/2010 12:00	21/10/2010 12:00	30.7	34.2	30.3	28.5
21/10/2010 12:00	22/10/2010 12:00	15.5	16.3	14.1	15.7
22/10/2010 12:00	23/10/2010 12:00	14.4	11.6	9.9	10.6
23/10/2010 12:00	24/10/2010 12:00	30.3	24.1	25.2	19.7
24/10/2010 12:00	25/10/2010 12:00	27.9	23.3	21.6	20.1
25/10/2010 12:00	26/10/2010 12:00	15.1	15.5	14.3	14.9
26/10/2010 12:00	27/10/2010 12:00	23.3	20.4	16.8	17.3
27/10/2010 12:00	28/10/2010 12:00	16.9	18.4	19.5	20.5
28/10/2010 12:00	29/10/2010 12:00	20.2	21.9	20.5	22.0
29/10/2010 12:00	30/10/2010 12:00	15.6	16.3	20.0	17.4
30/10/2010 12:00	31/10/2010 12:00	13.2	13.3	11.8	13.3
31/10/2010 12:00	1/11/2010 12:00	16.1	13.5	13.1	12.2

1/11/2010 12:00	2/11/2010 12:00	16.3	15.7	14.2	14.4
2/11/2010 12:00	3/11/2010 12:00	19.6	15.4	14.2	13.9
3/11/2010 12:00	4/11/2010 12:00	24.4	23.4	17.2	
4/11/2010 12:00	5/11/2010 12:00	23.6	26.1	24.3	26.8
5/11/2010 12:00	6/11/2010 12:00	14.3	16.7	14.1	16.8
6/11/2010 12:00	7/11/2010 12:00	20.8	24.5	19.7	20.6
7/11/2010 12:00	8/11/2010 12:00	14.6	16.9	15.4	21.1
8/11/2010 12:00	9/11/2010 12:00	23.9	24.4	22.1	25.3
9/11/2010 12:00	10/11/2010 12:00	13.6	17.1	17.1	17.1
10/11/2010 12:00	11/11/2010 12:00	15.6	17.4	16.4	19.0
11/11/2010 12:00	12/11/2010 12:00	11.4	11.9	11.8	15.8
12/11/2010 12:00	13/11/2010 12:00	16.2	15.8	16.6	18.1
13/11/2010 12:00	14/11/2010 12:00	11.1	12.5	15.6	20.6
14/11/2010 12:00	15/11/2010 12:00	9.8	10.4	9.4	11.3
15/11/2010 12:00	16/11/2010 12:00	7.7	9.2	9.5	10.1
16/11/2010 12:00	17/11/2010 12:00	11.8	13.0	15.2	16.1
17/11/2010 12:00	18/11/2010 12:00	11.8	13.8	18.9	13.7
18/11/2010 12:00	19/11/2010 12:00	16.2	19.0	17.9	20.9
19/11/2010 12:00	20/11/2010 12:00	24.6	26.5	24.5	30.6
20/11/2010 12:00	21/11/2010 12:00	42.1	33.4	27.6	36.5
21/11/2010 12:00	22/11/2010 12:00	31.4	29.8	30.2	28.5
22/11/2010 12:00	23/11/2010 12:00	19.5	21.8	16.7	16.2
23/11/2010 12:00	24/11/2010 12:00	15.8	16.7	12.7	14.0
24/11/2010 12:00	25/11/2010 12:00	14.1	15.2	13.2	17.8
25/11/2010 12:00	26/11/2010 12:00	20.8	19.2	19.0	18.6
26/11/2010 12:00	27/11/2010 12:00	27.5	24.2	20.3	22.9
27/11/2010 12:00	28/11/2010 12:00	29.7	21.4	22.9	27.1
28/11/2010 12:00	29/11/2010 12:00	42.3	27.3	28.1	34.0
29/11/2010 12:00	30/11/2010 12:00	25.2	23.6	22.6	26.8
30/11/2010 12:00	1/12/2010 12:00	25.8	34.3	30.8	29.5
1/12/2010 12:00	2/12/2010 12:00	33.1	37.8	31.9	32.2
2/12/2010 12:00	3/12/2010 12:00	19.8	20.7	20.9	19.9
3/12/2010 12:00	4/12/2010 12:00	10.2	12.9	12.4	10.8
4/12/2010 12:00	5/12/2010 12:00	12.6	14.0	14.6	14.6

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5/12/2010 12:00	6/12/2010 12:00	17.1	18.5	18.0	15.2
6/12/2010 12:00	7/12/2010 12:00	8.5	10.0	8.5	8.3
7/12/2010 12:00	8/12/2010 12:00	15.0	17.4	16.4	13.6
8/12/2010 12:00	9/12/2010 12:00	13.6	15.5	12.6	13.4
9/12/2010 12:00	10/12/2010 12:00	14.8	16.9	14.5	15.4
10/12/2010 12:00	11/12/2010 12:00	19.1	22.6	20.7	22.0
11/12/2010 12:00	12/12/2010 12:00	23.7	24.6	22.7	24.6
12/12/2010 12:00	13/12/2010 12:00	29.3	24.5	26.9	34.3
13/12/2010 12:00	14/12/2010 12:00	24.3	32.1	23.8	21.3
14/12/2010 12:00	15/12/2010 12:00	22.1	25.7	20.4	22.8
15/12/2010 12:00	16/12/2010 12:00	16.3	19.2	16.1	20.4
16/12/2010 12:00	17/12/2010 12:00	16.8	21.0	17.0	18.9
17/12/2010 12:00	18/12/2010 12:00	18.0	19.1	14.5	16.7
18/12/2010 12:00	19/12/2010 12:00	12.3	13.5	10.5	12.3
19/12/2010 12:00	20/12/2010 12:00	32.7	27.6	26.0	25.8
20/12/2010 12:00	21/12/2010 12:00	30.8	25.3	28.9	30.2
21/12/2010 12:00	22/12/2010 12:00	32.9	25.1	26.4	26.6
22/12/2010 12:00	23/12/2010 12:00	21.7	22.6	21.8	23.5
23/12/2010 12:00	24/12/2010 12:00	31.7	33.1	36.5	38.5
24/12/2010 12:00	25/12/2010 12:00	33.2	31.0	29.9	30.9
25/12/2010 12:00	26/12/2010 12:00	28.0	17.2	15.4	16.2
26/12/2010 12:00	27/12/2010 12:00	23.5	18.3	17.8	19.9
27/12/2010 12:00	28/12/2010 12:00	33.8	26.3	25.3	29.4
28/12/2010 12:00	29/12/2010 12:00	40.5	31.0	25.6	26.2
29/12/2010 12:00	30/12/2010 12:00	35.9	23.8	22.4	23.0
30/12/2010 12:00	31/12/2010 12:00	21.2	18.1	16.4	16.4
31/12/2010 12:00	1/01/2011 12:00	29.8	18.0	16.0	17.1
1/01/2011 12:00	2/01/2011 12:00	42.7	22.1	19.6	21.7
2/01/2011 12:00	3/01/2011 12:00	54.7	35.4	33.3	39.4
3/01/2011 12:00	4/01/2011 12:00	22.3	23.5	22.3	22.2
4/01/2011 12:00	5/01/2011 12:00	20.0	20.7	19.0	21.4
5/01/2011 12:00	6/01/2011 12:00	27.5	34.9	28.0	35.7
6/01/2011 12:00	7/01/2011 12:00	28.9	31.3	30.4	30.7
7/01/2011 12:00	8/01/2011 12:00	18.4	21.5	19.6	20.5

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8/01/2011 12:00	9/01/2011 12:00	24.7	25.3	22.3	23.5
9/01/2011 12:00	10/01/2011 12:00	27.2	21.1	21.0	21.1
10/01/2011 12:00	11/01/2011 12:00	31.9	20.5	22.3	20.7
11/01/2011 12:00	12/01/2011 12:00	19.5	16.3	17.2	17.3
12/01/2011 12:00	13/01/2011 12:00	18.6	19.0	19.0	17.9
13/01/2011 12:00	14/01/2011 12:00	27.7	28.2	27.0	25.0
14/01/2011 12:00	15/01/2011 12:00	29.3	31.5	26.8	29.5
15/01/2011 12:00	16/01/2011 12:00	24.1	24.9	22.6	23.6
16/01/2011 12:00	17/01/2011 12:00	38.2	33.1	30.9	32.6
17/01/2011 12:00	18/01/2011 12:00	41.3	37.6	32.5	33.4
18/01/2011 12:00	19/01/2011 12:00	31.8	31.4	24.2	24.9
19/01/2011 12:00	20/01/2011 12:00	28.7	28.3	21.0	21.6
20/01/2011 12:00	21/01/2011 12:00	24.8	23.5	22.9	24.0
21/01/2011 12:00	22/01/2011 12:00	30.8	30.1	25.0	30.0
22/01/2011 12:00	23/01/2011 12:00	26.8	27.7	27.7	29.6
23/01/2011 12:00	24/01/2011 12:00	16.9	16.4	16.5	16.8
24/01/2011 12:00	25/01/2011 12:00	8.6	8.9	8.5	8.8
25/01/2011 12:00	26/01/2011 12:00	12.5	13.4	12.5	13.4
26/01/2011 12:00	27/01/2011 12:00	24.9	21.3	19.1	18.6
27/01/2011 12:00	28/01/2011 12:00	35.0	33.6	27.1	31.1
28/01/2011 12:00	29/01/2011 12:00	<b>63.0</b>	<b>56.7</b>	<b>52.6</b>	<b>52.9</b>
29/01/2011 12:00	30/01/2011 12:00	29.3	30.3	28.8	29.3
30/01/2011 12:00	31/01/2011 12:00	38.7	38.8	36.9	36.4
31/01/2011 12:00	1/02/2011 12:00	12.6	10.9	9.4	9.2
1/02/2011 12:00	2/02/2011 12:00	26.1	29.2	17.1	18.8
2/02/2011 12:00	3/02/2011 12:00	20.6	21.6	18.7	17.4
3/02/2011 12:00	4/02/2011 12:00				
4/02/2011 12:00	5/02/2011 12:00	18.4	16.5	15.2	14.4
5/02/2011 12:00	6/02/2011 12:00	30.3	23.2	21.0	21.3
6/02/2011 12:00	7/02/2011 12:00	29.7	27.8	25.8	25.3
7/02/2011 12:00	8/02/2011 12:00	36.4	<b>50.8</b>	35.7	36.9
8/02/2011 12:00	9/02/2011 12:00	10.2	14.9	14.1	12.0
9/02/2011 12:00	10/02/2011 12:00	7.8	10.7	8.3	6.9
10/02/2011 12:00	11/02/2011 12:00	10.4	12.3	9.8	9.2

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11/02/2011 12:00	12/02/2011 12:00	15.1	14.2	15.6	11.9
12/02/2011 12:00	13/02/2011 12:00	25.8	21.4	24.7	21.8
13/02/2011 12:00	14/02/2011 12:00	37.2	24.1	26.6	27.2
14/02/2011 12:00	15/02/2011 12:00	25.1	25.6	38.7	34.7
15/02/2011 12:00	16/02/2011 12:00	23.9	41.1	23.3	22.5
16/02/2011 12:00	17/02/2011 12:00	23.7	18.5	16.6	17.2
17/02/2011 12:00	18/02/2011 12:00	11.2	12.7	12.7	13.3
18/02/2011 12:00	19/02/2011 12:00	11.6	12.6	11.5	11.4
19/02/2011 12:00	20/02/2011 12:00	24.6	21.0	19.8	20.4
20/02/2011 12:00	21/02/2011 12:00	27.7	26.4	26.2	26.7
21/02/2011 12:00	22/02/2011 12:00	29.4	21.6	23.2	24.9
22/02/2011 12:00	23/02/2011 12:00		22.2	20.1	20.0
23/02/2011 12:00	24/02/2011 12:00		17.0	17.3	14.9
24/02/2011 12:00	25/02/2011 12:00	22.1	20.1	22.5	30.9
25/02/2011 12:00	26/02/2011 12:00	19.4	19.7	25.1	33.8
26/02/2011 12:00	27/02/2011 12:00	20.7	17.9	17.4	20.8
27/02/2011 12:00	28/02/2011 12:00	30.4	21.0	18.8	22.5
28/02/2011 12:00	1/03/2011 12:00	19.2	16.5	18.6	24.6
1/03/2011 12:00	2/03/2011 12:00	37.7	28.9	31.5	33.4
2/03/2011 12:00	3/03/2011 12:00	37.8	34.1	34.3	28.6
3/03/2011 12:00	4/03/2011 12:00	32.4	33.5	31.6	37.2
4/03/2011 12:00	5/03/2011 12:00	30.4	31.6	30.8	34.8
5/03/2011 12:00	6/03/2011 12:00	15.1	14.6	13.6	13.3
6/03/2011 12:00	7/03/2011 12:00	14.0	14.2	12.7	12.1
7/03/2011 12:00	8/03/2011 12:00	11.8	12.1	10.8	10.9
8/03/2011 12:00	9/03/2011 12:00	13.7	12.4	11.8	12.2
9/03/2011 12:00	10/03/2011 12:00	14.8	13.5	13.1	14.8
10/03/2011 12:00	11/03/2011 12:00	18.7	22.5	20.6	23.6
11/03/2011 12:00	12/03/2011 12:00	19.8	21.1	18.8	20.2
12/03/2011 12:00	13/03/2011 12:00	17.2	15.5	16.8	18.0
13/03/2011 12:00	14/03/2011 12:00	23.3	19.4	19.9	20.2
14/03/2011 12:00	15/03/2011 12:00	25.0	29.5	30.6	27.0
15/03/2011 12:00	16/03/2011 12:00	33.0	33.7	25.6	29.1
16/03/2011 12:00	17/03/2011 12:00	10.2	13.0	10.8	10.6

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17/03/2011 12:00	18/03/2011 12:00	6.7	8.8	9.9	8.9
18/03/2011 12:00	19/03/2011 12:00	11.4	15.4	11.9	11.8
19/03/2011 12:00	20/03/2011 12:00	11.8	9.6	9.8	8.8
20/03/2011 12:00	21/03/2011 12:00	18.0	12.4	10.8	10.7
21/03/2011 12:00	22/03/2011 12:00	17.3	30.1	15.7	17.1
22/03/2011 12:00	23/03/2011 12:00	14.5	15.6	15.3	15.2
23/03/2011 12:00	24/03/2011 12:00	23.9	25.0	22.4	20.3
24/03/2011 12:00	25/03/2011 12:00	17.2	15.5	16.9	17.2
25/03/2011 12:00	26/03/2011 12:00	17.2	16.7	22.1	25.4
26/03/2011 12:00	27/03/2011 12:00	21.3	18.8	16.8	20.4
27/03/2011 12:00	28/03/2011 12:00	22.2	20.4	22.2	24.1
28/03/2011 12:00	29/03/2011 12:00	24.8	26.3	27.3	28.5
29/03/2011 12:00	30/03/2011 12:00	23.9	19.5	17.8	19.7
30/03/2011 12:00	31/03/2011 12:00	17.7	15.4	15.6	17.6
31/03/2011 12:00	1/04/2011 12:00	16.3	12.3	11.8	12.8
1/04/2011 12:00	2/04/2011 12:00	14.0	10.4	11.2	12.4
2/04/2011 12:00	3/04/2011 12:00	26.1	16.9	16.8	22.1
3/04/2011 12:00	4/04/2011 12:00	24.6	18.5	20.0	24.7
4/04/2011 12:00	5/04/2011 12:00	22.7	23.0	23.2	24.7
5/04/2011 12:00	6/04/2011 12:00	23.0	23.8	20.6	25.6
6/04/2011 12:00	7/04/2011 12:00	22.9	21.2	21.4	24.3
7/04/2011 12:00	8/04/2011 12:00	13.9	13.1	13.5	12.0
8/04/2011 12:00	9/04/2011 12:00	24.8	21.6	19.3	18.1
9/04/2011 12:00	10/04/2011 12:00	20.4	21.7	19.9	22.9
10/04/2011 12:00	11/04/2011 12:00	16.6	26.7	17.7	18.1
11/04/2011 12:00	12/04/2011 12:00	14.3	12.6	12.5	13.0
12/04/2011 12:00	13/04/2011 12:00	16.8	19.4	17.3	17.0
13/04/2011 12:00	14/04/2011 12:00	15.0	16.3	14.8	14.0
14/04/2011 12:00	15/04/2011 12:00	9.8	8.4	6.7	7.7
15/04/2011 12:00	16/04/2011 12:00	12.1	11.0	13.6	25.2
16/04/2011 12:00	17/04/2011 12:00	11.3	9.4	8.8	14.5
17/04/2011 12:00	18/04/2011 12:00	18.1	17.8	16.1	15.4
18/04/2011 12:00	19/04/2011 12:00	11.6	10.5	10.1	13.3
19/04/2011 12:00	20/04/2011 12:00	19.7	18.0	17.7	17.0

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20/04/2011 12:00	21/04/2011 12:00	32.8	30.3	31.1	30.7
21/04/2011 12:00	22/04/2011 12:00	15.1	14.6	12.4	10.6
22/04/2011 12:00	23/04/2011 12:00	17.5	9.1	9.4	9.2
23/04/2011 12:00	24/04/2011 12:00	18.3	16.6	15.8	14.9
24/04/2011 12:00	25/04/2011 12:00	24.5	22.2	22.9	22.3
25/04/2011 12:00	26/04/2011 12:00	20.6	15.3	15.8	13.5
26/04/2011 12:00	27/04/2011 12:00	13.0	8.6	8.5	9.1
27/04/2011 12:00	28/04/2011 12:00	10.2	8.4	9.0	7.2
28/04/2011 12:00	29/04/2011 12:00	14.3	13.4	15.1	13.7
29/04/2011 12:00	30/04/2011 12:00	21.9	16.9	17.2	16.4
30/04/2011 12:00	1/05/2011 12:00	22.2	20.4	24.4	20.5
1/05/2011 12:00	2/05/2011 12:00	9.0	5.9	6.7	5.2
2/05/2011 12:00	3/05/2011 12:00	9.0	8.6	8.0	8.3
3/05/2011 12:00	4/05/2011 12:00	14.3	13.1	11.5	16.5
4/05/2011 12:00	5/05/2011 12:00	10.1	10.9	9.6	10.8
5/05/2011 12:00	6/05/2011 12:00	15.6	13.4	13.0	13.1
6/05/2011 12:00	7/05/2011 12:00	16.0	11.5	11.6	11.6
7/05/2011 12:00	8/05/2011 12:00	12.9	8.8	7.8	11.8
8/05/2011 12:00	9/05/2011 12:00	9.6	7.2	9.1	8.7
9/05/2011 12:00	10/05/2011 12:00	22.8	19.5	25.7	19.7
10/05/2011 12:00	11/05/2011 12:00	18.6	18.0	15.9	16.5
11/05/2011 12:00	12/05/2011 12:00	17.5	14.9	16.5	15.2
12/05/2011 12:00	13/05/2011 12:00	15.4	13.9	13.6	12.5
13/05/2011 12:00	14/05/2011 12:00	11.4	9.6	9.5	8.8
14/05/2011 12:00	15/05/2011 12:00	7.0	16.7	10.4	12.1
15/05/2011 12:00	16/05/2011 12:00	7.7	4.6	6.5	9.9
16/05/2011 12:00	17/05/2011 12:00	12.9	10.8	14.7	22.3
17/05/2011 12:00	18/05/2011 12:00	17.7	18.6	16.7	14.1
18/05/2011 12:00	19/05/2011 12:00	11.5	14.8	9.4	8.5
19/05/2011 12:00	20/05/2011 12:00	11.5	13.2	10.7	9.3
20/05/2011 12:00	21/05/2011 12:00	16.9	18.5	15.9	15.8
21/05/2011 12:00	22/05/2011 12:00	21.8	21.9	16.9	17.5
22/05/2011 12:00	23/05/2011 12:00	14.6	15.0	11.4	11.5
23/05/2011 12:00	24/05/2011 12:00	9.6	10.7	6.3	

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24/05/2011 12:00	25/05/2011 12:00	9.4			10.7
25/05/2011 12:00	26/05/2011 12:00		10.3	13.0	13.1
26/05/2011 12:00	27/05/2011 12:00	7.0	8.2	9.1	10.5
27/05/2011 12:00	28/05/2011 12:00	7.8	7.6	9.3	9.2
28/05/2011 12:00	29/05/2011 12:00	10.0	10.5	9.8	10.8
29/05/2011 12:00	30/05/2011 12:00	11.1	10.9	10.6	16.5
30/05/2011 12:00	31/05/2011 12:00	10.8	11.8	11.0	11.6
31/05/2011 12:00	1/06/2011 12:00	15.0	16.7	12.3	
1/06/2011 12:00	2/06/2011 12:00	10.8	12.4	10.7	
5/06/2011 12:00	6/06/2011 12:00		20.0	12.5	12.9
6/06/2011 12:00	7/06/2011 12:00		10.3	10.4	
7/06/2011 12:00	8/06/2011 12:00		13.0	18.8	
8/06/2011 12:00	9/06/2011 12:00	12.2	13.4	17.0	16.1
9/06/2011 12:00	10/06/2011 12:00	6.9	7.7	10.1	9.4
10/06/2011 12:00	11/06/2011 12:00	5.2	5.8	9.3	9.8
11/06/2011 12:00	12/06/2011 12:00	7.0	7.5	8.5	9.5
12/06/2011 12:00	13/06/2011 12:00	6.1	6.6	8.2	8.9
13/06/2011 12:00	14/06/2011 12:00	7.2	8.3	7.5	11.1
14/06/2011 12:00	15/06/2011 12:00	9.1	9.8	9.7	10.2
15/06/2011 12:00	16/06/2011 12:00	11.6	11.8	11.8	12.3
16/06/2011 12:00	17/06/2011 12:00	20.2	20.7	21.9	22.4
17/06/2011 12:00	18/06/2011 12:00	31.2	34.3	46.5	44.5
18/06/2011 12:00	19/06/2011 12:00	17.0	17.2	16.7	17.7
19/06/2011 12:00	20/06/2011 12:00	12.4	12.7	12.4	
20/06/2011 12:00	21/06/2011 12:00	24.6		23.9	
21/06/2011 12:00	22/06/2011 12:00	17.0	18.7	14.9	
22/06/2011 12:00	23/06/2011 12:00	16.4	20.1	16.3	18.6
23/06/2011 12:00	24/06/2011 12:00	12.8	20.0	8.5	
24/06/2011 12:00	25/06/2011 12:00	10.8	10.9	10.7	
25/06/2011 12:00	26/06/2011 12:00	11.6	13.8	10.2	11.0
26/06/2011 12:00	27/06/2011 12:00	19.6	21.2	14.8	13.3
27/06/2011 12:00	28/06/2011 12:00	11.9	11.9	13.6	29.4
28/06/2011 12:00	29/06/2011 12:00	26.8	27.5	26.2	28.7
29/06/2011 12:00	30/06/2011 12:00	13.8	15.3	14.8	14.4

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30/06/2011 12:00	1/07/2011 12:00	6.4	6.2	6.4	7.1
1/07/2011 12:00	2/07/2011 12:00	9.0	9.1	9.5	
2/07/2011 12:00	3/07/2011 12:00	8.0	8.4	8.3	8.7
3/07/2011 12:00	4/07/2011 12:00	13.7	14.3	14.2	14.5
4/07/2011 12:00	5/07/2011 12:00	8.3	8.8	8.5	7.5
5/07/2011 12:00	6/07/2011 12:00	13.7	14.1	13.9	
6/07/2011 12:00	7/07/2011 12:00	10.7	10.7	10.6	7.9
7/07/2011 12:00	8/07/2011 12:00	9.9	9.9	8.6	8.1
8/07/2011 12:00	9/07/2011 12:00	6.1	5.8	6.0	4.7
9/07/2011 12:00	10/07/2011 12:00	11.2	10.5	6.9	7.5
10/07/2011 12:00	11/07/2011 12:00	5.8	5.2	5.2	5.8
11/07/2011 12:00	12/07/2011 12:00	5.7	4.9	5.8	7.8
12/07/2011 12:00	13/07/2011 12:00	6.5	6.0	6.7	11.8
13/07/2011 12:00	14/07/2011 12:00	7.4	13.0	7.0	8.7
14/07/2011 12:00	15/07/2011 12:00	6.2		22.2	
15/07/2011 12:00	16/07/2011 12:00	11.2	10.6	11.0	
16/07/2011 12:00	17/07/2011 12:00	12.4	12.2	10.0	11.4
17/07/2011 12:00	18/07/2011 12:00	13.7	14.3	10.8	12.3
18/07/2011 12:00	19/07/2011 12:00	8.2	7.3	14.0	15.1
19/07/2011 12:00	20/07/2011 12:00	5.5	7.6	7.2	
20/07/2011 12:00	21/07/2011 12:00	12.5	16.6	13.0	
21/07/2011 12:00	22/07/2011 12:00	10.6	11.2	12.4	
22/07/2011 12:00	23/07/2011 12:00	11.5	17.3	11.1	
23/07/2011 12:00	24/07/2011 12:00	15.1	21.1	14.0	
24/07/2011 12:00	25/07/2011 12:00	7.4	8.8	9.7	
25/07/2011 12:00	26/07/2011 12:00	6.4	7.9	8.9	
26/07/2011 12:00	27/07/2011 12:00	13.0	17.7	15.5	
27/07/2011 12:00	28/07/2011 12:00	6.3	9.4	8.8	
28/07/2011 12:00	29/07/2011 12:00	8.9	9.4	10.5	
29/07/2011 12:00	30/07/2011 12:00	13.5	13.5	15.3	
30/07/2011 12:00	31/07/2011 12:00	7.4	7.5	9.2	
31/07/2011 12:00	1/08/2011 12:00	17.5	18.6	21.0	
1/08/2011 12:00	2/08/2011 12:00	7.9	8.2	9.4	
2/08/2011 12:00	3/08/2011 12:00	11.8	12.0	13.9	

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3/08/2011 12:00	4/08/2011 12:00	12.2	13.6	13.5	
4/08/2011 12:00	5/08/2011 12:00	17.1	19.3	16.3	
5/08/2011 12:00	6/08/2011 12:00	15.5	18.3	17.2	
6/08/2011 12:00	7/08/2011 12:00	9.7	11.7	12.1	
7/08/2011 12:00	8/08/2011 12:00	7.1	7.8	9.1	
8/08/2011 12:00	9/08/2011 12:00	7.3	7.5	9.2	
9/08/2011 12:00	10/08/2011 12:00	16.5	19.4	15.5	
10/08/2011 12:00	11/08/2011 12:00	8.2	14.0	8.1	
11/08/2011 12:00	12/08/2011 12:00	6.2	10.9	9.4	
12/08/2011 12:00	13/08/2011 12:00	5.2	5.1	22.4	23.2
13/08/2011 12:00	14/08/2011 12:00	6.3	6.9	7.7	
14/08/2011 12:00	15/08/2011 12:00	13.5	14.3	14.6	
15/08/2011 12:00	16/08/2011 12:00	8.2	7.9	9.3	
16/08/2011 12:00	17/08/2011 12:00	21.8	22.3	24.5	
17/08/2011 12:00	18/08/2011 12:00	15.7	23.8	14.9	
18/08/2011 12:00	19/08/2011 12:00	13.1	15.6	12.7	13.5
19/08/2011 12:00	20/08/2011 12:00	13.9	24.4		15.4
20/08/2011 12:00	21/08/2011 12:00	18.5	21.2		17.7
21/08/2011 12:00	22/08/2011 12:00	21.2		20.9	20.3
22/08/2011 12:00	23/08/2011 12:00	7.1			7.5
23/08/2011 12:00	24/08/2011 12:00	12.3			16.2
24/08/2011 12:00	25/08/2011 12:00	13.9	16.7	15.4	15.5
25/08/2011 12:00	26/08/2011 12:00	12.0	15.1	9.5	10.9
26/08/2011 12:00	27/08/2011 12:00	13.8	16.9		11.9
27/08/2011 12:00	28/08/2011 12:00	15.8	16.2		16.0
28/08/2011 12:00	29/08/2011 12:00	11.1	11.6		14.2
29/08/2011 12:00	30/08/2011 12:00	20.5	32.1		20.9
30/08/2011 12:00	31/08/2011 12:00	16.9	16.0	21.8	22.0
31/08/2011 12:00	1/09/2011 12:00	19.5	20.2	16.2	18.4
1/09/2011 12:00	2/09/2011 12:00	13.3	13.5	11.4	12.5
2/09/2011 12:00	3/09/2011 12:00	10.5	11.1	9.2	10.6
3/09/2011 12:00	4/09/2011 12:00	12.4	12.8	12.0	13.8
4/09/2011 12:00	5/09/2011 12:00	16.0		16.1	16.9
5/09/2011 12:00	6/09/2011 12:00	28.5		24.8	24.8

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6/09/2011 12:00	7/09/2011 12:00	30.5	31.4	29.8	32.0
7/09/2011 12:00	8/09/2011 12:00	28.8	27.2	26.0	26.7
8/09/2011 12:00	9/09/2011 12:00	14.0	14.2	12.2	12.2
9/09/2011 12:00	10/09/2011 12:00	10.3	9.2	8.3	9.0
10/09/2011 12:00	11/09/2011 12:00	6.8	6.8	6.1	6.2
11/09/2011 12:00	12/09/2011 12:00	12.2	10.6	11.0	9.9
12/09/2011 12:00	13/09/2011 12:00	14.6	14.5	12.1	13.2
13/09/2011 12:00	14/09/2011 12:00	9.0	9.4	9.2	9.4
14/09/2011 12:00	15/09/2011 12:00	17.4	17.5	15.9	16.3
15/09/2011 12:00	16/09/2011 12:00	16.0	17.6	15.7	16.2
16/09/2011 12:00	17/09/2011 12:00	11.8	13.2	12.6	12.3
17/09/2011 12:00	18/09/2011 12:00	14.0	14.1	12.7	12.6
18/09/2011 12:00	19/09/2011 12:00	14.1	15.4	14.0	15.1
19/09/2011 12:00	20/09/2011 12:00	13.3	14.7	13.6	14.7
20/09/2011 12:00	21/09/2011 12:00	15.9	18.3	15.0	15.7
21/09/2011 12:00	22/09/2011 12:00	17.5	20.0	16.2	17.1
22/09/2011 12:00	23/09/2011 12:00	15.4	16.6	15.2	18.2
23/09/2011 12:00	24/09/2011 12:00	17.7	15.0	11.4	15.2
24/09/2011 12:00	25/09/2011 12:00	14.9	13.5	15.5	30.5
25/09/2011 12:00	26/09/2011 12:00	17.9	19.0	16.3	16.2
26/09/2011 12:00	27/09/2011 12:00	9.2	10.3	9.0	8.5
27/09/2011 12:00	28/09/2011 12:00	12.5	14.1	13.6	14.1
28/09/2011 12:00	29/09/2011 12:00	20.9	25.1	19.6	18.5
29/09/2011 12:00	30/09/2011 12:00	19.2		19.3	17.6
30/09/2011 12:00	1/10/2011 12:00	21.5		20.1	21.0

Blank Spaces - data either not available or non-validated due to technical problems. Full details can be found in the relevant monthly ambient air quality monitoring reports.

**Red** - Exceedances of 50µg/m<sup>3</sup> assessment criteria are highlighted in red and bold.

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**APPENDIX C Silica as Quartz in PM<sub>10</sub>**

Date Sampled	Site 1	Site 2	Site 4
15/12/2010			<0.1
16/12/2010		<0.1	<0.1
17/12/2010		<0.1	<0.1
18/12/2010		<0.1	<0.1
19/12/2010		<0.1	<0.1
20/12/2010		<0.1	<0.1
21/12/2010		<0.1	<0.1
22/12/2010		<0.1	<0.1
23/12/2010		<0.1	<0.1
24/12/2010		<0.1	<0.1
25/12/2010		<0.1	<0.1
26/12/2010		<0.1	<0.1
27/12/2010		<0.1	<0.1
28/12/2010		<0.1	<0.1
29/12/2010		<0.1	<0.1
30/12/2010		<0.1	<0.1
31/12/2010		<0.1	<0.1
1/01/2011		<0.1	<0.1
2/01/2011		<0.1	<0.1
3/01/2011		<0.1	<0.1
4/01/2011		<0.1	<0.1
5/01/2011		0.6	<0.1
6/01/2011		<0.1	<0.1
7/01/2011		<0.1	<0.1
8/01/2011		<0.1	<0.1
9/01/2011		<0.1	<0.1
10/01/2011		<0.1	<0.1
11/01/2011		<0.1	<0.1
12/01/2011		<0.1	<0.1

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13/01/2011		<0.1	<0.1
14/01/2011		<0.1	<0.1
15/01/2011		<0.1	<0.1
16/01/2011		<0.1	<0.1
17/01/2011		<0.1	<0.1
18/01/2011		<0.1	<0.1
19/01/2011		<0.1	<0.1
20/01/2011		0.1	<0.1
21/01/2011		<0.1	<0.1
22/01/2011		<0.1	<0.1
23/01/2011		<0.1	<0.1
24/01/2011		<0.1	<0.1
25/01/2011		<0.1	<0.1
26/01/2011		<0.1	<0.1
27/01/2011		<0.1	<0.1
28/01/2011		<0.1	<0.1
29/01/2011		<0.1	<0.1
30/01/2011		<0.1	<0.1
31/01/2011		<0.1	<0.1
1/02/2011		<0.1	<0.1
2/02/2011		<0.1	<0.1
3/02/2011		<0.1	<0.1
4/02/2011		<0.1	<0.1
5/02/2011		<0.1	<0.1
6/02/2011		<0.1	<0.1
7/02/2011		<0.1	<0.1
8/02/2011		<0.1	<0.1
9/02/2011		<0.1	<0.1
10/02/2011		<0.1	<0.1
11/02/2011		<0.1	<0.1
12/02/2011		<0.1	<0.1
13/02/2011		<0.1	<0.1

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14/02/2011		<0.1	<0.1
15/02/2011		<0.1	<0.1
16/02/2011		<0.1	0.1
17/02/2011		<0.1	<0.1
18/02/2011		<0.1	<0.1
19/02/2011		<0.1	<0.1
20/02/2011		<0.1	<0.1
21/02/2011		<0.1	<0.1
22/02/2011		<0.1	<0.1
23/02/2011		<0.1	<0.1
24/02/2011			<0.1
25/02/2011	<0.1	<0.1	<0.1
26/02/2011	<0.1	<0.1	<0.1
27/02/2011	<0.1	<0.1	<0.1
28/02/2011	<0.1	<0.1	<0.1
1/03/2011	<0.1	<0.1	<0.1
2/03/2011	<0.1	<0.1	<0.1
3/03/2011	<0.1	<0.1	<0.1
4/03/2011	<0.1	<0.1	<0.1
5/03/2011	<0.1	<0.1	<0.1
6/03/2011	<0.1	<0.1	<0.1
7/03/2011	<0.1	<0.1	<0.1
8/03/2011	<0.1	<0.1	<0.1
9/03/2011	<0.1	<0.1	<0.1
10/03/2011	<0.1	<0.1	<0.1
11/03/2011	<0.1	<0.1	<0.1
12/03/2011	<0.1	<0.1	<0.1
13/03/2011	<0.1	<0.1	<0.1
14/03/2011	<0.1	<0.1	<0.1
15/03/2011	<0.1	<0.1	<0.1
16/03/2011	<0.1	<0.1	<0.1
17/03/2011	0.1	<0.1	<0.1

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18/03/2011	<0.1	<0.1	<0.1
19/03/2011	<0.1	<0.1	<0.1
20/03/2011	<0.1	<0.1	<0.1
21/03/2011	<0.1	<0.1	<0.1
22/03/2011	<0.1	<0.1	<0.1
23/03/2011	<0.1	<0.1	<0.1
24/03/2011	<0.1	<0.1	<0.1
25/03/2011	<0.1	<0.1	<0.1
26/03/2011	<0.1	<0.1	<0.1
27/03/2011	<0.1	<0.1	<0.1
28/03/2011	<0.1	<0.1	<0.1
29/03/2011	<0.1	<0.1	<0.1
30/03/2011	<0.1	<0.1	<0.1
31/03/2011	<0.1	<0.1	<0.1
1/04/2011	<0.1	<0.1	<0.1
2/04/2011	<0.1	<0.1	<0.1
3/04/2011	<0.1	<0.1	<0.1
4/04/2011	<0.1	<0.1	<0.1
5/04/2011	<0.1	<0.1	<0.1
6/04/2011	<0.1		<0.1
7/04/2011	<0.1	<0.1	<0.1
8/04/2011	<0.1	<0.1	<0.1
9/04/2011	<0.1	<0.1	<0.1
10/04/2011	<0.1	<0.1	<0.1
11/04/2011	<0.1	<0.1	<0.1
12/04/2011	<0.1	<0.1	<0.1
13/04/2011	<0.1	<0.1	<0.1
14/04/2011	<0.1	<0.1	<0.1
15/04/2011	<0.1	<0.1	<0.1
16/04/2011	<0.1	<0.1	<0.1
17/04/2011	<0.1	<0.1	<0.1
18/04/2011	<0.1	<0.1	<0.1

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19/04/2011	<0.1	<0.1	<0.1
20/04/2011	<0.1	<0.1	<0.1
21/04/2011	<0.1	<0.1	<0.1
22/04/2011	<0.1	<0.1	<0.1
23/04/2011	<0.1	<0.1	<0.1
24/04/2011	<0.1	<0.1	<0.1
25/04/2011	<0.1	<0.1	<0.1
26/04/2011	<0.1	<0.1	<0.1
27/04/2011	<0.1	<0.1	<0.1
28/04/2011	<0.1	<0.1	<0.1
29/04/2011	<0.1	<0.1	<0.1
30/04/2011	<0.1	<0.1	<0.1
1/05/2011	<0.1	<0.1	<0.1
2/05/2011	<0.1	<0.1	<0.1
3/05/2011	<0.1	<0.1	<0.1
4/05/2011	<0.1	<0.1	<0.1
5/05/2011	<0.1	<0.1	
6/05/2011	<0.1	<0.1	
7/05/2011	<0.1	<0.1	
8/05/2011	<0.1	<0.1	
9/05/2011	<0.1	<0.1	
10/05/2011	<0.1	<0.1	
11/05/2011	<0.1	<0.1	
12/05/2011	<0.1	<0.1	
13/05/2011	<0.1	<0.1	
14/05/2011	<0.1	<0.1	
15/05/2011	<0.1	<0.1	
16/05/2011	<0.1	<0.1	
17/05/2011	<0.1	<0.1	
18/05/2011	<0.1	<0.1	
19/05/2011	<0.1	<0.1	
20/05/2011	<0.1	<0.1	

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21/05/2011	<0.1	<0.1	
22/05/2011	<0.1	<0.1	
23/05/2011	<0.1	<0.1	<0.1
24/05/2011	<0.1	<0.1	<0.1
25/05/2011	<0.1	<0.1	<0.1
26/05/2011	<0.1	<0.1	<0.1
27/05/2011	<0.1	<0.1	<0.1
28/05/2011	<0.1	<0.1	<0.1
29/05/2011	<0.1	<0.1	<0.1
30/05/2011	<0.1	<0.1	<0.1
31/05/2011	<0.1	<0.1	<0.1
1/06/2011	<0.1	<0.1	<0.1
2/06/2011	<0.1	<0.1	<0.1
3/06/2011	<0.1	<0.1	<0.1
4/06/2011	<0.1	<0.1	<0.1
5/06/2011	<0.1	<0.1	<0.1
6/06/2011	<0.1	<0.1	<0.1
7/06/2011	<0.1	<0.1	<0.1
8/06/2011	<0.1	<0.1	<0.1
9/06/2011	<0.1	<0.1	<0.1
10/06/2011	<0.1	<0.1	<0.1
11/06/2011	<0.1	<0.1	<0.1
12/06/2011	<0.1	<0.1	<0.1
13/06/2011		<0.1	<0.1
14/06/2011	<0.1	<0.1	<0.1
15/06/2011	<0.1	<0.1	<0.1
16/06/2011	<0.1	<0.1	<0.1
17/06/2011	<0.1	<0.1	<0.1
18/06/2011	<0.1	<0.1	<0.1
19/06/2011	<0.1	<0.1	<0.1
20/06/2011	<0.1	<0.1	<0.1
21/06/2011	<0.1	<0.1	<0.1

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22/06/2011	<0.1	<0.1	<0.1
23/06/2011	<0.1	<0.1	<0.1
24/06/2011	<0.1	<0.1	<0.1
25/06/2011	<0.1	<0.1	<0.1
26/06/2011	<0.1	<0.1	<0.1
27/06/2011	<0.1	<0.1	<0.1
28/06/2011	<0.1	<0.1	<0.1
29/06/2011	<0.1	<0.1	<0.1
30/06/2011	<0.1	<0.1	<0.1
1/07/2011	<0.1	<0.1	<0.1
2/07/2011	<0.1	<0.1	<0.1
3/07/2011	<0.1	<0.1	<0.1
4/07/2011	<0.1	<0.1	<0.1
5/07/2011	<0.1	<0.1	<0.1
6/07/2011	<0.1	<0.1	<0.1
7/07/2011	<0.1	<0.1	<0.1
8/07/2011	<0.1	<0.1	<0.1
9/07/2011	<0.1	<0.1	<0.1
10/07/2011	<0.1	<0.1	<0.1
11/07/2011	<0.1	<0.1	<0.1
12/07/2011	<0.1	<0.1	<0.1
13/07/2011	<0.1	<0.1	<0.1
14/07/2011	<0.1	<0.1	<0.1
15/07/2011	<0.1	<0.1	<0.1
16/07/2011	<0.1	<0.1	<0.1
17/07/2011	<0.1	<0.1	<0.1
18/07/2011	<0.1	<0.1	<0.1
19/07/2011	<0.1	<0.1	<0.1
20/07/2011	<0.1	<0.1	<0.1
21/07/2011	<0.1	<0.1	<0.1
22/07/2011	<0.1	<0.1	<0.1
23/07/2011	<0.1	<0.1	<0.1

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24/07/2011	<0.1	<0.1	<0.1
25/07/2011	<0.1	<0.1	<0.1
26/07/2011	<0.1	<0.1	<0.1
27/07/2011	<0.1	<0.1	<0.1
28/07/2011	<0.1	<0.1	<0.1
29/07/2011	<0.1	<0.1	<0.1
30/07/2011	<0.1	<0.1	<0.1
31/07/2011	<0.1	<0.1	<0.1
1/08/2011	<0.1	<0.1	<0.1
2/08/2011	<0.1	<0.1	<0.1
3/08/2011	<0.1	<0.1	<0.1
4/08/2011	<0.1	<0.1	<0.1
5/08/2011	<0.1	0.16	<0.1
6/08/2011	<0.1	0.26	<0.1
7/08/2011	<0.1	<0.1	<0.1
8/08/2011	<0.1	<0.1	<0.1
9/08/2011	<0.1	<0.1	<0.1
10/08/2011	<0.1	0.22	<0.1
11/08/2011	<0.1	<0.1	<0.1
12/08/2011	<0.1	<0.1	<0.1
13/08/2011	<0.1	<0.1	<0.1
14/08/2011	<0.1	0.13	<0.1
15/08/2011	<0.1	<0.1	<0.1
16/08/2011	<0.1	<0.1	<0.1
17/08/2011	<0.1	0.47	<0.1
18/08/2011	<0.1	<0.1	<0.1
19/08/2011	0.1	0.34	<0.1
20/08/2011	0.12	0.2	<0.1
21/08/2011	0.11	<0.1	<0.1
22/08/2011	<0.1	<0.1	<0.1
23/08/2011	<0.1	0.15	<0.1
24/08/2011	<0.1	<0.1	<0.1

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25/08/2011	<0.1	0.38	<0.1
26/08/2011	<0.1	0.15	<0.1
27/08/2011	<0.1	<0.1	<0.1
28/08/2011	<0.1	<0.1	<0.1
29/08/2011	<0.1	<0.1	<0.1
30/08/2011	<0.1	<0.1	<0.1
31/08/2011	<0.1	<0.1	<0.1
1/09/2011	<0.1	<0.1	<0.1
2/09/2011	<0.1	<0.1	<0.1
3/09/2011	<0.1	<0.1	<0.1
4/09/2011	<0.1	<0.1	<0.1
5/09/2011	<0.1	<0.1	<0.1
6/09/2011	<0.1	<0.1	<0.1
7/09/2011	<0.1	<0.1	<0.1
8/09/2011	<0.1	<0.1	<0.1
9/09/2011	<0.1	<0.1	<0.1
10/09/2011	<0.1	<0.1	<0.1
11/09/2011	<0.1	<0.1	<0.1
12/09/2011	<0.1	0.15	<0.1
13/09/2011	<0.1	<0.1	<0.1
14/09/2011	<0.1	<0.1	<0.1
15/09/2011	<0.1	<0.1	<0.1
16/09/2011	<0.1	<0.1	<0.1
17/09/2011	<0.1	<0.1	<0.1
18/09/2011	<0.1	<0.1	<0.1
19/09/2011	<0.1	<0.1	<0.1
20/09/2011	<0.1	0.1	<0.1
21/09/2011	<0.1	<0.1	<0.1
22/09/2011	<0.1	<0.1	<0.1
23/09/2011	<0.1	<0.1	<0.1
24/09/2011	<0.1	<0.1	<0.1
25/09/2011	<0.1	<0.1	<0.1

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26/09/2011	<0.1	<0.1	<0.1
27/09/2011	<0.1	<0.1	<0.1
28/09/2011	<0.1	<0.1	<0.1
29/09/2011	<0.1	<0.1	<0.1
30/09/2011	<0.1	<0.1	<0.1

Note: Blank cells is missing data. For more information see monthly reports

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2010\_Sept2011

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2010\_Sept2011.doc

**APPENDIX D DAILY TSP RESULTS**

Sampling Start Date	Sampling End Date	Site 1 (µg/m <sup>3</sup> )	Site 2 (µg/m <sup>3</sup> )	Site 3 (µg/m <sup>3</sup> )	Site 4 (µg/m <sup>3</sup> )	Site 5 (µg/m <sup>3</sup> )
1/10/2010 12:00	2/10/2010 12:00	15	14	27	21	16
2/10/2010 12:00	3/10/2010 12:00	30	38	35	32	23
3/10/2010 12:00	4/10/2010 12:00	18	27	17	15	20
4/10/2010 12:00	5/10/2010 12:00	17	27	24	25	19
5/10/2010 12:00	6/10/2010 12:00	53	72	51	62	48
6/10/2010 12:00	7/10/2010 12:00	48	40	33	32	33
7/10/2010 12:00	8/10/2010 12:00	33	23	34	32	25
8/10/2010 12:00	9/10/2010 12:00	40	32	45	43	39
9/10/2010 12:00	10/10/2010 12:00	29	39	35	38	32
10/10/2010 12:00	11/10/2010 12:00	48	32	21	28	15
11/10/2010 12:00	12/10/2010 12:00	4.9	16	5.6	17	15
12/10/2010 12:00	13/10/2010 12:00	48	28	16	11	17
13/10/2010 12:00		31	44	34	33	31
14/10/2010 12:00:00 PM & 16/10/2010 12:00:00 PM	15/10/2010 12:00:00 PM & 17/10/2010 12:00:00PM	72	69	60	68	56
15/10/2010 12:00	16/10/2010 12:00	35	35	30	29	31
17/10/2010 12:00	18/10/2010 12:00	39	43	40	37	27
18/10/2010 12:00	19/10/2010 12:00	54	72	54	53	37
19/10/2010 12:00	20/10/2010 12:00	48	42	36	46	37
20/10/2010 12:00	21/10/2010 12:00	50	65	56	54	49
21/10/2010 12:00	22/10/2010 12:00	25	29	21	20	22
22/10/2010 12:00	23/10/2010 12:00	30	20	15	14	20
23/10/2010 12:00	24/10/2010 12:00	65	54	67	41	24
24/10/2010 12:00	25/10/2010 12:00	41	42	30	26	30
25/10/2010 12:00	26/10/2010 12:00	31	29	24	20	23
26/10/2010 12:00	27/10/2010 12:00	43	42	33	31	30
27/10/2010 12:00	28/10/2010 12:00	2.7	35	33	32	26
28/10/2010 12:00	29/10/2010 12:00	34	43	64	34	30
29/10/2010 12:00	30/10/2010 12:00	22	26	45	21	18

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30/10/2010 12:00	31/10/2010 12:00	18	19	17	17	13
31/10/2010 12:00	1/11/2010 12:00	32	31	24	16	18
1/11/2010 12:00	2/11/2010 12:00	26	24	25	21	19
2/11/2010 12:00	3/11/2010 12:00	38	33	29	22	20
3/11/2010 12:00	4/11/2010 12:00	50	53	40		30
4/11/2010 12:00	5/11/2010 12:00	38	45	40	43	40
5/11/2010 12:00	6/11/2010 12:00	22	35	23	23	26
6/11/2010 12:00	7/11/2010 12:00	35	53	33	32	30
7/11/2010 12:00	8/11/2010 12:00	24	34	27	41	23
8/11/2010 12:00	9/11/2010 12:00	38	48	41	45	32
9/11/2010 12:00	10/11/2010 12:00	27	42	33	39	22
10/11/2010 12:00	11/11/2010 12:00	24	34	24	30	20
11/11/2010 12:00	12/11/2010 12:00	18	21	19	31	24
12/11/2010 12:00	13/11/2010 12:00	26	29	21	28	27
13/11/2010 12:00	14/11/2010 12:00	17	22	29	35	14
14/11/2010 12:00	15/11/2010 12:00	16	19	16	22	31
15/11/2010 12:00	16/11/2010 12:00	31	12	30	22	13
16/11/2010 12:00	17/11/2010 12:00	20	26	25	41	17
17/11/2010 12:00	18/11/2010 12:00	31	39	28	27	18
18/11/2010 12:00	19/11/2010 12:00	38	36	46	57	30
19/11/2010 12:00	20/11/2010 12:00	57	52	51	78	26
20/11/2010 12:00	21/11/2010 12:00	81	66	66	100	42
21/11/2010 12:00	22/11/2010 12:00	45	56	47	50	41
22/11/2010 12:00	23/11/2010 12:00	30	34	24	22	24
23/11/2010 12:00	24/11/2010 12:00	31	32	17	24	20
24/11/2010 12:00	25/11/2010 12:00	35	33	26	33	23
25/11/2010 12:00	26/11/2010 12:00	46	44	35	38	30
26/11/2010 12:00	27/11/2010 12:00	66	56	34	44	45
27/11/2010 12:00	28/11/2010 12:00	91	42	47	95	39
28/11/2010 12:00	29/11/2010 12:00	100	64	63	98	43
29/11/2010 12:00	30/11/2010 12:00	54	55	44	72	41
30/11/2010 12:00	1/12/2010 12:00	38	64	69	70	33
1/12/2010 12:00	2/12/2010 12:00	57	69	48	53	47

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2/12/2010 12:00	3/12/2010 12:00	25	34	34	33	28
3/12/2010 12:00	4/12/2010 12:00	19	26	29	26	14
4/12/2010 12:00	5/12/2010 12:00	18	21	23	22	19
5/12/2010 12:00	6/12/2010 12:00	15	31	25	22	25
6/12/2010 12:00	7/12/2010 12:00	14	21	14	15	17
7/12/2010 12:00	8/12/2010 12:00	24	34	26	22	22
8/12/2010 12:00	9/12/2010 12:00	20	32	19	22	21
9/12/2010 12:00	10/12/2010 12:00	26	35	26	28	26
10/12/2010 12:00	11/12/2010 12:00	32	45	37	31	28
11/12/2010 12:00	12/12/2010 12:00	39	45	38	42	38
12/12/2010 12:00	13/12/2010 12:00	55	57	82	83	39
13/12/2010 12:00	14/12/2010 12:00	55	68	42	36	35
14/12/2010 12:00	15/12/2010 12:00	36	54	33	40	34
15/12/2010 12:00	16/12/2010 12:00	28	46	31	47	25
16/12/2010 12:00	17/12/2010 12:00	35	50	36	43	31
17/12/2010 12:00	18/12/2010 12:00	35	42	26	37	25
18/12/2010 12:00	19/12/2010 12:00	26	29	18	26	21
19/12/2010 12:00	20/12/2010 12:00	63	53	58	50	36
20/12/2010 12:00	21/12/2010 12:00	71	59	71	83	36
21/12/2010 12:00	22/12/2010 12:00	81	54	59	63	41
22/12/2010 12:00	23/12/2010 12:00	42	57	59	61	39
23/12/2010 12:00	24/12/2010 12:00	50	58	72	77	43
24/12/2010 12:00	25/12/2010 12:00	63	52	47	55	46
25/12/2010 12:00	26/12/2010 12:00	87	45	29	35	32
26/12/2010 12:00	27/12/2010 12:00	61	48	52	62	31
27/12/2010 12:00	28/12/2010 12:00	73	60	55	66	43
28/12/2010 12:00	29/12/2010 12:00	100	66	40	42	58
29/12/2010 12:00	30/12/2010 12:00	86	55	51	46	39
30/12/2010 12:00	31/12/2010 12:00	46	34	28	28	28
31/12/2010 12:00	1/01/2011 12:00	74	37	27	31	32
1/01/2011 12:00	2/01/2011 12:00	95	44	40	44	32
2/01/2011 12:00	3/01/2011 12:00	240	88	82	120	52
3/01/2011 12:00	4/01/2011 12:00	37	44	38	31	40

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4/01/2011 12:00	5/01/2011 12:00	38	42	39	45	42
5/01/2011 12:00	6/01/2011 12:00	52	81	62	67	69
6/01/2011 12:00	7/01/2011 12:00	46	49	45	47	50
7/01/2011 12:00	8/01/2011 12:00	34	33	38	32	32
8/01/2011 12:00	9/01/2011 12:00	49	44	40	40	31
9/01/2011 12:00	10/01/2011 12:00	56	33	35	38	31
10/01/2011 12:00	11/01/2011 12:00	70	41	45	48	34
11/01/2011 12:00	12/01/2011 12:00	41	38	*	40	22
12/01/2011 12:00	13/01/2011 12:00	48	53	*	49	29
13/01/2011 12:00	14/01/2011 12:00	49	66	55	51	44
14/01/2011 12:00	15/01/2011 12:00	46	55	44	51	46
15/01/2011 12:00	16/01/2011 12:00	37	39	32	33	29
16/01/2011 12:00	17/01/2011 12:00	79	70	66	75	61
17/01/2011 12:00	18/01/2011 12:00	78	75	51	49	43
18/01/2011 12:00	19/01/2011 12:00	71	76	40	37	40
19/01/2011 12:00	20/01/2011 12:00	58	64	29	29	33
20/01/2011 12:00	21/01/2011 12:00	61	51	46	51	39
21/01/2011 12:00	22/01/2011 12:00	44	57	47	69	40
22/01/2011 12:00	23/01/2011 12:00	34	32	35	37	34
23/01/2011 12:00	24/01/2011 12:00	39	34	34	33	28
24/01/2011 12:00	25/01/2011 12:00	12	18	14	16	12
25/01/2011 12:00	26/01/2011 12:00	20	27	19	23	20
26/01/2011 12:00	27/01/2011 12:00	49	41	28	28	29
27/01/2011 12:00	28/01/2011 12:00	69	70	50	61	60
28/01/2011 12:00	29/01/2011 12:00	91	80	67	67	74
29/01/2011 12:00	30/01/2011 12:00	46	46	38	38	39
30/01/2011 12:00	31/01/2011 12:00	55	53	48	48	48
31/01/2011 12:00	1/02/2011 12:00	33	31	23	22	25
1/02/2011 12:00	2/02/2011 12:00	56	86	35	38	25
2/02/2011 12:00	3/02/2011 12:00	42	52	45	40	30
3/02/2011 12:00	4/02/2011 12:00	71	71	44	44	32
4/02/2011 12:00	5/02/2011 12:00	37	45	31	29	32
5/02/2011 12:00	6/02/2011 12:00	72	55	42	40	38

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6/02/2011 12:00	7/02/2011 12:00	75	79	62	68	87
7/02/2011 12:00	8/02/2011 12:00	140	160	72	92	53
8/02/2011 12:00	9/02/2011 12:00	28	50	34	27	9
9/02/2011 12:00	10/02/2011 12:00	24	32	15	15	16
10/02/2011 12:00	11/02/2011 12:00	28	33	21	20	18
11/02/2011 12:00	12/02/2011 12:00	53	51	44	31	20
12/02/2011 12:00	13/02/2011 12:00	75	51	57	53	29
13/02/2011 12:00	14/02/2011 12:00	110	45	55	63	33
14/02/2011 12:00	15/02/2011 12:00	25	42	73	64	23
15/02/2011 12:00	16/02/2011 12:00	48	99	33	39	30
16/02/2011 12:00	17/02/2011 12:00	43	35	29	30	18
17/02/2011 12:00	18/02/2011 12:00	14	31	28	32	16
18/02/2011 12:00	19/02/2011 12:00		33	24	28	17
19/02/2011 12:00	20/02/2011 12:00		68	66	60	27
20/02/2011 12:00	21/02/2011 12:00		49	42	39	35
21/02/2011 12:00	22/02/2011 12:00		49	51	59	25
22/02/2011 12:00	23/02/2011 12:00	89	63	73	79	24
23/02/2011 12:00	24/02/2011 12:00	36	43	34	29	17
24/02/2011 12:00	25/02/2011 12:00	51	54	44	84	30
25/02/2011 12:00	26/02/2011 12:00	39	40	49	93	17
26/02/2011 12:00	27/02/2011 12:00	42	35	45	59	21
27/02/2011 12:00	28/02/2011 12:00		46	38	62	23
28/02/2011 12:00	1/03/2011 12:00	52	35	48	83	22
1/03/2011 12:00	2/03/2011 12:00	110	91	92	120	40
2/03/2011 12:00	3/03/2011 12:00	81	120	110	96	28
3/03/2011 12:00	4/03/2011 12:00	52	100	84	110	28
4/03/2011 12:00	5/03/2011 12:00	46	64	56	87	34
5/03/2011 12:00	6/03/2011 12:00	20	24	18	26	18
6/03/2011 12:00	7/03/2011 12:00	23	30	20	20	21
7/03/2011 12:00	8/03/2011 12:00	15	27	14	16	13
8/03/2011 12:00	9/03/2011 12:00	24	29	20	25	18
9/03/2011 12:00	10/03/2011 12:00	28	33	31	48	40
10/03/2011 12:00	11/03/2011 12:00	29	53	36	55	34

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11/03/2011 12:00	12/03/2011 12:00	28	42	27	34	26
12/03/2011 12:00	13/03/2011 12:00	32	28	30	46	17
13/03/2011 12:00	14/03/2011 12:00	56	62	67	61	22
14/03/2011 12:00	15/03/2011 12:00	79	85	85	69	27
15/03/2011 12:00	16/03/2011 12:00	47	110	55	84	27
16/03/2011 12:00	17/03/2011 12:00	23	43	22	24	15
17/03/2011 12:00	18/03/2011 12:00	12	42	26	24	9
18/03/2011 12:00	19/03/2011 12:00	24	31	17	17	20
19/03/2011 12:00	20/03/2011 12:00	15	19	12	15	14
20/03/2011 12:00	21/03/2011 12:00	53	32	17	19	22
21/03/2011 12:00	22/03/2011 12:00	25	97	33	33	19
22/03/2011 12:00	23/03/2011 12:00	29	33	36	47	23
23/03/2011 12:00	24/03/2011 12:00	37	56	32	36	35
24/03/2011 12:00	25/03/2011 12:00	32	25	26	36	24
25/03/2011 12:00	26/03/2011 12:00	35		57	82	25
26/03/2011 12:00	27/03/2011 12:00	48		39	74	23
27/03/2011 12:00	28/03/2011 12:00	37		40	62	69
28/03/2011 12:00	29/03/2011 12:00	36		52	66	32
29/03/2011 12:00	30/03/2011 12:00		49	29	42	25
30/03/2011 12:00	31/03/2011 12:00	33		29	38	23
31/03/2011 12:00	1/04/2011 12:00	25		20	30	15
1/04/2011 12:00	2/04/2011 12:00					
2/04/2011 12:00	3/04/2011 12:00	54		51	85	14
3/04/2011 12:00	4/04/2011 12:00	43		46	79	25
4/04/2011 12:00	5/04/2011 12:00	36		37	58	30
5/04/2011 12:00	6/04/2011 12:00	47	40	47	51	46
6/04/2011 12:00	7/04/2011 12:00					
7/04/2011 12:00	8/04/2011 12:00					
8/04/2011 12:00	9/04/2011 12:00	44	41	28	29	24
9/04/2011 12:00	10/04/2011 12:00					
10/04/2011 12:00	11/04/2011 12:00	27	70	41	58	19
11/04/2011 12:00	12/04/2011 12:00	18	22	21	22	19
12/04/2011 12:00	13/04/2011 12:00					

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13/04/2011 12:00	14/04/2011 12:00					
<b>14/04/2011 12:00</b>	<b>15/04/2011 12:00</b>	10	18	11	18	15
15/04/2011 12:00	16/04/2011 12:00					
16/04/2011 12:00	17/04/2011 12:00					
<b>17/04/2011 12:00</b>	<b>18/04/2011 12:00</b>	20	24	18	18	18
18/04/2011 12:00	19/04/2011 12:00					
19/04/2011 12:00	20/04/2011 12:00					
<b>20/04/2011 12:00</b>	<b>21/04/2011 12:00</b>	50	62	55	62	56
21/04/2011 12:00	22/04/2011 12:00					
22/04/2011 12:00	23/04/2011 12:00					
<b>23/04/2011 12:00</b>	<b>24/04/2011 12:00</b>	31	36	31	33	35
24/04/2011 12:00	25/04/2011 12:00					
25/04/2011 12:00	26/04/2011 12:00					
<b>26/04/2011 12:00</b>	<b>27/04/2011 12:00</b>	23	22	20	30	17
27/04/2011 12:00	28/04/2011 12:00	24	28	24	26	29
28/04/2011 12:00	29/04/2011 12:00	20	30	26	27	23
<b>29/04/2011 12:00</b>	<b>30/04/2011 12:00</b>	42	37	31	39	33
30/04/2011 12:00	1/05/2011 12:00					
1/05/2011 12:00	2/05/2011 12:00					
<b>2/05/2011 12:00</b>	<b>3/05/2011 12:00</b>	12	21	11	18	17
3/05/2011 12:00	4/05/2011 12:00					
4/05/2011 12:00	5/05/2011 12:00					
<b>5/05/2011 12:00</b>	<b>6/05/2011 12:00</b>	27	34	22	33	23
6/05/2011 12:00	7/05/2011 12:00					
7/05/2011 12:00	8/05/2011 12:00					
<b>8/05/2011 12:00</b>	<b>9/05/2011 12:00</b>	17	20	42	28	15
9/05/2011 12:00	10/05/2011 12:00					
10/05/2011 12:00	11/05/2011 12:00					
<b>11/05/2011 12:00</b>	<b>12/05/2011 12:00</b>	25	31	35	40	25
12/05/2011 12:00	13/05/2011 12:00					
13/05/2011 12:00	14/05/2011 12:00					
<b>14/05/2011 12:00</b>	<b>15/05/2011 12:00</b>	11	53	40	65	7.3
15/05/2011 12:00	16/05/2011 12:00					
16/05/2011 12:00	17/05/2011 12:00					

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<b>17/05/2011 12:00</b>	<b>18/05/2011 12:00</b>	24	30	28	25	22
18/05/2011 12:00	19/05/2011 12:00					
19/05/2011 12:00	20/05/2011 12:00					
<b>20/05/2011 12:00</b>	<b>21/05/2011 12:00</b>	30	31	31	40	28
21/05/2011 12:00	22/05/2011 12:00					
22/05/2011 12:00	23/05/2011 12:00					
<b>23/05/2011 12:00</b>	<b>24/05/2011 12:00</b>	15	24	15	18	14
24/05/2011 12:00	25/05/2011 12:00					
25/05/2011 12:00	26/05/2011 12:00					
<b>26/05/2011 12:00</b>	<b>27/05/2011 12:00</b>	8.3	12	15	20	9.4
27/05/2011 12:00	28/05/2011 12:00					
28/05/2011 12:00	29/05/2011 12:00					
<b>29/05/2011 12:00</b>	<b>30/05/2011 12:00</b>	25	23	30	37	26
30/05/2011 12:00	31/05/2011 12:00					
31/05/2011 12:00	1/06/2011 12:00					
<b>1/06/2011 12:00</b>	<b>2/06/2011 12:00</b>	17	21	20	17	21
2/06/2011 12:00	3/06/2011 12:00					
3/06/2011 12:00	4/06/2011 12:00					
<b>4/06/2011 12:00</b>	<b>5/06/2011 12:00</b>	24	44	25	21	30
5/06/2011 12:00	6/06/2011 12:00					
6/06/2011 12:00	7/06/2011 12:00					
<b>7/06/2011 12:00</b>	<b>8/06/2011 12:00</b>	21	18	39	34	19
8/06/2011 12:00	9/06/2011 12:00					
9/06/2011 12:00	10/06/2011 12:00					
<b>10/06/2011 12:00</b>	<b>11/06/2011 12:00</b>	6.1	8.7	25	26	8.3
11/06/2011 12:00	12/06/2011 12:00					
12/06/2011 12:00	13/06/2011 12:00	8.3	12	20	26	9.2
<b>13/06/2011 12:00</b>	<b>14/06/2011 12:00</b>	21	23	24	24	25
14/06/2011 12:00	15/06/2011 12:00					
15/06/2011 12:00	16/06/2011 12:00					
<b>16/06/2011 12:00</b>	<b>17/06/2011 12:00</b>	30	32	35	33	31
17/06/2011 12:00	18/06/2011 12:00					
18/06/2011 12:00	19/06/2011 12:00					
<b>19/06/2011 12:00</b>	<b>20/06/2011 12:00</b>	19	22	20	23	18

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20/06/2011 12:00	21/06/2011 12:00					
21/06/2011 12:00	22/06/2011 12:00					
<b>22/06/2011 12:00</b>	<b>23/06/2011 12:00</b>	26	45	28	32	48
23/06/2011 12:00	24/06/2011 12:00					
24/06/2011 12:00	25/06/2011 12:00					
<b>25/06/2011 12:00</b>	<b>26/06/2011 12:00</b>	16	29	14	14	19
26/06/2011 12:00	27/06/2011 12:00					
27/06/2011 12:00	28/06/2011 12:00					
<b>28/06/2011 12:00</b>	<b>29/06/2011 12:00</b>	24	28	25	27	24
29/06/2011 12:00	30/06/2011 12:00					
30/06/2011 12:00	1/07/2011 12:00					
<b>1/07/2011 12:00</b>	<b>2/07/2011 12:00</b>	14	14	16	14	16
2/07/2011 12:00	3/07/2011 12:00					
3/07/2011 12:00	4/07/2011 12:00					
<b>4/07/2011 12:00</b>	<b>5/07/2011 12:00</b>	12	24	6.1	14	13
5/07/2011 12:00	6/07/2011 12:00					
6/07/2011 12:00	7/07/2011 12:00					
<b>7/07/2011 12:00</b>	<b>8/07/2011 12:00</b>	13	22	15	15	20
8/07/2011 12:00	9/07/2011 12:00					
9/07/2011 12:00	10/07/2011 12:00					
<b>10/07/2011 12:00</b>	<b>11/07/2011 12:00</b>	11	13	11	16	10
11/07/2011 12:00	12/07/2011 12:00					
12/07/2011 12:00	13/07/2011 12:00					
<b>13/07/2011 12:00</b>	<b>14/07/2011 12:00</b>	13	33	19	37	14
14/07/2011 12:00	15/07/2011 12:00					
15/07/2011 12:00	16/07/2011 12:00					
<b>16/07/2011 12:00</b>	<b>17/07/2011 12:00</b>	21	27	18	18	28
17/07/2011 12:00	18/07/2011 12:00					
18/07/2011 12:00	19/07/2011 12:00					
<b>19/07/2011 12:00</b>	<b>20/07/2011 12:00</b>	11	21	11	15	13
20/07/2011 12:00	21/07/2011 12:00					
21/07/2011 12:00	22/07/2011 12:00					
<b>22/07/2011 12:00</b>	<b>23/07/2011 12:00</b>	20	48	16	15	35
23/07/2011 12:00	24/07/2011 12:00					

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24/07/2011 12:00	25/07/2011 12:00					
<b>25/07/2011 12:00</b>	<b>26/07/2011 12:00</b>	12	20	14	17	14
26/07/2011 12:00	27/07/2011 12:00					
27/07/2011 12:00	28/07/2011 12:00					
<b>28/07/2011 12:00</b>	<b>29/07/2011 12:00</b>	18	19	23	20	20
29/07/2011 12:00	30/07/2011 12:00					
30/07/2011 12:00	31/07/2011 12:00					
<b>31/07/2011 12:00</b>	<b>1/08/2011 12:00</b>	29	30	35	29	32
1/08/2011 12:00	2/08/2011 12:00					
2/08/2011 12:00	3/08/2011 12:00					
<b>3/08/2011 12:00</b>	<b>4/08/2011 12:00</b>	19	23	19	24	18
4/08/2011 12:00	5/08/2011 12:00					
5/08/2011 12:00	6/08/2011 12:00					
<b>6/08/2011 12:00</b>	<b>7/08/2011 12:00</b>	14	27	31	78	16
7/08/2011 12:00	8/08/2011 12:00					
8/08/2011 12:00	9/08/2011 12:00					
<b>9/08/2011 12:00</b>	<b>10/08/2011 12:00</b>	29	50	22	22	23
10/08/2011 12:00	11/08/2011 12:00					
11/08/2011 12:00	12/08/2011 12:00					
<b>12/08/2011 12:00</b>	<b>13/08/2011 12:00</b>	11	12	74	39	12
13/08/2011 12:00	14/08/2011 12:00					
14/08/2011 12:00	15/08/2011 12:00					
<b>15/08/2011 12:00</b>	<b>16/08/2011 12:00</b>	17	18	21	21	16
16/08/2011 12:00	17/08/2011 12:00					
17/08/2011 12:00	18/08/2011 12:00					
<b>18/08/2011 12:00</b>	<b>19/08/2011 12:00</b>	20	35	22	22	23
19/08/2011 12:00	20/08/2011 12:00					
20/08/2011 12:00	21/08/2011 12:00					
<b>21/08/2011 12:00</b>	<b>22/08/2011 12:00</b>	32		44	36	37
22/08/2011 12:00	23/08/2011 12:00					
23/08/2011 12:00	24/08/2011 12:00	25		37	43	26
<b>24/08/2011 12:00</b>	<b>25/08/2011 12:00</b>	17		23	26	17
25/08/2011 12:00	26/08/2011 12:00	22		20	18	30
26/08/2011 12:00	27/08/2011 12:00					

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<b>27/08/2011 12:00</b>	<b>28/08/2011 12:00</b>	33	32	27	27	54
28/08/2011 12:00	29/08/2011 12:00					
29/08/2011 12:00	30/08/2011 12:00					
<b>30/08/2011 12:00</b>	<b>31/08/2011 12:00</b>	24	21	29	39	27
31/08/2011 12:00	1/09/2011 12:00					
1/09/2011 12:00	2/09/2011 12:00					
<b>2/09/2011 12:00</b>	<b>3/09/2011 12:00</b>	16	16	17	17	16
3/09/2011 12:00	4/09/2011 12:00					
4/09/2011 12:00	5/09/2011 12:00					
<b>5/09/2011 12:00</b>	<b>6/09/2011 12:00</b>	47	48	43	45	41
6/09/2011 12:00	7/09/2011 12:00					
7/09/2011 12:00	8/09/2011 12:00	40	20	37	36	38
<b>8/09/2011 12:00</b>	<b>9/09/2011 12:00</b>	20	19	17	15	19
9/09/2011 12:00	10/09/2011 12:00					
10/09/2011 12:00	11/09/2011 12:00					
<b>11/09/2011 12:00</b>	<b>12/09/2011 12:00</b>	30	19	25	2	26
12/09/2011 12:00	13/09/2011 12:00					
13/09/2011 12:00	14/09/2011 12:00					
<b>14/09/2011 12:00</b>	<b>15/09/2011 12:00</b>	29	27	27	28	27
15/09/2011 12:00	16/09/2011 12:00					
16/09/2011 12:00	17/09/2011 12:00					
<b>17/09/2011 12:00</b>	<b>18/09/2011 12:00</b>	27	25	29	23	31
18/09/2011 12:00	19/09/2011 12:00					
19/09/2011 12:00	20/09/2011 12:00					
<b>20/09/2011 12:00</b>	<b>21/09/2011 12:00</b>	22	31	23	22	28
21/09/2011 12:00	22/09/2011 12:00					
22/09/2011 12:00	23/09/2011 12:00					
<b>23/09/2011 12:00</b>	<b>24/09/2011 12:00</b>	37	31	23	36	
24/09/2011 12:00	25/09/2011 12:00					
25/09/2011 12:00	26/09/2011 12:00					
<b>26/09/2011 12:00</b>	<b>27/09/2011 12:00</b>	14	17	16	16	14
27/09/2011 12:00	28/09/2011 12:00					
28/09/2011 12:00	29/09/2011 12:00	32	47	30	32	28
<b>29/09/2011 12:00</b>	<b>30/09/2011 12:00</b>	33	45	31	30	30

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30/09/2011 12:00	1/10/2011 12:00	36		42	49	26
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<sup>1</sup> This date represents the day that the filter paper was removed from the HVAS.

Blank Space – is Unvalidated or unavailable data

**Red** - Exceedance of the 24hr target criteria ( $90\mu\text{g}/\text{m}^3$ ) is highlighted in red and bold

**Bold** – represents required “summer” and “winter” sampling days

Note that the laboratory reports these results to two significant figures. In other words, analysed concentrations above  $99\mu\text{g}/\text{m}^3$  are reported to the nearest 'ten'. For example,  $101\mu\text{g}/\text{m}^3$  will be reported as  $100\mu\text{g}/\text{m}^3$ .

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**APPENDIX E HVAS METAL SPECIATION RESULTS**

Sampling Start Date	Sampling End Date	Site 1 (µg/m3)						Site 2 (µg/m3)						Site 3 (µg/m3)						Site 4 (µg/m3)						Site 5 (µg/m3)				
		Li	Zn	Fe	Ni	Pb	S	Li	Zn	Fe	Ni	Pb	S	Li	Zn	Fe	Ni	Pb	S	Li	Zn	Fe	Ni	Pb	S	Li	Zn	Fe	Ni	Pb
1/10/2010 12:00	2/10/2010 12:00	<0.002		0.16	<0.002	<0.003	0.47	<0.002		0.19	<0.002	<0.003	0.48	<0.002		0.21	<0.002	<0.003	0.51	<0.002		0.17	<0.002	<0.003	0.51	<0.002		0.14	<0.002	<0.003
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	<0.002		0.32	<0.002	<0.003	0.85	<0.002		0.54	<0.002	<0.003	0.86	<0.002		0.24	<0.002	<0.003	0.82	<0.002		0.20	<0.002	<0.003	0.84	<0.002		0.27	<0.002	<0.003
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	<0.002		0.63	<0.002	<0.003	0.93	<0.002		0.85	0.01	<0.003	1.10	<0.002		0.93	0.01	<0.003	1.40	<0.002		0.44	<0.002	<0.003	1.60	<0.002		0.48	<0.002	<0.003
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	<0.002		0.35	<0.002	<0.003	0.88	<0.002		0.41	<0.002	<0.003	0.82	<0.002		0.14	<0.002	<0.003	0.86	<0.002		0.13	<0.002	<0.003	0.87	<0.002		0.14	<0.002	<0.003
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	<0.002		0.29	<0.002	<0.003	0.99	<0.002		0.70	0.01	<0.003	0.98	<0.002		0.31	<0.002	<0.003	1.00	<0.002		0.23	<0.002	<0.003	0.88	<0.002		0.29	<0.002	<0.003
14/10/2010 12:00:00 PM & 16/10/2010 12:00:00 PM	15/10/2010 12:00:00 PM & 17/10/2010 12:00:00 PM	<0.002		1.30	0.01	<0.003	2.40	<0.002		1.40	0.01	<0.003	1.80	<0.002		0.80	<0.002	<0.003	1.80	<0.002		0.68	<0.002	<0.003	2.00	<0.002		0.48	0.01	<0.003
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	<0.002		1.20	0.01	<0.003	0.24	<0.002		1.60	0.02	<0.003	0.15	<0.002		1.20	0.01	<0.003	0.17	<0.002		1.70	0.01	<0.003	0.18	<0.002		0.97	<0.002	<0.003
19/10/2010 12:00	20/10/2010 12:00	<0.002		1.10	0.02	<0.003	1.20	<0.002		0.92	0.01	<0.003	1.20	<0.002		0.80	0.01	<0.003	1.00	<0.002		0.87	0.02	<0.003	1.10	<0.002		0.57	<0.002	<0.003
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	<0.002		0.53	0.01	<0.003	0.89	<0.002		0.67	0.01	<0.003	0.80	<0.002		0.21	<0.002	<0.003	0.79	<0.002		0.21	<0.002	<0.003	0.84	<0.002		0.41	<0.002	<0.003
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	<0.002		0.48	<0.002	<0.003	0.87	<0.002		0.81	0.01	<0.003	0.96	<0.002		0.27	<0.002	<0.003	0.94	<0.002		0.17	<0.002	<0.003	0.87	<0.002		0.39	<0.002	<0.003
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	<0.002		0.19	<0.002	<0.003	0.87	<0.002		0.44	<0.002	<0.003	0.91	<0.002		0.88	0.01	<0.003	1.10	<0.002		0.16	<0.002	<0.003	0.84	<0.002		0.18	<0.002	<0.003
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	<0.002		0.65	<0.002	<0.003	0.68	<0.002		0.54	<0.002	<0.003	0.73	<0.002		0.30	<0.002	<0.003	0.67	<0.002		0.23	<0.002	<0.003	0.70	<0.002		0.29	<0.002	<0.003

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12/01/2011 12:00	13/01/2011 12:00	<0.002		0.62	0.003	<0.003	1.7	<0.002		0.9	0.012	<0.003	3.5						<0.002		1.1	0.011	<0.003	4.1	<0.002		0.29	<0.002	<0.003		
13/01/2011 12:00	14/01/2011 12:00																														
14/01/2011 12:00	15/01/2011 12:00	<0.002		0.23	<0.002	<0.003	1.1	<0.002		0.54	0.004	<0.003	1.1	<0.002		0.22	<0.002	<0.003	1.1	<0.002		0.19	<0.002	<0.003	1.1	<0.002		0.18	<0.002	<0.003	
15/01/2011 12:00	16/01/2011 12:00																														
16/01/2011 12:00	17/01/2011 12:00																														
17/01/2011 12:00	18/01/2011 12:00	<0.002		1.4	0.017	<0.003	4.1	<0.002		1.4	0.008	<0.003	5.8	<0.002		0.76	0.003	<0.003	4.6	<0.002		0.89	<0.002	<0.003	1.8	<0.002		0.39	<0.002	<0.003	
18/01/2011 12:00	19/01/2011 12:00																														
19/01/2011 12:00	20/01/2011 12:00																														
20/01/2011 12:00	21/01/2011 12:00	<0.002		0.93	0.007	<0.003	3.6	<0.002		1.3	0.009	<0.003	2	<0.002		0.59	0.006	<0.003	3.4	<0.002		0.66	0.009	<0.003	4.5	<0.002		0.46	0.004	<0.003	
21/01/2011 12:00	22/01/2011 12:00	<0.002		0.56	0.010	<0.003	2	<0.002		1	0.010	<0.003	2.6	<0.002		0.99	0.010	<0.003	2.6	<0.002		1.5	0.020	<0.003	4.6	<0.002		0.43	<0.002	<0.003	
22/01/2011 12:00	23/01/2011 12:00	<0.002		0.25	<0.002	<0.003	1.4	<0.002		0.3	<0.002	<0.003	1.2	<0.002		0.26	<0.002	<0.003	1.2	<0.002		0.26	<0.002	<0.003	1.2	<0.002		0.22	<0.002	<0.003	
23/01/2011 12:00	24/01/2011 12:00	<0.001		0.12	0.005	<0.005		<0.001		0.27	0.004	<0.005		<0.001		0.11	0.004	<0.005		<0.001		0.13	0.004	<0.005		<0.001		0.09	<0.002	<0.005	
24/01/2011 12:00	25/01/2011 12:00	<0.001		0.1	<0.002	<0.005	0.82	<0.001		0.24	<0.002	<0.005	0.9	<0.001		0.08	<0.002	<0.005	0.84	<0.001		0.08	<0.002	<0.005	0.72	<0.001		0.08	<0.002	<0.005	
25/01/2011 12:00	26/01/2011 12:00	<0.001		0.21	<0.002	<0.003	0.82	<0.001		0.44	<0.002	<0.003	1.1	<0.001		0.2	<0.002	<0.003	1.1	<0.001		0.35	<0.002	<0.003	1.9	<0.001		0.15	<0.002	<0.003	
26/01/2011 12:00	27/01/2011 12:00	<0.001		0.83	<0.002	<0.003	0.88	<0.001		1	0.009	<0.003	0.97	<0.001		0.41	<0.002	<0.003	0.86	<0.001		0.39	<0.002	<0.003	0.82	<0.001		0.24	<0.002	<0.003	
27/01/2011 12:00	28/01/2011 12:00																														
28/01/2011 12:00	29/01/2011 12:00	<0.001		0.44	0.004	<0.003	2.1																								
29/01/2011 12:00	30/01/2011 12:00	<0.001		0.64	0.011	<0.003	1.1	<0.001		0.98	0.007	<0.003	1.2	<0.001		0.46	<0.002	<0.003	1.1	<0.001		0.28	<0.002	<0.003	1.2	<0.001		0.27	<0.002	<0.003	
30/01/2011 12:00	31/01/2011 12:00	<0.001		0.66	<0.002	<0.003	1.2	<0.001		0.73	0.005	<0.003	1.1	<0.001		0.43	<0.002	<0.003	1.2	<0.001		0.32	<0.002	<0.003	1.2	<0.001		0.32	<0.002	<0.003	
31/01/2011 12:00	1/02/2011 12:00																														
1/02/2011 12:00	2/02/2011 12:00	<0.001	0.2	0.5	0.004	<0.003	2.400	<0.001	0.2	1.0	0.008	<0.003	4.400	<0.001	0.2	0.4	<0.002	<0.003	2.300	<0.001	0.1	0.3	<0.002	<0.003	1.300	<0.001	0.2	0.3	<0.002	<0.003	
2/02/2011 12:00	3/02/2011 12:00																														
3/02/2011 12:00	4/02/2011 12:00	<0.001	0.2	0.9	0.006	<0.003	3.000	<0.001	0.2	1.3	0.013	<0.003	4.800	<0.001	0.2	0.6	0.003	<0.003	1.200	<0.001	0.2	0.7	0.004	<0.003	1.200	<0.001	0.2	0.3	<0.002	<0.003	
4/02/2011 12:00	5/02/2011 12:00	<0.001	0.2	0.8	0.006	<0.003	2.100	<0.001	0.2	0.7	0.005	<0.003	0.960	<0.001	0.1	0.2	<0.002	<0.003	0.900	<0.001	0.2	0.3	<0.002	<0.003	1.000	<0.001	0.2	0.3	<0.002	<0.003	
5/02/2011 12:00	6/02/2011 12:00	<0.001	0.1	1.2	0.010	<0.003	3.700	<0.001	0.2	1.2	0.010	<0.003	3.500	<0.001	0.1	0.7	<0.002	<0.003	1.400	<0.001	0.2	0.7	<0.002	<0.003	1.000	<0.001	0.2	0.4	<0.002	<0.003	
6/02/2011 12:00	7/02/2011 12:00																														
7/02/2011 12:00	8/02/2011 12:00	<0.001	0.2	0.9	0.008	<0.003	2.800	<0.001	0.2	1.7	0.022	0.010	4.400	<0.001	0.2	0.9	0.005	<0.003	1.300	<0.001	0.2	1.2	0.006	<0.003	1.000	<0.001	0.2	0.2	<0.002	<0.003	
8/02/2011 12:00	9/02/2011 12:00	<0.001	0.1	0.2	0.006	<0.003	2.200	<0.001	0.2	0.5	0.009	<0.003	3.700	<0.001	0.2	0.3	0.005	<0.003	2.400	<0.001	0.2	0.2	0.004	<0.003	2.200	<0.001	0.2	0.1	<0.002	<0.003	
9/02/2011 12:00	10/02/2011 12:00																														
10/02/2011 12:00	11/02/2011 12:00	<0.001	0.2	0.5	0.006	<0.003	1.800	<0.001	0.2	1.1	0.005	<0.003	1.200	<0.001	0.1	0.3	<0.002	<0.003	0.580	<0.001	0.2	0.5	<0.002	<0.003	0.710	<0.001	0.2	0.3	<0.002	<0.003	
11/02/2011 12:00	12/02/2011 12:00	<0.001	0.1	0.6	0.009	<0.003	3.100	<0.001	0.2	1.0	0.013	<0.003	3.300	<0.001	0.1	0.5	0.006	<0.003	2.300	<0.001	0.2	0.6	<0.002	<0.003	1.200	<0.001	0.4	0.1	<0.002	<0.003	
12/02/2011 12:00	13/02/2011 12:00	<0.001	0.4	0.8	0.005	<0.003	1.900	<0.001	0.4	1.0	0.008	<0.003	1.800	<0.001	0.5	1.7	0.006	<0.003	1.900	<0.001	0.4	1.3	0.004	<0.003	0.850	<0.001	0.5	0.1	<0.002	<0.003	
13/02/2011 12:00	14/02/2011 12:00	<0.001	0.4	0.7	<0.002	<0.003	0.810	<0.001	0.5	0.8	0.006	<0.003	0.760	<0.001	0.5	1.0	0.004	<0.003	1.200	<0.001	0.4	1.2	0.004	<0.003	0.730	<0.001	0.5	0.2	<0.002	<0.003	
14/02/2011 12:00	15/02/2011 12:00																														
15/02/2011 12:00	16/02/2011 12:00							<0.001	0.53	1.300	0.010	<0.003	3.4																		
16/02/2011 12:00	17/02/2011 12:00	<0.001	0.58	0.760	0.006	<0.003	2.3	<0.001	0.55	1.100	0.009	<0.003	1.5	<0.001	0.55	0.710	0.004	<0.003	1.1	<0.001	0.37	0.550	<0.002	<0.003	0.72	<0.001	0.56	0.340	<0.002	<0.003	

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## APPENDIX F INSOLUBLE DUST DEPOSITION RESULTS

Insoluble Dust	October	November	December	January	February	March	April	May	June	July	August	September	
Off-site "neighbour hood"	DG1	1900	<b>4700</b>	3300	<b>4400</b>	<b>5300</b>	3500	2300	1200	900	900	800	2000
	DG3	400	400	500	900	600	300	400	200	200	200	400	1100
	DG4	2300	<b>17200</b>	<b>6000</b>	<b>15000</b>	<b>43100</b>	<b>20400</b>	<b>4200</b>	100	500	500	200	500
	DG5	800	800	800	1000	500	300	1600	200	200	200	200	700
	DG6	<b>4500</b>	1000	1500	1900	500	200	500	200	400	400	800	2400
	DG7	700	600	500	1000	700	400	500	100	400	400	400	700
	DG8	1300	500	500	1300	400	500	400	200	200	200	500	800
	DG11	1000	600	500	800	800	500	600	300	400	400	800	600
	DG12	500	600	300	400	300	200	200	100	200	200	400	400
	DG13	600	600	500	400	500	400	300	100	100	100	700	1400
	DG14	700	300	1000	100	400	100	200	300	100	100	300	400
	DG15	1700	700	500	900	900	200	700	400	300	300	700	1600
	DG16	1000	600	800	2800	700	800	700	200	200	200	300	700
	DG17	600		200	400	100	300	200	100	200	200	300	
DG18	3100	2500	1900	<b>6300</b>	3800	<b>7200</b>	1100	700	1600	1600	500	1000	
DG19	500	300	800	900	500	500	200	100	400	400	400	700	
On-site "peak" <sup>1</sup>	DG9	9900	4800	8800	12600	4100	4700	11700	8200	5500	5500	13000	14600
	DG10	4900	6000	3800	4700	7500	7300	3400	2700	5900	5900	6400	7100
NSW EPA Criteria		4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000

**Bold** - Exceedances of the NSW EPA criteria of 4000 mg/m<sup>2</sup>/month of insoluble dust for 'off-site' monitors is highlighted in red and bold.

<sup>1</sup> Conditions of the licence are not applicable to the on-site monitors and therefore exceedances of the NSW EPA criteria are not noted in this table.

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### APPENDIX G DEPOSITION METAL SPECIATION RESULTS

Nickel Deposition Results (mg/m<sup>2</sup>/month) for October 2010 to September 2011

Nickel	October	November	December	January	February	March	April	May	June	July	August	September		
Off-site "neighbour- hood"	DG1	0.91	0.8	0.96	1.748	1.946	0.5	0.5	0.3	<0.3	<0.3	<0.3	0.3	
	DG3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	
	DG4	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	
	DG5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	
	DG6	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	
	DG7	<0.3	<0.3	<0.3	<0.3	<0.3	0.321	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	
	DG8	2	2	2	2	2	2	2	<0.3	<0.3	<0.3	<0.3	<0.3	
	DG11	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	
	DG12	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	
	DG13	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.478	<0.3		0.8	0.5	
	DG14	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	
	DG15	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	
	DG16	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	
	DG17	<0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	
	DG18	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	
	DG19	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	
	On-site "peak" <sup>1</sup>	DG9	12.81	64.1	107.21	30.5	5.76	7.45	21.74	8.57	17.37	7.93	20.42	37.18
		DG10	52.6	13.69	8.48	15.7	9.48	54.54	35.58	21.75	156.4	20.19	21.1	22.36

Note: DG17 – Missing data for November 2010 due to no sample available due to missing glass funnel

Note: DG13 – Missing data for July 2011 due to broken dust gauge due to strong winds

Note: DG 17 – Missing data for September 2011 due to no sample available due to missing dust gauge

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Lead Deposition Results (mg/m<sup>2</sup>/month) for October 2010 to September 2011

Lead	October	November	December	January	February	March	April	May	June	July	August	September	
Off-site "neighbour- hood"	DG1	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
	DG3	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
	DG4	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
	DG5	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
	DG6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
	DG7	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
	DG8	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
	DG11	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
	DG12	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
	DG13	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6		<0.6	<0.6
	DG14	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
	DG15	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
	DG16	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
	DG17	<0.6		<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
DG18	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
DG19	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	
On-site "peak" <sup>1</sup>	DG9	0.9	26.7	<0.6	1.2	0.6	<0.6	0.6	<0.6	<0.6	0.9	<0.6	
	DG10	3.7	0.8	<0.6	0.7	0.8	0.7	<0.6	<0.6	<0.6	0.8	<0.6	

Note: DG17 – Missing data for November 2010 due to no sample available due to missing glass funnel

Note: DG13 – Missing data for July 2011 due to broken dust gauge due to strong winds

Note: DG 17 – Missing data for September 2011 due to no sample available due to missing dust gauge

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Iron Deposition Results (mg/m<sup>2</sup>/month) for October 2010 to September 2011

Iron	October	November	December	January	February	March	April	May	June	July	August	September		
Off-site "neighbour- hood"	DG1	6	97.5	49.36	82.16	136.26	27.6	25.3	49.4	18.6	19.1	24.1	39.7	
	DG3	7.3	8.2	7.4	12.4	18.1	10.8	6.7	6.3	5.1	4.3	5.9	8.9	
	DG4	6.8	31.4	20.6	29	49.5	21.3	9.4	4.5	4.3	3.5	3.3	5.7	
	DG5	6.4	8.6	5.7	11.2	6.9	4.6	7.35	3.5	4.4	5.3	5	8.6	
	DG6	12.7	5.9	5.6	7.8	2.4	2.7	2.7	3.5	3.5	4	8.1	7.7	
	DG7	7	8.5	6.9	12.1	16.7	8	6.1	6.7	6.8	6	5.7	5	
	DG8	18.6	7.3	8	12.9	13.2	9.8	6.2	3	6.3	4.7	5.5	8.7	
	DG11	6	13.4	8.2	13.9	29.8	10	10.8	11.3	14.6	16.2	19	6.5	
	DG12	6	4.9	4.2	7.7	6.1	3	2.9	3.8	3.6	3.1	4.5	3.6	
	DG13	7.3	<0.6	8.8	21.6	27.6	15.9	5.7	5.4	1.2		8.7	8.8	
	DG14	6.8	3.1	2.8	4.4	5.313	1.9	2.9	3	2.7	3.8	3.6	4.1	
	DG15	6.4	6.5	8.6	12	12	4.6	5.3	4.3	4.4	7	10.9	14.7	
	DG16	12.7	10.3	14	25.1	23.9	11.5	11.9	6.5	5.5	6.5	6.7	8.4	
	DG17	7		3.6	10.2	4.9	3	2	3.5	4.3	4.4	4.1		
	DG18	18.6	10.6	7.2	24.9	8.6	7.4	11.4	7.8	10.4	12.2	13.3	8	
	DG19	6	4.9	12.3	9.3	8.7	7.9	3.4	6.1	6.3	6.7	5.5	7.2	
	On-site "peak" <sup>1</sup>	DG9	131.87	196.1	254.91	192.6	111.46	100.63	285.7	168	132	145	354	281
		DG10	288	146.71	84.04	136	234	184	106	130	257	82.9	155	164

Note: DG17 – Missing data for November 2010 due to no sample available due to missing glass funnel

Note: DG13 – Missing data for July 2011 due to broken dust gauge due to strong winds

Note: DG 17 – Missing data for September 2011 due to no sample available due to missing dust gauge

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Sulphur Deposition Results (mg/m<sup>2</sup>/month) for October 2010 to September 2011

Sulphur	October	November	December	January	February	March	April	May	June	July	August	September		
Off-site "neighbourhood"	DG1	60.7	<30	<30	<30	69.1	65.7	53.5	<30	<30	<30	<30		
	DG3	38.8	59.7	36.6	71.1	<30	86.4	<30	<30	<30	<30	<30		
	DG4	376	844	622	868	921	813	628	214	<30	<30	<30	97.9	
	DG5	<30	<30	<30	<30	33.4	<30	1170	<30	<30	<30	<30	<30	
	DG6	62.4	45.8	31.8	98.1	50.3	<30	132	76.4	<30	<30	119	143	
	DG7	23.7	52.7	<30	64.9	60.5	64.3	<30	<30	<30	<30	<30	87.2	
	DG8	42.4	<30	<30	<30	<30	<30	48.7	<30	49.5	<30	<30	<30	
	DG11	77.8	57.7	<30	35.2	62.2	58.1	57.4	<30	52.4	<30	<30	81.5	
	DG12	70.4	52.8	<30	63.8	66.5	36.9	44.5	47	56.2	<30	95.8	78.1	
	DG13	146	98.1	109	180	179	134	89.7	95.6	<30		<30	79.2	
	DG14	96.7	542	34.5	54.6	91.3	<30	58.2	82.7	60	<30	109	79.8	
	DG15	66.9	<30	<30	82.1	113	53.4	136	34.7	<30	<30	<30	115	
	DG16	60.7	57.5	35.3	65.8	32.4	<30	48.7	<30	<30	<30	<30	<30	
	DG17	66.2		<30	<30	61	35.5	<30	<30	<30	<30	<30		
	DG18	71.6	<30	30.8	1040	58.6	60.9	63.4	<30	76.2	<30	<30	<30	
	DG19	39.2	<30	<30	<30	66	38.8	<30	43.2	<30	<30	<30	<30	
	On-site "peak" <sup>1</sup>	DG9	51.1	37.7	145.4	178.6	87.9	36.3	58.3	45.5	47.5	<30	141	136.5
		DG10	201.3	57	44	131	93.5	114.4	127.4	83.7	265	98.4	108	84.3

Note: DG17 – Missing data for November 2010 due to no sample available due to missing glass funnel

Note: DG13 – Missing data for July 2011 due to broken dust gauge due to strong winds

Note: DG 17 – Missing data for September 2011 due to no sample available due to missing dust gauge

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Lithium Deposition Rates (mg/m<sup>2</sup>/month) for October 2010 to September 2011

Lithium	October	November	December	January	February	March	April	May	June	July	August	September	
Off-site "neighbour- hood"  On-site "peak" <sup>1</sup>	DG1			0.11	0.07	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
	DG3			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
	DG4			0.19	0.24	0.16	0.13	<0.03	<0.03	<0.03	<0.03	<0.03	
	DG5			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
	DG6			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
	DG7			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
	DG8			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
	DG11			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
	DG12			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
	DG13			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03		<0.03	<0.03	
	DG14			<0.03	<0.03	<0.03	0.02	<0.03	<0.03	<0.03	<0.03	<0.03	
	DG15			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
	DG16			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
	DG17			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03		
	DG18			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
	DG19			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
	DG9				0.04	0.10	<0.03	0.04	0.05	0.05	<0.03	0.12	0.10
	DG10				0.10	0.11	0.04	<0.03	0.03	<0.03	<0.03	0.05	0.05

Note: DG17 – Missing data for November 2010 due to no sample available due to missing glass funnel

Note: DG13 – Missing data for July 2011 due to broken dust gauge due to strong winds

Note: DG 17 – Missing data for September 2011 due to no sample available due to missing dust gauge

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Zinc Deposition Rates (mg/m<sup>2</sup>/month) for October 2010 to September 2011

Zinc	October	November	December	January	February	March	April	May	June	July	August	September
Off-site "neighbour- hood"	DG1				10.2	19.1	4.8	4.7	4.4	5.6	9.0	8.2
	DG3				8.7	8.1	16.0	11.2	4.9	5.0	7.8	7.9
	DG4				2.9	20.0	3.3	6.1	6.1	8.4	18.3	14.0
	DG5				3.7	6.1	4.3	12.4	4.5	1.0	0.8	1.5
	DG6				11.1	0.1	6.7	8.5	3.3	3.6	12.0	7.6
	DG7				11.0	7.2	2.8	11.5	8.7	10.3	14.0	14.8
	DG8				5.7	11.1	7.4	7.3	6.0	3.7	8.7	36.5
	DG11				12.5	8.3	8.8	14.3	13.0	5.6	7.1	7.6
	DG12				7.1	0.2	4.2	8.0	7.8	8.1	10.3	8.6
	DG13				19.9	0.3	12.5	14.5	7.8		8.4	11.6
	DG14				7.1	0.1	5.8	15.0	7.5	5.3	13.5	8.8
	DG15				6.6	0.3	3.8	13.4	5.8	7.8	6.9	6.5
	DG16				2.6	0.1	5.4	10.7	6.6	6.1	10.8	7.2
DG17				22.3	0.2	0.5	13.1	1.4	5.9	19.6		
DG18				4.2	0.1	18.2	3.1	3.2	23.4	17.7	2.3	
DG19				3.9	6.2	9.4	8.4	10.5	4.6	13.9	7.6	
On-site "peak" <sup>1</sup>	DG9				22.8	261.6	65.5	94.2	13.2	9.0	16.0	11.8
	DG10				14.5	110.7	96.9	42.8	13.2	22.0	27.8	18.8

Note: DG17 – Missing data for November 2010 due to no sample available due to missing glass funnel

Note: DG13 – Missing data for July 2011 due to broken dust gauge due to strong winds

Note: DG 17 – Missing data for September 2011 due to no sample available due to missing dust gauge

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## APPENDIX H RAINWATER TANK METAL RESULTS

Nickel Rainwater Tank Results (mg/L) for October 2010 to September 2011

Nickel in Rainwater Tanks	October	November	December	January	February	March	April	May	June	July	August	September
DG3	0.009	0.003	0.006	0.002	0.003	0.002	0.008	0.002	0.005	0.006	0.003	0.01
DG5	0.004	0.005	0.001	0.001	0.003	0.004		0.006	0.005	0.004	0.002	0.006
DG8	0.006	0.005	0.007	0.003	0.005	<b>0.038</b>	0.006	0.004	0.008			
DG11	0.014	0.014	0.016	0.015	<b>0.024</b>	0.017	0.013	0.013	0.013	0.014	0.013	0.016
DG12	0.005	0.009	0.01	0.006	0.006	0.01	0.004	0.005	0.005	0.003	0.004	0.004
DG14	0.002	0.002	0.002	0.001	0.002	0.002	0.001	0.001	0.002	0.002	0.002	0.003
DG15	0.002	0.002	<b>0.034</b>	0.001	0.002	0.002	<0.001	0.001	0.001	<0.001	<0.001	0.002
DG16	0.01	0.001	0.009	0.006	0.006	0.004	0.003	0.004	0.003	0.002	0.002	0.003
DG17	0.008	0.008	0.007	0.006	0.006	0.006	0.005	0.006	0.007	0.007	0.006	0.007
DG18	0.001	<0.001	0.001	<0.001	0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.001
DG19	<0.001	0.007	0.007	0.01	0.007	0.007	0.005	0.006	0.006	0.003	0.003	0.004
Assessment Criteria	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02

Note: DG5 - Data missing for April 2011 due to insufficient water in tank

Note: DG8 – Data missing for July, August and September 2011 due to removal of rainwater tank by owner. DEC notified in July 2011

**Bold** – Exceedances of the assessment criteria is highlighted in red and bold

Iron Rainwater Tank Results (mg/L) for October 2010 to September 2011

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Iron in Rainwater Tanks	October	November	December	January	February	March	April	May	June	July	August	September
DG3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DG5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	<0.05	0.53
DG8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			
DG11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DG12	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DG14	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DG15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DG16	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DG17	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DG18	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DG19	<0.05	<0.05	<0.05	0.37	0.28	0.22	0.23	0.11	0.05	0.05	0.05	0.05

Note: DG5 - Data missing for April 2011 due to insufficient water in tank

Note: DG8 – Data missing for July, August and September 2011 due to removal of rainwater tank by owner. DEC notified in July 2011

Lead Rainwater Tank Results (mg/L) for October 2010 to September 2011

Lead in Rainwater Tanks	October	November	December	January	February	March	April	May	June	July	August	September
DG3	0.001	0.001	0.001	0.001	0.001	0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
DG5	0.001	<b>0.019</b>	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<b>0.012</b>
DG8	0.001	<0.001	0.001	0.001	0.002	0.002	<0.001	<0.001	0.001			
DG11	<b>0.017</b>	<b>0.019</b>	<b>0.018</b>	<b>0.026</b>	<b>0.024</b>	<b>0.027</b>	<b>0.023</b>	<b>0.022</b>	<b>0.018</b>	<b>0.022</b>	<b>0.019</b>	<b>0.019</b>
DG12	<0.001	0.001	0.002	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
DG14	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DG15	0.001	0.001	0.004	0.002	<0.001	0.002	0.001	<0.001	0.002	0.001	<0.001	0.001
DG16	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DG17	0.001	0.003	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DG18	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DG19	<0.001	0.001	0.001	0.006	0.003	0.01	0.002	0.007	0.002	0.007	<0.001	0.001
Assessment Criteria	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Note: DG5 - Data missing for April 2011 due to insufficient water in tank

Note: DG8 – Data missing for July, August and September 2011 due to removal of rainwater tank by owner. DEC notified in July 2011

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**Bold** – Exceedances of the assessment criteria is highlighted in red and bold

Sulphur Rainwater Tank Results (mg/L) for October 2010 to September 2011

Sulphur in Rainwater Tanks	October	November	December	January	February	March	April	May	June	July	August	September
DG3	1	1	2	1	3	<10	<1	<1	<1	<1	<1	1
DG5	1	<1	<1	<1	<1	<10		<1	<1	<1	<1	<1
DG8	2	<1	2	<1	<1	<10	<1	<1	<1			
DG11	<1	<1	1	1	1	<10	1	1	1	<1	<1	<1
DG12	1	1	2	1	<1	<10	<1	1	<1	<1	1	<1
DG14	2	2	3	2	2	<10	2	2	2	2	2	2
DG15	1	1	2	1	1	<10	<1	<1	<1	<1	<1	<1
DG16	1	<1	1	<1	<1	<10	<1	<1	<1	<1	<1	<1
DG17	1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<1	<1
DG18	1	1	1	1	1	<10	1	1	1	1	<1	<1
DG19	<1	<1	1	<1	<1	<10	1	1	<1	<1	<1	<1

Note: DG5 - Data missing for April 2011 due to insufficient water in tank

Note: DG8 – Data missing for July, August and September 2011 due to removal of rainwater tank by owner. DEC notified in July 2011.

Note: March 2011 results are all <10 as laboratory error should have shown results <1 or above as level of detect. Was not noticed at the time due to change of EPSL staff

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