



ESPERANCE PORTS
Sea & Land

TSP EXCEEDANCE REPORT

MONITORING PERIOD

16TH OCTOBER 2011

AND

18th and 20th OCTOBER 2011

Revision	Prepared	Reviewed	Approved	Date	Description
1	N. Norrish	A Leonard		7/11/2011	

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1. INTRODUCTION

On the 27th October 2011, the Esperance Ports Sea and Land (EPSL) became aware of laboratory results detailing dust (measured as Total Suspended Particles) exceeding the license criteria (refer to Table 1). Consistent with the latest Licence (L5099/1974/13) issued on the 24th February 2011 (amended 28th July 2011) requirement of Condition 9, this requires an exceedance report to be submitted to the DEC, within seven working days (24th October 2011).

Table 1. Emission Concentration Targets from the Port Environmental Licence (L5099/1974/13) issued to EPSL on 24th February 2011 (amended 28th July 2011).

Emission	Ambient concentration target
Nickel in air	0.14 µg/m ³
Dust as PM ₁₀	50 µg/m ³
Dust as TSP	90 µg/m ³
Silica in air	5 µg/m ³

2. INVESTIGATION

Measured Total Suspended Particulate (TSP) concentrations exceeded the license (L5099/1974/13) target (Table 1) for TSP. The recorded TSP at the monitoring sites (refer to Figure 1) for exceedance periods A, B and C are as follows:

Exceedance Period A (between 1344 on 16/10/2011 and 1254 17/10/2011)

- Site 3: 100 ug/m³
- Site 4: 130 ug/m³

Exceedance Period B (between 1244 on 18/10/2011 and 1253 on 19/10/2011)

- Site 3: 110 ug/m³

Exceedance Period C (between 1305 on 20/10/2011 and 1252 on 21/10/2011)

- Site 3: 130 ug/m³

Note: to reflect the practical reporting errors, values exceeding 100 ug/m³ are rounded to the nearest 10 ug/m³ by MPL analytical laboratory.



Figure 1. Location of Air Quality Monitoring Stations

2.1 Port Activities

The following Port activities occurred during the monitoring period:

Exceedance A:

- China Progress was alongside Berth 3 between 2258 on 14th October 2011 and 1006 on 18th October 2011 being loaded with iron ore.
- Pioneer was alongside Berth 2 between 0806 15th October 2011 and 1642 on 16th October 2011 being unloaded with empty containers and loaded with full containers.
- Agios Nikolas was alongside Berth 1 between 1430 on 16th October 2011 and 1752 on 17th October 2011 being loaded with barley.
- 36,201 tonnes of iron ore averaged across 4 trains; and
- 158 tonnes of nickel concentrate across 2 trucks.

Exceedance B:

- Aquabella was alongside Berth 3 between 1200 18th October 2011 and 1650 on 21st October 2011 being loaded with iron ore;
- 18,437 tonnes of iron ore averaged across 2 trains;
- 145 tonnes nickel concentrate across 2 trucks; and
- 790 tonnes of sulphur was out-loaded across 10 trucks.

Exceedance C:

- Aquabella was alongside Berth 3 between 1200 18th October 2011 and 1650 on 21st October 2011 being loaded with iron ore;
- 159 tonnes of nickel concentrate across 2 trucks; and
- 948 tonnes of sulphur was out-loaded across 12 trucks.

2.2 Meteorological Activities

The wind directions for the 24 hour period in which the exceedance occurred are as follows:

Exceedance A: winds were in a wind arc from NNW (3%), N (20%), NNE (46%) and NE (31%) (Figure 2). The maximum hourly average wind speed of 15.5 m/s (30 knots) was recorded from the north (356 degrees) between 1000 and 1100 on 17th October 2011. The 'Beaufort Wind Force Scale' is a measure of understanding wind speeds in descriptive terminology. A wind speed of 30 knots is described as a 'near gale' winds (28-33 knots) (BOM, 2011).

Exceedance B: winds were mainly (68%) offshore being from the south to south west, the remaining winds were distributed from NNE (1%), N (3%), NNW (3%), NW (4%), WNW (6%), W (5%), WSW (2%), S (6%) and SSE (2%) (Figure 3). The maximum hourly average wind speed of 7.6 m/s (15 knots) was recorded from the SSW between 0000 and 0100 hours on the 19th October 2011. A wind speed of 15 knots is described as a 'moderate breeze' (11-16 knots) (BOM, 2011).

Exceedance C: winds were mainly onshore in the NE to SSE wind arc (93%). The remaining winds were from NNW (1%), N (4%) and NNE (1%) (Figure 4). The maximum hourly average wind speed of 8.6 m/s (17 knots) was recorded from the SE between 1500 and 1600 hours on the 20th October 2011. A wind speed of 17 knots is described as a 'fresh winds' (17-21 knots) (BOM, 2011).

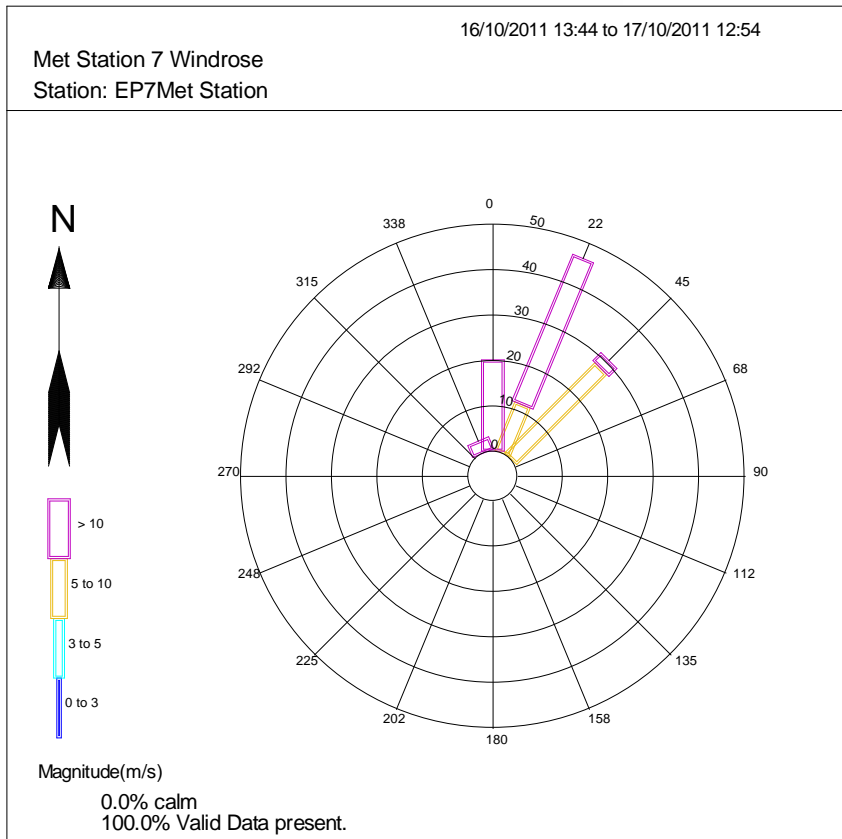


Figure 2: Exceedance A - Windrose for the monitoring period 1344 on 16/10/2011 to 1254 on 17/10/2011. Raw data source: EP7 monitoring station, Berth 3.

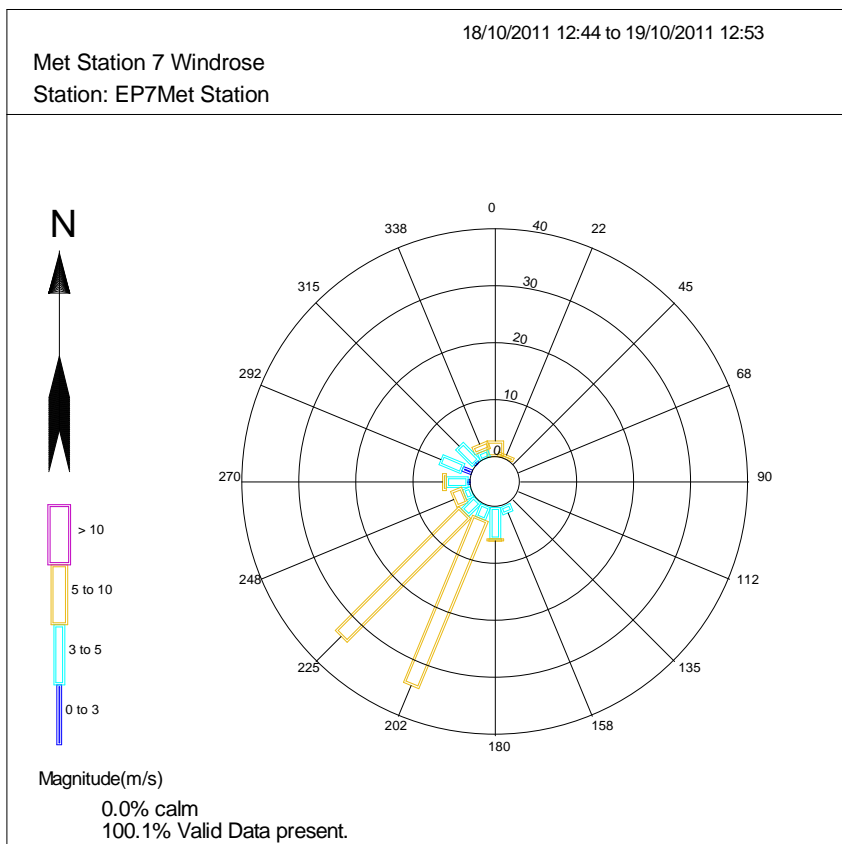


Figure 3. Exceedance B – Windrose between 1244 on 18/10/2011 and 1253 19/10/2011. Raw data source: EP7 monitoring station, Berth 3.

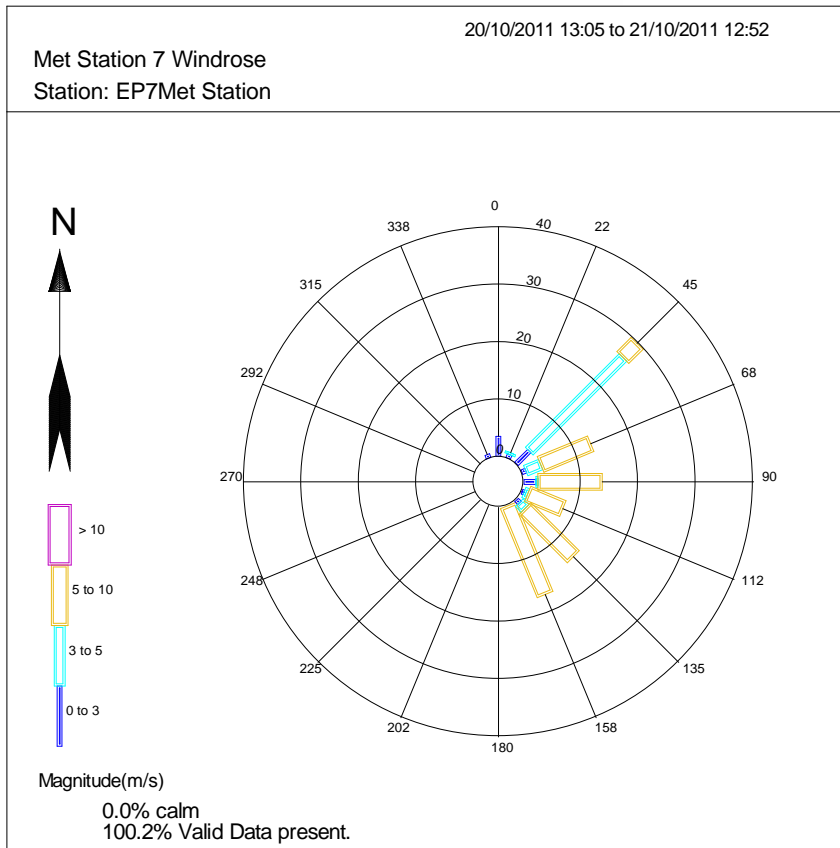


Figure 4. Exceedance C – Windrose between 1305 on 20/10/2011 and 1252 21/10/2011. Raw data source: EP7 monitoring station, Berth 3.

2.3 Reason for exceedance

Exceedance A:

The exceedance between 16th and 17th October 2011 at Sites 3 and 4 was probably due to grain loading activities on Berth 1 based on correlations between the activity, wind direction and dust levels. Barley loading at Berth 1 began at 1618 hours on the 16/10/2011 and finished at 2337 hours on the 16/10/2011. Sites 3 and 4 were downwind (N to NE winds) of grain loading operations for the majority of the exceedance period.

Although grain dust is mainly consists of large (>10 μm) dust particulate, a PM10 exceedance occurred for this same period at site 4, with levels at Site 3 also elevated but not in exceedance of the licence criteria. The peaks in PM10 measured in real time occurred just after grain loading commenced and decreased after it stopped. This PM10 exceedance report has already been submitted to the DEC.

Further evidence of correlations between Berth 1 activity and levels of TSP is provided by real time data from measured at E Sampler 6 which is located between Berth 1 and Site 4 where a clear correlation is shown between barley loading times and increases in hourly TSP from E Sampler 6 (Figure 5). During the first loading period, which commenced on

16th October at 1618, the TSP increases as the winds turn towards a NNE direction. A decrease in TSP corresponds with the end of the ship loading period at 2337, consistent with the PM10 correlation. During the second loading time, commencing on 17th October at 0716, a corresponding TSP increase also occurred. During this time winds reached >10 m/s from 33° to 359° direction (Figure 6). Therefore, a weight of evidence suggests grain loading is the likely source of the TSP exceedance.

Nickel contributed 0.01% of the TSP and iron contributed only 3.3% of the TSP. Iron (3.3% Fe in TSP) and nickel (0.01% Ni in TSP) representing the prescribed bulk products handled by EPSL and as is normally found together they contributed a small proportion (<4%) of the overall dust.

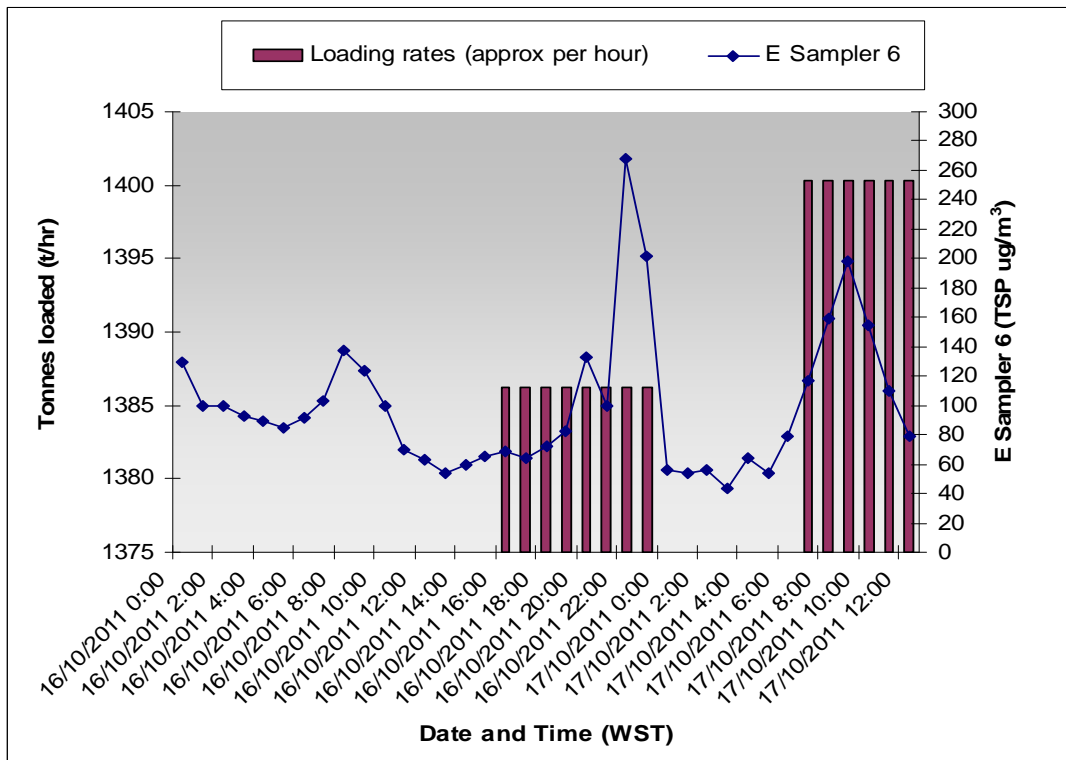


Figure 5. Hourly TSP data from E Sampler 6 and average tonnes of barley loaded per hour from Berth 1 between 16th October and 17th October 2011.

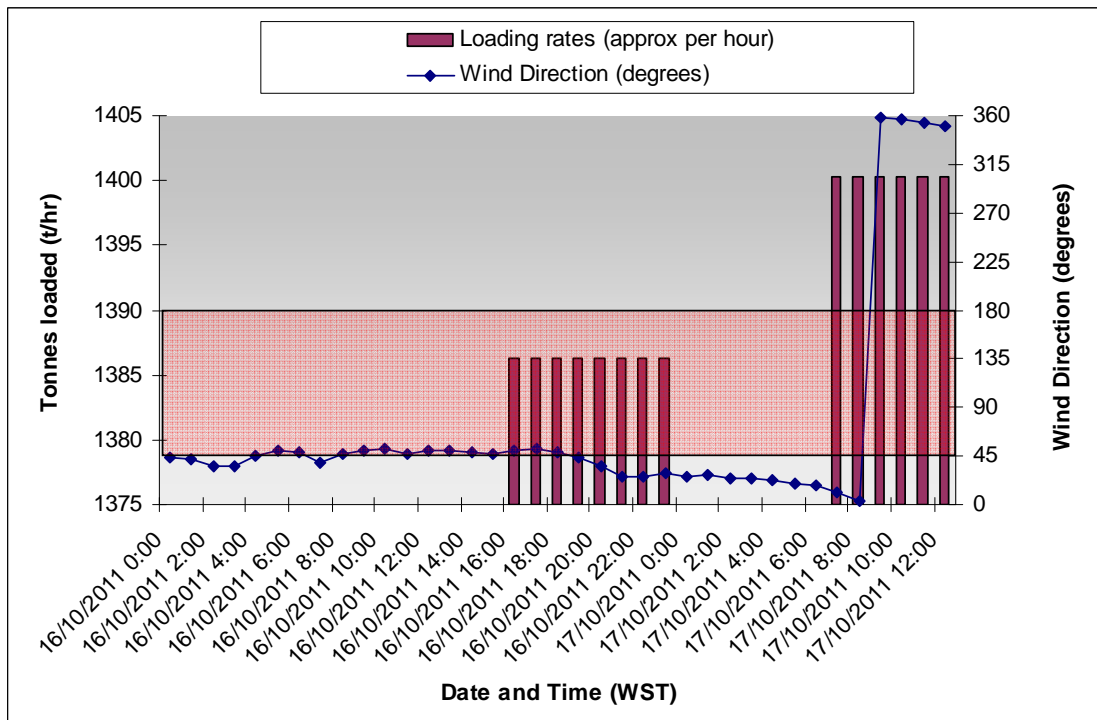


Figure 6. Wind direction and average tonnes barley loaded per hour on Berth 1 between 16th hrs on 17th October 2011.

Exceedance B:

The exceedances at Site 3 are most likely a result of earthworks that were carried out on a driveway next to the air sampler. A bobcat was used to move gravel, sand and blue metal to reset a driveway next to the air sampler (Figure 7). Earthworks were conducted between 17th and 20th October 2011. The wind direction during the exceedance was predominantly from a SW to SSW direction with wind speeds between 5 and 10 m/s. Mobilised particles from around Dempster Head may have also contributed to the TSP. Nickel contributed 0.01% of TSP. Iron contributed 2.2% of the TSP.

Exceedance C:

Similarly, the exceedance between 20th and 21st October 2011 is most likely to be due to the earthworks being conducted at Site 3. As the wind was predominantly in a NE to E direction, mobilised particles from unsealed surfaces of the port and around the CBH lease area may have also contributed to the TSP. Nickel contributed 0.01% of TSP. Iron contributed 1.9% of the TSP.

3. CONCLUSIONS

Exceedance A:

A weight of correlative evidence indicates the exceedances at Sites 3 and 4 on 16th October 2011 are due to grain ship loading. The winds for the majority of the exceedance were in a N to NE direction. Berth 1 is downwind of Site 3 in a NE wind and downwind of Site 4 in a N to NE wind. This exceedance appears to be correlated with PM10 results on the 16th October 2011, as increases in PM10 during the same period, coincide with the ship loading times from Berth 1 barley loading.

Exceedance B and C:

The exceedances at Site 3 on the 18th and 20th October 2011 are most likely a result of earthworks that were carried out on a driveway next to the air sampler. Mobilised particles from Dempster Head may have also contributed to the TSP on the 18th October 2011. Mobilised particles from the unsealed surfaces within the port and from the CBH lease area may have also contributed to the TSP on the 20th October 2011.



Figure 7. Earthworks carried out next to HVAS Site 3.

3.1 Corrective Action

During 2011, CBH have been in the process of setting up a monitoring program to assess the performance of their existing dust controls. These results will inform and will consider plans to expand the technology. EPSL already implements a dust binding agent on unsealed surfaces within the port. No further action can be practically taken by EPSL to further reduce dust from within the port. If earthworks are carried out by the Port near the air quality samplers in the future, the civil works team will inform the Environmental Department before the works commence. Dust suppression measures can then be implemented and DEC informed of a likely dust exceedance.

APPENDIX A MPL LABORATORY REPORT

CERTIFICATE OF ANALYSIS 115849

Client:

Esperance Ports - Sea and Land

PO Box 35

Esperance

WA 6450

Attention: N Norrish

Sample log in details:

Your Reference:

No. of samples:

Date samples received:

Date completed instructions received:

Location:

Dust Analysis

24 High Volume Filters

19/10/11

19/10/11

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

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

Report Details:

Date results requested by:

26/10/11

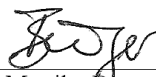
Date of Preliminary Report:

Not issued

Issue Date:

25/10/11

Results Approved By:



Dr Monika Buerger
Supervisor – Micro, Asbestos, Dust

Client Reference: Dust Analysis

Metals in High Volume Filters	UNITS	PQL	115849-1	115849-2	115849-3	115849-4	115849-5
Our Reference:	--	--	EPL155	EPL156	EPL157	EPL158	EPL159
Your Reference	--	--	Site 4	Site 3	Site 2	Site 1	Site 5
Location	--	--	14/10/2011	14/10/2011	14/10/2011	14/10/2011	14/10/2011
Date Sampled							
Dust	mg/filter	0.1	97	100	120	99	84
Dust in Air	µg/m ³	0.1	59	63	71	61	52
Iron	µg/filter	5	310	310	1,100	380	280
Iron in Air	µg/m ³	0.005	0.19	0.19	0.65	0.23	0.17
Nickel	µg/filter	2	<2	<2	5	<2	<2
Nickel in Air	µg/m ³	0.002	<0.002	<0.002	0.003	<0.002	<0.002
Lead	µg/filter	5	<5	<5	<5	<5	<5
Lead in Air	µg/m ³	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Lithium	µg/filter	2	3	3	4	3	3
Lithium in Air	µg/m ³	0.001	0.002	0.002	0.002	0.002	0.002
Sulfur	µg/filter	50	2,300	2,400	2,400	2,200	2,100
Sulfur in Air	µg/m ³	0.02	1.4	1.5	1.4	1.3	1.3
Zinc	µg/filter	5	77	72	88	84	69
Zinc in Air	µg/m ³	0.002	0.050	0.040	0.050	0.050	0.040

Metals in High Volume Filters	UNITS	PQL	115849-6	115849-7	115849-8	115849-9	115849-10
Our Reference:	--	--	EPL160	EPL161	EPL162	EPL163	EPL164
Your Reference	--	--	Blank	Site 4	Site 3	Site 2	Site 1
Location	--	--	15/10/2011	15/10/2011	15/10/2011	15/10/2011	15/10/2011
Date Sampled							
Dust	mg/filter	0.1	2.0	98	80	83	77
Dust in Air	µg/m ³	0.1	[NA]	62	51	49	49
Iron	µg/filter	5	200	[NA]	[NA]	[NA]	[NA]
Nickel	µg/filter	2	<2	[NA]	[NA]	[NA]	[NA]
Lead	µg/filter	5	<5	[NA]	[NA]	[NA]	[NA]
Lithium	µg/filter	2	3	[NA]	[NA]	[NA]	[NA]
Sulfur	µg/filter	50	740	[NA]	[NA]	[NA]	[NA]
Zinc	µg/filter	5	67	[NA]	[NA]	[NA]	[NA]

Metals in High Volume Filters	UNITS	PQL	115849-11	115849-12	115849-13	115849-14	115849-15
Our Reference:	--	--	EPL165	EPL166	EPL167	EPL168	EPL169
Your Reference	--	--	Site 5	Blank	Site 4	Site 3	Site 2
Location	--	--	15/10/2011	16/10/2011	16/10/2011	16/10/2011	16/10/2011
Date Sampled							
Dust	mg/filter	0.1	72	1.9	210	160	120
Dust in Air	µg/m ³	0.1	46	[NA]	130	100	74
Iron	µg/filter	5	[NA]	[NA]	6,800	2,900	[NA]
Iron in Air	µg/m ³	0.005	[NA]	[NA]	4.3	1.9	[NA]
Nickel	µg/filter	2	[NA]	[NA]	27	11	[NA]
Nickel in Air	µg/m ³	0.002	[NA]	[NA]	0.017	0.007	[NA]
Lead	µg/filter	5	[NA]	[NA]	<5	<5	[NA]
Lead in Air	µg/m ³	0.005	[NA]	[NA]	<0.005	<0.005	[NA]

Client Reference: Dust Analysis

Metals in High Volume Filters							
Our Reference:	UNITS	PQL	115849-11	115849-12	115849-13	115849-14	115849-15
Your Reference	--	--	EPL165	EPL166	EPL167	EPL168	EPL169
Location	--	--	Site 5	Blank	Site 4	Site 3	Site 2
Date Sampled			15/10/2011		16/10/2011	16/10/2011	16/10/2011
Lithium	µg/filter	2	[NA]	[NA]	4	5	[NA]
Lithium in Air	µg/m ³	0.001	[NA]	[NA]	0.003	0.003	[NA]
Sulfur	µg/filter	50	[NA]	[NA]	4,100	2,600	[NA]
Sulfur in Air	µg/m ³	0.02	[NA]	[NA]	2.7	1.6	[NA]
Zinc	µg/filter	5	[NA]	[NA]	95	87	[NA]
Zinc in Air	µg/m ³	0.002	[NA]	[NA]	0.060	0.060	[NA]

Metals in High Volume Filters							
Our Reference:	UNITS	PQL	115849-16	115849-17	115849-18	115849-19	115849-20
Your Reference	--	--	EPL170	EPL171	EPL172	EPL173	EPL174
Location	--	--	Site 1	Site 5	Blank	Site 4	Site 3
Date Sampled			16/10/2011	16/10/2011		17/10/2011	17/10/2011
Dust	mg/filter	0.1	120	130	4.3	73	130
Dust in Air	µg/m ³	0.1	76	84	[NA]	48	87
Iron	µg/filter	5	[NA]	[NA]	[NA]	550	2,400
Iron in Air	µg/m ³	0.005	[NA]	[NA]	[NA]	0.37	1.6
Nickel	µg/filter	2	[NA]	[NA]	[NA]	3	11
Nickel in Air	µg/m ³	0.002	[NA]	[NA]	[NA]	<0.002	0.008
Lead	µg/filter	5	[NA]	[NA]	[NA]	<5	6
Lead in Air	µg/m ³	0.005	[NA]	[NA]	[NA]	<0.005	<0.005
Lithium	µg/filter	2	[NA]	[NA]	[NA]	3	5
Lithium in Air	µg/m ³	0.001	[NA]	[NA]	[NA]	0.002	0.003
Sulfur	µg/filter	50	[NA]	[NA]	[NA]	2,400	2,500
Sulfur in Air	µg/m ³	0.02	[NA]	[NA]	[NA]	1.6	1.6
Zinc	µg/filter	5	[NA]	[NA]	[NA]	82	93
Zinc in Air	µg/m ³	0.002	[NA]	[NA]	[NA]	0.050	0.060

Client Reference: Dust Analysis

Metals in High Volume Filters							
Our Reference:	UNITS	PQL	115849-21	115849-22	115849-23	115849-24	115849-25
Your Reference	--	--	EPL175	EPL176	EPL177	EPL178	Lab Blank
Location	--	--	Site 2	Site 1	Site 5	Blank	
Date Sampled			17/10/2011	17/10/2011	17/10/2011		
Dust	mg/filter	0.1	83	65	65	4.4	[NA]
Dust in Air	µg/m ³	0.1	51	43	43	[NA]	[NA]
Iron	µg/filter	5	1,500	470	450	200	220
Iron in Air	µg/m ³	0.005	0.94	0.31	0.30	[NA]	[NA]
Nickel	µg/filter	2	8	<2	<2	<2	<2
Nickel in Air	µg/m ³	0.002	0.005	<0.002	<0.002	[NA]	[NA]
Lead	µg/filter	5	<5	<5	<5	<5	<5
Lead in Air	µg/m ³	0.005	<0.005	<0.005	<0.005	[NA]	[NA]
Lithium	µg/filter	2	4	3	3	3	3
Lithium in Air	µg/m ³	0.001	0.002	0.002	0.002	[NA]	[NA]
Sulfur	µg/filter	50	2,200	2,000	2,000	730	810
Sulfur in Air	µg/m ³	0.02	1.4	1.3	1.3	[NA]	[NA]
Zinc	µg/filter	5	88	75	73	65	77
Zinc in Air	µg/m ³	0.002	0.050	0.050	0.050	[NA]	[NA]

MethodID	Methodology Summary
DUST-004	Airborne samples analysed according to AS 2985 for Respirable Dust or AS 3640 for Inhalable Dust . Sample results based on volume data supplied by client. Samples tested as received, *accreditation does not cover sampling.
METALS-020	Metals in soil and water by ICP-OES.

Report Comments:

INS: Insufficient sample for this test; NT: Not tested; PQL: Practical Quantitation Limit; <: Less than; >: Greater than
RPD: Relative Percent Difference; NA: Test not required; LCS: Laboratory Control Sample; NR: Not requested
NS: Not specified; NEPM: National Environmental Protection Measure
DOL: Sample rejected due to particulate overload

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD a matrix spike recoveries for the sample batch were within laboratory acceptance criteria.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spike and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and Speciated Phenols is acceptable.

Surrogates: 60-140% is acceptable for general organics and 10-140% for SVOC and Speciated Phenols.



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1. INTRODUCTION

On the 27th October 2011, the Esperance Ports Sea and Land (EPSL) became aware of laboratory results detailing dust (measured as Total Suspended Particles) exceeding the license criteria (refer to Table 1). Consistent with the latest Licence (L5099/1974/13) issued on the 24th February 2011 (amended 28th July 2011) requirement of Condition 9, this requires an exceedance report to be submitted to the DEC, within seven working days (24th October 2011).

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Silica in air	5 µg/m ³

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Measured Total Suspended Particulate (TSP) concentrations exceeded the license (L5099/1974/13) target (Table 1) for TSP. The recorded TSP at the monitoring sites (refer to Figure 1) for exceedance periods A, B and C are as follows:

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- Site 3: 100 ug/m³
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- Site 3: 110 ug/m³

Exceedance Period C (between 1305 on 20/10/2011 and 1252 on 21/10/2011)

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Note: to reflect the practical reporting errors, values exceeding 100 ug/m³ are rounded to the nearest 10 ug/m³ by MPL analytical laboratory.



Figure 1. Location of Air Quality Monitoring Stations

2.1 Port Activities

The following Port activities occurred during the monitoring period:

Exceedance A:

- China Progress was alongside Berth 3 between 2258 on 14th October 2011 and 1006 on 18th October 2011 being loaded with iron ore.
- Pioneer was alongside Berth 2 between 0806 15th October 2011 and 1642 on 16th October 2011 being unloaded with empty containers and loaded with full containers.
- Agios Nikolas was alongside Berth 1 between 1430 on 16th October 2011 and 1752 on 17th October 2011 being loaded with barley.
- 36,201 tonnes of iron ore averaged across 4 trains; and
- 158 tonnes of nickel concentrate across 2 trucks.

Exceedance B:

- Aquabella was alongside Berth 3 between 1200 18th October 2011 and 1650 on 21st October 2011 being loaded with iron ore;
- 18,437 tonnes of iron ore averaged across 2 trains;
- 145 tonnes nickel concentrate across 2 trucks; and
- 790 tonnes of sulphur was out-loaded across 10 trucks.

Exceedance C:

- Aquabella was alongside Berth 3 between 1200 18th October 2011 and 1650 on 21st October 2011 being loaded with iron ore;
- 159 tonnes of nickel concentrate across 2 trucks; and
- 948 tonnes of sulphur was out-loaded across 12 trucks.

2.2 Meteorological Activities

The wind directions for the 24 hour period in which the exceedance occurred are as follows:

Exceedance A: winds were in a wind arc from NNW (3%), N (20%), NNE (46%) and NE (31%) (Figure 2). The maximum hourly average wind speed of 15.5 m/s (30 knots) was recorded from the north (356 degrees) between 1000 and 1100 on 17th October 2011. The 'Beaufort Wind Force Scale' is a measure of understanding wind speeds in descriptive terminology. A wind speed of 30 knots is described as a 'near gale' winds (28-33 knots) (BOM, 2011).

Exceedance B: winds were mainly (68%) offshore being from the south to south west, the remaining winds were distributed from NNE (1%), N (3%), NNW (3%), NW (4%), WNW (6%), W (5%), WSW (2%), S (6%) and SSE (2%) (Figure 3). The maximum hourly average wind speed of 7.6 m/s (15 knots) was recorded from the SSW between 0000 and 0100 hours on the 19th October 2011. A wind speed of 15 knots is described as a 'moderate breeze' (11-16 knots) (BOM, 2011).

Exceedance C: winds were mainly onshore in the NE to SSE wind arc (93%). The remaining winds were from NNW (1%), N (4%) and NNE (1%) (Figure 4). The maximum hourly average wind speed of 8.6 m/s (17 knots) was recorded from the SE between 1500 and 1600 hours on the 20th October 2011. A wind speed of 17 knots is described as a 'fresh winds' (17-21 knots) (BOM, 2011).

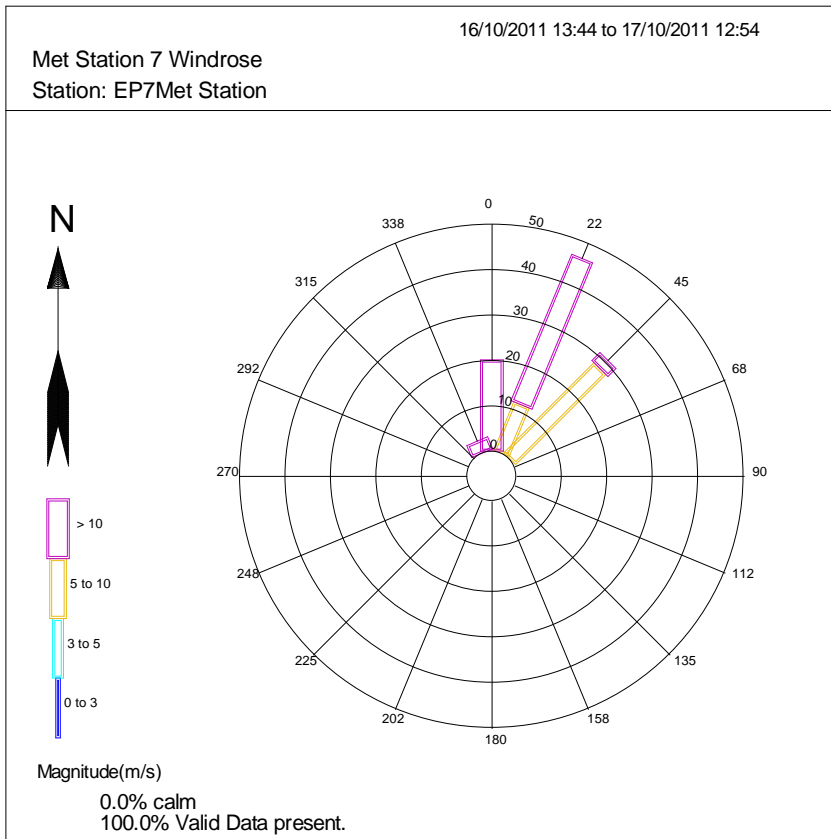


Figure 2: Exceedance A - Windrose for the monitoring period 1344 on 16/10/2011 to 1254 on 17/10/2011. Raw data source: EP7 monitoring station, Berth 3.

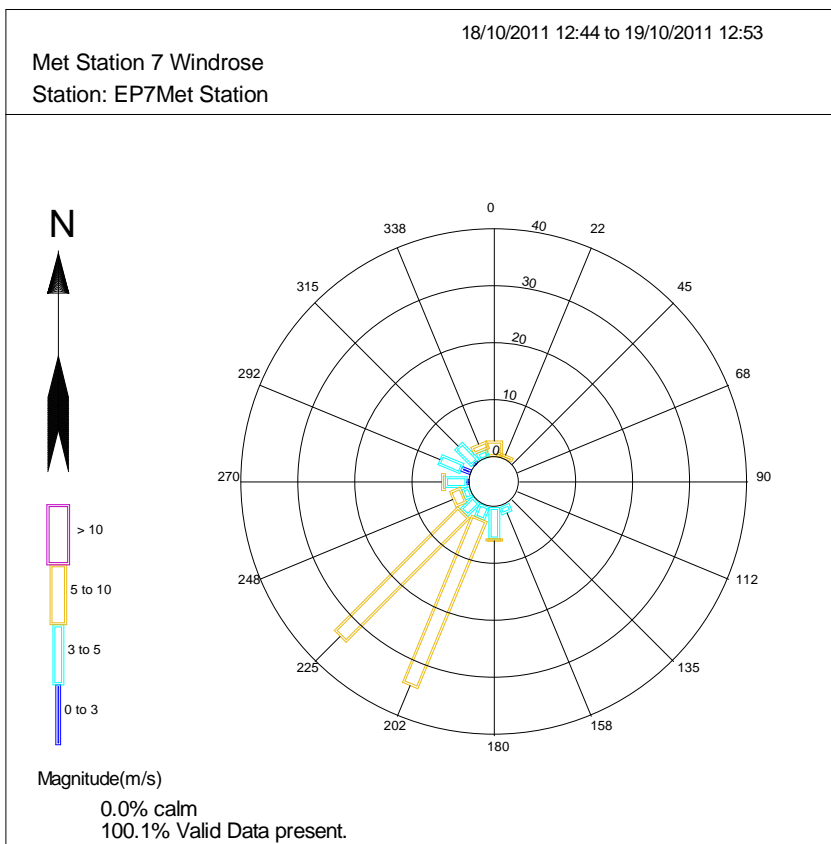


Figure 3. Exceedance B – Windrose between 1244 on 18/10/2011 and 1253 19/10/2011. Raw data source: EP7 monitoring station, Berth 3.

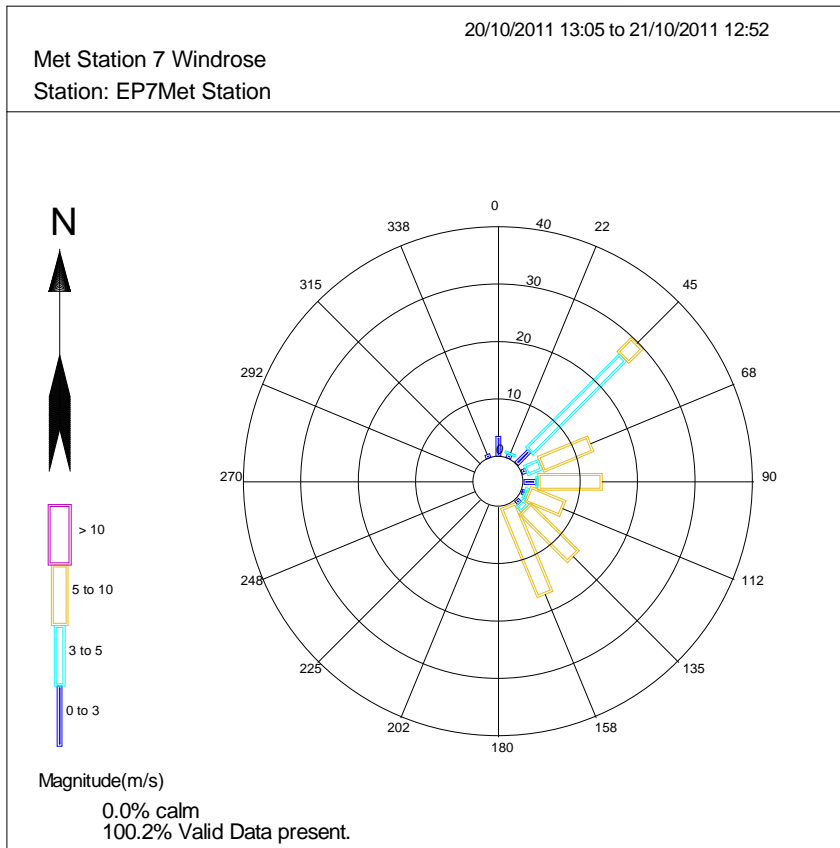


Figure 4. Exceedance C – Windrose between 1305 on 20/10/2011 and 1252 21/10/2011. Raw data source: EP7 monitoring station, Berth 3.

2.3 Reason for exceedance

Exceedance A:

The exceedance between 16th and 17th October 2011 at Sites 3 and 4 was probably due to grain loading activities on Berth 1 based on correlations between the activity, wind direction and dust levels. Barley loading at Berth 1 began at 1618 hours on the 16/10/2011 and finished at 2337 hours on the 16/10/2011. Sites 3 and 4 were downwind (N to NE winds) of grain loading operations for the majority of the exceedance period.

Although grain dust is mainly consists of large (>10 μm) dust particulate, a PM10 exceedance occurred for this same period at site 4, with levels at site 3 also elevated but not in exceedance of the licence criteria. The peaks in PM10 measured in real time occurred just after grain loading commenced and decreased after it stopped. This PM10 exceedance report has already been submitted to the DEC.

Further evidence of correlations between Berth 1 activity and levels of TSP is provided by real time data from measured at E Sampler 6 which is located between Berth 1 and Site A clear correlation is shown between barley loading times and increases in hourly TSP from E Sampler 6 (Figure 5). During the first loading period, which commenced on 16th October

at 1618, the TSP increases as the winds turn towards a NNE direction. A decrease in TSP corresponds with the end of the ship loading period at 2337, consistent with the PM10 correlation. During the second loading time, commencing on 17th October at 0716, a corresponding TSP increase also occurred. During this time winds reached >10 m/s from 33° to 235° direction (Figure 6). Therefore, a weight of evidence suggests grain loading is the likely source of the TSP exceedance.

Nickel contributed 0.01% of the TSP and iron contributed only 3.3% of the TSP. Iron (3.3% Fe in TSP) and nickel (0.01% Ni in TSP) representing the prescribed bulk products handled by EPSL and as is normally found together they contributed a small proportion (<4%) of the overall dust.

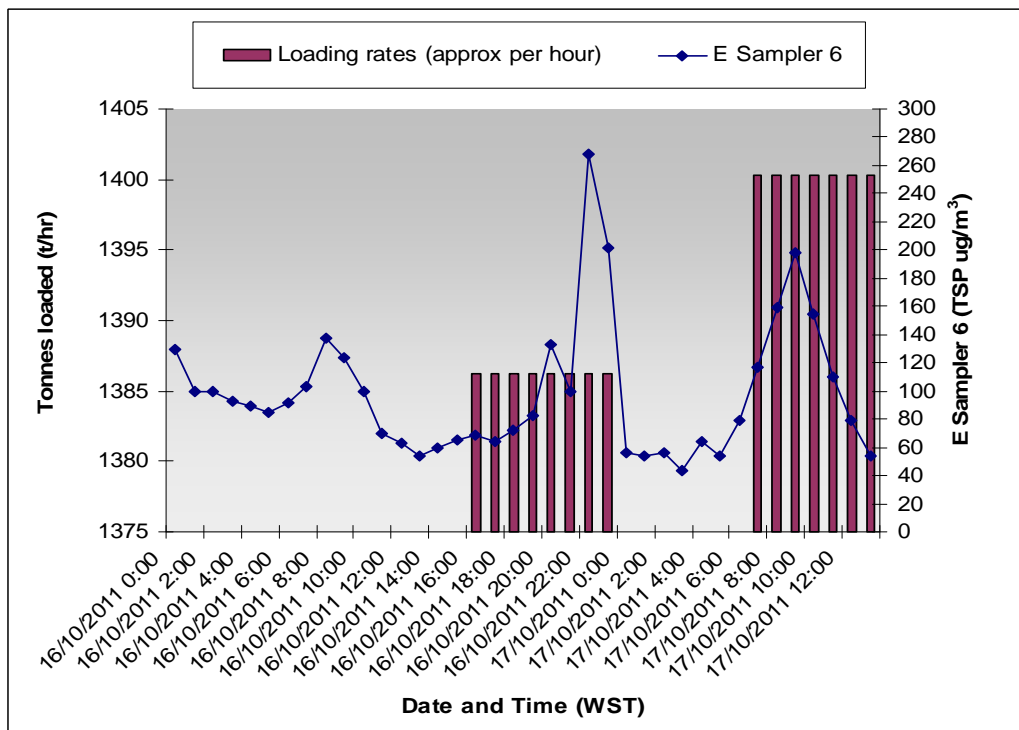


Figure 5. Hourly TSP data from E Sampler 6 and average tonnes of barley loaded per hour from Berth 1 between 16th October and 17th October 2011.

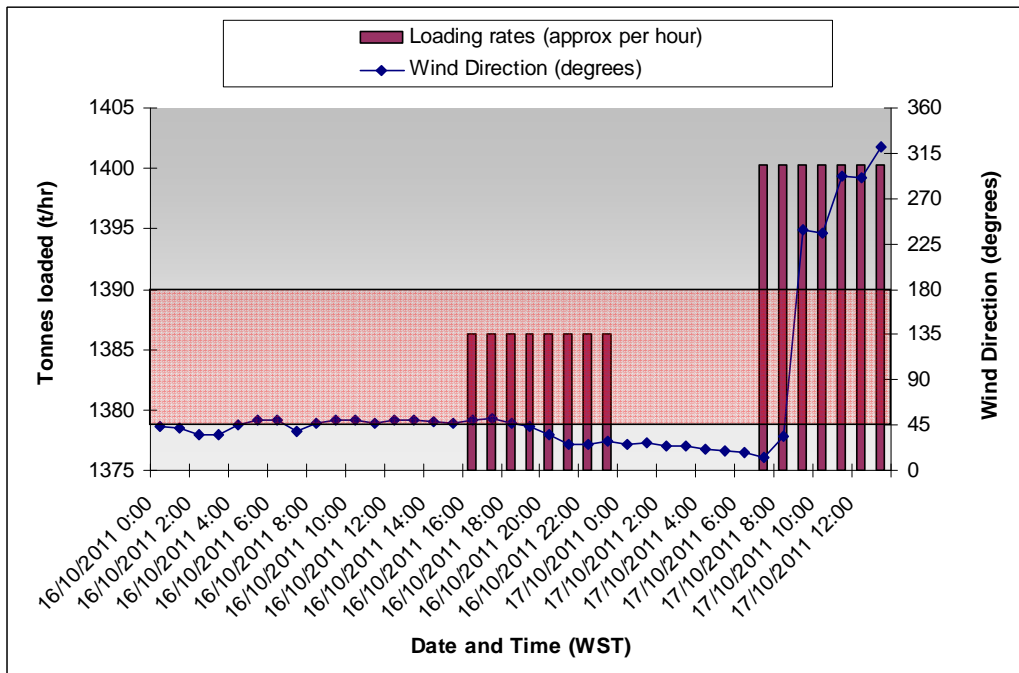


Figure 6. Wind direction and average tonnes barley loaded per hour on Berth 1 between 16th and 17th October 2011.

Exceedance B:

The exceedances at Site 3 are most likely a result of earthworks that were carried out on a driveway next to the air sampler. A bobcat was used to move gravel, sand and blue metal to reset a driveway next to the air sampler (Figure 7). Earthworks were conducted between 17th and 20th October 2011. The wind direction during the exceedance was predominantly from a SW to SSW direction with wind speeds between 5 and 10 m/s. Mobilised particles from around Dempster Head may have also contributed to the TSP. Nickel contributed 0.01% of TSP. Iron contributed 2.2% of the TSP.

Exceedance C:

Similarly, the exceedance between 20th and 21st October 2011 is most likely to be due to the earthworks being conducted at Site 3. As the wind was predominantly in a NE to E direction, mobilised particles from unsealed surfaces of the port and around the CBH lease area may have also contributed to the TSP. Nickel contributed 0.01% of TSP. Iron contributed 1.9% of the TSP.

3. CONCLUSIONS

Exceedance A:

A weight of correlative evidence indicates the exceedances at Sites 3 and 4 on 16th October 2011 are due to grain ship loading. The winds for the majority of the exceedance were in a N to NE direction. Berth 1 is downwind of Site 3 in a NE wind and downwind of Site 4 in a N to NE wind. This exceedance appears to be correlated with PM10 results on the 16th October 2011, as increases in PM10 during the same period, coincide with the ship loading times from Berth 1 barley loading.

Exceedance B and C:

The exceedances at Site 3 on the 18th and 20th October 2011 are most likely a result of earthworks that were carried out on a driveway next to the air sampler. Mobilised particles from Dempster Head may have also contributed to the TSP on the 18th October 2011. Mobilised particles from the unsealed surfaces within the port and from the CBH lease area may have also contributed to the TSP on the 20th October 2011.



Figure 7. Earthworks carried out next to HVAS Site 3.

3.1 Corrective Action

During 2011, CBH have been in the process of setting up a monitoring program to assess the performance of their existing dust controls. These results will inform and will consider plans to expand the technology. EPSL already implements a dust binding agent on unsealed surfaces within the port. No further action can be practically taken by EPSL to further reduce dust from within the port. If earthworks are carried out by the Port near the air quality samplers in the future, the civil works team will inform the Environmental Department before the works commence. Dust suppression measures can then be implemented and DEC informed of a likely dust exceedance.

APPENDIX A MPL LABORATORY REPORT