

Dust Management Plan – 2013

Pilbara Port Operations

June 2013

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1 Introduction

1.1 Project Background

Rio Tinto Iron Ore (RTIO) operates iron ore receiving, processing, stockpiling and exporting facilities at the Parker Point, East Intercourse Island and Cape Lambert port facilities (herein referred to as the Pilbara Port Operations). Townships in proximity to Pilbara Port Operations are Karratha, Dampier, Point Samson, Wickham and Roebourne. Parker Point and East Intercourse Island terminals are located adjacent to the township of Dampier and approximately 19 kilometres (km) east of Karratha. The Cape Lambert terminal is located 3.5 km northeast of Point Samson, approximately 7 km north of Wickham and 19 km north of Roebourne. In 2011, a combined total of 225.3 million tonnes of iron ore was shipped by the Pilbara Port Operations.

The Dampier Port Operations Dust Management Plan (DMP) was initially developed in accordance with specific conditions in the 2003-2004 Department of Environment and Conservation (DEC) Environmental Licence to Operate for the Parker Point (4542/10) and East Intercourse Island (6951/11) terminals. However, these conditions have since been removed by the DEC and requirements to update and review the DMP annually are now listed within Ministerial Statement 770 (*Ministerial Statement No. 000770- Hamersley Iron Dampier Port upgrade to a throughput capacity of 145 million tonnes per annum*). The first DMP was prepared and issued to the DEC in August 2002. Reviews of the DMP were undertaken and submitted in subsequent years, with the most recent plan submitted in December 2010.

In December 2002, the first externally available Cape Lambert DMP was submitted to the DEC in accordance with the Environmental Licence to Operate L5278/1973. Requirements to submit a DMP were removed from this licence and are now listed within Ministerial Statement 741 (*Ministerial Statement No. 000741- Cape Lambert Port Upgrade – increase in throughput to 85 million tonnes per annum*). The Cape Lambert DMP has been reviewed and submitted annually since 2002, with the most recent Plan submitted in December 2010.

In September 2010 the Cape Lambert Port B (CLB) development was approved pursuant to Ministerial Statement 840 (*Ministerial Statement No. 000840- Cape Lambert Port B Development –process and export 130 million tonnes of iron ore per annum*). The CLB development is being constructed in two phases, namely A and B, and commissioning for each of these phases is planned to occur in approximately Q3 2013 and Q4 2014 respectively. Prior to commissioning activities, Condition 10-1 of Ministerial Statement 840 requires the Cape Lambert DMP to be revised to include CLB dust management measures.

Historically the Dampier and Cape Lambert Operations have had individual DMPs. However, in 2010 the decision was made to amalgamate these management plans into one Pilbara Port Operations DMP that covers the three terminals. This document represents the third combined DMP for the Pilbara Port Operations, and is the first DMP version to include Cape Lambert Port B dust management requirements.

1.2 Purpose and Scope

Rio Tinto Iron Ore recognise that the Pilbara Port Operations can result in the generation of dust, and in combination with naturally occurring background levels, have the potential to impact on the local environment and surrounding communities. This includes the townships of Dampier and Point Samson, and the King Bay Industrial Area.

This DMP is intended to provide a reproducible and consistent approach for dust management, with the aim of continuously reducing levels of fugitive dust generated by the East Intercourse Island (EII), Parker Point and Cape Lambert terminals. It describes the dust management approach that Rio Tinto will implement to manage and reduce dust impacts from Pilbara Port Operations.

Specifically, this DMP addresses the following:

- the process for developing the DMP;
- identification of dust sources and the dust control equipment and management practices in place to minimise the generation of dust;
- details of the Port Operations dust monitoring program, including dust monitoring locations;
- identification of regulatory guidelines and compliance criteria;
- the methodology for determining Rio Tinto's contribution to dust impacts on the townships of Dampier and Point Samson, and the King Bay Industrial Area;
- outlining specific accountabilities for Rio Tinto employees and contractors in relation to dust management; and
- outlining the internal and external communication and reporting procedures relating to dust management activities, including incidents.

1.3 Legal Requirements

The Pilbara Port Operations have undergone significant expansions in recent years, including:

- 2007: environmental approval was granted to increase the capacity of the Cape Lambert Port A terminal to 85 million tonnes per annum (mtpa) under Ministerial Statement 741;
- 2008: environmental approval was granted to increase the capacity of the Dampier terminals to 145 mtpa under Ministerial Statement 770;
- 2010: environmental approval was granted to construct Cape Lambert Port B, which has up to a 130 mtpa capacity, under Ministerial Statement 840. Cape Lambert Port B is still under construction; commissioning is planned for approximately Q3 2013 and Q4 2014.

This DMP has been reviewed and prepared in accordance with current relevant legislation and guidelines, including the following:

- conditions 6.1-6.12, of the Dampier Ministerial Statement 770;
- schedules 2 and 3 of the Dampier Ministerial Statement 770;
- conditions 6.1-6.4 and 7.1-7.4 of the Cape Lambert Ministerial Statement 741;

- schedules 2 and 3 of the Cape Lambert Ministerial Statement 741;
- conditions 10.1-10.4 of Cape Lambert Port B Ministerial Statement 840.

These conditions are detailed in Appendix 1 along with an outline of where the conditions are addressed within this document.

1.4 Definitions

Dust is considered to be any particle suspended within the atmosphere, and is generally comprised of fine, airborne particles of earth or pollen material. Monitoring equipment used to measure dust may also include in their measurement smoke particles, salt, and other aerosols suspended in the air.

Particles are typically classified on the basis of their size, referred to as their “aerodynamic diameter”. Particulate Matter (PM) less than 50 micrometres (μm) are referred to as Total Suspended Particulates (TSP), while finer dust particles less than 10 μm and 2.5 μm in diameter are referred to as PM_{10} and $\text{PM}_{2.5}$ respectively.

Total Suspended Particulates is associated with the potential for nuisance or loss of amenity, while PM_{10} and $\text{PM}_{2.5}$ are associated with potential adverse health effects. PM_{10} particles are typically inhaled through the nose and mouth, and deposited in the trachea and bronchia section of the lungs. Respirable dust represents $\text{PM}_{2.5}$ particles, which have the potential to penetrate more deeply into the lungs.

1.5 Dust Criteria

There are no single standards or limits for airborne dust universally applied throughout Western Australia. Environmental criteria that are available for use include:

- The *Environmental Protection (Kwinana Atmospheric Wastes) Policy 1992*, which has specified levels of pollutants (including particulates) for defined zones around the Kwinana Industrial Area as shown in Table 1; and
- *National Environment Protection Council (NEPC)* health-based ambient air quality standards for six pollutants, including particles as PM_{10} . A summary of these are outlined in Table 1.

Table 1: Environmental criteria for airborne dust available for use in Western Australia

Particle size	Averaging time	Concentration (µg/m³)	Frequency	Reference
TSP	15 mins	1000	Not to be exceeded	Policy area ^(a)
	24 hours	260	Not to be exceeded	Area A (central industrial area) ^(a)
		150	Desirable not to be exceeded	
	24 hours	260	Not to be exceeded	Area B ('Transition Area' – some residential) ^(a)
		90	Desirable not to be exceeded	
	24 hours	150	Not to be exceeded	Area C (residential) ^(a)
		90	Desirable not to be exceeded	
PM ₁₀	24 hours	50	Not more than 5 days a year	NEPM for Ambient Air ^(b)
PM _{2.5}	24 hours	25	Goal is to gather sufficient data nationally to facilitate a review of the Advisory Reporting Standards as part of the review of this Measure scheduled to commence in 2008	
	1 year	8		

^{a)} *Environmental Protection (Kwinana) (Atmospheric Wastes) Policy 1992 and Environmental Protection (Kwinana) (Atmospheric Wastes) Regulations 1992.*

^(b) National Environment Protection Council (NEPC), 1998, National Environment Protection Measure (NEPM) for Ambient Air Quality, 26 June 1998 and Variation dated 23 May 2003.

From the *Environmental Protection (Kwinana) (Atmospheric Wastes) Policy 1992* and *Environmental Protection (Kwinana) (Atmospheric Wastes) Regulations 1992*, the TSP criteria for Area A is considered relevant to the King Bay Industrial Area.

1.6 Climate

The Pilbara Port Operations lie within the Australian arid (subtropical) climatic zone, characterised by low and variable rainfall (average 261 mm per year), high daily temperatures, high diurnal variability and high evaporation rates (approx. 3400 mm per year). The area may experience tropical cyclones during the summer months resulting in recorded wind speeds of up to 250 km/hour with heavy swells and torrential rain. On average two to three cyclones cross the Pilbara Coast per year.

The risk of dust impacts from the Pilbara Port Operations on local communities changes seasonally due to the seasonal pattern of wind directions in the area. The cooler months, particularly May to August are generally characterised by light to moderate easterlies and south easterlies (Figure 4 & Figure 8). The summer months, November to February, are dominated by westerly and north-westerly winds which tend to be moderate to strong in the afternoons (Figure 2 & Figure 6). Calm conditions or light winds are common in the morning throughout the year but are infrequent during the afternoon.

Figures 1 to 8 below illustrate the seasonal wind roses at the Dampier and Cape Lambert terminals during 2011 and 2012. The wind roses provide a graphical representation of the frequency distribution of winds of varying strength, from all compass points.

September 2011 – November 2011

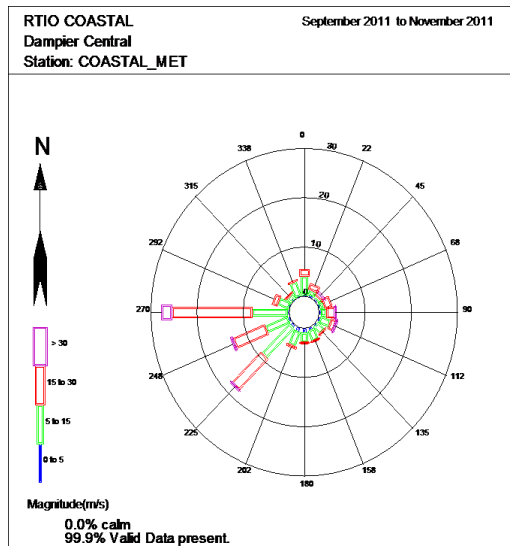


Figure 1. Spring wind rose for Dampier (September 2011 – November 2011)

December 2011 – February 2012

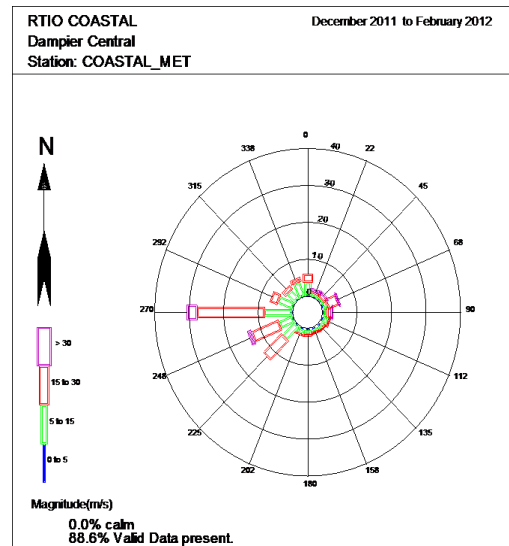


Figure 2. Summer wind rose for Dampier (December 2011 – February 2012)

March 2012 – May 2012

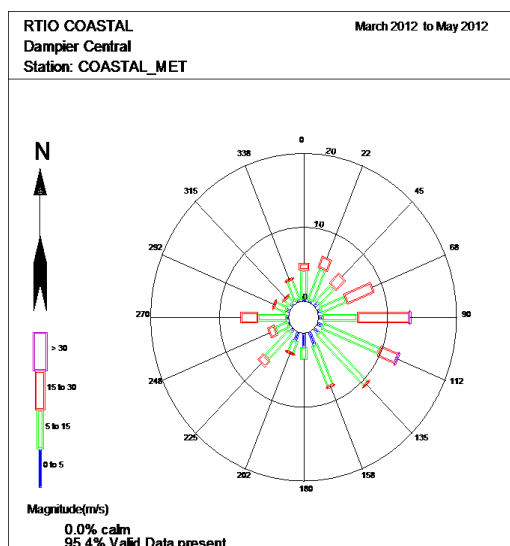


Figure 3. Autumn wind rose for Dampier (March 2012 – May 2012)

June 2012 – August 2012

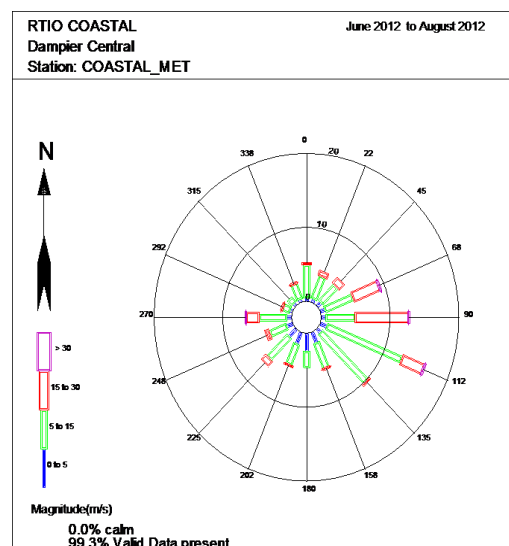


Figure 4. Winter wind rose for Dampier (June 2012 – August 2012)

September 2011 – November 2011

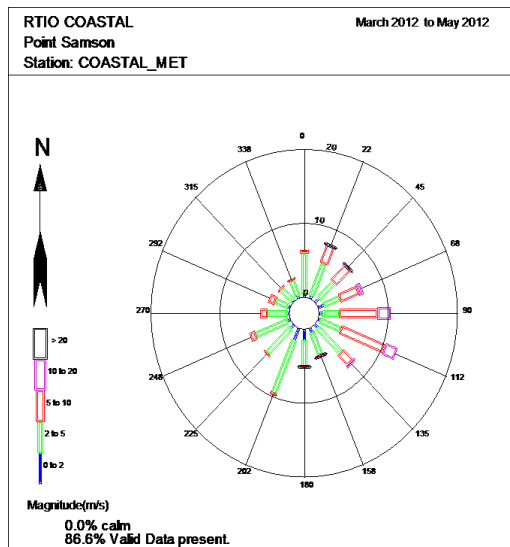


Figure 5. Spring wind rose for Cape Lambert MET Station (September 2011 – November 2011)

December 2011 – February 2012

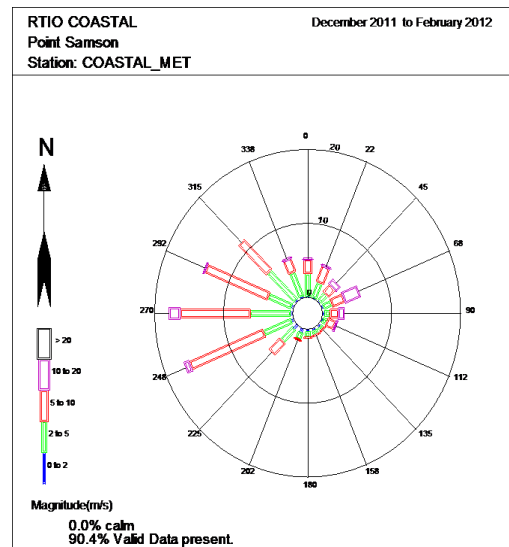


Figure 6. Summer wind rose for Cape Lambert MET Station (December 2011 – February 2012)

March 2012 – May 2012

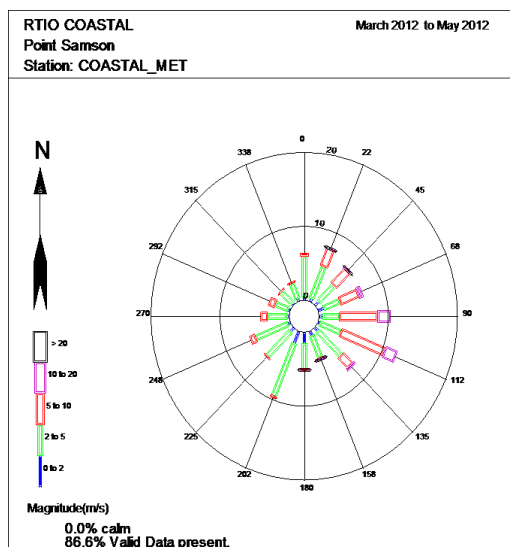


Figure 7. Autumn wind rose for Cape Lambert MET Station (March 2012 – May 2012)

June 2012 – August 2012

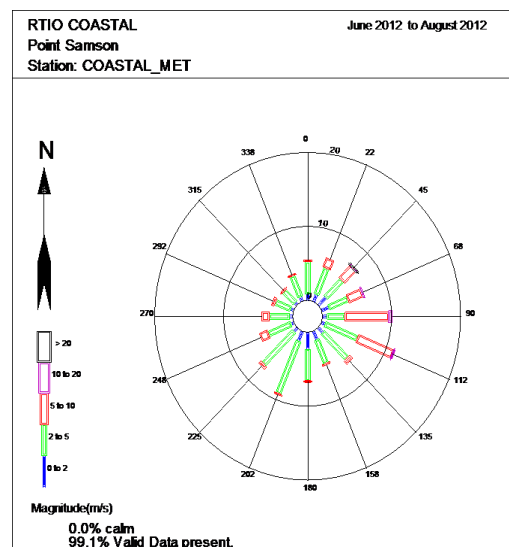


Figure 8. Winter wind rose for Cape Lambert MET Station (June 2012 – August 2012)

2 Health, Safety, Environment and Quality Management System

This DMP is intended to provide a reproducible and consistent approach for managing dust generated by the Rio Tinto Pilbara Port Operations, with the aim of achieving the Plan's objectives and the Rio Tinto Environmental Policy (available publically at http://www.riotintoironore.com/ENG/resources/104_720.asp). The DMP forms a part of the Rio Tinto Health, Safety, Environment & Quality Management System (HSEQMS).

On an annual basis as part of the HSEQ review process, senior management, operational, and environmental personnel review and update the site environmental risk register, and outline dust management objectives and targets.

Environmental Improvement Plans (EIP) and Action Management Plans (AMP) are then formulated to meet the objectives and targets and address significant environmental risks. EIP actions cover all areas of the operation, with specific EIPs dedicated to dust improvement (Dust Improvement Plans, or DIPs). The following section details the HSEQ system, and describes how the planning, checking, implementation and review processes interact.

2.1 Environmental Risk Assessment

2.1.1 Environmental Risk Register

During the risk register review, significant risks with an existing Environmental Improvement Plan action are not reviewed, as the actions are still planned for completion. Significant risks with a completed EIP from the previous year are reassessed to check the effectiveness of the EIP in reducing the residual risk. The risk assessment team considers the following when reviewing the environmental risk register:

- changes or additions to site activities and processes;
- performance against previous years EIP actions;
- new or changed legislation;
- community and government feedback;
- monitoring results;
- status of corrective actions from internal and external inspection and audit findings;
- recent history of environmental incidents on site; and
- existing operational controls.

2.1.2 Dust Risk Registers

A dust risk register for both the Dampier (East Intercourse Island and Parker Point) and Cape Lambert terminals has been developed and is reviewed annually, in line with the corresponding site Environmental Risk Registers. The dust risk register is included in Appendix 2 and incorporates the following:

- a. work area;

- b. risk category (Community Impact or Environmental);
- c. scenario description and responsible scenario owner;
- d. cause description;
- e. impact description;
- f. inherent risk rating;
- g. current controls (physical, procedural or behavioural) and description of these; and
- h. current risk rating (low, moderate, high or critical) on implementation of listed controls.

2.2 Objectives and Targets

2.2.1 Setting Objectives and Targets

The setting of objectives and targets is an important step in the continuous improvement process. Objectives are goals that an organisation sets itself to achieve, while a target is a detailed performance requirement, quantified and measurable, that is set to achieve those objectives.

The Pilbara Port Operations General Manager, in consultation with the Superintendent Environment and operational staff, set and approve dust management objectives and targets that the Pilbara Port Operations plan to meet over the reporting period.

In setting dust management objectives and targets, the following is considered:

- risks identified in the Dust Risk Register;
- legal compliance issues;
- audit findings and corrective actions;
- stakeholder complaints and views;
- technological options; and
- financial, operational, and business requirements.

2.2.2 2013 Objectives and Targets

Table 2: 2013 Objectives and Targets outlines the dust management plan objectives and targets for the reporting period, as approved by the Pilbara Port Operations General Manager.

Table 2: 2013 Objectives and Targets

DMP Objective #	Objective	Targets
1	Achieve a reduction in dust from Rio Tinto's Pilbara Port Operations impacting on the towns of Dampier and Point Samson, and the King Bay	1.1 – Zero TSP exceedences of 150 µg/m³ over a 24 hour period as measured at the King Bay Industrial Area dust monitoring station attributable to Rio Tinto's Operations^(a). 1.2 – Zero TSP exceedences of 150 µg/m³ over a 1 hour period as measured at the Dampier Primary School (Dampier Central) and King Bay Industrial Area

	Industrial Area.	monitoring stations, attributable to Rio Tinto's Operations^(a). 1.3 – Zero TSP exceedences of 200 µg/m³ over a 10 minute period as measured at the Point Samson TEOM dust monitoring station, attributable to Rio Tinto's Operations^(a). 1.4 – Zero PM₁₀ exceedences of 50 µg/m³ over a 24 hour period as measured at the Dampier Primary School and Point Samson TEOM monitoring stations, attributable to Rio Tinto's Operations^(a).
2	Ensure dust management practices meet legal requirements and stakeholder expectations.	2.1 – Meet all ministerial conditions relating to dust management at all times. 2.2 – Implement all actions that are agreed to in community meetings, Coastal Community Environment Forum (CCEF) meetings, and discussions between the Pilbara Port Operations Manager and community members.
3	Ensure communication channels between stakeholders and Rio Tinto are maintained	3.1 – Respond to all external dust complaints 3.2 – Hold a minimum of two CCEF meetings during the reporting period 3.3 – Advertise the availability of the Rio Tinto 1800 number through local print media on a regular basis 3.4 – Communicate monitoring data available to local communities via the internet

(a) See Section 4 for the methodology for calculating Rio Tinto's contribution to dust levels in the Dampier, Point Samson and King Bay Industrial Area.

2.3 Dust Improvement Plan (DIP)

2.3.1 Developing the Dust Improvement Plan

Once the environmental and dust risk registers have been reviewed, and objectives and targets have been defined, Environmental Improvement Plans are then formulated through a consultative process between environmental, senior management, and operations personnel. Environmental Improvement Plans cover all areas of the Operation, with specific EIPs dedicated to dust improvement (Dust Improvement Plans). The DIPs outline how the Pilbara Port Operations will meet the endorsed objectives and targets, and address high risk areas identified in the environmental and dust risk registers.

Progress on the DIPs are tracked at monthly Environmental Performance Review Meetings (see **Section 8.1.4**). Additional improvement actions that are undertaken during the reporting year are tracked in the same forum. The DIP is aligned with the Operations budgeting cycle to ensure adequate financial and human resources are allocated.

In previous years as part of the expansions undertaken at the Pilbara Port Operations, considerable capital works have been undertaken to install new dust controls, and improve existing controls. During 2011 the internal dust monitoring network for Cape Lambert and Dampier Operations have been upgraded. Previously used dust scans have been replaced with E-samplers and data communication has been integrated with the operational control system. The dust monitors are spatially arranged in such a way that they allow boundary monitoring. Elevated dusts level can thus be detected at site boundaries long before they reach any communities. This system aims at early detection of elevated dust levels allowing earlier and more targeted activation of dust suppression measures leading to impact reduction. Additional dust monitors have been installed at the contractor camps (Kangaroo Hill, Dampier and at Cape Lambert). Also the dust monitoring station at Karratha was relocated in 2011 to a more effective position. The locations of dust monitors are detailed in Appendix 4.

In 2012 a Predictive Dust Modelling System for Parker Point and East Intercourse Island was implemented. The model has improved dust management strategies at the sites by providing Rio Tinto Port Operations personnel with capability to predict potential impacts up to 48 hours in advance and respond to control dust emissions at an earlier stage to avoid causing an impact.

The DIPs for 2012 are detailed in Appendix 3. The 2013 DIP's are currently under development.

3 Dust Control Strategies

3.1 Sources of Dust

Dust is primarily generated from the infrastructure involved in the various stages of in-loading, processing, stockpiling and out-loading of iron ore at the Ports. Table 3 details the most common sources of dust generation at the Pilbara Port Operations

Table 3: Sources of dust generated on-site

Dust generated from	Sources
Plant and Equipment	Conveyors, car dumpers, primary, secondary and tertiary crushers, screen houses, re-screening plants
Materials handling	Transfer points, chutes, conveyor carry-back
Open areas	Stockyards, bulking yards, laydown areas, build-up beneath conveyors, site roads
Stacking and Reclaiming	Stackers, reclaimers, shiploaders

3.2 Dust Control Equipment

Various methods of dust control are employed at the Ports, including but not necessarily limited to:

- Baghouse dust collection systems installed on all car dumpers and screen houses;
- Baghouse dust collection systems on the secondary and tertiary crushers, and sinter fines building at Cape Lambert;
- Wet scrubber at the Lump Rescreening Plant 2 at Cape Lambert;
- Dust collectors on sample stations
- Dust covers on all car dumpers, crushers and screen houses;
- Dust covers on some conveyors (i.e. 5E conveyor at EII);
- Water cannons on stockpiles;
- Water sprays on conveyors, transfer stations, tertiary crushing and screening activities;
- Water sprays on mobile plant (stackers, reclaimers, shiploaders)
- Water trucks on roads and other exposed areas; and
- Chemical dust suppressants on open areas.

Other dust mitigation measures include:

- Street sweepers
- Mechanical removal of ore from beneath conveyors
- Belt scrapers on all major conveyors
- A High Pressure Low Volume (HPLV) belt washer on the C300 conveyor at Cape Lambert

3.3 Operation of Dust Control Equipment

The operation of dust control equipment at the Ports is largely controlled using Human Machine Interface (HMI). The HMI's provide a real-time display of current operational activities. The status and availability of dust control equipment is displayed on the HMI control pages throughout the operations inloading to outloading activities. When faults are identified on the HMI, the Regional Operations Centre (ROC) is able to alert on-site personnel. If necessary, it is escalated and raised as a maintenance notification or scheduled in the next work area shut down. The dust control equipment controlled and monitored by the HMI's is detailed in the subsequent sections 3.3.1 to 3.3.4.

3.3.1 Stockyard cannons

Stockyard water cannons are arranged in parallel lines alongside the stockpiles. Their water sprays wet the surfaces of the stockpiles thus suppressing dust lift off. Cannon activation and runtime cycle can be controlled remotely by using predetermined automatic settings or set to manual. When in automatic the cannons operate on timers and the activation sequence follows a set regime. Selected cannons have wind speed and wind direction limits that determine when the cannons commence operation. These limits are based on dust lift off conditions with regards to wind speed. The operating mode can be switched between the two settings by the OC and also at the discretion of Operations staff allowing for an adaptive and quick response to changing conditions.

3.3.2 Baghouse dust collectors

Baghouse dust collection systems are installed on all car dumpers and screen houses at the Ports, and on the crushers and sinter fines building at Cape Lambert A. Whenever these

pieces of infrastructure are in operation the baghouses are also required to be operational (unless specifically bypassed due to operational requirements). The collected dust is discharged to an agglomerator where it is mixed with water before being discharge to a main conveyor.

3.3.3 Belt washers/belt sprays

Water sprays are fitted to transfer points and at various locations along conveyors throughout the Port Operations. The operation of water sprays is controlled through either automatically or manually through the HMI. The cycle times can vary depending on the type of product being carried on the belt.

3.3.4 Water sprays on stackers, reclaimers and shiploaders

Sprays are maintained on all stackers, reclaimers and shiploaders and can be set in manual or automatic modes. The HMI also reports the rate at which the water sprays are releasing water.

3.4 Other Dust Control Strategies

3.4.1 Communication

In 2012 a Predictive Dust Modelling System for Parker Point and East Intercourse Island was implemented. The system combines weather forecast data with a dust plume prediction model. The plume prediction was derived using information on ore types and dust source locations on site. The system is validated at regular intervals using real weather data and dust concentrations recorded. Predicted PM₁₀ and TSP plumes are graphically displayed enhancing the understanding of potential dust impacts on the community. The model can predict up to 48 hours in advance, allowing Operations personnel to proactively respond and tailor dust control strategies to reduce potential impacts.

At Cape Lambert the Bureau of Meteorology (BOM) website is used to predict wind and weather events. BOM data is also used to generate dust risk rating for Cape Lambert for the next three days. These reports are discussed at the morning Production Meeting each day. The Daily Dust Summary Reports which are generated by an external service provider are also discussed during this meeting with any dust exceedences from the previous day or trends are highlighted. It is here that any issues related to dust control equipment are acknowledged and recorded (i.e. availability to water cannons).

3.4.2 Operation of water trucks and street sweepers

Water trucks operate on site roads and open areas around the Ports to help suppress dust. Water trucks generally follow a standard route; however this can be altered to target high risk areas where earthworks or other maintenance may be taking place. Street sweepers are also utilised on-site for the maintenance of sealed surfaces.

3.4.3 Bulk ore moisture

The Ports use moisture analysers which are designed to be placed on conveyors within 5 metres of a weightometer. Moisture analysers use microwaves to determine the moisture of the ore stream passing through the microwave signal. The units provide a continuous reading so the plant operators can react to any changes in ore moisture. The plant operating system is configured to increase water addition when the moisture levels fall and reduce water input when the moisture level exceeds targets.

3.4.4 Removal of spilled material

The build-up of ultra-fine material beneath conveyors can be a significant source of dust. The mechanical removal of this material is carried out by the Operations crews at Dampier and Cape Lambert using bob-cats and front-end loaders with specially designed low profile attachments able to reach the material underneath conveyors. It is a labour intensive and time consuming task and clean up is undertaken according to a schedule.

The plant areas and transfer points are washed down on a regular basis. Spilled material is directed to the nearest sediment trap where it is allowed to settle. It is then removed using a bobcat and allowed to dry prior to being re-used on-site or re-screened and sent to the stockpiles.

3.4.5 Standard Work Practices

A number of Standard Work Procedures (SWPs) have been developed for activities relating to the operation and maintenance of dust control equipment on-site. SWPs outline the steps to be taken to safely complete a task and are developed in alignment with HSEQMS Standards Element 6 – *Training, Competency and Awareness*. Examples of SWP's which contribute to reducing dust emissions include:

- RTIO-HSE-0051406 – CD1 Remote Water Cannon Whilst Dumping
- RTIO-HSE-0091186 – Replacing / Changing Torit Dust Extraction Filters
- RTIO-HSE-0025710 – Cleaning and Jack Hammering of Chutes

3.5 Maintenance Strategies

The maintenance of dust control equipment is scheduled by the maintenance planning team and is often timed to coincide with infrastructure shut downs. Planned Maintenance Orders (PMOs) have also been developed for various dust control equipment. This ensures that equipment is inspected on a regular basis and required maintenance is carried out.

Water trucks are serviced regularly in line with the schedule developed by the vehicle maintenance planners. Additionally, water trucks are inspected daily by trained operators who complete a pre-start check of the truck. Any failures, leaks or issues identified with the vehicle would result in a maintenance notification being entered into the system. For more serious mechanical problems, the vehicle may be tagged out of service until maintenance is carried out.

4 Dust Monitoring Program

4.1 Aims of the Monitoring Program

Rio Tinto Iron Ore has undertaken dust monitoring in the Dampier township since 1993, the Cape Lambert region since 1999 and the Wickham region since 2010. The number, types and locations of the monitors have varied over the years in response to changing demands and circumstances.

The Rio Tinto Pilbara Port Operations dust monitoring network includes several methods of dust monitoring aimed at targeting different undesirable effects of dust. Locations and details of the dust monitoring network are outlined in Appendix 4: Port Operations Dust

Monitoring Network. These methods include the continuous monitoring of PM_{2.5}, PM₁₀, TSP and depositional dust.

The broad aim of the dust monitoring program is to provide a quantitative measure of how the Pilbara Port Operations are performing against the objectives and targets.

Secondary aims of the program are to:

- determine long-term trends in ambient dust levels;
- establish the contribution to PM₁₀ and TSP dust levels from the Dampier and Cape Lambert terminals on the towns of Dampier and Point Samson respectively (see section 4 for how this is calculated);
- determine TSP, PM₁₀ and PM_{2.5} concentrations at representative locations within Dampier and Point Samson for comparison to criteria levels detailed in Table 1;
- determine PM₁₀ concentrations at nearby towns Karratha and Roebourne that will have negligible impacts from the Pilbara Port Operations, and therefore be representative of *regional* dust levels. These towns are representative of a typical Pilbara town;
- establish a record of PM_{2.5} dust levels in the region; and
- provide scientific data to the community.

The objectives of the Dust Monitoring Program, as defined by Dampier's Ministerial Statement 770 (6.1):

1. *Establish the port operations' contribution to PM₁₀ dust levels in the town of Dampier and Total Suspended Particulate (TSP) dust levels in the King Bay Industrial Area respectively;*
2. *Undertake short-term PM₁₀ monitoring (at hourly intervals) in the town of Dampier and short term TSP monitoring (at 24-hourly intervals) at the King Bay Industrial Area;*
3. *Identify the number of times the 24 hour average TSP emissions (referred to in condition 6-1(2)), exceed 150 µg/m³ in the King Bay Industrial Area attributable to the port operations, and identify and implement actions to reduce TSP emissions when an exceedance occurs;*
4. *Establish a real-time dust monitoring network to provide an early warning system of when PM₁₀ impacts on the town of Dampier are likely to exceed 50 µg/m³ and when TSP impacts on the King Bay Industrial Area are likely to exceed 150 µg/m³; and*
5. *Establish an annual summary report for submission to the CEO, of the PM₁₀ impacts on the town of Dampier and TSP impacts on the King Bay Industrial Area.*

The objectives of the Dust Monitoring Program, as defined by Cape Lambert's Ministerial Statement 741 (6.1) are to:

1. *Establish the proposal's contribution to PM₁₀ and Total Suspended Particulate (TSP) dust levels on the town of Point Samson; and*
2. *Identify the number of short-term TSP dust impacts on the town of Point Samson attributable to the proposal.*

Note: A short term TSP dust impact occurs when dust emissions exceed 200 µg/m³ averaged over 10 minute intervals.

The objective of the Dust Monitoring Program, as defined by Cape Lambert Port B's Ministerial Statement 840 (10.1-10.4) is to:

1. *describe the process for defining and reviewing criteria for determining when port is significantly contributing to dust levels at Point Samson and Wickham, in consultation with the Department of Environment and Conservation.*

4.2 Total Suspended Particulates (TSP)

Total suspended particulates (TSP) are monitored at the Dampier Primary School, King Bay Industrial Area and Point Samson. The measurement of TSP is directed towards defining nuisance dust impacts that enter these areas as a result of the Pilbara Port Operations. When elevated readings occur, measured levels are compared against the target levels below:

- Target 1.1: 150 µg/m³ over a 24 hour period as measured at the King Bay Industrial Area;
- Target 1.2: 150 µg/m³ over a 1 hour period as measured at the Dampier Primary School and the King Bay Industrial Area; and
- Target 1.3: 200 µg/m³ over a 10 minute period as measured and Point Samson.

4.3 Particulate Matter less than 10 Microns (PM₁₀)

The monitoring of PM₁₀ at off-site locations is undertaken using real time samplers (Tapered Element Oscillating Microbalance, or TEOMs) at Dampier Primary School (Dampier Central), Dampier North, Dampier East, Dampier West, Karratha, Point Samson, Roebourne and Wickham. The monitoring of PM₁₀ is directed towards defining the potential for health impacts, and for comparison against the following targets:

- Target 1.4: 50 µg/m³ over a 24 hour average as measured at Dampier Primary School (Dampier Central, and Point Samson.

E-samplers (nephelometers) are used to measure PM₁₀ at 12 locations (see Appendix 4) across the Pilbara Port Operations, with the aim of providing an early warning of elevated dust levels. This in turn prompts the proactive implementation of dust control strategies, including the targeted use of dust control equipment.

4.4 Particulate Matter less than 2.5 Microns (PM_{2.5})

The monitoring of PM_{2.5} is undertaken using TEOMs located at Dampier Primary School, Karratha, Point Samson and Roebourne. The 24 hour average PM_{2.5} concentrations can be compared against the National Environmental Protection (Ambient Air Quality) Measure (NEPM) Advisory Reporting Standard of 25 µg/m³ (24 hour average) as outlined in Table 1. The consistent collection of PM_{2.5} concentration data contributes to providing a reliable data context and better understanding of this type of information for the region.

4.5 Australian Standards Conformity

All Rio Tinto TEOM dust monitoring stations are subject to a service arrangement with an appropriately trained and qualified external service provider to ensure compliance with all relevant Australian Standards, including AS2923 (1987), Ambient Air – Guide for Measurement of Horizontal Wind for Air Quality Application, at a 90% return rate over a calendar year.

Calibration records and certificates are issued by the external service provider to Rio Tinto, and are available on request.

4.6 Dust Speciation

Dust speciation is measured at 12 locations across the Pilbara Port Operations. The aim of the monitoring is to provide information of monthly contribution to overall dust deposition levels at the areas of Dampier, the King Bay Industrial Area, Wickham and Point Samson attributable to the Pilbara Port Operations. The locations of these deposition bottles are listed in Appendix 4.

4.7 Dust Speciation Methodology

On a monthly basis, the contents from each dust deposition bottle are sent to an external laboratory, and analysed for the following:

- total mass;
- soluble fraction mass;
- insoluble fraction mass; and
- total mass of iron.

Based upon previous analysis, an iron content of 60% is used to reflect the presence of iron ore dust. The conservative assumption is used that all iron collected by the deposition bottles are derived from iron ore dust. This will allow an estimate of the iron ore dust contribution to the total mass and insoluble mass fractions.

Dust sample speciation is being carried out, and will continue for a minimum of 12 months in order to meet the following Ministerial Requirements:

- Condition 3, Schedule 2, Ministerial Statement 770 (Dampier); and
- Condition 1.2, Schedule 2, Ministerial Statement 741 (Cape Lambert).

4.8 Dust Dispersion Modelling Validation

As required by Condition 6-5 of Ministerial Statement 770, field measurements were taken to validate the emissions and dust characteristics used to model dust impacts on the town of Dampier and the King Bay Industrial Area as published in the dust dispersion report contained in Appendix B of the Environmental Protection Statement (*Dampier Port Increase in Throughput to 145 Mtpa – Revisions 5, September, 2007*). The findings of the monitoring and model validation were submitted to the DEC on 10 December 2009. *RTIO-HSE-0064415 – Dampier Dust Emission Model Validation Report by SKM – May 2009. Assessment to meet MS770 condition 6-5.*

As required by Condition 8-2 and 8-3 of Cape Lambert's Ministerial Statement 741, a model validation assessment was undertaken at Cape Lambert between 29 September and 5 October 2010. The purpose of this monitoring was to validate the emissions and dust characteristics used to model the potential dust impacts from Mesa A ore of the town of Point Samson. The Dust Emissions Validation Report was submitted to the EPA on 30 August 2011 (RTIO-HSE-0111360 – Dust Emissions Validation – Cape Lambert Operations – Assessment to meet Ministerial Statement 741, Condition 8.1 and 8.2

4.9 Iron Ore Mineralogical Composition

A study of the mineralogical composition of iron ore transported to the Dampier terminal from each of its iron ore mines was completed in March 2009. The intention of this report was to determine levels of residual heavy metal and asbestos impurities. The findings of this report were submitted to the Department of Health in April 2009 as per Conditions 1 and 2 of Schedule 2 within Ministerial Statement 770 (RTIO-HSE-0061869 – Submission of Mineralogical Composition Study for Ministerial Statement 770). Department of Health Letter of response to Dampier Mineralogical Composition Report (RTIO-HSE-0061869) dated 13 May 2009.

5 Determining Contributions to Dust Levels

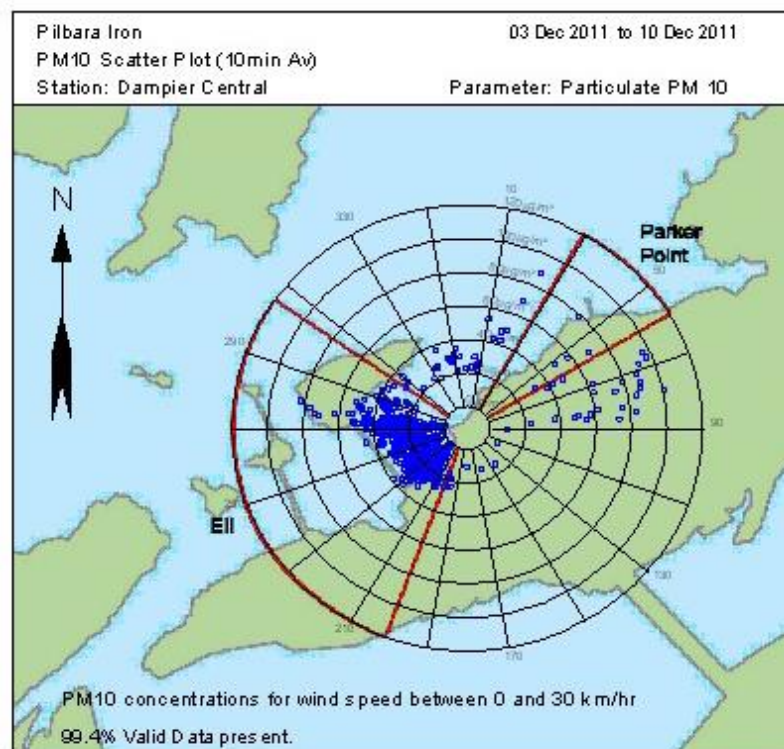
For evaluating compliance with performance targets 1.1 and 1.4 (as outlined in Table 2: 2013 Objectives and Targets), the Coastal Port Operation's contribution to PM₁₀ and TSP 24 hour exceedences at Dampier Primary School (Dampier Central), the King Bay Industrial Area and Point Samson are estimated by calculating the percentage of the total dust load for the relevant 24 hour period that was recorded when the wind direction was from within the terminal's nominated arc of influence (see Table 3 below). The arcs of influence for the Dampier terminal, the King Bay Industrial Area and the Cape Lambert terminal are illustrated in Figures 9 to 11 below.

If the percentage of the total PM₁₀ or TSP dust load from the respective arc of influence exceeds 50%, then it is recorded that the terminal potentially contributed to the 24 hour averaged exceedence, unless it can be demonstrated that other sources, such as wildfires (and associated smoke) contributed to the elevated dust levels recorded.

For evaluating compliance with performance targets 1.2 and 1.3 (as outlined in Table 2), the Pilbara Port Operation's contribution to the 10 minute and 1 hr average for TSP at the respective dust monitoring station is considered to be 100% if the recorded average wind direction during the 10 minute interval is from within the nominated arc of influence.

Table 4. Bearings from the dust monitoring stations to the Pilbara Port Operations Parker Point, Ell and Cape Lambert

Source	Bearing (from) (degrees)		
	Dampier Primary School	King Bay Industrial Area	Point Samson
Parker Point operational area	29 - 59	198 - 249	
East Intercourse operational area including 5E Conveyor and Road	201 - 305		
Cape Lambert operational area			290-20

**Figure 9. Dampier wind rose showing the arc of influence from Rio Tinto Operations.**

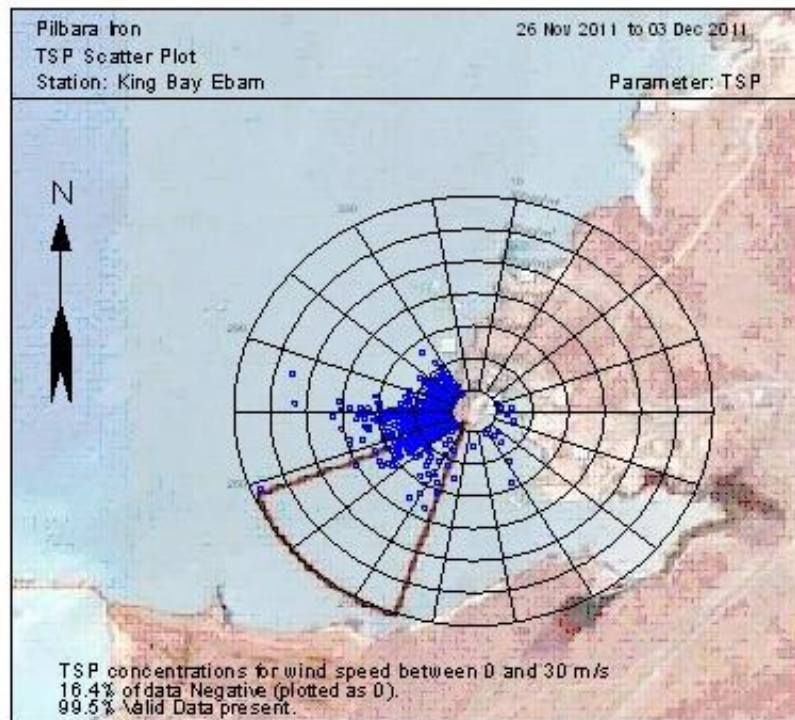


Figure 10. King Bay Industrial Area wind rose showing the arc of influence from Rio Tinto Operations.

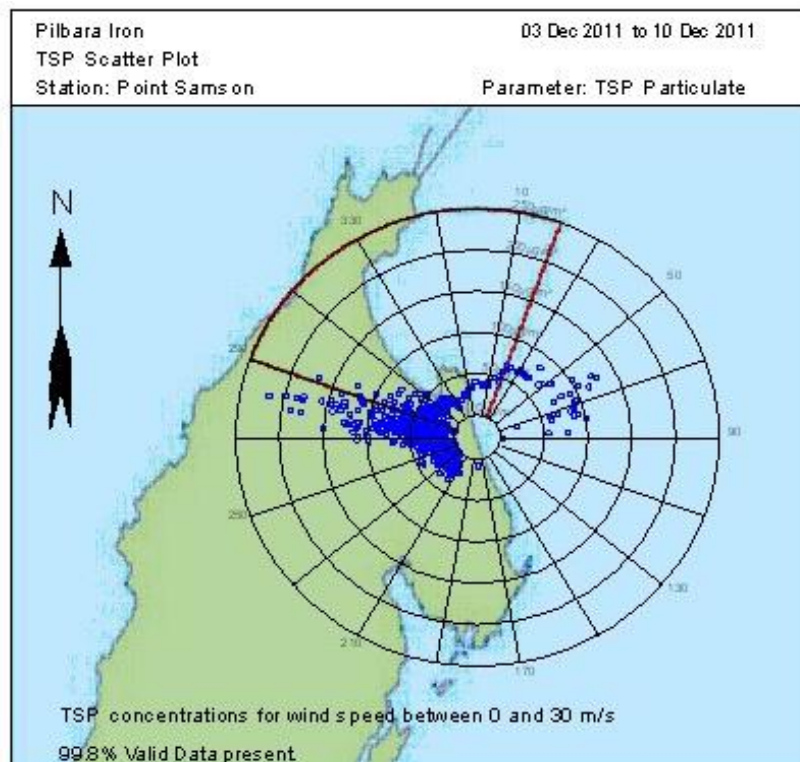


Figure 11. Point Samson wind rose showing the arc of influence from Rio Tinto Operations.

6 Aboriginal Rock Art

Rio Tinto has funded a four-year research program by the CSIRO Marine and Atmospheric Research Centre through the Burrup Rock Art Monitoring Management Committee on the impacts of air pollution on the rock art of the Burrup Peninsula. The project has found no evidence that emissions from industries existing on the Burrup Peninsula are causing damage to surrounding rock art. The official media release is available at <http://www.csiro.au/news/No-threat-to-Burrup-rock-art.html> and the final report is available from: http://www.dmp.wa.gov.au/documents/BI_BurrupRockArtCSIROFieldStudies.pdf.

Rio Tinto is committed to supplying dust monitoring data collected to aid further studies and investigations on the impacts of air quality on Burrup rock art.

7 Accountabilities

The successful implementation of the DMP requires that all site personnel have a commitment to, and an understanding of their roles and responsibilities under the plan. All Rio Tinto employees and contractors have responsibilities in relation to dust management. The main areas of responsibility at each level of the organisation are summarised in this section.

General Manager Port Operations

- Ensure the site operates in accordance with all legal obligations.
- Ensure personnel are aware of their obligations under all legal requirements.
- Chair the Coastal Communities Environmental Forum (CCEF).
- Ensure appropriate resources are available to meet the commitments made in the DMP and supporting Dust Monitoring Program.

Manager Operations

- Provide resources to ensure employees are trained in the correct use of dust control equipment.
- Coordinate the development, approval and implementation of the DMP.
- Develop, implement, monitor and review the annual dust improvement plan for the Pilbara Port Operations.
- Ensure communication of the DMP to relevant operations personnel.
- Provide resources to ensure dust control equipment is well maintained and operational.
- Respond to dust related community comments

Manager Environment

- Provide support to Operations regarding dust management.
- Provide feedback to site management, regulators and the community.
- Assist in the development of Dust Improvement Plans.

- Attend the CCEF meeting.
- Provide assistance to the Community Relations department with respect to community consultation programmes.

Manager Health and Safety

- Maintain personnel and workplace dust monitoring networks and associated quality assurance programmes.
- Produce relevant internal and external reports on exposure levels.

Manager Maintenance

- Provide necessary resources for implementation of the DMP.
- Ensure dust management issues, initiatives and performance are communicated to maintenance personnel.
- Ensure dust control equipment is well maintained and operational. Ensure dust management issues, initiatives and performance are communicated to maintenance personnel.
- Ensure team members and contractors comply with relevant environmental legislation.

Superintendent Operations

- Provide necessary resources for implementation of the DMP.
- Ensure dust management issues, initiatives and performance are communicated to production personnel.
- Undertake road management, including spillage clean-up, road watering, and operation of the road sweeper.
- Ensure dust control equipment is well maintained and operational.
- Ensure team members and contractors comply with relevant legal conditions.
- Assist in investigating causes of dust exceedances and dust related environmental incidents

Superintendent Environment – Port Operations

- Ensure maintenance of the compliance dust monitoring network and associated quality assurance program, and provide feedback to site management, regulators and the community.
- Provide support and advice to the Port Operations on all dust related compliance and improvement issues.
- Produce relevant internal and external dust reports.
- Review and update DMP
- Facilitate development of Dust Improvement Plans.
- Participate in the CCEF meeting.
- Provide assistance to the Community Relations department with respect to community consultation programs.

Superintendent - Health and Safety

- Advise, educate and coach Line Managers and employees involved in the workplace monitoring program.
- Review and monitor effectiveness of the workplace monitoring program.
- Report any deficiencies or opportunities for improvement of the workplace monitoring program.
- Ensure that the workplace monitoring program meets quality assurance.
- Assist site so that the workplace particulates and gas/vapour contaminants that contribute to the exceedence of Occupational Exposure Limits (OEL) are identified and characterised.
- Assist sites in implementing systems to ensure employees and contractors are not exposed to health hazards.
- Assist the Manager in meeting regulatory compliance.

Other Superintendents

- Ensure team members and contractors comply with relevant environmental legislation.
- Communicate dust performance to team members.

Environmental Advisor

- Provide training and awareness for Operations.
- Investigate internal and external exceedences and produce relevant internal and external dust reports for Operations and government.
- Review dust related environmental incidents
- Assist and advise in the development of Dust Improvement Plans.
- Assist and advise in review and update of DMP.

Environmental Monitoring Officer

- Undertake relevant monitoring as required by licence or Rio Tinto standards
- Ensure servicing and repairs of fixed dust monitoring stations are undertaken safely and in accordance with relevant Australian Standards.

Corporate Health Specialist

- Assist Business Units in the formulation and implementation of a workplace monitoring program to evaluate occupational exposures to dust, fibres, mist, fumes, gases and vapours.
- Advise, educate and coach OHS personnel involved in the workplace monitoring program.
- Introduce an audit system to ensure compliance with this standard.
- Assist sites in implementing systems to ensure employees and contractors are not exposed to health hazards.

- Assist Business Units in the formulation and implementation strategies to manage occupational exposures to hazardous substances.
- Advise, educate and coach personnel involved in the interpretation of actions levels, OELs and/or biological test limit values.
- Introduce an audit system to ensure compliance with HSEQ Standard B1- Particulate and Gas/Vapour Exposures.

Site Occupational Hygiene Officer

- Assist the business in conducting workplace monitoring in accordance with training received and Rio Tinto Iron Ore procedures (HSEQ Std B1).
- Schedule a randomised workplace monitoring program that has been developed in accordance with these standards and communicate program (HSEQ Std B1).
- Ensure that all forms/reports are completed and adequately filed (HSEQ Std B1).
- Undertake monthly ventilation inspections.
- Ensure all dust related information is entered into the Site Ventilation Log Book.
- CONTAM requirements.
- Ensure personal monitoring is undertaken to meet workplace monitoring program requirements and risk based monitoring.

All Employees and Contractors

- Report dusty conditions and/or faulty equipment that may result in dusty conditions using standard communication channels.
- Use dust management equipment/techniques as required following standard operating procedures.
- Suggest dust control improvements and raise dust issues in toolbox, monthly HSE Meetings, and/or Contractor HSE meetings.

8 Communication and Reporting

8.1 Internal

There is a wide range of communication channels through which Rio Tinto staff are informed of dust management issues and practices occurring at the Pilbara Port Operations. Many of these channels are two-way and provide staff with a means to raise issues associated with dust management at the site.

8.1.1 Inductions and Training

All personnel who work autonomously are required to undertake site induction training. Topics covered in the induction include the significance of dust management at the site and its potential impact on the surrounding communities, and the responsibilities of all personnel on site to minimise the amount of fugitive dust generated by the operations. Individuals must prove competent at the induction by undertaking an assessment.

Additional training is provided in the form of “Environmental Awareness Modules”, with one module specifically focussed on dust management at the Pilbara Port Operations. These modules are presented on an as-needed basis by environmental personnel or line Supervisors.

8.1.2 Health, Safety and Environment Meeting

Monthly Health, Safety and Environment (HSE) meetings are held for all terminals. All significant dust management issues are communicated in this forum, including both internal and external exceedences.

8.1.3 Information Centre

Environmental issues are discussed daily at operational and weekly at divisional Information Centre (IC) meetings. Weather forecasts, dust levels from the previous week and operational issues are tracked and discussed at these meetings with works planned to ensure potential dust issues are considered.

Attendee’s for the various IC meetings comprise the General Manager Port Operations; Manager Operations; Manager Asset Services; Manager Technical & Quality; Health and Safety Manager; Manager Environment; Reliability Assurance Manager; Operations Superintendents; Superintendent Maintenance Planning; Superintendent Quality Measurement; Superintendent Process Improvement; Superintendent Technical Analysis; Health and Safety Superintendent; Occupational Hygiene Superintendent; Health, Safety and Hygiene Advisors; Superintendent Environment; Site Environmental Advisors, Staff Operators and Maintainers.

8.1.4 Environmental Performance Review Meeting

Monthly Environmental Performance Review Meetings (EPRM) are held at Dampier and Cape Lambert Operations to review environmental performance (including dust issues), to discuss internal and external issues, review the previous months environmental monitoring, discuss new ideas, and document the status of EIP actions and other initiatives being implemented.

Attendees of the EPRM comprise the Operations Manager, Operations Superintendent, Site Environmental Advisor, Superintendent Environment, Superintendent Plant Maintenance and Specialist Maintenance Advisor.

8.1.5 Incident Reports

If targets 1.1 or 1.4 (see Table 2: 2013 Objectives and Targets) are recorded at any Dust Monitoring Stations where the Rio Tinto calculated contribution is greater than 50% using the methodology outlined in Section 4, an incident will be reported internally. Any internal or external dust related observation and complaint is also raised as an incident. For any incident, a report is entered into the Rio Tinto database for tracking and management, and is reviewed on a daily basis by the Site Environmental Advisor, and on a monthly basis by Senior Management at the monthly site HSE meeting and site EPRM.

8.1.6 Internal Exceedence Analysis and Reporting

On a daily basis, the Dampier and Cape Lambert Site Environmental Advisors receive automatic reports of the previous 24-hour monitoring results from dust monitoring stations (as outlined in Appendix 1: Summary of Legal Requirements). If an exceedence of either the TSP or PM₁₀ internal or external target levels is recorded at any location, the Site Environmental Advisor provides an exceedence analysis to the Port Operations Manager and Port Operations Superintendent.

A short term dust alarm (via SMS text and/or email) is sent to key Port Operations personnel when the 10-minute PM₁₀ data point exceeds 175 µg/m³ (external trigger is 200 µg/m³). The alarm provides an early warning of potential impacts on Dampier, the King Bay Industrial Area or Point Samson from Port Operations. This alarm allows site to undertake corrective actions if required when short term elevated dust levels are recorded at the TEOM stations. The short-term alarm is only triggered when the wind is from the operation's arc of influence.

A long term dust alarm is also sent to key Port Operations personnel (via SMS and/or email) when the 24 hour rolling average for PM₁₀ exceeds 50µg/m³ at Dampier Central and Point Samson. The long term alarm is triggered independently of the wind direction and the respective arcs of influence for the Dampier and Cape Lambert Operations, however it does provide Operations personnel with an early warning of a potential long term dust impact.

8.1.7 Cleaner Air Community of Practice

The Cleaner Air Community of Practice (CoP) has been established to discuss, share information and collectively learn best-practice and innovative ideas from each other to help solve problems relating to various aspects of dust management throughout the organisation. The CoP meets twice a year to discuss the objectives of the community as well as various aspects of dust.

The CoP can be accessed by all Rio Tinto employees via the Rio Tinto intranet, and following the links from Pathfinder.

The CoP aims to achieve the following objectives:

- Identify opportunities to reduce dust generation in work areas;
- Contribute to helping others solve problems;
- Streamline and simplify monitoring practices;
- Identify training and information required for role support; and
- Ensure more effective internal and external communication.

Information and discussion on various aspects of dust includes:

- Health, Safety, Environment and Community: Standards, Guidelines, Dust Suppression and Reduction Trials, Measurement and Monitoring;
- Mining: Land Clearing, Material Movement, Blasting, Open Areas/Roads and ROM Dump Hoppers;
- Processing: Crushing, Screening, Conveyors, Transfer Points, Stockpiles, Stacking and Reclaiming;

- Mechanical: Design, Equipment and Specifications;
- Rail and Port: Stacking, Reclaiming, Shiploading, Rail Transport and Car Dumpers;
- Training, Education and Awareness; and
- Water usage.

8.1.8 Rio Tinto Board Reports

Six monthly reports to the Rio Tinto board contain information about significant dust management issues that may have arisen during the reporting period.

8.2 External

8.2.1 Public availability of the Dust Management Plan

Condition 6-12 of Ministerial Statement 770, Condition 6-4 of Ministerial Statement 741 and Condition 10-4 of Ministerial Statement 840 requires that this DMP be made publicly available in a manner approved by the CEO. The reviewed and updated DMP is made publically available each year via the Rio Tinto Iron Ore website (www.riotintoironore.com)

8.2.2 Coastal Community Environment Forum

The principal forum for liaison with the local community and other stakeholders is the Coastal Community Environmental Forum (CCEF), which was initially established in December 2000 as the Dampier/Point Samson Dust Working Group. The CCEF has representatives from the Dampier, Point Samson and Wickham communities, Roebourne Shire, Department of Environment and Conservation, Dampier Port Authority, Water Corporation, Department of Water, Pilbara Development Commission and Rio Tinto. The CCEF can meet as required, with a minimum of two meetings per year. Progress on key elements of the DMP are reported to and discussed with CCEF members.

The CCEF provides the following:

1. A formal mechanism for community representatives to communicate their views on any environmental issues of relevance to present and potential future operations of the Pilbara Port Operations.
2. An avenue for the Pilbara Port Operations to provide information to the community on environmental aspects of the operations activities, monitoring, and future plans, with allowance for community comments and feedback on these.
3. An avenue for community requests for information on environmental aspects of the operations activities, monitoring, and future plans.
4. Consultation on the type of information required by the community, and the content of company information being distributed on environmental issues.

8.2.3 Community Hotline

Rio Tinto have an established community hotline (1800 445 465) which is regularly communicated in local print media. The line is operated 24 hours per day and allows callers to identify themselves or remain anonymous. Complaints are recorded, disseminated, and responded to as per the Complaint Evaluation and Response Flowchart (Figure 12). All

received complaints are collated, analysed, and reported on by the Rio Tinto Environment Department as part of dust performance reporting.

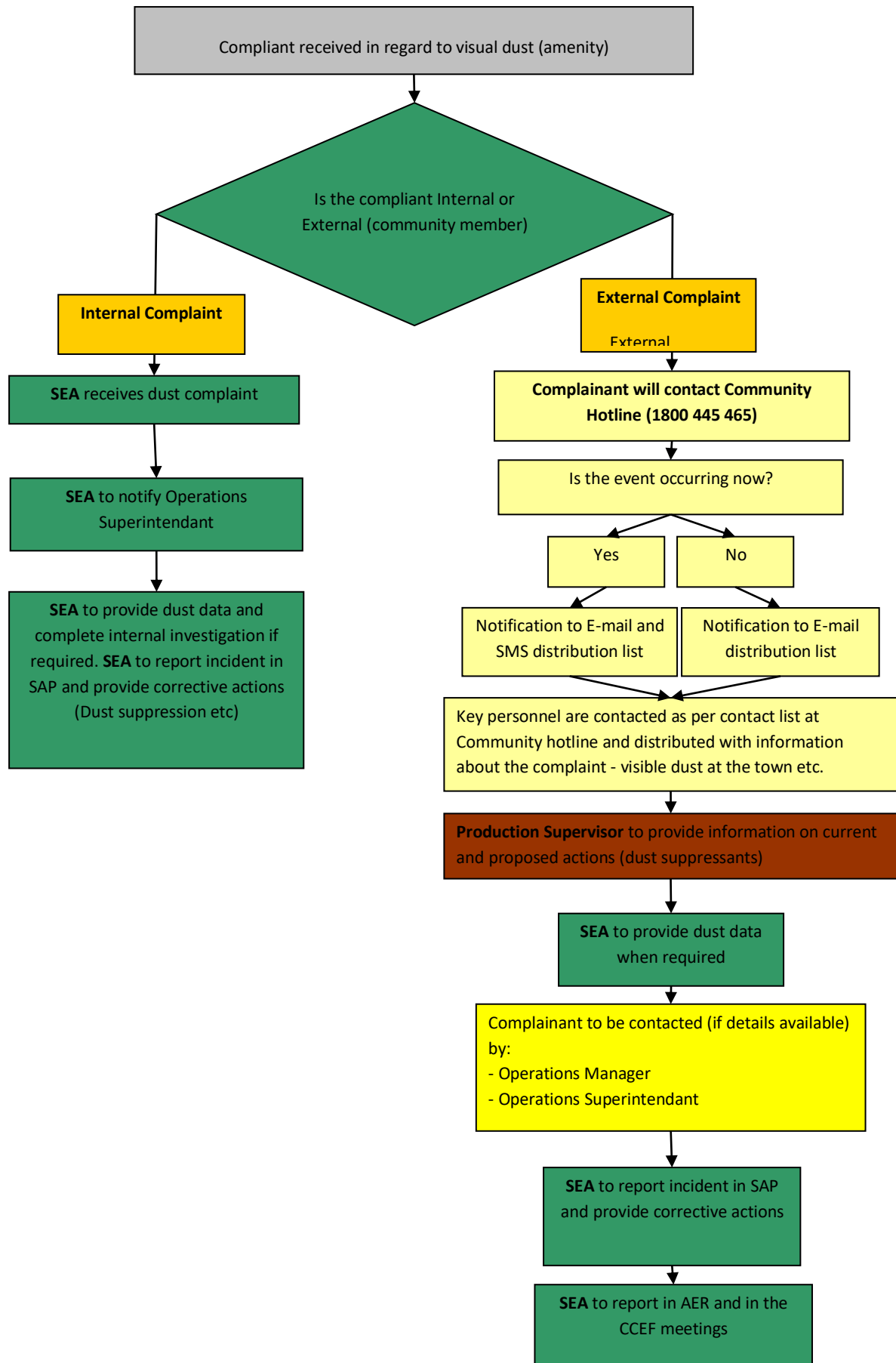


Figure 12: Compliance Evaluation and Response Flowchart

8.2.4 External Exceedence Reporting under Ministerial Statements 770 & 741

Rio Tinto is required to submit a report to the CEO of the DEC within 5 days of any exceedance of the National Environment Protection Council (NEPM) 24-hour PM₁₀ (50 µg/m³) standard. This applies to any exceedance recorded at the monitoring stations located at Dampier Primary School (Dampier Central) and Point Samson. Rio Tinto is also required to report any exceedences of the 24 hour TSP (150 µg/m³) trigger for King Bay Industrial Area. It is noted however, there is currently no NEPM standard for 24-hour TSP.

This report will include the following information from the monitoring equipment registering the exceedence:

1. The identification of the sources of the dust (as far as practicable) based on wind direction data;
2. the meteorological, TSP or PM₁₀ data;
3. the meteorological and PM₁₀ data from the corresponding town (Karratha, Roebourne or Wickham) monitoring equipment for comparative purposes; and
4. if it is determined that the exceedence is potentially attributable to the Pilbara Port Operations, then a description will be provided of the management actions taken, or proposed to be taken, to reduce emissions below the NEPM 24-hour PM₁₀ standard of 50 µg/m³.

Management actions, mitigation measures and dust event investigation procedures are identified and implemented at Dampier (Ministerial Statement 770, Schedule 3, Condition 2 (2)) and Cape Lambert (Schedule 3, Condition 2.2(2)) in response to any recorded short-term impacts potentially attributable to the Pilbara Port Operations.

8.2.5 Internet

A publicly accessible internet site has been developed for the communication of real-time dust monitoring results (TSP and PM₁₀) from the Dampier Primary School (Dampier Central), Dampier East, Dampier West, Dampier North, Karratha, Point Samson, Wickham and Roebourne monitoring stations to Rio Tinto staff and the wider community.

This information can be accessed via the Rio Tinto iron ore website:
<http://www.pilbarairon.com/dustmonitoring/>.

8.2.6 Further Dust Reporting under Ministerial Statement 770 (Dampier)

The Pilbara Port Operations operate under multiple Ministerial Statements and for this reason, the terminals at Dampier and Cape Lambert have different dust summary reporting requirements. All requirements of Ministerial Statement 770 are summarised in Appendix 1: Summary of Legal Requirements.

The Dampier requirements are listed below:

- Annual Summary Report
 - Condition 6-1 (5): *Establish an annual report for submission to the CEO, of the PM₁₀ impacts on the town of Dampier and TSP impacts on the King Bay Industrial Area.*

- Schedule 2, Condition 7: *Submit annual written reports to the CEO providing a summary of hourly averages of real-time monitoring as outlined in 4 above (Schedule 2, Condition 4) and submit 10-minute data to the CEO upon request.*
- Schedule 3, Condition 2(1): *Submit an annual summary report on the progress of dust remediation works to the CEO within 12 months of the formal authority issued to the decision-making authorities under section 45(7) of the Environmental Protection Act 1986.*

Progress of dust remediation works are reported in the Annual Environmental Report (see **Section 8.2.8**).

- Dust Sampling Speciation Report
 - Schedule 2, Condition 8: *Submit an annual report to the CEO providing a summary of the dust sample speciation results as required by 3 above (Schedule 2, Condition 3).*
- Annual Dust Trend Analysis
 - Schedule 2, Condition 10: *The proponent shall submit an annual trend analysis of TSP and PM₁₀ dust levels compared with benchmarked performance, dust monitoring performance, exceedences of dust amenity targets and health criteria, community complaints and progress on dust remediation works to the CEO 12 months following the implementation of the Dust Monitoring Program.*
- Externally Reportable Exceedences
 - Schedule 2, Condition 9: *Where the proponent makes a significant contribution to dust levels at the town of Dampier and King Bay Industrial Area, the proponent shall report this to the CEO.*
 - Schedule 3, Condition 2(3): *Submit a report of all exceedences recorded under management action 2(3) above (Schedule 3, Condition 2(3)) to the CEO within five days after being recoded and identify within the report:*
 1. *The source/s of the dust (as far as practicable); and*
 2. *Where the exceedences are attributed to dust from the proposal, include a description of the management actions taken, or proposed to be taken, by the proponent to reduce the proposal's emissions to below the NEPM 24-hour PM10 standard (action trigger level)*

8.2.7 Further Dust Reporting under Ministerial Statement 741 (Cape Lambert)

All requirements of Ministerial Statement 741 can be summarised in Appendix 1: Summary of Legal Requirements.

The Cape Lambert requirements are listed below:

- Annual Summary Report
 - Schedule 3, Condition 2.2(1): *The proponent shall submit an annual summary report on the progress of dust remediation works to the CEO within 12 months of*

the formal authority issued to the decision-making authorities under section 45(7) of the Environmental Protection Act 1986.

Progress of dust remediation works are reported in the Annual Environmental Report (see **Section 8.2.8**).

- Quarterly Dust Reports
 - Schedule 2, Condition 1.7: *Submit quarterly written reports to the CEO providing a summary of hour averages of real time monitoring as outlined in condition 1.3 of Schedule 2 and submit 10-minute data to the CEO upon request.*
- Dust Sampling Speciation Results
 - Schedule 2, Condition 1.8: *Submit an annual report to the CEO providing a summary of the dust sample speciation results as required by condition 1.2 of Schedule 2.*
- Annual Trend Analysis
 - Schedule 2, Condition 1.10: *The proponent shall submit an annual trend analysis of TSP and PM₁₀ dust levels compared with benchmarked performance, dust monitoring performance, exceedences of dust amenity targets and health criteria, community complaints and progress on dust remediation works to the CEO 12 months after the implementation of the Dust Monitoring Program.*

Progress of dust remediation works are reported in the Annual Environmental Report (see **Section 8.2.8**).

- **Externally Reportable Exceedences**
 - Schedule 2, Condition 1.9: Where the proponent makes a “significant contribution” to dust levels at Point Samson the proponent shall report the dust event to the CEO.
 - Schedule 3, Condition 2.2(4): *Submit a report of all exceedances recorded under management action 2.2(3) to the CEO within five days after being recorded and identify within the report;*
 1. *The source/s of the dust (as far as practicable); and*
 2. *Where the exceedences are attributed to dust from the proposal, include a description of the management actions taken, or proposed to be taken, by the proponent to reduce the proposal’s emissions to below the NEPM 24-hour PM₁₀ standard (action trigger level).*

8.2.8 Annual Environmental Report

The Annual Environmental Report (AER) includes a review of the Pilbara Port Operations dust monitoring results, comparison against performance targets, a summary of dust action plans from the reporting period (Improvement Plans) and proposed initiatives for the next reporting period. Details on dust complaints received by the community and the progress of dust remediation works are submitted as part of the Dampier and Cape Lambert AER’s to the Department of State Development (DSD), Department of Mines and Petroleum (DMP),

the Office of the Environmental Protection Authority (EPA) and the Department of Environment and Conservation (DEC) in April of every year. This Report can be viewed by members of the public upon request.

8.2.9 Annual Environmental Compliance Report

The requirement for an annual assessment of compliance against approvals granted under the Part IV of the *Environmental Protection Act 1986* was introduced in 2006. The Minister for the Environment stated that Proponents operating under Ministerial Conditions would be required to report annually on their compliance as a means for Proponents to regularly self-audit to ensure compliance.

A key number of these (Ministerial) approvals for RTIO (as of August 2009) now contain this requirement and this will be progressively included in future Part IV approvals. The terminology for this Part IV reporting process has been termed (for RTIO purposes) the Annual Environmental Compliance Reporting (AECR) process.

The Port Operations demonstrates compliance of Ministerial Statements 770 (Dampier), 741 and 840 (Cape Lambert) annually through this AECR process. This report is submitted to the DEC at the same time as the AER in April of every year.

9 System and Performance Review

9.1 System Review

The suitability, adequacy and effectiveness of the HSEQ Management System, and the DMP, is reviewed annually by senior management and environment personnel. The review considers the following:

- the extent to which objectives and targets have been met;
- dust concerns or complaints from external stakeholders;
- general dust performance based on monitoring results;
- periodic audit findings from the DEC;
- periodic internal audit findings of dust management practices;
- periodic internal technical reviews of dust control trials and investigations;
- changing circumstances, including developments in legal and other requirements; and
- annual external review of dust management practices and dust monitoring results.

Any changes or recommendations for improvement identified during this review are then incorporated into the annual review of the Dust Management Plan.

9.2 Performance Review

The Performance Review is prepared by the Superintendent Environment – Port Operations and is submitted to the DEC on an annual basis with the Rio Tinto Annual (or Triennial as applicable) Environmental Report and the Dust Trend Analysis.

The 2009 Review of the 2008 Port Operations Dust Management Strategy was submitted to the DEC as part of the Rio Tinto Triennial Environment Report (TER) in March 2010 and the

Dampier (submitted July 2010) and Cape Lambert (June 2010) Annual Dust Trend Analysis. The next Annual Environment Report (AER) is due on the 30 April 2013 (see Section 7.2.8).

The Dampier and Cape Lambert Annual Dust Trend Analysis reports are due in July and June 2012 respectively. Please see section 7.2.6 and 7.2.7 for more information on these reports.

9.3 Industry Studies

The Port Hedland Dust Management Taskforce have developed the Port Hedland Air Quality and Noise Management Plan (March 2010). Extensive health studies have been conducted which include a thorough investigation into the potential health effects of iron rich PM₁₀ particulates. A copy of this report can be found at <http://www.dsd.wa.gov.au/7899.aspx>.

10 References

Environmental Protection Authority (2007) *Ministerial Statement No. 000741- Cape Lambert Port Upgrade – increase in throughput to 85 million tonnes per annum*; May 2007.

Environmental Protection Authority (2008) *Ministerial Statement No. 000770- Hamersley Iron Dampier Port upgrade to a throughput capacity of 145 million tonnes per annum*; June 2008.

Government of Western Australia (1992). *Environmental Protection (Kwinana) (Atmospheric Waste) Policy 1992 and Environmental Protection (Kwinana) (Atmospheric Waste) Regulations*; 1992.

Government of Western Australia Department of State Development (2010). *Port Hedland Air Quality and Noise Management Plan*; March 2010.

National Environment Protection Council (1998) *National Environment Protection Measure for Ambient Air Quality*, June 1998 and Variation dated 23 May 2003.

Appendix 1: Summary of Legal Requirements

Requirement	Section No. & Commentary
Ministerial Statement 770 Dampier Port Upgrade – Increase in Throughput to 145 million tonnes per annum 6-1 Within six months following the Minister for the Environment issuing a notice under section 45(7) of the <i>Environmental Protection Act 1986</i>, the proponent shall update the Dust Monitoring Program referred to in the Environmental Protection Statement (Dampier Port Increase in Throughput to 145 Mtpa- Revision 5, September 2007) in consultation with the Department of Environment and Conservation, the Department of Health and the Dampier Port Authority to the requirements of the Minister for the Environment. The objectives in updating the Dust Monitoring Program are to: 1. Establish the port operations' contribution to PM₁₀ dust levels in the town of Dampier and Total Suspended Particulate (TSP) dust levels in the King Bay Industrial Area respectively; 2. Undertake short term PM₁₀ monitoring (at hourly intervals) in the town of Dampier and short term TSP monitoring (at 24-hourly intervals) at the King Bay Industrial Area; 3. Identify the number of times the 24 hour average TSP emissions (referred to in condition 6-1 (2)), exceed 150µg/m³ in the King Bay Industrial Area attributable to the port operations, and identify and implement actions to reduce TSP emissions when an exceedance occurs; 4. Establish a real-time dust monitoring network to provide an early warning system of when PM₁₀ impacts on the town of Dampier are likely to exceed 50 µg/m³ and when TSP impacts on the King Bay Industrial Area are likely to exceed 150 µg/m³; and 5. Establish an annual summary report for submission to the CEO, of the PM₁₀ impacts on the town of Dampier and TSP impacts on the King Bay Industrial Area.	Section 4
6-2 The proponent shall include within the updated Dust Monitoring Program the Monitoring Actions as outlined in Schedule 2 [as follows]: 1. Conduct a study of the mineralogical composition of iron ore transported to Dampier Port Operations from each of its iron ore mines, to determine levels of residual heavy metal and asbestos impurities. 2. The proponent shall complete the study referred to in 1. above within 9 months from the Minister for the Environment issuing a notice under section 45(7) of the <i>Environmental Protection Act 1986</i> and shall provide a copy of the written findings of the study to the Department of Health within one month of completion of the study.	Sections 4.2 & 4.3

Requirement	Section No. & Commentary
Ministerial Statement 770 Dampier Port Upgrade – Increase in Throughput to 145 million tonnes per annum	
3. Conduct monthly dust sample speciation or a method approved by the CEO to determine the percentage of dust received at the town of Dampier and King Bay Industrial Area attributable to the proposal, when the wind direction is within the arc of influence of 29° – 59° and 201° – 305° at Dampier Primary School and 198° – 249° at King Bay site. The speciation should be undertaken on a dust sample representative of dust received during a calendar month for a period of 12 months. The dust sample speciation shall commence on implementation of the Dust Monitoring Program.	Section 4.3
4. Conduct real-time monitoring of TSP and PM ₁₀ ambient dust levels, wind speed and direction. The monitoring shall commence on implementation of the updated Dust Monitoring Program.	Section 4.5
5. Conduct 10 minute sampling at the real time TEOM monitor located at Dampier Primary School and King Bay Industrial Area during short term TSP dust impacts. The sampling shall commence on implementation of the updated Dust Monitoring Program. <i>Note: A “short term TSP dust impact” is where the Environmental Protection (Kwinana Atmospheric Wates) Policy and Regulations 1999 (KEPP) goal of 150 µg/m3 is exceeded for 1 hour.</i>	Section 8.2.6
6. Ensure conformity with Australian Standard AS 2923 (1987), <i>Ambient Air - Guide for Measurement of Horizontal Wind for Air Quality Applications</i> at a 90% return rate over the calendar year.	Complete Section 8.2.4
7. Submit annual written reports to the CEO providing a summary of hourly averages of real time monitoring as outlined in 4 above and submit 10-minute data to the CEO upon request. <i>Note: Consideration should be given to reporting the annual frequency at which TSP dust levels, (sampled in accordance with the ‘a method approved by the CEO’, at the dust monitors) exceed 200 micrograms per cubic metre (µg/m3) when the wind direction is between 28° – 59° and 201° – 305° for Dampier and 198° – 249° for King Bay.</i>	Section 8.2.6
8. Submit an annual report to the CEO providing a summary of the dust sample speciation results as required by 3 above.	
9. Where the proponent makes a “significant contribution” to dust levels at the town of Dampier and the King Bay Industrial Area, the proponent shall report the dust event to the CEO. <i>Note: The proposal’s contribution to dust levels at Dampier and King Bay is considered to be a “significant contribution” when the wind direction is within the arc of influence of 28° – 59° and 201° – 305° and 198° – 249° respectively, unless the proponent demonstrates by a method approved by the CEO that more than 50% of the dust was generated by other sources.</i>	Section 8.2.1 Section 8.2.5
10. The proponent shall submit an annual trend analysis of TSP and PM ₁₀ dust levels compared with benchmarked performance, dust monitoring performance, exceedences of dust amenity targets and health criteria, community complaints and progress on dust remediation works to the CEO 12 months following the implementation of the Dust Monitoring Program.	
11. The report referred to in action 10 above is to be made publicly available and forwarded to the relevant agencies.	

Requirement Ministerial Statement 770 Dampier Port Upgrade – Increase in Throughput to 145 million tonnes per annum	Section No. & Commentary
12. The proponent shall post real-time monitoring results of TSP and PM ₁₀ dust levels on its web site or in another form approved by the CEO.	
6-3 Within 12 months following the formal authority issued by the Minister for the Environment under section 45(7) of the <i>Environmental Protection Act 1986</i> , the proponent shall implement the approved updated Dust Monitoring Program referred to in condition 6-1.	Complete
6-4 The proponent shall make the Dust Monitoring Program referred to in condition 6-1 publicly available in a manner approved by the CEO.	Section 8.2.1
6-5 Within 12 months following the Minister for the Environment issuing a notice under section 45(7) of the <i>Environmental Protection Act 1986</i> , the proponent shall undertake field measurements to validate the emissions and dust characteristics used to model dust impacts on the town of Dampier and the King Bay Industrial Area as published in the dust dispersion report contained in Appendix B of the proponent's Environmental Protection Statement (Dampier Port Increase in Throughput to 145 Mtpa – Revision 5, September 2007).	Complete (Section 4.8)
6-6 Within 18 months following the Minister for the Environment issuing a notice under section 45(7) of the <i>Environmental Protection Act 1986</i> , the proponent shall provide a report to the CEO on the findings of the validation required by condition 6-5.	Complete
6-7 Within six months following the Minister for the Environment issuing a notice under section 45(7) of the <i>Environmental Protection Act 1986</i> , the proponent shall, in consultation with the Department of Environment and Conservation, the Department of Health and the Dampier Port Authority, update the Dust Management Plan referred to in the Environmental Protection Statement (Dampier Port Increase in Throughput to 145 Mtpa- Revision 5, September 2007).	This document
6-8 The Dust Management Plan shall incorporate a program of works and outline operational procedures to be implemented in order to achieve a significant reduction in dust impacts of the proposal on the town of Dampier and the King Bay Industrial Area.	Appendix 3
6-9 The Dust Management Plan shall include the management actions as outlined in Schedule 3 [as follows]: 1. The Dust Management Plan shall include: (1) A review of current operational and maintenance procedures with the objective of ensuring that all reasonable and practicable measures are being	Section 3

Requirement	Section No. & Commentary
Ministerial Statement 770 Dampier Port Upgrade – Increase in Throughput to 145 million tonnes per annum	
implemented to minimise dust emissions from the proposal. (2) The preparation of a schedule of works and operational procedures to be implemented with the objective of reducing dust impacts from the proposal on the town of Dampier and the King Bay Industrial Area. <i>Note: The works and operational procedures should include optimising the performance of dust suppression equipment, and restricting potentially dusty operations during adverse weather conditions. The Plan should also include short-term response process and actions which may be implemented as a result of exceedences of dust criteria.</i> (3) Identification of potential dust remediation works and the preparation of a timeline for the implementation of the dust remediation works. (4) Identification of the mineralogical composition of iron ore transported to Dampier Port Operations.	Appendix 3 Appendix 3 Section 4.9
2. The Proponent shall: (1) Submit an annual summary report on the progress of dust remediation works to the CEO within 12 months of the formal authority issued to the decision-making authorities under section 45(7) of the <i>Environmental Protection Act 1986</i>. (2) Identify and implement management actions, mitigation measures and dust event investigation procedures when the wind direction is within the arc of influence of 28° – 59° and 201° – 305° and 198° – 249° if a short term dust impact occurs or the dust levels recorded at the town of Dampier and/or the King Bay Industrial Area exceed the National Environmental Protection Measure (NEPM) PM₁₀ standards or the Environmental Protection (Kwinana Atmospheric Wastes) Policy 1999. (3) Record all exceedences of the NEPM 24-hour TSP and PM₁₀ standards recorded at any of the monitoring sites within the town of Dampier and the King Bay Industrial Area. (4) Submit a report of all exceedences recorded under management action 2.2(3) to the CEO within five days after being recorded and identify within the report; 1. The source/s of the dust (as far as practicable); and 2. Where the exceedences are attributed to dust from the proposal, include a description of the management actions taken,	Complete Section 5 Section 8.2.4 Section 8.2.4

Requirement	Section No. & Commentary
Ministerial Statement 770 Dampier Port Upgrade – Increase in Throughput to 145 million tonnes per annum	
or proposed to be taken, by the proponent to reduce the proposal's emissions to below the NEPM 24 hour PM10 standard (action trigger level). (5) Record and investigate community complaints including those raised by the Coastal Community Environmental Forum and make this information available to the CEO upon request 6-10 The proponent shall implement the Dust Management Plan referred to in conditions 6-7, 6-8, 6-9.	Section 8.2.3 Section 1.2
6-11 The proponent shall review the Dust Management Plan on an annual basis.	This document
6-12 The proponent shall make the Dust Management Plan referred to in conditions 6-7, 6-8, 6-9 and 6-10 publicly available in a manner approved by the CEO	Section 8.2.1

Requirement	Section No. & Commentary
Ministerial Statement 840 Cape Lambert Port B Development – Process and Export 130 Million Tonnes of Iron Ore Per Annum	
10-1 Prior to commissioning, the proponent shall update the <i>Dust Management Plan - 2009 Cape Lambert Port Operations, December 2008</i> to include Cape Lambert Port B to the requirements of the CEO on advice from the Department of Environment and Conservation.	This document
10-2 The Construction Environmental Management Plan and Dust Management Plan shall describe the process for defining and reviewing criteria for determining when port construction or operation is significantly contributing to ambient dust levels at Point Samson and Wickham, in consultation with the Department of Environment and Conservation.	Section 2.2
10-3 The proponent shall implement the Dust Management Plan required by condition 10-1.	Section 8.2.9

Requirement	Section No. & Commentary
Ministerial Statement 840 Cape Lambert Port B Development – Process and Export 130 Million Tonnes of Iron Ore Per Annum	
10-4 The proponent shall make the Dust Management Plan required by condition 10-1 publicly available in a manner approved by the CEO.	Section 8.2.1

Appendix 2: Port Operations Dust Risk Register

Risk Assessment ID	Work Area Description	Category	Scenario Description	Scenario Owner Position	Cause Description	Impact Description	Risk Rating (inherent)	Control Type Description	Control Description	Control Comments	Risk Rating (current)
1	Dampier	Community impact	Excessive dust generation during dumping activities at PPt and EII	Manager Operations	Equipment difficulty includes design, defective parts and inadequate maintenance. Additional causes may include inadequate procedures	Excessive dust in community resulting in potential non compliance to legislation, community concern, negative reputational impact	High	3 Engineering Controls	Controlled by engineering standards	Filters maintained on a regular schedule (Wormald). Ventilation technicians monitor personal health levels of operations. SWP for spray painting No Zinc pac paints used where possible.	Moderate
2	Dampier	Community impact	Excessive dust generation from conveying of ore at PPt and EII	Manager Operations	Equipment difficulty includes design, defective parts and inadequate maintenance. Additional causes may include inadequate procedures	Excessive dust in community resulting in potential non compliance to legislation, community concern, negative reputational impact	High	3 Engineering Controls	Controlled by engineering standards	Sprays on top of conveyors & on return sides of some conveyors. Transfer sprays include both automatic and manual equipment. SWP DO-POC-043 contains matrix for use of water sprays for each product	Moderate
3	Dampier	Community impact	Excessive dust generated from the operation of screen houses at PPt and EII (including re-screening)	Manager Operations	Equipment difficulty includes design, defective parts and inadequate maintenance. Additional causes may include inadequate procedures	Excessive dust in community resulting in potential non compliance to legislation, community concern, negative reputational impact	High	3 Engineering Controls	Controlled by engineering standards	Dust management includes dry dust extraction systems. Spillage cleaned up on a regular maintenance schedule.	Low
4	Dampier	Community impact	Excessive dust generation during stacking and reclaiming of ore at PPt and EII	Manager Operations	Equipment difficulty includes design, defective parts and inadequate maintenance. Additional causes may include inadequate procedures	Excessive dust in community resulting in potential non compliance to legislation, community concern, negative reputational impact	High	3 Engineering Controls	Controlled by engineering standards	Water cannons at stockyards (reduced run time, increased frequency), maintaining moisture content, sprays on stackers and reclaimers. Control system for cannons has been improved – a number of deficiencies were identified in the logic and were worked through resulting in improvements to the system. Water reelers and dust sprays to be commissioned by the end of 2011.	High

Risk Assessment ID	Work Area Description	Category	Scenario Description	Scenario Owner Position	Cause Description	Impact Description	Risk Rating (inherent)	Control Type Description	Control Description	Control Comments	Risk Rating (current)
5	Dampier	Community impact	Excessive dust generation from Bulking and re-screening operations	Support Superintendent	Procedures includes followed incorrectly or not used.	Excessive dust in community resulting in potential non compliance to legislation, community concern, negative reputational impact	High	3 Engineering Controls	Controlled by engineering standards	Multiple Water carts used during bulking and re-screening activities. WPH-DAMP-OHS-PROC-0026 details Coastal Stockpiling HSE Document library - WPH have document developed.	Moderate
6	Dampier	Community impact	Excessive dust lift-off from stockyards at PPt and EII	Manager Operations	Equipment difficulty includes design, defective parts and inadequate maintenance. Additional causes may include inadequate procedures or not followed correctly and natural wind events.	Excessive dust in community resulting in potential non compliance to legislation, community concern, negative reputational impact	High	3 Engineering Controls	Controlled by engineering standards	New automated stockpile spray system implemented and in use at PPt and EII Regular inspection and maintenance or stockyard cannons Speed limits in stockyards. Vegetated areas around stockyards assist to capture dust and reduce open areas for lift-off.	High
7	Dampier	Community impact	Excessive dust generation during ship loading at PPt and EII	Manager Operations	Equipment difficulty includes design, defective parts and inadequate maintenance. Additional causes may include inadequate procedures or not followed correctly and natural wind events	Excessive dust in community resulting in potential non compliance to legislation, community concern, negative reputational impact	High	3 Engineering Controls	Controlled by engineering standards	Spraying of water onto ore at exit of screen house 3 extra manual sprays along 18E.Ship Loader competency assessment. Dust suppression to be added to ore in stockpiles; Ship loader boom sprays.	High
8	Dampier	Community impact	Excessive dust generation from spilt ore clean up	Manager Operations	Equipment difficulty includes design, defective parts and inadequate maintenance. Additional causes may include inadequate procedures or not followed correctly and natural wind events	Excessive dust in community resulting in potential non compliance to legislation, community concern, negative reputational impact	High	5 Personal Protective Equipment (PPE)	Controlled by the use of personal protective equipment (PPE) or administrative controls only	Use of extended bucket attachment on loader to remove spilt ore Micro sprays on 5E conveyor Preventive Running Maintenance (daily) WPH have contract to clean up ore spillage. Managed by RTIO Company Rep.	High
9	Dampier	Community impact	Dust generation from vehicle movements on sealed and unsealed roads around site, including stockyards and bulking areas	Manager Operations	Procedural causes include failure to follow or followed incorrectly. Other potential causes include equipment design, inadequate communication, inadequate training or human performance difficulty.	Excessive dust in community resulting in potential non compliance to legislation, community concern, negative reputational impact	High	3 Engineering Controls	Controlled by engineering standards	25km/hr speed limit reduced on unsealed roads. Road Sweeper schedule targeting high-risk roads developed as an 2008 EIP.	Moderate

Risk Assessment ID	Work Area Description	Category	Scenario Description	Scenario Owner Position	Cause Description	Impact Description	Risk Rating (inherent)	Control Type Description	Control Description	Control Comments	Risk Rating (current)
11	Dampier	Environmental impact	Excessive dust generation from operations causing habitat loss (vegetation)	Manager Operations	Equipment difficulty includes design, defective parts and inadequate maintenance. Additional causes may include inadequate procedures or not followed correctly and natural wind events	Dust smothering vegetation resulting in inhibited growth and/or death	Moderate	3 Engineering Controls	Controlled by engineering standards	Sprays and water reelers on in loading sequences. Dry scrubber dust extraction system and variable speed drives at ppt dumper. Bag filter system at EI.	Low
101	Ops Planning bulk handling facility	Environmental impact	Excessive dust generation from crushing and blending materials (primary, secondary and tertiary rotary crushers) in the Bulk Handling Facility (BHF)	Superintendent Metallurgical Evaluation	Equipment difficulty includes ineffective design, defective parts and/or failure to maintain.	Community, employee and regulatory concern Negative reputational impact	Moderate	3 Engineering Controls	Controlled by engineering standards	Dust extraction on fines crushers Skirts on screens Street sweeper used to clean area Sample process is based on not losing any sample (Quality procedures). Weekly inspection of dust extraction system (bags) by Downers contractors Procedures require samples to be wet to minimise dust	Low
102	Ops Planning bulk handling facility	Environmental impact	Excessive dust generation from Dry Screening (annexe + BHF Shed), ESSA screen, Haver, ROTAPS, sweco screen and locker screen.	Superintendent Metallurgical Evaluation	Equipment difficulty includes ineffective design, defective parts and/or failure to maintain.	Community, employee and regulatory concern Negative reputational impact	Moderate	4 Administrative Controls	Controlled by the use of personal protective equipment (PPE) or administrative controls only	Small screens and shakers located in enclosed cabinets Technician experience to add water to minimise loss of sample/working to conditions (Stop work if windy etc) requirement of process is to reduce sample loss.	Low
103	Ops Planning bulk handling facility	Environmental impact	Dust generation from build-up of reject ore (waste fines) from manual sample preparation	Superintendent Metallurgical Evaluation	Procedural causes include failure to follow or followed incorrectly. Other potential causes include equipment design, failure to maintain, communication, inadequate training, work instruction or human performance difficulty.	Community, employee and regulatory concern Impact on surrounding vegetation health Negative reputational impact	Moderate	3 Engineering Controls	Controlled by engineering standards	Automate sprinkler system - 5mins every 12 hours to form a crust. Natural landscape provides a windbreak	Low
1.16	Processing	Community impact	Excessive dust generated from crushing and screening plant operations	Production Superintendent	Preventative/predictive maintenance inadequate	Impacts upon community amenity (visible dust etc.) From offsite particle travel	Critical	3 Engineering Controls	Controlled by engineering standards	Scrubber system. Spillage cleanup. Ore moisture content. Covers on screening. Baghouse.	Moderate
1.20	Cape Lambert stockyard	Community impact	Excessive dust generated from chutes at transfer stations associated with stockyard operations	Production Superintendent	Equipment difficulty includes design, defective parts and inadequate maintenance. Additional causes may include inadequate procedures or extreme weather conditions	Impacts upon community amenity (visible dust etc.) From offsite particle travel	Critical	3 Engineering Controls	Controlled by engineering standards	Chute enclosed. Some sprays. Dust hutchies. Scrapers	Moderate

Risk Assessment ID	Work Area Description	Category	Scenario Description	Scenario Owner Position	Cause Description	Impact Description	Risk Rating (inherent)	Control Type Description	Control Description	Control Comments	Risk Rating (current)
1.21	Cape Lambert stockyard	Environmental impact	Dust generated from conveyors associated with stockyard operations	Production Superintendent	Change to product type, inadequate moisture control, inadequate preventative/predictive maintenance of dust suppression equipment on conveyors, extreme weather conditions. Spillage cleanup procedures not followed	Impacts upon community amenity (visible dust etc.) From offsite particle travel	Critical	3 Engineering Controls	Controlled by engineering standards	Belt scrapers. Water sprays. Water cannons (to moisten stockpiles). Dust hutchers. Underbelt cleanup of spillage	High
1.24	Cape Lambert outloading	Environmental impact	Excessive dust generated from shiploading iron ore	Production Superintendent	Equipment difficulty includes design, defective parts and inadequate maintenance. Additional causes may include inadequate procedures or extreme weather conditions	Impacts upon community amenity (visible dust etc.) From offsite particle travel. Negative reputation risk.	High	3 Engineering Controls	Controlled by engineering standards	Dust sprays on shiploader. Spill cleanup. Belt scrapers. Road cleaned with street sweeper	Moderate
1.25	Cape Lambert stockyard	Community impact	Excessive dust generated from bulking associated with stockyard operations	Production Superintendent	Change to product type, inadequate moisture control, inadequate preventative/predictive maintenance of dust suppression equipment on conveyors, extreme weather conditions. Spillage cleanup procedures not followed	Impacts upon community amenity (visible dust etc.) From offsite particle travel	High	3 Engineering Controls	Controlled by engineering standards	Dust management procedures for bulking contractor Water cart bitterns dust suppression restricted access speed limits	Low
1.26	Cape Lambert stockyard	Community impact	Excessive dust generated from dozing of dead stockpile associated with stockyard operations	Production Superintendent	Procedures not followed. Extreme weather conditions	Impacts upon community amenity (visible dust etc.) From offsite particle travel	High	3 Engineering Controls	Controlled by engineering standards	Water Canons. Water truck	Moderate
1.27	Cape Lambert stockyard	Environmental impact	Excessive dust generated from stockpiles / windrows associated with stockyard operations	Production Superintendent	Equipment difficulty includes design, defective parts and inadequate maintenance. Additional causes may include inadequate procedures or not followed correctly and natural wind events	Impacts upon community amenity (visible dust etc.) From offsite particle travel	Critical	3 Engineering Controls	Controlled by engineering standards	Water cannons. Citect automated control of cannons. High dust alarm from Pt Samson TEOM. Dustscan alarms - currently not tied in. Water truck	Moderate

Risk Assessment ID	Work Area Description	Category	Scenario Description	Scenario Owner Position	Cause Description	Impact Description	Risk Rating (inherent)	Control Type Description	Control Description	Control Comments	Risk Rating (current)
1.29	Processing	Community impact	Dust generated from processing associated with Lump Rescreening Plant 2 (LRP2)	Production Superintendent	Equipment difficulty includes design, defective parts and inadequate maintenance.	Impacts upon community amenity (visible dust etc.) From offsite particle travel	Critical	3 Engineering Controls	Controlled by engineering standards	Scrubber system. Sprays on emergency fines reject conveyor. Dustscan alarms currently not tied in	Moderate
1.38	On-site roads and vehicle parks	Community impact	Excessive dust generated from Heavy Mobile Equipment operations / movements	Production Superintendent	Procedures not followed	Impacts upon community amenity (visible dust etc.) From offsite particle travel	High	3 Engineering Controls	Controlled by engineering standards	Defined routes. Maintenance of roads. Water trucks. Bitterns applied for dust control. Speed limits	Moderate
2.17	Cape Lambert stockyard	Community impact	Excessive dust generation associated with maintenance related issues on dust suppression equipment fitted to stockyard stackers, reclaimers and ship loaders	Production Superintendent	Insufficient maintenance and timely repairs to damaged water sprays on stackers, reclaimers and ship loaders	Impacts upon community amenity (visible dust etc.) From offsite particle travel	Critical	4 Administrative Controls	Controlled by the use of personal protective equipment (PPE) or administrative controls only	Inspections PM03 and PM01 Individual Machines shutdown if problem arises Notification via operation centre in regard to machine condition/failure etc Remaining machines are rationalised to try to work effectively	Critical
2.18	Cape Lambert plant	Environmental impact	Excessive dust generation associated with maintenance related issues on belt scrapers	Maintenance Support Superintendent	Equipment design failure (under rated for requirements). Inadequate preventative maintenance. Changes to ore types.	Impacts upon community amenity (visible dust etc.) From offsite particle travel; Also waste ore to landfill	Critical	4 Administrative Controls	Controlled by the use of personal protective equipment (PPE) or administrative controls only	Inspections. Planned maintenance (PM01)	High

Risk Assessment ID	Work Area Description	Category	Scenario Description	Scenario Owner Position	Cause Description	Impact Description	Risk Rating (inherent)	Control Type Description	Control Description	Control Comments	Risk Rating (current)
2.19	Cape Lambert stockyard	Environmental impact	Excessive dust generation associated with maintenance related issues on stockyard water cannons	Shift Maintenance Superintendent	Equipment difficulty - inadequate predictive/preventative maintenance and/or defective parts.	Impacts upon community amenity (visible dust etc.) From offsite particle travel	High	4 Administrative Controls	Controlled by the use of personal protective equipment (PPE) or administrative controls only	Inspection program in place, and critical spares identified. Maintenance undertaken following identification of problems	High
2.20	Cape Lambert plant	Environmental impact	Excessive dust generation associated with maintenance related issues on dust control spray equipment throughout site	Shift Maintenance Superintendent	Equipment design failure (under rated for requirements). Inadequate preventative maintenance. Changes to ore types.	Impacts upon community amenity (visible dust etc.) From offsite particle travel	High	4 Administrative Controls	Controlled by the use of personal protective equipment (PPE) or administrative controls only	Inspection program. PM03. Identification of machine failure by operational control (remote) and alarm raised. Status of water sprays tracked at operational information centres.	High
2.21	Cape Lambert plant	Environmental impact	Excessive dust generation associated with maintenance related issues on scrubber systems throughout site if maintenance fails.	Shift Maintenance Superintendent	Equipment design failure (under rated for requirements). Inadequate preventative maintenance. Changes to ore types.	Impacts upon community amenity (visible dust etc.) From offsite particle travel	Critical	3 Engineering Controls	Controlled by engineering standards	Inspection program. PM03. Identification of machine failure by operational control (remote) and alarm raised. Scrubbers being replaced with bag houses	High
2.24	Cape Lambert plant	Community impact	Excessive dust generation associated with maintenance related issues on crusher and associated screens	Shift Maintenance Superintendent	Inadequate predictive and preventative maintenance or parts defective	Reduced visual amenity for surrounding communities. Negative reputational risk	High	4 Administrative Controls	Controlled by the use of personal protective equipment (PPE) or administrative controls only	Inspections. PM03	High

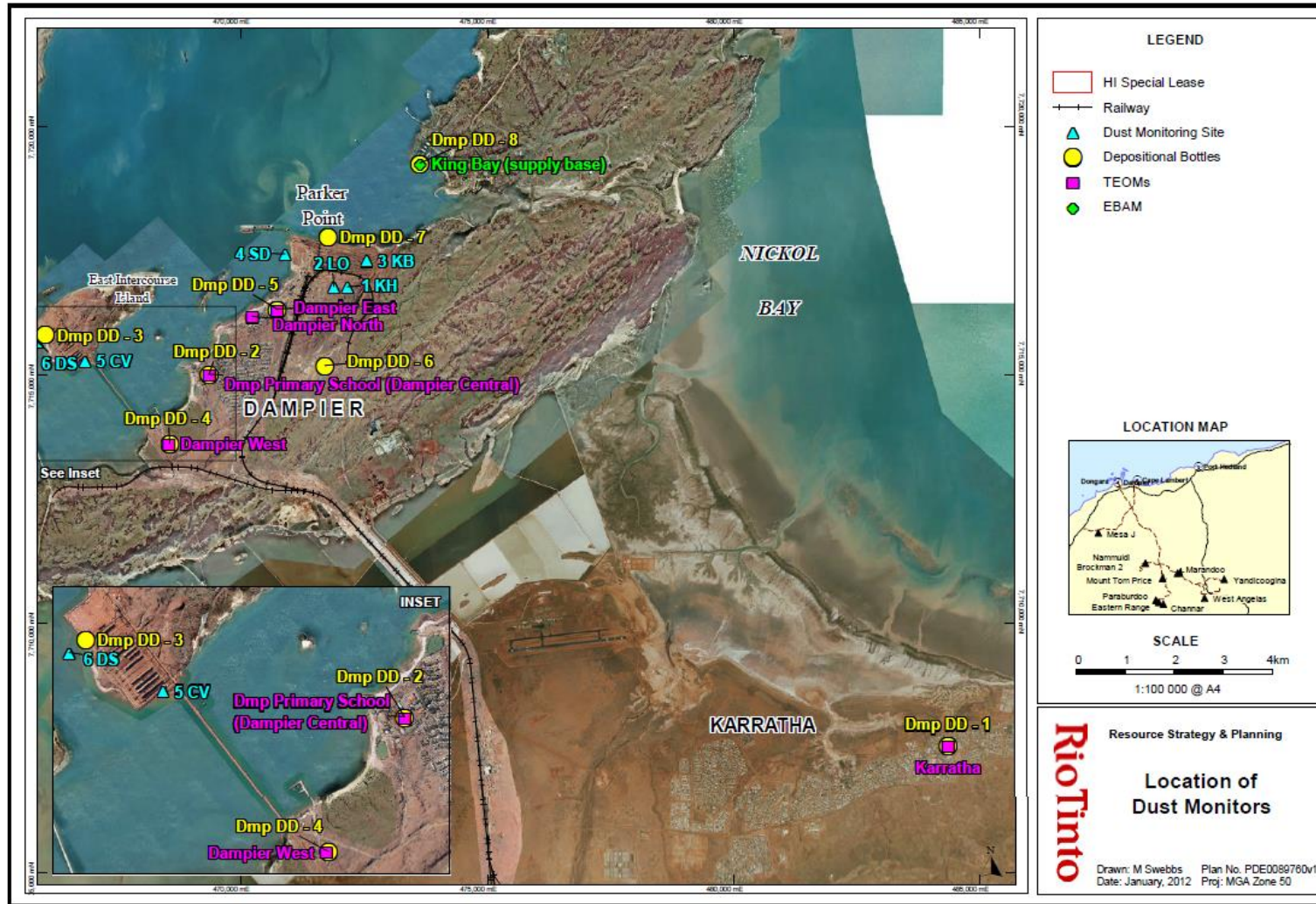
Risk Assessment ID	Work Area Description	Category	Scenario Description	Scenario Owner Position	Cause Description	Impact Description	Risk Rating (inherent)	Control Type Description	Control Description	Control Comments	Risk Rating (current)
6.02	Cape Lambert sample plant	Community impact	Generation of excessive dust from sampling plant(s)	Process Superintendent	Equipment difficulty includes design, defective parts and inadequate maintenance. Additional causes may include inadequate procedures and/or training.	Reduced visual amenity for surrounding communities. Negative reputational risk	Low	3 Engineering Controls	Controlled by engineering standards	Plant/chute enclosure reduces dust Feeders & cutters are corrected	Low
6.17	Laboratory building	Community impact	Generation of excessive dust from cleaning activities around Laboratory Buildings	Process Superintendent	Procedures includes followed incorrectly or not used. Other potential causes may include lack of inspection (quality control), communication, work direction or human performance difficulty.	Visual impact. Negative reputational impact. Non compliance with commonwealth legislation.	Low	4 Administrative Controls	Controlled by the use of personal protective equipment (PPE) or administrative controls only	Manual push sweeper (sweep dust into bin)	Low
6.18	Laboratory building	Community impact	Generation of excessive dust associated with handling / storage of samples for Laboratory Operations	Process Superintendent	Procedures includes followed incorrectly or not used. Other potential causes may include lack of inspection (quality control), communication, work direction or human performance difficulty.	Visual impact. Negative reputational impact. Non compliance with commonwealth legislation.	Low	4 Administrative Controls	Controlled by the use of personal protective equipment (PPE) or administrative controls only	Removal to landfill Wetting down of area when required	Low
6.19	Laboratory building	Community impact	Generation of excessive dust associated when emptying dust extraction bins and storing this material at Laboratory Operations	Process Superintendent	Procedures includes followed incorrectly or not used. Other potential causes may include lack of inspection (quality control), communication, work direction or human performance difficulty.	Visual impact. Negative reputational impact. Non compliance with commonwealth legislation.	Low	3 Engineering Controls	Controlled by engineering standards	Enclosed	Low
	Sandblasting yard	Community impact	Excessive dust generated from Abrasive Blasting activities in yard	Superintendent project engineering	Equipment difficulty causes include design, defective parts and failure to maintenance. Other potential causes may include failure to communicate, failure to follow or incorrectly followed procedures, human performance difficulty or inadequate training.	Impacts upon community amenity (visible dust etc.) From offsite particle travel	Low	3 Engineering Controls	Controlled by engineering standards	Fully enclosed area. Debris/material - garnet is Picked up and disposed of. Removed offsite	Low
1.01 and 1.06	Cape Lambert inloading	Community impact	Excessive dust generation associated with car dumping activities	Production Superintendent	Equipment difficulty includes design, defective parts and inadequate maintenance. Additional causes may include inadequate procedures and/or training.	Impacts upon community amenity (visible dust etc.) From offsite particle travel	High	3 Engineering Controls	Controlled by engineering standards	Enclosed car dumpers. Bag houses at both dumpers	Low

Risk Assessment ID	Work Area Description	Category	Scenario Description	Scenario Owner Position	Cause Description	Impact Description	Risk Rating (inherent)	Control Type Description	Control Description	Control Comments	Risk Rating (current)
1.10 and 1.12 , 1.13, 1.15	On-site roads and vehicle parks	Community impact	Excessive dust generated from vehicle movements along roads on site	Operations Manager	The physical controls are adequately designed, however, road sweeps continually breakdown and there are insufficient numbers of equipment. Other potential causes are extreme weather conditions	Community, employee and regulatory concern Negative reputational impact	Moderate	3 Engineering Controls	Controlled by engineering standards	Roads are bitumised and bitterns are applied for dust control. Road sweeper is used on roads. Speed controls and defined road systems	Low
1.22 and 1.23	Cape Lambert stockyard	Community impact	Excessive dust generated from stacking and reclaiming of ore within the stockyard	Production Superintendent	Equipment difficulty includes design, defective parts and inadequate maintenance. Additional causes may include inadequate procedures or extreme weather conditions	Impacts upon community amenity (visible dust etc.) From offsite particle travel	Critical	3 Engineering Controls	Controlled by engineering standards	Water sprays at stackers and reclaimers. Max drop heights. Moisture content in ore. Stockyard cannons	Moderate
7.23 and 7.24	Marine	Environmental impact	Spills / leaks of Skag water while loading / unloading inhibitor in 20L drums (Marine)	Marine Operations Superintendent	Equipment difficulty causes include design, defective parts and failure to maintenance. Other potential causes may include failure to communicate, failure to follow or incorrectly followed procedures, human performance difficulty or inadequate training.	Marine pollution / ecological impacts	Moderate	4 Administrative Controls	Controlled by the use of personal protective equipment (PPE) or administrative controls only	Collection by vacuum tanker truck Operational procedure in place	Low

Appendix 3: Port Operations Dust Improvement Plans

Dust Improvement Plan ID	Dust Improvement Plan Description	Key Performance Indicators	Accountability	Timeframe for Completion
<i>Port Operations</i>				
2012.1	Reduce visible dust emissions at Cape Lambert through improvements in the operation and maintenance of LRP2, the installation of a fogger at LRP2 and the installation of HPLV belt cleaners on all yard and CD2 conveyors	Receiving no complaints from the community. Reduction of visible dust emissions on-site (measured by cleaning and maintenance on-site).	Brad Goes	March 2013
2012.2	Dampier HPLV Evaluation and Carry Back Program. Identify optimal locations, design and install four HPLV units at Dampier. Two at EII and two at Parker Point	Establishment of two functional HPLV units at each site.	Wayne Ellis	December 2012
2012.3	EII Dumper Wetting Agent – Explore and evaluate the options for using a chemical dust suppressant at the car dumper and the transfers at 1E to 4E at EII	Completion of a final report evaluating dust suppression options.	Wayne Ellis	31 August 2012

Appendix 4: Port Operations Dust Monitoring Network





Site Name	Location (GDA94)		Parameter Measured	Monitor Type	Period of Monitoring	Comments
	Easting (m)	Northing (m)				
Current Dampier Monitoring Locations						
Dampier Central (located at Dampier Primary School)	469,354	7,715,007	PM ₁₀	TEOM	13.04.200 – current	
			PM ₁₀	TEOM	23.06.2005 – current	New instrument installed on 23.06.2005
			TSP	TEOM	23.02.2002 – current	
			Wind speed, wind direction, relative humidity (10m)	Various	24.02.1998 – current	
			Nuisance Dust	Dust Deposition Bottle #2	27.11.2002 - current	
Dampier West (EII)	468,535	7,713,619	PM ₁₀	TEOM	Dec 2009 – current	EII Meeting room
				Dust Deposition Bottle #4		
Dampier (EII)	466,034	7,715,813		Dust Deposition Bottle #3		
Dampier East	470,737	7,716,323	PM ₁₀	TEOM	2007 – current	
				Dust bottle #5		
Dampier North	470,225	7,716,179	PM ₁₀	TEOM	2007 – current	
Kangaroo Hill Camp	472,205	7,716,676	PM ₁₀	E-Sampler (Nephelometer)	2009 – current	
Karratha (Water Corporation Pump Station)	485,417	7,708,005	PM ₁₀	TEOM	22.02.2002 – current	
			PM _{2.5}	TEOM	28.06.2005 – current	
			Met data (5m)	Various	22.02.2002 – current	
			Nuisance Dust	Deposition Gauge #1	27.11.2002 – current	

			TSP	EBAM	01.07.08 – current	Station changed from PM10 to TSP to achieve compliance with Ministerial Statement 770
				Dust Bottle #8		
				Dust Bottle #6		
				Dust Bottle #7		
Current Cape Lambert Monitoring Locations						
Point Samson	520,117	7,719,572	PM _{2.5}	TEOM	30.01.2007 – current	
			PM ₁₀	TEOM	15.09.2000 - current	
			TSP	TEOM	30.01.2007 – current	
			Dust deposition	Dust deposition bottle	15.06.2007 – current	Deposition Bottle CL-DD3
Cossack Hatchery	519,265	7,720,148	PM ₁₀	E-Sampler (Nephelometer)	02.11.2007 – current	E-Sampler #6 – Calibration unit for other community based Dustscan equipment
Wickham	514,215	7,713,942	PM ₁₀	TEOM	20.12.2005 – current	
			Dust deposition	Dust deposition bottle	15.06.2007 – current	Deposition Bottle CL-DD4
Roebourne	515,020	7,702,720	PM ₁₀	TEOM	01.11.2009 – current	Relocated from Rocky Ridge
			PM _{2.5}	TEOM	01.11.2009 – current	
Cape Lambert Operations	518,854	7,722,899	PM ₁₀	E-Sampler	25.08.2006 – current	E-Sampler #2 – End of Rail Line
	518,689	7,722,122	PM ₁₀	E-Sampler	25.08.2006 – current	E-Sampler#3 – East side to ocean
			Dust deposition	Dust deposition bottle	15.06.2007 – current	Deposition Bottle CL-DD1 – East side to ocean
	518,897	7,722,383	PM ₁₀	E-Sampler	25.08.2006 – current	E-Sampler #4 – East side near LRP1
	517,991	7,721,889	PM ₁₀	E-Sampler	25.08.2006 – current	E-Sampler #1 – Control Room

	517612	7721573	PM ₁₀	E-sampler	12.2010	CL01 – Coarse ore stockpile
	517112	7720640	PM ₁₀	E-sampler	12.2010	CL02 - Pilbara Iron Operations
	513668	7715007	PM ₁₀	E-sampler	12.2010	CL03 – 7kp Landfill
	516233	7719590	PM ₁₀	E-sampler	12.2010.	CL04 – Bells Crossing
	513318	7714140	PM ₁₀	E-sampler	12.2010.	CL05 – OB's
CLU80 Construction Camp Administration	516,360	7,717,598	PM ₁₀	E-Sampler (Nephelometer)	02.11.2007 – current	E-Sampler #5 – Wastewater Treatment Enclosure