Government of Western Australia
Department of Water and Environmental Regulation

Amendment Notice 1

Licence Number	L4275/1982/15
Licence Holder	Mid West Ports Authority
File Number	2011/000451
Premises	Geraldton Port Part of Lot 503 on Deposited Plan 57801 as depicted in Schedule 1 GERALDTON WA 6530
Date of Amendment	15/08/2018

Amendment

The Chief Executive Officer (CEO) of the Department of Water and Environmental Regulation (DWER) has amended the above Licence in accordance with section 59 of the *Environmental Protection Act 1986* (EP Act) as set out in this Amendment Notice. This Amendment Notice constitutes written notice of the amendment in accordance with section 59B(9) of the EP Act.

Date signed: 15 August 2018

Danielle Eyre

Senior Manager, Industry Regulation (Resource Industries)

an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

Definitions and interpretation

Definitions

In this Amendment Notice, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
AACR	Annual Audit Compliance Report
Amendment Application	refers to the application for amendment to Licence L4275/1992/15 received by the Department on 12 January 2018.
Amendment Notice	refers to this document
AS4156.6-2000	Australian Standard AS4156.6-2000: Determination of Dust/moisture Relationship for Coal.
Assigned Level	A noise level determined under regulation 8 of the Noise Regulations.
Category/ Categories/ Cat.	categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department Administering the *Environmental Protection Act 1986* Locked Bag 33 Cloisters Square PERTH WA 6850 info@dwer.wa.gov.au
Delegated Officer	an officer under section 20 of the EP Act
Department	means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
EP Act	*Environmental Protection Act 1986 (WA)*
EP Regulations	*Environmental Protection Regulations 1987 (WA)*
Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of and during this Review
Licence	means L4275/1982/15 issued under Part V of the EP Act

Licence Holder	Mid West Ports Authority
Minister	the Minister responsible for the EP Act and associated regulations
MS	Ministerial Statement
NEPM	National Environmental Protection (Ambient Air Quality) Measure
Noise Regulations	*Environmental Protection (Noise) Regulations 1997 (WA)*
PM_{10}	used to describe particulate matter that is smaller than 10 microns (µm) in diameter.
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report.
Risk Event	as described in Guidance Statement: Risk Assessment
$\mu g/m^3$	micrograms per cubic metre

Amendment Notice

This amendment is made pursuant to section 59 of the *Environmental Protection Act 1986* (EP Act) to amend the Licence issued under the EP Act for a prescribed premises as set out below. This notice of amendment is given under section 59B(9) of the EP Act.

This notice is limited only to an application received by the Department of Water and Environmental Regulation (DWER) on 12 January 2018 to authorise the Mid West Ports Authority (the Licence Holder) to handle up to 300,000 tonnes per year of manganese ore out of Berth 6 at the Geraldton Port (the Premises). Low tonnages of manganese have previously been exported from the Premises in Financial Years FY03 (19,725 tonnes) and FY06 (6,531 tonnes) (MWPA, 2006).

The following guidance statements have informed the decision made on this amendment:

- Guidance Statement: Regulatory Principles (July 2015)
- Guidance Statement: Setting Conditions (October 2015)
- Guidance Statement: Land Use Planning (February 2017)
- Guidance Statement: Decision Making (February 2017)
- Guidance Statement: Risk Assessment (February 2017)
- Guidance Statement: Environmental Siting (November 2016)

Amendment description

The proposal involves the delivery of manganese ore to the Premises using side tipping trucks that unload product within a shed. The Licence Holder then proposes to load manganese into sealed containers that will be emptied into the vessel using a rotating tipping frame. The rotating tipping frame will lower the sealed containers into the hold of the ship, lift the lid and empty the contents.

Manganese ore will be sourced from the Little Horseshoe Lights Mine Site located approximately 130 km north-west of Meekatharra in Western Australia. In the initial stages of manganese export, the Licence Holder proposes to conduct a 100,000 tonne trial loading 25,000 to 30,000 tonnes per shipment. If operationally successful, the Licence Holder anticipates that loading rates will reach 300,000 tonnes per year, on top of existing tonnages of bulk granular material currently handled through the Premises.

The proposed amendment does not require an increase in daily throughputs at the Premises beyond those currently authorised (44,000 tonne per day). In addition, the proposal does not require the construction of new infrastructure.

No changes to the aspects of the original Licence relating to Category 58 have been requested by the Licence Holder. However, DWER intends to commence a full risk-based review of the Premises within the next six months to align the Licence with DWER's Regulatory Framework.

Key finding: A second loading option was proposed through the Amendment Application to load manganese ore using the Berth 4 or 5 conveyor and shiploading equipment. As insufficient information was provided to support a risk-assessment for this activity, DWER has not risk-assessed this activity in this Decision Report. This Amendment Notice does not permit the second loading option.

Other approvals

The Licence Holder has provided the following information relating to other approvals as outlined in Table 2.

Table 2: Relevant approvals

Legislation	Number	Approval
Part IV of EP Act	Ministerial Statement 087	Dredging and land reclamation activities for Port Expansion
	Ministerial Statement 367	Dredging and land reclamation activities for Port Expansion
	Ministerial Statement 600	Breakwater construction, railway extension, dredging and land reclamation activities for Port Expansion
Mines Safety and Inspection Act 1994	Project Code J01712	Licence to operate

Part IV of the EP Act

The Environmental Protection Authority (EPA) has assessed proposed activities at the Port three times since 1989. This assessment has had regard to Ministerial Statements MS367 and MS600 noting that all conditions of MS087 have been replaced by MS367. The most relevant factors relating to the proposed licence amendment are outlined below.

Ministerial Statement 367

Conditions of MS367 relate to dredging activities and the preparation of a water quality monitoring program for the Port, including the Inner Harbour, for comparison against baseline water quality data. Further, MS367 required the proponent (the Licence Holder), through Condition 3-3, to ensure that waters within the Geraldton Inner Harbour are maintained so that they do not have "…an adverse impact on the marine environment or on the beneficial uses of the waters outside the Inner Harbour."

Post-construction commitments of the Proponent include the management and monitoring of deposited sediment to ensure that future industrial land contains no contaminated sediment.

Ministerial Statement 600

In July 2002, the Minister for Environment issued MS600 to authorise the construction of the reconstruction of breakwaters, deepening and widening of the shipping channel, reclamation of land, offshore disposal of dredge spoil and the construction of a railway line on the eastern breakwater as well as activities along Town Beach. Condition 7-1 requires the proponent to monitor and manage water quality of the Geraldton Inner Harbour basin to maintain ecosystem integrity for a "Moderate level" of protection; and to maintain the marine environment beyond the Inner Harbour to a "High level" of protection, ensuring the maintenance of:

- aquatic life for human consumption;
- aquaculture at Town Beach;
- primary and secondary contact recreation values; and
- aesthetic values.

Proponent commitments relevant to Part V of the EP Act and required under Condition 2 of MS600 include the implementation of a Water Quality Management and Monitoring Programme.

The EPA assessment of the proposal is presented in EPA Bulletin 1050 and identifies stormwater inputs, spillages and inputs into waters from routine loading and unloading

activities as main sources of contaminants. EPA Bulletin 1050 states that the proponent is required to "undertake water and sediment quality monitoring in accordance with the water and sediment quality criteria documented in the DEP (now DWER) licence to determine concentrations of nutrients, accumulation of contaminants and the effectiveness of the Bulk Handling Action Plan and the port's management practices."

EPA Bulletin 1050 also notes that the proponent will be required through Condition 7 of MS600 to monitor water and sediment quality in the Geraldton Inner Harbour and Town Beach to confirm that environmental quality objectives are being maintained.

Key finding: MS367 and MS600 relate to impacts to marine and sediment quality resulting from short-term dredging and breakwater construction activities and not the daily operations undertaken at the Premises. DWER notes that Existing Licence does not require the Licence Holder to monitor marine water quality although it does require annual sediment monitoring, which duplicates requirements under MS367.

Following review of *Guidance Statement: Setting Conditions* and Ministerial Statements MS367 and MS600, nothing within either Ministerial Statement restricts the inclusion of monitoring conditions for sediment, marine discharge or marine water quality monitoring within the Part V licence (L4275/1982/15).

DWER will reassess the requirement for the application of stormwater monitoring and continuation of sediment monitoring following a full risk-based review of the Premises.

Amendment history

Licence L4275/1982/15 was renewed on 12 March 2015 to authorise the continued handling of bulk granular material through:

- Berth 4 – lead sulfide, copper and zinc concentrates loaded via conveyor system to the shiploader;
- Berth 6 – nickel, copper and zinc concentrates loaded using a Rotabox system;
- Berth 4 – talc and soda ash via conveyor system to the shiploader;
- Berths 4 and 6 - mineral sands via conveyor system to the shiploader;
- Berths 5 and 7 – iron ore loaded into the vessel via conveyor system from shed stockpiles.

All product, excluding containerised metal concentrates and talc, is stored in sheds until a critical volume is achieved for shipping or transporting offsite. Low-fines talc is stored in open lump stockpiles near the mineral sands concentrates storage sheds.

No amendments have been made to the Licence since its renewal in March 2015.

Monitoring

Ambient air quality monitoring

Ambient air quality monitoring is conducted using a network of Tapered Element Oscillating Microbalance monitors that measure particulate matter finer than 10 microns in diameter (PM_{10}) at 10 minute intervals. Metals speciation monitoring is also conducted at three boundary locations and at Berth 1, within the Premises boundary, using High Volume Air Samplers that can measure metals as total suspended particulates and PM_{10} (Figure 1). A Beta Attenuation Monitor (BAM) located approximately 4 km north of the Premises is used as a background monitor. During the period February 2016 to January 2017, targets specified in

Figure 1: Air quality monitoring network

the Licence for PM_{10} (50 µg/m^3) were exceeded on 106 occasions across all monitoring sites[1]. A maximum 24-hour PM_{10} concentration of 162.8 µg/m^3 was recorded on 25 February 2017 at the Port Way monitor, over three times the NEPM guideline measure for PM_{10}.

Within quarterly reporting the Licence Holder noted that boundary monitors generally record concentrations within 10 µg/m^3 of the background monitor (Offsite Monitor) between 69 and 94% of the time (MWPA, 2018). However, November 2017 to January 2018 reporting data identified that during monitored exceedances, ambient PM_{10} concentrations recorded at boundary monitors were typically greater than 10 µg/m^3 more than those concentrations recorded at the background monitor (Figure 2). Of the 13 exceedances recorded between November 2017 and January 2018 potential sources from prescribed activities included visible talc dust from the Bulk Mineral Storage Area, loading operations at the Berths 4 and 5

[1] Some of these exceedances may have occurred on the same day but at different monitoring sites. Exceedances also include the 16 days where PM_{10} concentrations at the Offsite Monitor exceeded 50 µg/m^3.

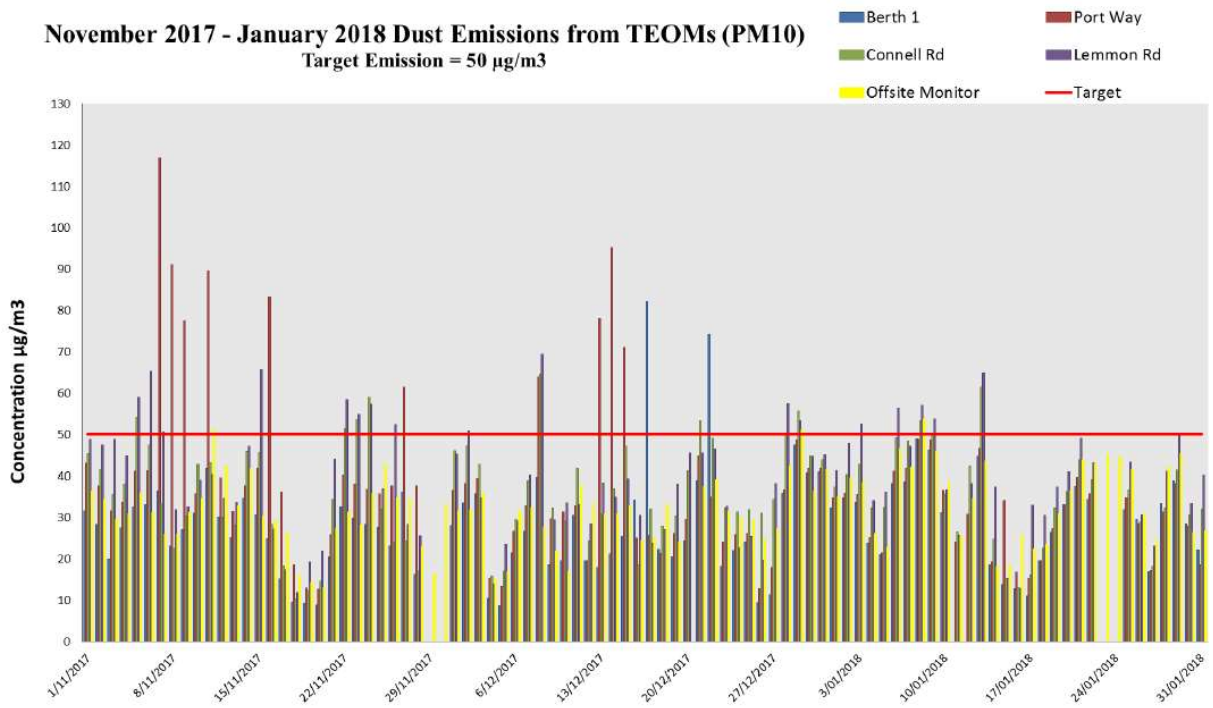

Figure 2: PM_{10} concentrations recorded at dust monitors during November 2017 to January 2018

overhead conveyors for talc, garnet and iron ore. External sources were also identified during exceedance investigations including CBH grain handling conducted at Berth 3, abrasive blasting in the Fishing Boat Harbour, general site maintenance works and works on the Geraldton foreshore that involves earthmoving. CBH grain handling at Berth 3 has been attributed as contributory to six of the 13 exceedances.

The Licence Holder's management response (as reported to DWER in the quarterly report) following monitored elevated dust levels was to:

- lower the loading chute deeper into the hold of the vessel;
- ensure dust collectors were operated along the conveyor system;
- operate water sprays; and
- adjust the feed rate to maintain the level within the truck unloader hopper used to prevent product surges during loading.

Key findings:

1) The positioning of the BAM (background) monitor is located adjacent to an unsealed beach access track that may lead to higher particle concentrations recorded at this site. However, a comparison of particle concentrations between this monitoring location and Premises boundary monitors indicates that dust concentrations are consistently higher near to Category 58 activities.
2) PM_{10} and TSP exceedances recorded at boundary monitors are not clearly attributed to Licence Holder activities. Category 58 activities occurring during these exceedances was not disclosed in monitoring reports, with the exception of the November 2017 to January 2018 report. Other sources such as construction, abrasive blasting at the Fishing Boat Harbour and beach sand may have contributed to exceedances.
3) Open materials stockpiling and operation of the overhead conveyor system were both identified as key contributors to dust generation from the Premises.

Sediment monitoring

In accordance with the Existing Licence sediment samples are taken on an annual basis at 18 sites within the Inner Harbour (Commercial Harbour), Fishing Boat Harbour, Outer Reclamation Area and background sites shown in Figure 3. Although manganese is not a monitored parameter within the Annual Sediment Compliance Survey (2007) it is evident that Category 58 activities at the Premises are contributing to the concentration of metals within the Geraldton Inner Harbour.

Interim Sediment Quality Guidelines (ISQG) provided in the *ANZECC Guidelines for Fresh and Marine Water Quality (2000)* are exceeded most commonly within the Inner Harbour for both ISQG-Low (trigger) values and ISQG-High values[2]. ISQG-High values for copper (270 mg/kg) and zinc (410 mg/kg) were exceeded adjacent to Berth 4 at monitoring location CH4 with concentrations measured at 325 mg/kg for copper and 596 mg/kg for zinc (O2 Marine 2017). Samples obtained from monitoring site CH3 also exceeded ISQG-High concentrations for zinc with concentrations measured at 596 mg/kg. Sediment ISQG-Low value concentrations for lead (50 mg/kg) and silver (1.0 mg/kg), found in High Precious Metal (30-40% lead sulfide concentrate), were exceeded in sediment samples collected at CH3 and CH4 (O2 Marine 2017). Lead is also found in smaller concentrations within IGO copper concentrate.

Lead sulfide, zinc and copper concentrates are loaded into vessels at Berth 4 using an overhead conveyor. Elevated copper concentrations were also identified in the two Fishing Boat Harbour sediment monitoring sites FBH1 and FBH2 with samples containing 482 and 364 mg/kg respectively and above ISQG-High values (270 mg/kg). Concentrations of zinc in sediment samples at these locations was also identified above ISQG-Low values. The Fishing Boat Harbour is located approximately 500 m west of Berth 4, where zinc and copper concentrates are loaded onto vessels.

Key findings:

1) Nickel concentrations in sediment do not exceed ISQG-Low or High values although this is likely due to the handling method (Rotaboxes) and low tonnages handled through the Premises in recent years.
2) Concentrations for aluminium and iron were also measured at high levels although neither have ISQG values associated. Aluminium is considered to be naturally occurring within the 2017 Annual Sediment Compliance Survey and there are few known anthropogenic sources in proximity to the Premises.
3) The Licence Holder has stated that a significant area of the stormwater catchment is located beyond the bulk handling areas and is beyond the Licence Holder's direct control. However, sediment quality monitoring indicates that existing handling methods for metal concentrates (conveyor to shiploader) may be resulting in elevated metals concentrations in the marine environment.

[2] ISQG-High concentrations are intended to represent a concentration above which adverse biological effects are expected to occur more frequently.

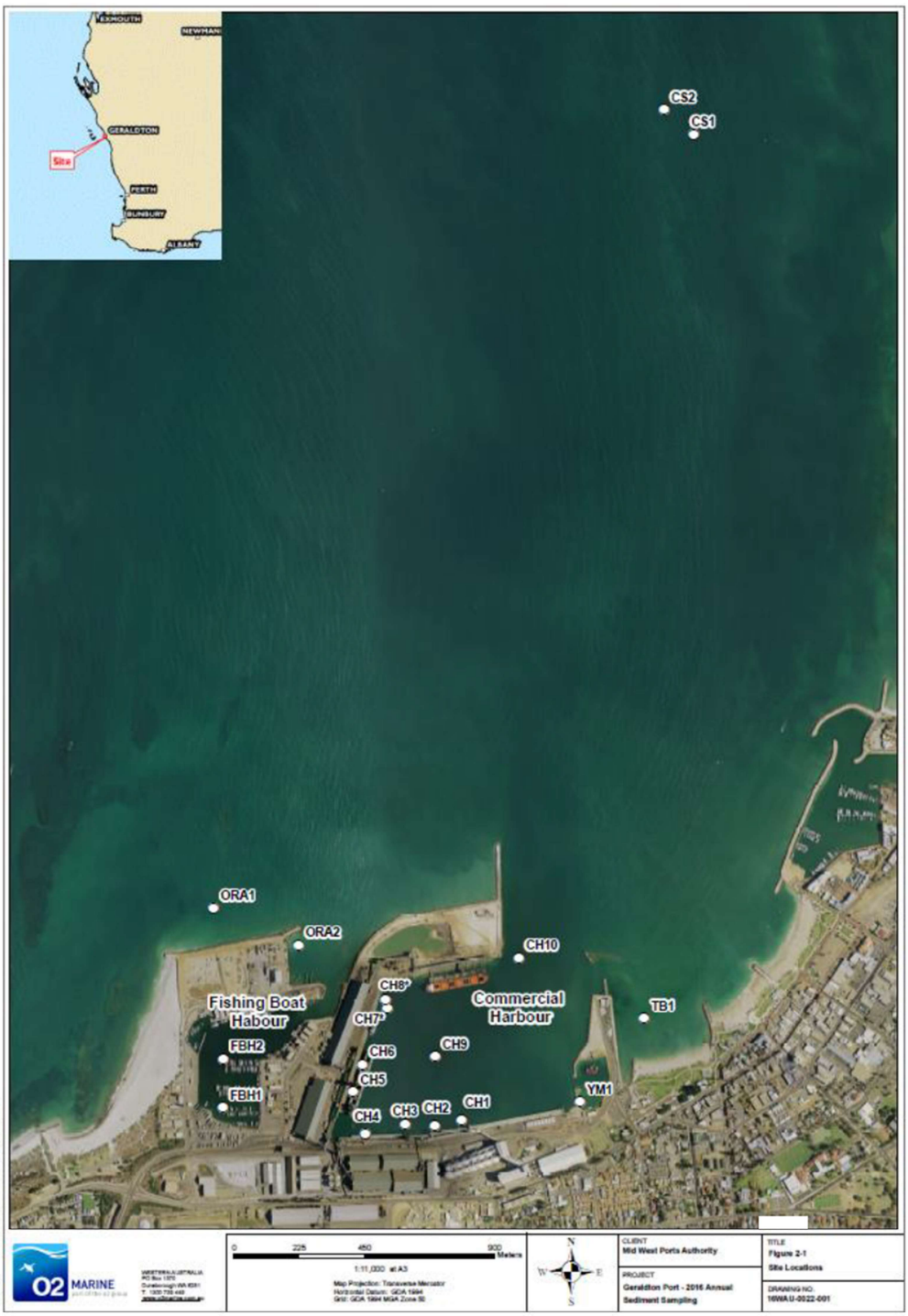

Figure 3: 2017 Sediment sampling locations

Consultation

DWER referred the Amendment Application to authorise up to 300,000 tonnes per year of manganese ore from the Premises on 26 February 2018 to the Department of Health (DoH) and City of Greater Geraldton for a 21 day comment period. The Amendment Application was also made available for review at the Department's website.

Department of Health

On 20 April 2018, the DoH provided no objections to the proposal providing that:

- The dust management controls at the facility are industry best practice; and
- In the opinion of the DWER's air-quality branch the increased capacity through the port is unlikely to increase the number of exceedances of the dust limits.

Following the risk assessment outlined below, the Delegated Officer has decided that a range of regulatory controls should be applied to the Licence to manage the risk to public health and amenity to an acceptable level. DWER acknowledges that the rotating tipping frame method of handling bulk granular material significantly reduces the level of exposure of that material to the open environment and consequently reduces the ability for dust generation, when compared to traditional handling methods.

It should be noted that existing Licence conditions do not provide limits on dust concentrations in ambient air, with the exception of lead as TSP. Therefore DWER has considered the DoH's comments with reference to the potential for exceedances to NEPM.

Ambient dust concentrations on any given day will depend on the activity of a range of dust sources (Premises and non-port related) and meteorological factors.

Based on the limited information available, it is not possible to assess if exceedances are likely to increase due to the introduction of the proposed operation. However, it is noted that the proposal will not result in an increase in the maximum daily throughputs at the Premises. The following additional controls for the management of dust have been identified:

- Installation of truck wheel-wash facilities to prevent track out. Track out would result in a buildup of dust along access routes which would eventually become a source of dust.
- Regular sweeping down of bitumen roads or watering/chemical stabilisation of gravel roads.
- Covered truck loads.
- The implementation of additional loading controls based on meteorological conditions.
- A review of the location of the background monitor.

The risk assessment within this Amendment Notice is restricted to the bulk handling of manganese ore only. The introduction of further dust management controls relating to other Premises activities will be considered following a full risk-based review. These controls may include management actions triggered by meteorological conditions or changes to monitoring requirements.

City of Greater Geraldton

On 8 March 2018, the City of Greater Geraldton provided comment noting the potential adverse health effects of manganese if presented in concentrated levels at sensitive receptors. The City of Greater Geraldton provided the recommendation that the Licence Holder continue water and air quality monitoring to ensure that exposure levels are kept to a minimum and that emergency response procedures be developed in case of upset conditions.

DWER has considered these comments and notes that sediment and air quality monitoring will continue to be required under the Licence. Following the risk assessment below the Delegated Officer has determined that ambient water quality monitoring for manganese is not required based on the low risk associated with insoluble manganese in the marine environment. The recommendation for marine water quality monitoring will be considered through a full risk-based review of the Premises scheduled for commencement within the next six months.

Ambient air quality monitoring data currently provided to DWER in accordance with existing Licence conditions will continue to be used to ensure regulatory oversight and will also be used to assist the full risk-based review of the Premises. Response procedures during 'upset conditions' will be considered through this review process and where the risk to receptors justifies such prescriptive controls.

Location and receptors

Table 3 below lists the relevant sensitive land uses in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 3: Receptors and distance from activity boundary

Residential and sensitive premises	Distance from Prescribed Premises
Residential	750 m southeast of Berth 6 100 m south of the Premises boundary
Light industry	700 m southeast of Berth 6
Fishing Boat Harbour	215 m west of storage shed entrance

Table 4 below lists the relevant environmental receptors in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment. No specified ecosystems were identified in proximity to the Premises through this assessment.

Table 4: Environmental receptors and distance from activity boundary

Environmental receptors	Distance from Prescribed Premises
Geraldton Inner Harbour marine environment	Directly adjacent to Primary Activities
Seagrass communities in Champion Bay	Approximately 1 km from the entrance to the Geraldton Inner Harbour

Risk assessment

Error! Reference source not found. below describes the Risk Events associated with the amendment consistent with the *Guidance Statement: Risk Assessments*. Both tables identify whether the emissions present a material risk to public health or the environment, requiring regulatory controls.

Table 5: Risk assessment for proposed amendments during operation

Risk Event						Continue risk assessment?	Reasoning
Source/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**		
Cat 58 Bulk material loading or unloading	Manganese in-loading, transfer to containers and out-loading using a rotating tipping frame	**Dust**: Handling of manganese ore escaping the shed, loading equipment/ facilities and vessel hold.	Residential receptors and the Fishing Boat Harbour	Air: wind dispersion	Health and amenity impacts	Yes	Refer to risk assessment below.
			Marine environment	Dust settling in the marine environment	Suspended solids and ecotoxicity	Yes	Refer to the section "Surface water discharges" below for an assessment on risks to the marine environment.
		Surface water discharges: Spills, **s**tormwater and wash water discharges to the marine environment.	Marine environment including benthic environment	Direct discharge to the Geraldton Inner Harbour	Suspended solids and ecotoxicity	Yes	Refer to risk assessment below.
		Noise: Truck movements at the Premises and operation of the rotating tipping frame generating noise.	Residential receptors and the Fishing Boat Harbour	Air	Impacts to amenity	Yes	Refer to risk assessment below.
		Odour: Odour from the manganese ore.	Residential receptors and the Fishing Boat Harbour	Air: wind dispersion	Impacts to amenity	No	Manganese ore does not have a distinct odour.

Risk Event - Dust

Fugitive dust generated during the loading of manganese ore into vessels may be transported by wind to the nearest sensitive receptor located approximately 750 m from Berth 6. Chronic exposure to manganese dust in ambient air may contribute to lung disease and effects on the nervous system (WHO, 1999).

The World Health Organization (WHO) has established a provisional guideline for respirable manganese in ambient air of 0.15 µg/m^3 averaged annually and a guideline for occupational exposure levels of 0.3 mg/m^3. However, due to limited test studies of the effects of ambient respirable manganese dust on community populations there remains uncertainty about the pulmonary effects of low-level/non-occupational manganese exposure (WHO, 2001). There are no relevant guidelines for manganese in ambient air averaged over a 24-hour period.

The NEPM specifies an air quality guideline value for PM_{10} of 50 µg/m^3 averaged over a 24-hour period, with five exceedances per year.

The hazards associated with fugitive dust from loading manganese ore are heavily influenced by particle size, with the smaller particles representing a greater level of risk to human health.

Table 6: Specifications of manganese lump and fines products

Specification	Horseshoe Manganese DSO Screened Lump (7-50 mm)	Horseshoe Manganese DSO Fines (<7 mm)
Particle size distribution (% of product finer than 10 microns)	0%	3.17%
Particle size distribution (% of product finer than 100 microns)	0%	11.70%
Dust Extinction Moisture	Not provided	0.94%
Transportable Moisture Limit	Not provided	8.8%
Silica (SiO_2) content	<1%	<1%
Solubility in water	Insoluble	Insoluble
Odour	None	None

Although lump product is not expected to consist of respirable dust once screened, product transport and re-handling (stockpiling and loading into containers) are likely to result in the generation of a small fraction of fines.

The Licence Holder has proposed the following key controls to manage dust from manganese handling operations:

- When loading manganese into Rotaboxes the shed door will remain closed at all times unless doors are open for the ingress and egress of trucks used to transport the product to the Premises.
- Loading of manganese product will occur using a Rotabox that remains sealed until the container is below the hold of the vessel.
- Product is loaded into the vessel at a drop height of no more than two metres.
- Product moisture is maintained above the DEM level for each manganese product.
- A sweeper is available to remove any spills generated during loading and is operated daily.

Product moisture is tested at the mine and prior to haulage for comparison against the DEM level. The Licence Holder has also proposed to analyse the moisture content of the manganese product

within the shed and prior to loading the product into Rotabox containers for approximately every for every 1,000 to 2,000 tonnes of product handled. The DEM level of manganese will be retested at least every 12 months to confirm that the DEM level has not changed.

Taking into consideration the relevant factors discussed in this report, the Delegated Officer has determined that general fugitive dust as PM_{10} is the primary parameter of concern from the Premises.

The low human toxicity and respirable fraction of both manganese fines and lump products suggests that specific consequence criteria for health are likely to be met. Low level impacts to amenity at a local level may occur as a result of dust lift-off from additional truck movements associated with the proposal. Therefore the consequence of loading manganese fines and lump products out of the Premises has been determined to be **minor**.

The following additional controls will be required to manage this risk:

- Installation of truck wheel-wash facilities to prevent dust from being tracked beyond the shed.
- Regular sweeping down of Berth 6 and surrounds.

Proposed handling methods and the maintenance of ore moisture contents above the DEM level reduce the likelihood of dust emissions resulting in impacts to public health and the environment to **unlikely** as the risk event will probably not occur in most circumstances.

The overall rating for the risk of dust impacts on sensitive receptors during operation is **Medium** based on Licence Holder controls and product quality.

Risk Event – Surface water discharges

Dissolved manganese can be toxic to marine organisms if it is soluble. For example, the effective concentration, a measure of biotoxicity, for 50% of marine mussels (EC50) is 30 mg/L and 50 mg/L for marine green alga (Qube, 2017). The maximum concentration of dissolved manganese in the marine environment to avoid observable effects for marine invertebrates is 1.3 mg/L (Qube, 2017).

However, both manganese lump and fines products from the Little Horseshoe Lights Mine Site is insoluble in water and is not expected to result in toxic effects to the marine environment. Therefore the greatest risk to the marine environment is from increased turbidity as a result of manganese being allowed to enter the marine environment from surface water discharges resulting in reduced light to aquatic organisms. The Geraldton Inner Harbour has been dredged and is a highly disturbed ecosystem and has a low ecological conservation value.

Given the above, in the event that low product moisture results in dust liftoff and deposition in the marine environment, or manganese ore collected on Berth 6 is collected with stormwater and discharged to the Geraldton Inner Harbour, on-site impacts are expected to be minimal. Therefore the consequence of manganese ore entering the marine environment in these concentrations is assessed as being **slight**.

The Licence Holder has proposed to operate sweeper and vacuum trucks to clean up any spilt material. As product will be handled outside of sheds within containers that remain closed until within the hold of the ship, there is not expected to be a spillage of manganese ore. There remains a possibility that manganese dust could be tracked from the shed where it is stored in bulk to the berth. From here manganese dust could enter stormwater and be discharged to the Geraldton Inner Harbour in the event of rainfall. The likelihood has been determined to be **possible** as the risk event could occur at some time.

The overall rating for the risk of dust impacts on sensitive receptors during operation is **Low**.

Risk Event – Noise

Noise has the potential to impact the amenity and comfort of nearby residential receptors. The closest receptor is located approximately 750m to the southeast of Berth 6. The Licence Holder is required to comply with the *Environmental Protection (Noise) Regulations 1997*. A search of DWER's Incident

and Complaints Management System identified one noise complaint received by the Department in the last five years relating to Port activities.

Noise from manganese ore loading activities will be generated from the additional 8 to 10 truck movements per day, the operation of front end loaders within the storage shed and the rotating tipping frame used to load the manganese ore into the vessel's hold. Noise generated from beyond the Premises boundary has not been considered in this risk assessment. This includes noise from trucks along the Port access road, which directs traffic around the western side of the industrial area to the south of the Premises.

Loading is expected to take approximately 85 hours for a 25-30,000 tonne shipment and therefore night-time loading will be required. Cumulative impacts may occur when loading manganese ore during the operation of other noise generating sources at the Premises. As 24 hour loading is already undertaken at Berth 6, maximum noise levels are not expected to increase. Therefore the consequence of noise being generated from proposed activities has been assessed as **minor** due to the potential for low level impacts to amenity when considered alongside other noise generating activities.

Noise exceedances of Assigned Levels are most likely to occur at night at times where wind speeds and temperatures are lower. The Delegated Officer has determined that the likelihood of noise exceedance increases due to more frequent night-time activity at Berth 6. Due to the low frequency of shipments (approximately one per month), the likelihood of the proposal significantly contributing to noise levels is **rare** and may occur only in exceptional circumstances.

The overall rating for the risk of noise impacts on sensitive receptors during operation is **Low**.

Decision

This amendment authorises the handling of bulk manganese ore into vessels out of Berth 6 using a Rotabox system. Ore will be received in bulk, and the Rotabox containers filled within a shed that is under negative pressure as a result of a dust extraction system. The Licence Holder's proposed controls for the handling of manganese out of Berth 6 are conditioned on the Licence to ensure that risks are reduced to acceptable levels.

Further monitoring and reporting conditions have been applied to the Licence to allow DWER to ensure that product specifications are consistent with the application and assessed risk. The existing Port dust monitoring network will also be used to monitor and assess dust impacts from manganese ore handling operations.

The additional monitoring data received will be used to better inform a full risk-based review of the Premises in accordance with DWER's Regulatory Framework. This risk-based review and assessment is scheduled to be commenced in mid-2018 and will include all prescribed premises activities including activities authorised through this amendment. Changes to the conditions imposed under this Amendment Notice may occur as part of the review.

Regulatory controls

Dust

The Delegated Officer has determined that Condition 1.3.5, which controls the handling methods of manganese ore, is necessary to limit the pathway for the product to enter ambient air.

The assessment of risk was in part based on the moisture content of manganese ore exceeding the DEM level. It was further based on the particle size distribution of both product streams being shipped. Therefore this Amendment Notice requires the Licence Holder to maintain accurate records of the manganese ore (lump and fine) moisture content, particle size distribution and DEM level to allow DWER to:

- confirm that this assessment accurately reflects the risk to sensitive receptors from hazards associated with the product; and
- determine compliance with licence controls, namely minimum product moisture requirements

specified under Condition 1.3.6.

Existing monitoring equipment will be used to monitor annual averages of ambient manganese in air for comparison against WHO standards and 24-hour averaged peaks to verify that day-to-day dust controls are effective.

Noise

No further conditions have been applied to the Licence in relation to noise emissions as the risks are considered acceptable.

Discharges to Water

No further conditions have been applied to the Licence in relation to the protection of the marine environment as the risks are considered acceptable. However, conditions for the management of dust to handle manganese ore within enclosed containers and sheds also limit the ability for manganese to enter the Geraldton Inner Harbour.

Licence Holder's comments

The Licence Holder was provided with the draft Amendment Notice on 6 June 2018. Comments received from the Licence Holder have been considered by the Delegated Officer as shown in Appendix 2.

Amendment

1. The Licence is amended by the insertion of the following Conditions:

1.3.5 The Licence Holder must:

(a) operate shed dust extraction equipment at all times when in-loading manganese ore into the manganese ore shed or when loading manganese ore into containers, resulting in a negative-pressure effect within the shed;

(b) keep the manganese ore shed closed when loading manganese ore into containers, unless doors are open for the ingress or egress of trucks;

(c) wash truck wheels prior to leaving the storage shed for the purpose of preventing the tracking out of manganese dust; and

(d) ensure that all manganese ore containers remain closed at all times when outside of the ship's hold and manganese ore storage shed.

1.3.6 Following each shipment of manganese ore, the Licence Holder must sweep all areas within the Premises where manganese ore is transported including, but not limited to, Berth 6 and the trafficable route from the manganese ore stockpile shed.

1.3.7 Where the DEM level can be determined for a distinct manganese ore product, the Licence Holder must only accept that product if it contains a Moisture Content above the DEM level.

1.3.8 For the purpose of determining compliance with Condition 1.3.7, the Licence Holder must obtain and maintain for each manganese ore product:

(a) accurate records of the DEM level, as derived from the application of AS4156.6-2000; or

(b) a declaration from a third party laboratory stating that determination of DEM is not possible for that distinct manganese ore product.

1.3.9 The Licence Holder must obtain and maintain accurate records of the representative Moisture Content for each shipment of manganese ore (fines and lump).

1.3.10 The Licence Holder must within 30 days of the first shipment from the Premises of

each distinct bulk manganese ore, and on a subsequent annual basis, determine the particle size distribution for each manganese ore product.

2 Condition 3.8.1 of the Licence is amended by the insertion of the red text shown in underline below:

3.8.1 The Licensee shall undertake the monitoring in Tables 3.8.1 and 3.8.2 according to the specifications in those tables and record and investigate results that do not meet any target specified.

Table 3.8.1: Monitoring of ambient air quality

Monitoring point reference and location (as shown in schedule 1)	Parameter	Limit	Target	Units[1]	Averaging period	Frequency[2]	Method
Berth 1; Lemmon Road; Port Way; Connell Road	Lead as TSP	0.5	-	µg/m^3	3 month rolling average[3]	Continuous during shiploading events	Mid West Ports Authority Air Quality Sampling and Analysis Plan
Berth 1; Lemmon Road; Port Way; Connell Road	Copper as PM_{10}	-	1.0	µg/m^3	24 hours	Continuous during shiploading events	
	Manganese as PM_{10}	-	-				
	Nickel as TSP	-	0.14				
	Particulates as TSP	-	90			Continuous	
	Particulates as PM_{10}	-	50				
	Manganese as PM_{10}	-	0.15	µg/m^3	Annual Rolling Average	Continuous during shiploading events	
Berth 1; Lemmon Road; Port Way	Lead as PM_{10}	-	0.5	µg/m^3	24 hours	Continuous during shiploading events	
Connell Road	Lead as PM_{10}	-	2.0	µg/m^3	24 hours	Continuous during shiploading events	

Note 1: All units are referenced to STP dry
Note 2: Continuous monitoring is permitted to include gaps equating to no more than 2 hours in every 24 hour monitoring period as required for the changing of HiVol sampler filter papers.
Note 3: The three month rolling average is to be calculated using the methodology outlined in schedule 3.

3 Condition 5.2.1 of the Licence is amended by the insertion of the red text shown in underline below:

5.2.1 The Licensee shall submit to the CEO an Annual Environmental Report within 64 calendar days after the end of the annual period. The report shall contain the information listed in Table 5.2.1 in the format or form specified in that table.

Table 5.2.1: Annual Environmental Report		
Condition or table (if relevant)	**Parameter**	**Format or form[1]**
-	Summary of any failure or malfunction of any pollution control equipment and any environmental incidents that have occurred during the annual period and any action taken	None specified
1.3.7	Representative DEM level for each distinct manganese product handled in the Annual Period.	None specified
1.3.9	Moisture Content averaged over each shipment.	None specified
1.3.10	Particle size distribution of each distinct manganese ore product (lump and fines)	None specified
Table 3.8.1	Ambient air quality monitoring and a comparison against specified targets	None specified
Table 3.8.2	Ambient sediment monitoring	None specified
5.1.3	Compliance	Annual Audit Compliance Report (AACR)
5.1.4	Complaints summary	None specified

Note 1: Forms are in Schedule 2

4 Condition 5.2.3 of the Licence is amended by the insertion of the red text shown in underline below:

5.2.3 The Licensee shall submit the information in Table 5.2.2 to the CEO according to the specifications in that table.

Table 5.2.2: Non-annual reporting requirements				
Condition or table (if relevant)	**Parameter**	**Reporting period**	**Reporting date (after end of the reporting period)**	**Format or form[1]**
-	Copies of original monitoring reports submitted to the Licensee by third parties	Not applicable	Within 14 days of the CEOs request	As received by the Licensee from third parties
1.3.8; 1.3.9; and 1.3.10	Particle size distribution; DEM level (where applicable[2]); and Moisture Content averaged over the first shipment of each distinct manganese ore product (lump and fines)	Not applicable	Within 30 days of the first shipment of each distinct manganese ore product (lump and fines)	None specified
3.8.1	Meteorological data and a description of all ship loading and unloading activities occurring the day before, day of and day after manganese loading.	Quarterly	Three months and then six months from the commencement of this Amendment notice	Tabulated
Table 3.8.1	Three month rolling average ambient air quality concentration for lead	Quarterly	Within 30 days after the end of each quarterly period	None specified
Table 3.8.1	Target exceedances	Quarterly	Within 30 days	ET1

			after the end of each quarterly period	
Table 3.8.1	Lead, copper or nickel target exceedances	Not applicable	Within 7 days of becoming aware of exceedance	ET1~~2~~3
Condition 3.8.2	Sediment sampling exceedances	Not applicable	Within six weeks of becoming aware of an exceedance	None specified

Note 1: Forms are in Schedule 2

Note 2: Where DEM cannot be determined for that distinct manganese ore product, evidence obtained in accordance with Condition 1.3.8 must be supplied.

~~Note 2~~ Note 3: The report shall also include a summary of the Shiploading Events associated with the exceedances including the type and quantity of cargo loaded and the date and time of commencement and completion of loading. The report shall also include air quality data for all parameters detailed in Table 3.8.1 recorded during any Shiploading Event undertaken during the period of the exceedances.

5 The Licence is amended by insertion of the following definitions:

Annual Rolling Average means the 12 month average calculated using the Monthly Average using the following formula:

$$\frac{\textit{Monthly Average} + \sum \textit{Previous 11 Monthly Averages}}{12}$$

DEM means the dust extinction moisture which is the Moisture Content expressed as a percentage of the product at which the dust number is 10 derived from the Australian Standard AS4156.6-2000.

Moisture Content means the ratio of the mass of water in a sample to the mass of solids in the sample, expressed as a percentage. In equation form:

$$w = \frac{m_1 - m_2}{m_1} \times 100$$

Where:
w = moisture content of sample;
m_1 = initial mass, in grams, of the test portion; and
m_2 = mass, in grams, of the test portion after drying.

Monthly Average means the average concentration calculated each calendar month using the following formula:

$$\frac{(A \times B) + C}{\textit{Number of days in calendar month}}$$

Where:
A = The average concentration calculated from all 24-hour sample collected during the calendar month.
B = The number of 24-hour periods in the calendar month where sampling was not required.
C = The sum of all 24-hour samples collected during the calendar month.

Appendix 1: Key documents

	Document title	In text ref	Availability
1.	DER, July 2015. *Guidance Statement: Regulatory principles.* Department of Environment Regulation, Perth.	N/A	Accessed at: www.dwer.wa.gov.au
2.	DER, October 2015. *Guidance Statement: Setting conditions.* Department of Environment Regulation, Perth.	N/A	
3.	DER, August 2016. *Guidance Statement: Licence duration.* Department of Environment Regulation, Perth.	N/A	
4.	DER, November 2016. *Guidance Statement: Risk Assessments.* Department of Environment Regulation, Perth.	N/A	
5.	DER, November 2016. *Guidance Statement: Decision Making.* Department of Environment Regulation, Perth.	N/A	
6.	Geraldton Port Authority (2006) Annual Report 2005/2006	MWPA, 2006	Accessed at: https://www.midwestports.com.au/Profiles/midwestports/Assets/ClientData/Documents/AnnualReport/2005-2006.pdf
7.	O2 Marine (2017) Geraldton Port Annual Sediment Compliance Survey – 2017.	O2 Marine, 2017	DWER records (A1617956)
8.	Qube (2017) SDS – Safety Data Sheet, Product Name: Horseshoe Manganese DSO Lump and Fines.	Qube, 2017	DWER records (A1138980)
9.	Toxikos (2010) Development and application of the Threshold of Toxicological Concern to screening evaluation of air toxics. Prepared for the Department of Health.	Toxikos, 2010	DWER records (A1138980)
10.	World Health Organization (2001) Chapter 6.8 – Manganese.	WHO, 2001	Accessed at: http://www.euro.who.int/__data/assets/pdf_file/0003/123078/AQG2ndEd_6_8Manganese.pdf
11.	World Health Organization (1999) Concise International Chemical Assessment Document 12 – Manganese and its compounds.	WHO, 1999	Accessed at: http://www.inchem.org/documents/cicads/cicads/cicad12.htm

Appendix 2: Summary of Licence Holder comments

The Licence Holder was provided with the draft Amendment Notice on 6 June 2018 for review and comment. The Licence Holder responded on 27 June 2018 providing the following comments on the draft Amendment Notice.

Condition	Summary of Licence Holder comment	DWER response
1.3.6	Trafficable areas between berth 6 and the manganese ore stockpile shed includes public roads. Therefore, MWPA have suggested the below alternative wording to ensure sweeping occurs within the Port's boundary and jurisdiction. *Following each shipment of manganese ore, the Licence Holder must sweep Berth 6 and the trafficable route within the Bulk Mineral Storage Area from the ~~and the trafficable areas between Berth 6 and the~~ manganese ore stockpile shed.*	Noted. The intent of this condition is to manage fugitive emissions from deposited dust as a result of manganese ore handling activities within the Premises. As the 'Bulk Mineral Storage Area' is not defined within the Licence, the condition has been amended to state: *Following each shipment of manganese ore, the Licence Holder must sweep ~~Berth 6 and the trafficable areas between Berth 6 and the~~ all areas within the Premises where manganese ore is transported including, but not limited to, Berth 6 and the trafficable route from the manganese ore stockpile shed.*
3.8.1	Table 3.8.1: Monitoring of ambient air quality. Noted that the parameter for Manganese as PM^{10} has a target of 0.15 µg/m^3 with an averaging period annually. MWPA request clarification of the methodology required to calculate the annual average (e.g. as per Schedule 3 which identifies methodology for lead three month rolling average).	Agreed. The averaging period has been changed to an Annual Rolling Average, which is now defined. The formula used to calculate the Annual Rolling Average closely resembles that used to calculate the 3-month rolling average specified in Schedule 3.
5.2.1/1.3.7	Table 5.2.1 – Section 1.3.7: Laboratory advice indicates that Dust Extinction Moisture (DEM) and Transportable Moisture Limit (TML) are not measurable using the laboratory methodologies for these tests due to the product particle size distribution. MWPA are awaiting confirmatory evidence from the customer's laboratory. MWPA can provide upon receipt. MWPA request revision of condition 1.3.7 to reflect DEM and TML for fines only (as per previously provided data) as per the below. *Representative DEM level for ~~each distinct~~ manganese ~~ore products~~*	Condition 1.3.7 has been amended to allow for the exclusion of some manganese products from the requirement to maintain a Moisture Content above DEM, where it can be demonstrated from a third party that the DEM level cannot be determined. Should the Licence Holder decide to trial the shipment of an alternative manganese lump ore, for example a product from a different supplier, evidence must be provided to demonstrate that the determination of DEM

Condition	Summary of Licence Holder comment	DWER response
	~~(lump and fines)~~ fines handled in the Annual Period.	is not possible. Alternatively, if the DEM level can be determined, that product must be handled with a Moisture Content at or above the DEM level.
5.2.1/1.3.8 (now 1.3.9)	Table 5.2.1 – Section 1.3.8: As per information above the moisture content will not be measured for lump product and therefore only reported for fines. MWPA request revision of condition 1.3.8 to reflect the below: *Moisture Content averaged over each shipment for manganese fines.*	Noted. Both the application and DWER's risk assessment identified that ore moisture presents a key control for the management of dust from all manganese ore types. The requirement to monitor the moisture content of manganese lump product will assist DWER in the investigation of any dust events and the potential for dust-off from all dry products, including those that do not have a specified DEM level. No change has been made to the requirement to monitor moisture content from all manganese ore products (lump and fines).
5.2.3	Table 5.2.2: As per the above MWPA request the non-annual reporting parameter for manganese to reflect fines only and remove reference to lump. Parameter description to be revised as per the below: *Particle size distribution; DEM level; and Moisture Content averaged over the first shipment ~~of each distinct~~ for manganese ~~ore product, (lump and fines)~~ fines. Particle size distribution averaged over the first shipment for manganese lump.*	Noted. The condition has been amended to allow for only the provision of particle size distribution and Moisture Content data for manganese products that have an indeterminable DEM level.
Licence Holder comments on the Risk Assessment		
Section	**Summary of Licence Holder comment**	**DWER response**
Table 6	Request that the cells for the DEM and TML for Horseshoe Manganese DSO Screened Lump (7-50mm) remain as "Not applicable" as laboratories have identified that these parameters are not measurable for this product due to the product particle size distribution.	Noted. The Licence Holder will be required to submit evidence from a third-party laboratory that Horseshoe lump DEM and TML cannot be measured and within 30 days of the first shipment of that ore product in accordance with condition 5.2.3.