



Application for Licence Amendment

Division 3, Part V Environmental Protection Act 1986

Applicant:	Fremantle Port Authority
ACN/ABN:	78 187 229 472
Licence Number:	L4476/1984/12
File Number:	DWER2015/002744-1
Premises:	Kwinana Bulk Terminal Riseley Road KWINANA BEACH, WA, 6167
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1. Definitions of terms and acronyms

In this Decision Report, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
AACR	Annual Audit Compliance Report
ACN	Australian Company Number
AER	Annual Environment Report
Amended Licence	means Reviewed Licence L4476/1984/12 as amended 26 February 2019 under Part V, Division 3 of the EP Act.
AS 4156.6 – 2000	Australian Standard AS 4156.6 – 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 <i>Environmental Protection Act 1986</i> 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 <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DoH	Department of Health
DWER	Department of Water and Environmental Regulation As of 1 July 2017, the Department of Environment Regulation (DWER), the Office of the Environmental Protection Authority (OEPA) and the Department of Water (DoW) amalgamated to form the Department of Water and Environmental Regulation (DWER). DWER was established under section 35 of the <i>Public Sector Management Act 1994</i> and is responsible for the administration of the <i>Environmental Protection Act 1986</i> along with other legislation.

EPA	Environmental Protection Authority
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
EP Regulations	<i>Environmental Protection Regulations 1987 (WA)</i>
Existing Licence	The Reviewed Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of this Amended Licence.
KIA	Kwinana Industrial Area as defined in the Kwinana EPP
Kwinana EPP	<i>Environmental Protection (Kwinana) (Atmospheric Wastes) Regulations 1992</i>
Licence Holder	Fremantle Port Authority
m ³	cubic metres
Mtpa	Million tonnes per annum
NEPM	National Environmental Protection (Ambient Air Quality) Measure
Noise Regulations	<i>Environmental Protection (Noise) Regulations 1997 (WA)</i>
Occupier	has the same meaning given to that term under the EP Act
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.
Reviewed Licence	means Licence L4476/1984/12 as amended on 29 July 2016 following a full risk-based review of the Premises.
Risk Event	As described in <i>Guidance Statement: Risk Assessment</i>
tpa	tonnes per annum
µg/m ³	micrograms per cubic metre

2. Background

Fremantle Port Authority (Licence Holder) holds a licence (L4476/1984/12) for a Category 58 premises under the *Environmental Protection Act 1986* (EP Act) for the Kwinana Bulk Terminal (KBT/the Premises). KBT is located within the Kwinana Industrial Area (KIA) and has two berths (one operational, one non-operational) extending into the Cockburn Sound. The Licence Holder has held a licence for KBT since 7 February 2002. KBT has been licensed since 1984, and the previous licence holder was Australian Iron and Steel Pty Ltd (BHP Billiton bulk handling).

The Licence Holder is a port authority established by section 4 of the *Port Authorities Act 1999* (PA Act). KBT is a port controlled and managed by the Licence Holder under the PA Act. The land upon which KBT is situated is port land under the PA Act, meaning land vested or acquired by a port authority.

As part of the Western Australian State Government consideration of port asset divestment the Licence Holder requested that the Department of Environment Regulation (DER, now Department of Water and Environmental Regulation [DWER]) review and update licence L4476/1984/12 to ensure that the regulatory obligations were appropriate for the current operation. The Licence review was completed in June 2016 in accordance with the Department's *Guidance Statement on Regulatory Principles* (July 2015).

2.1 Amendment June 2016

Following issuing of the Reviewed Licence on 9 June 2016, it was noted that there was an administrative error within the instrument. An amendment to the Licence was made under section 59(1)(e) of the EP Act and changes are detailed in Appendix 2.

2.2 Amendment 26 February 2019

On 15 March 2017, Fremantle Port Authority (the Licence Holder/Licence Holder) submitted an application under the EP Act to authorise:

- an export of approximately 400,000 tonnes per year of spodumene concentrate (lithium 4.0 – 6.5%);
- an increase in bauxite export tonnage from up to 300,000 (combined¹) to 1,300,000 (bauxite only) per year; and
- an increase in overall throughputs from 7.6 million tonnes per annum (Mtpa) to 9.6Mtpa,

from the Kwinana Bulk Terminal (KBT/the Premises).

In order to provide berth availability for the additional bulk granular material, the Licence Holder proposes to relocate approximately 300,000 tonnes per annum of cement clinker imports to Kwinana Bulk Jetty (KBJ). The KBJ licence (L4474/1976/14) was amended in May 2018 to authorise an increase in throughput capacity for cement clinker from 350,300 tonnes per annual period to 650,300 tonnes to allow for increased throughputs at KBT.

On 8 May 2018, the Licence Holder later submitted an addendum to the application requesting an increase in bauxite export tonnage to 2,500,000 tonnes per annum from the originally

¹ Note that the products included within the combined throughput volume on the Existing Licence are bauxite, granulated slag, gypsum and nut coke. Granulated slag, gypsum and nut coke will continue to be handled at the Premises at similar volumes (of up to 300,000 tonnes per annual period combined).

proposed 1,300,000 tonnes per annum. To facilitate this increase in throughputs the Licence Holder requested that iron ore tonnages be reduced on the Licence from 6,300,000 to 5,100,000 tonnes per annum. Bauxite and iron ore are handled at the Premises using the same methods, equipment and infrastructure.

It is proposed that the increased tonnages of bauxite ore will continue to be brought onto site using either trucks or trains, then placed on a portion of the iron ore pad. It is then loaded onto the EC05 and EC06 conveyor using front end loaders (FELs) via hoppers (H1 to H7).

Spodumene will be brought onto site using trucks and then placed on the EC03 stockpile pad. It will then be loaded onto the EC03 conveyor using FELs that tie into the existing export system at the T10 transfer tower, then onto the JC01 and JC03 conveyors and the cargo discharged using the AL04 ship loader.

The application also requested that conveyor EC03 be included in Schedule 2 of the Licence to describe the movement of product from the EC03 stockpile to the shiploader. The conveyor system has been operational prior to the issue of the Existing Licence and was omitted in error.

During the review of the Licence Holder's amendment applications, DWER developed a set of standard conditions in consultation with all Port Authorities, including the Licence Holder, that would allow for new bulk granular materials not currently handled at the Kwinana Bulk Terminal (the Premises), to be handled in a test scenario. Further consideration of the application of these conditions to the Amended Licence is provided in section 8.5.6 and the *Guideline: Port Authority bulk handling Trials – Category 58 and 58A* published on the Department's website.

3. Overview of the Premises

KBT is one part of the Licence Holder's port operations. KBT is a bulk loading and unloading facility operated by the Licence Holder and located within the Cockburn Sound.

It comprises two parallel jetties (KBB1 or Jetty No.1 and KBB2 or Jetty No.2) that extend into Cockburn Sound in a north-westerly direction. KBB2 was constructed in 1964/65. Operations on KBB1 have been suspended indefinitely as it is no longer serviceable. DWER has not assessed this infrastructure and KBB1 has been excluded from the premises in the Revised Licence.

3.1 Infrastructure

KBT infrastructure, as it relates to Category 58 activities, is detailed in Table 2 with reference to the Premises Map, Building Identification Plan, and Conveyor Identification Plan (all plans are attached in the Revised Licence).

Table 2: KBT Category 58 infrastructure

	Infrastructure	Plan reference
1	Import storage shed	Building Identification Plan 120-302: 326
2	Export storage shed	Building Identification Plan 120-302: 325
3	Clinker (bulk material) storage silos	Premises Map
4	Rail Tippler facilities – narrow and standard gauge	Building Identification Plan 120-302: 327
5	Administration and workshop buildings	Building Identification Plan 120-302: 321 and 324
6	Single jetty (KBB2 or No.2 Jetty)	Building Identification Plan 120-302: 322

	Infrastructure	Plan reference
7	Grab loader-unloader with a discharge rate of up to 2,000 tonnes per hour (t/h)	Conveyor Identification Plan 120-606
8	Grab unloader with a discharge rate of 700 – 800t/h with bag house	Conveyor Identification Plan 120-606 General Site Plan: AL05
9	Hopper systems	Building Identification Plan 120-302
10	Conveyor systems for imports from the transfer point on KBB2 to the land based stockpiling or storage facilities.	Conveyor Identification Plan 120-606: T1, IC01, T2 and IC11 (to Bulk Storage Silos); or T1, IC01, T2, IC02 and IC03 (to import sheds or stockpiles)
11	Conveyor system for exports from rail tippler facilities to KBB2.	Conveyor Identification Plan 120-606: RC01, RC02 (to stockpiles) EC03, EC05 and EC06 (to KBB2 conveyor) JC01, JC03 and JC04 conveyors
12	Stockpile storage areas	Premises Plan
13	Stormwater Infiltration Basins	Building Identification Plan 120-302: Area 'A – D' Stormwater Infiltration Basin

3.2 Operational Aspects

The conveyor system delivers bulk product to and from KBB2 with imported material being transferred off site by trucks. The berth loader and conveying system has a maximum loading rate of 2,000 tonnes per hour. KBB2 is available for 24-hours a day, seven days a week.

Bulk products currently handled through KBT include bauxite, cement clinker, iron ore, gypsum, granulated slag and nut coke. Iron ore exports are the largest bulk cargo handled annually by tonnage. The handling of coal from the Griffin mine in Collie was discontinued in 2015.

The Licence Holder is responsible for all operations and facilities onsite at KBT including all material handling systems, stockpile management and rail line management. DWER confirms that the Licence Holder is the occupier of the premises for the purposes of holding a licence under Part V of the EP Act.

Information on the bulk granular materials imported and exported at KBT for the 2017-2018 period is set out in Table 3 below.

Table 3: Bulk granular materials imported and exported at KBT 2017-2018

	Product	Product owner
Export	Iron ore	Mineral Resources Limited
	Bauxite	Alcoa
	Spodumene	Process Minerals International
Import	Cement clinker	Cockburn Cement and BGC Cement
	Gypsum	BGC Plasterboard
	Granulated slag	Cockburn Cement and BGC Cement

	Product	Product owner
	Nut coke	BHP Billiton

Material descriptions and handling summary are set out in Table 4 below:

Table 4: Material descriptions and handling summary

	Description	Handling
Iron ore	<p>Iron ore comprises of lump ore (6mm to 32mm) diameter and fine ore (<6 mm diameter).</p> <p>Iron ore may contain small quantities of crystalline silica (quartz).</p> <p>Iron ore is not soluble in water.</p>	<p>Iron ore is delivered to the port by rail and is transferred to underground conveyers via a tippler. The train moves through the tippler enclosure (indicated by 327 Rail Tippler Building in Building Identification Plan attached to Revised Licence) in which the material is transferred to conveyor RC01 through bottom dumpers. RC01 rises to above ground level and intercepts transfer station T7 prior to moving to the Stacker Reclaimer for stockpiling.</p> <p>Iron ore is stockpiled on the premises prior to export. The stockpile area is positioned in an east-west direction. The length of the iron stockpile area is approximately 600m in length.</p> <p>Iron ore is reclaimed from the stockpile by front end loaders (FEL), which empty to a series of hoppers (H1 to H7). The iron ore is then transferred to conveyor EC05 and EC06 to intercept the jetty at transfer station T10.</p>
Cement clinker	<p>Cement clinker is granular material ranging from 3mm to 25mm in diameter comprised of calcium silicates.</p> <p>Cement clinker is soluble in water.</p>	<p>Cement clinker is transferred from the jetty via JC01 on import conveyors IC01 and IC11 to enclosed bulk material silos/sheds (silos).</p> <p>Material in the silos is gravity fed through telescopic chutes into truck hoppers for receipt by open trucks positioned beneath the hoppers. Dust extraction units are located on the T1 transfer station, T2 transfer station and the silos.</p> <p>Cement clinker can also be directed from conveyors IC01 to IC02 to the Stacker Reclaimer and along conveyor IC03 to the Import Storage Shed. Negative pressure is applied to the shed when FELs move the cement clinker inside to a hopper which feeds material into a side chute for transferal onto trucks within the shed prior to removal offsite. Shed air is vented through a dust extraction unit.</p>
Bauxite	<p>Bauxite is an aluminum ore consisting mostly of the minerals gibbsite, boehmite) and diaspore, mixed with the two iron oxides goethite and hematite, the clay mineral kaolinite and small amounts of anatase.</p> <p>Bauxite is not soluble in water.</p>	<p>Bauxite is brought onto site using either trucks or trains, then placed on a portion of the iron ore pad. It is then loaded into hoppers (H1 to H7) using FELs to conveyors EC05 and EC06.</p>
Gypsum	<p>Gypsum is a soft sulfate mineral</p>	<p>Gypsum is transferred from the jetty along conveyors</p>

	Description	Handling
	composed of calcium sulfate dehydrate. Gypsum is moderately soluble in water.	IC01 and IC02 to the Stacker Reclaimer, then along conveyor IC03 to stockpiles. Gypsum is reclaimed from the stockpile by FELs and then to trucks.
Granulated Slag	Granulated slag comprises of golf-ball sized round nuggets. Fines can arise. Granulated slag is not soluble in water.	Granulated slag is transferred from the jetty along conveyors IC01 and IC02 to the Stacker Reclaimer then along conveyor IC03 to stockpiles. Granulated slag is reclaimed from the stockpile by FELs and then to trucks.
Nut Coke	Nut coke is a solid carbonaceous material. Nut coke is not soluble in water.	Nut coke is transferred from the jetty along conveyors IC01 and IC02 to the Stacker Reclaimer, then along conveyor IC03 to stockpiles. Nut coke is reclaimed from the stockpile by FELs and then to trucks.

3.2.2 Throughput and Frequency Considerations

Due to the nature of fugitive dust emission concentrations of particulate matter at generation points/sources are not quantified. However, consideration has been given to the throughputs (in tonnes) and frequency of the materials (based on the 2017/18 period).

Table 5: Throughput and frequency of materials based on 2017/18 period

		Throughput (tonnes)	Frequency
Exports	Iron ore	2,267,269 tonnes of iron ore exported (highest material by tonnage)	51 shipping movements
	Bauxite	1,250,426 tonnes (exported)	27 shipping movements
	Spodumene	383,430 tonnes (exported)	14 shipping movements
Imports	Cement clinker	743,628 tonnes clinker (imported)	23 shipping movements a year
	Granulated slag, gypsum, nut coke	97,391 tonnes (imported)	4 shipping movements a year (3 gypsum, 1 nut coke)

Source: Fremantle Ports (2018) Annual Report

3.3 Exclusions

DWER has only assessed bulk granular material that is imported or exported from KBT and managed by the Licence Holder. Third party conveyor infrastructure (EC04 on Conveyor Identification Plan), which originates on adjacent land and was part of the Hismelt (Operations) Pty Limited (Hismelt) pig iron load out facility, is currently not in use. The adjacent land is owned and managed by LandCorp. DWER has not assessed this conveyor infrastructure in this decision report and the Revised Licence excludes the conveyor infrastructure from the Premises.

4. Legislative Context

4.1 Part IV of the EP Act

KBT has not been assessed by the Environmental Protection Authority (EPA) and there is no Ministerial Statement directly relating to its construction or operation. However, there are Ministerial Statements that have been issued for the facility and activities that have and currently utilise the facility. These Ministerial Statements have been considered below.

4.1.1 Ministerial Statement 610 – Hismelt Process Plant

Ministerial Statement 610 was issued on November 2002 and authorised a proposal by Hismelt to construct and operate a commercial scale Hismelt Process Plant at Kwinana adjacent to KBT. The Ministerial Statement did not extend to the Licence Holder's lands or shipping infrastructure. The Hismelt project ceased operation in 2010.

The supporting EPA Bulletin 1068 provides information on materials imported or exported through KBT for the plant including raw materials (iron ore, coal, lime, natural gas) and product (pig iron, slag, gypsum) at the time of the operation of the Hismelt plant. Advice provided by the EPA extended to KBT and stated that the recommissioning of KBB1, or any significant change in existing operations or facilities at KBB2, would need to be referred to the EPA.

4.1.2 Ministerial Statement 852 – Carina Iron Ore Mine

Ministerial Statement 852 was issued on 28 January 2011 and authorised the Carina Iron Ore Mine. Schedule 1 of Ministerial Statement 852 states that iron ore would be mined at a rate of 4 million tons per annum and be transported from the Carina Iron Ore Mine via rail to KBT. A section 45C EP Act amendment was later approved on 11 October 2013 to increase mining to a rate of 6 million tons per annum.

Iron ore from the Carina Iron Ore Mine is currently being exported from KBT.

4.2 Applicable Part V Standards and Guidelines

4.2.1 *Environmental Protection (Kwinana) (Atmospheric Wastes) Regulation 1992*

Environmental Protection Policies (EPPs) are statutory policies developed under Part III of the EP Act).

The Environmental Protection (Kwinana) (Atmospheric Wastes) Policy Approval Order 1999 (Kwinana EPP) and Environmental Protection (Kwinana) (Atmospheric Wastes) Regulations 1992 (Kwinana EPP Regulations) provides ambient air quality standards and ambient air quality limits for the concentration of atmospheric wastes. Clause 6(2) of the Kwinana EPP excludes the concentration of any discharge of atmospheric waste generated within the boundaries of the industrial premises emitting the waste, and applies to contribution to the concentration of the atmospheric waste beyond its boundaries.

The Kwinana EPP defines three areas (Area A, B and C), where:

- Area A is the area of land on which heavy industry is located;
- Area B is outside Area A and is zoned for industrial purposes from time to time under a Metropolitan Region Scheme or a town planning scheme;
- Area C is beyond Areas A and B, predominantly rural and residential.

KBT resides within Policy Area A. Schedule 2 of the Kwinana EPP Regulations provides

standards and limits identified in Table 6.

Table 6: Kwinana EPP Regulations ambient air quality standards and limits

Ambient air quality standards and ambient air quality limits – total suspended particulates				
Item	Area	Standard (µg/m ³)	Limit (µg/m ³)	Averaging period
1	Policy Area	-	1,000	15 minutes
2	Area A	150	260	24-hours

The Policy defines ‘standard’ the concentration of an atmospheric waste which it is desirable not to exceed and ‘limit’ as the concentration of an atmospheric waste which is not to be exceeded.

DWER has had regard to the Kwinana EPP and EPP Regulations in assessing the risk of fugitive dust emissions for KBT beyond the boundary of the premises.

4.2.2 State Environmental (Cockburn Sound) Policy 2015

State Environmental Policies are non-statutory policies developed by the EPA under Part II section 17(3)(d) of the EP Act. They are considered by Cabinet for adoption on a whole-of-Government basis.

The *State Environmental (Cockburn Sound) Policy 2015* (Policy) identifies environmental values for Cockburn Sound that must be maintained. The Policy establishes the environmental values and specifies Environmental Quality Objectives and Environmental Quality Criteria (EQC). EQCs are comprised mostly of numerical values, with some narrative statements, and are documented in the *Environmental Quality Criteria Reference Document for Cockburn Sound*, EPA, 2015.

The Policy provides that public authorities with management or regulatory responsibilities in the policy area should have regard for the purpose and content of the Policy in any decision-making related to the policy area. KBT is situated within the Policy area and specifically within an area mapped as Moderate ecological protection (Schedule 2 of the Policy).

DWER has had regard to the purposes and content of the Policy in assessing the risk to Cockburn Sound from KBT.

Monitoring of water quality by the Licence Holder at KBT is reported to the Cockburn Sound Management Council (CSMC). CSMC is established under section 25(1) of the EP Act and its terms of reference are set out in the Policy.

5. Part V of the EP Act

5.1 Works approvals

Works approval W4966/2011/1 was issued on 11 July 2011 for the installation of a new product handling system that replaced the existing infrastructure from the points between the train unloading tippler and the conveyor out to KBT wharf. The upgrading of infrastructure was required to facilitate the increase in iron ore export from the Carina Iron Ore Mine.

A compliance report was submitted to DWER in accordance with Condition 3 of W4966/2011/1 that stated all works were constructed in accordance with the works approval and documentation supporting the application. However, there were system performance issues with respect to the ability of sprinklers to provide full stockpile coverage in all weather conditions. The Licence Holder stated that the dust suppression system as approved would only ever achieve full stockpile coverage in low wind speed conditions. The Licence Holder proposed to use a water truck with cannon to provide full coverage when required. Additional

improvements were made to the sprinkler system to maximise the performance of the dust suppression system.

No licence amendments were subsequently necessary for operation of the facility approved under W4966/2011/1.

5.2 Licence amendments

Following issuing of the Reviewed Licence on 9 June 2016, it was noted that there was an administrative error within the instrument. An amendment to the Licence was made under section 59(1)(e) of the EP Act and changes are detailed in Appendix 2.

5.3 Compliance Inspections

5.3.1 2018 Inspection

A compliance inspection was undertaken by DWER on 9 October 2018. The purpose of the inspection was to assess the regulatory controls in place to manage and mitigate environmental impacts.

No material issues were identified at the time of inspection.

5.3.2 2014 Inspection

A compliance inspection was undertaken by DWER on 16 January 2014. DWER determined that all licence conditions were complied with.

5.4 Annual Reports

Annual Audit Compliance Reports (AACR) and Annual Environmental Reports (AER) have been submitted annually in accordance conditions of each active Licence. Through the Reviewed Licence annual reporting periods were changed from the calendar year to an annual period based on the 12 month period commencing from the date of issuing the Reviewed Licence.

5.4.1 Annual period 2017/18

No non-compliances were identified by the Licence Holder during the reporting period.

One complaint was received from a neighbouring premise adjacent to the Premise on 13 August 2018. An investigation into the complaint identified that TSP at boundary monitors was elevated above the Standard of 150 $\mu\text{g}/\text{m}^3$ specified in the Kwinana EPP for Area A at one location (KBB1 – 156 $\mu\text{g}/\text{m}^3$) but below the specified limit of 260 $\mu\text{g}/\text{m}^3$.

The Licence Holder notes that dust levels could not be attributed to Premises activities based on wind directions and boundary monitor results. However, based on information provided in annual reports DWER was not able to verify this claim.

5.4.2 Annual period 2016/17

The Licence holder reported a non-compliance with the Reviewed Licence following the release of potentially contaminated stormwater from a containment channel on the southern boundary of the Premises and into the Cockburn Sound. Samples were taken from the overflow point and identified that the discharge contained iron ore and bauxite fines. The discharge was found to be the result of a significant rainfall event. The incident was reported to DWER on the day of non-compliance.

No complaints were recorded by the Licence Holder during the reporting period.

5.4.3 1 January 2012 to December 2015

Following a review of the AACRs and AERs as part of this assessment it is noted that there have been no non-compliances to reporting requirements as required by L4476/1984/12.

It is noted that the particulate monitoring data that has been submitted to DWER has shown that at times the air quality standard of 150 micrograms per cubic metre ($\mu\text{g}/\text{m}^3$) and limit for total suspended particulates (TSP) of $260\mu\text{g}/\text{m}^3$ as set out in Schedule 1 of the Kwinana EPP Regulations have been exceeded (refer to section 5.6.1).

Key finding: The Delegated Officer notes that information on air quality at boundary monitors, as provided in annual reports is insufficient to determine the source of dust. Therefore amendments to monitoring and reporting conditions are required in the Amended Licence to provide greater information on meteorological conditions and Premises activities during dust events.

5.5 Compliance history check

There have been no statutory notices given or prosecutions alleged since 1 January 2006 to the date of this report. The following incidents and complaints have been recorded within the Department's Incident Complaints Management System (ICMS) since 2010.

Table 7: Incidents and complaints since 2010

No.	Date	Incident details	Substantiated
17767	09/03/2010	Licence Holder reported monitoring data reliability for 16 of the 72 days of unloading/loading clinker below the 98% required by licence (condition 2). Self-reported by Licence Holder.	Self-reported. A letter of warning sent to Licence Holder.
18130	19/04/2010	Complaint received relating to excess fugitive dust emissions from KBT.	DWER Officers undertook a site visit on 19/04/2010 and identified that excess dust was being generated. Complaint substantiated. Activity was clinker being unloader from ship hold via grab and hopper.
21044	01/04/2011	BP advised DEC that during their use of KBT approximately 10L of fuel was spilt into the water during bunkering operations.	Self-reported. Not directly related to Licence Holder category 58 activities.
30084	13/09/2013	Complaint received relating to fugitive dust emissions from clinker unloading/loading. Reported to have happened 3-4 times in the proceeding few weeks and whenever there is north-west wind the dust covers cars.	The Licence Holder responded to this complaint by upgrading the unloader dust extraction system to manage dust emissions from the feeder belt.
35105	05/11/2014	Complaint received by the Department relating to a black powder is being emitted during ship unloading and that it is going onto the beach.	Premises inspected the following day and dust identified. No evidence of dust creating environmental impact.

43911	09/02/2017	Complaint received stating that asbestos material had washed up on the beach adjacent to the Premises.	Complaint not substantiated.
43931	10/02/2017	Licence Holder notification that significant rainfall had resulted in the stormwater system at the Premises to overflow causing the discharge of water contaminated with bauxite and iron ore fines. Licence Holder arranged for system to be cleaned out of sediment to increase capacity.	DWER identified that appropriate clean up was conducted and the incident was recorded.

5.6 Monitoring

5.6.1 Air quality monitoring

A review of dust monitoring data submitted by the Licence Holder in accordance with conditions of the Revised Licence identified five exceedances of 24-hour TSP limits specified in the Kwinana EPP (refer to section 4.2.1) for the 2017 calendar period and zero exceedances during 2016. Each exceedance event has been reported to be the result of prescribed burning.

As monitors are located within the Premise boundary the EPP criteria does not apply.

A total of four ambient air quality monitors (Met One E-Samplers) are located around the boundary of the Premises, in accordance with section 6(2) of the Kwinana EPP, and are depicted in Figure 1 below.



Figure 1: Location of air quality monitors

Prior to the issuing the Reviewed Licence the Licence Holder monitored particulate matter 10µm in diameter and smaller (PM₁₀) at boundary monitors KBB1 and East. As shown in Table 8, PM₁₀ was typically elevated above the level set by the *National Environmental Protection (Ambient Air Quality) Measure (NEPM)* of 50 µg/m³ over a 24-hour period at the boundary monitors in 2014. However, the Premises is located over 3 km from the nearest residential receptor and comparison of PM₁₀ measurements at the Premises boundary with NEPM may not accurately represent dust at the nearest residential receptors.

Table 8: PM₁₀ and TSP 2014 annual monitoring results

2014 period	PM ₁₀ (24 hour average)		TSP (24 hour average)			
	KBB1	East	KBB1	East	Griffin	T8
Average	56.7	61.2	88.4	114.4	85.2	87.5
Max.	243	168	226	651	217	399
Min.	8	12	23	21	25	21

PM₁₀ monitoring and reporting was removed from the requirements of the licence at the time of review in 2016.

5.6.2 Marine monitoring

The Licence Holder is required by conditions of both Kwinana Bulk Jetty (L4474/1976/14) and Kwinana Bulk Terminal (the Premises) Part V operating licences to conduct water quality, sediment and mussel monitoring at the locations depicted in Figure 2.

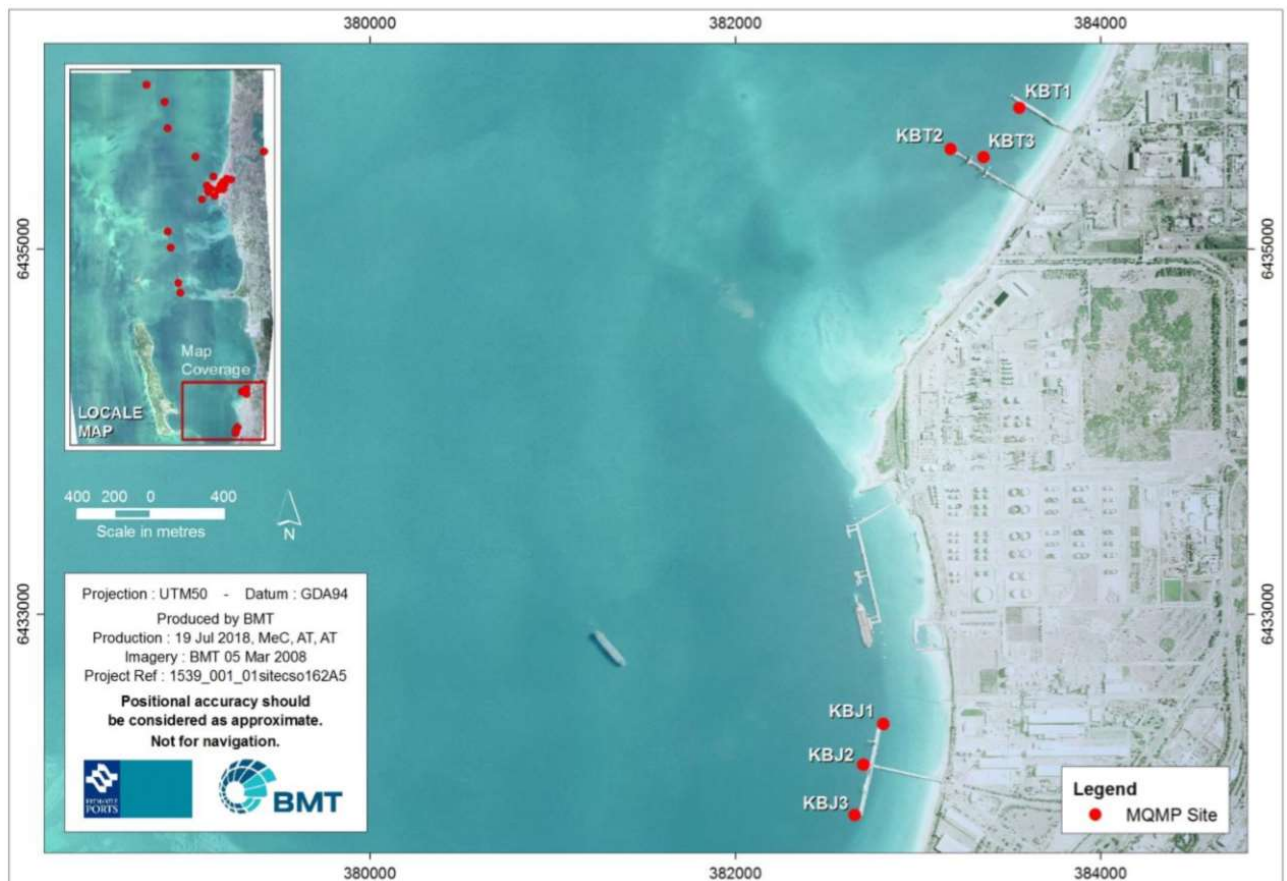


Figure 2: Cockburn Sound monitoring locations

Monitoring data is compared against *Environmental Quality Criteria Reference Document for Cockburn Sound* (EPA, 2017), which provides site-specific values for the Cockburn Sound. Monitoring results at the three monitoring locations near to the Premises are presented in Tables 9 to 11 below and referenced against Environmental Quality Criteria (EQC) with exceedances shown in red text and bold.

EQC are based on ANZECC default trigger values for slightly disturbed inshore marine ecosystems in south-west Australia (ANZECC, 2018; BMT, 2018). ANZECC Guidelines define trigger values as:

concentrations that, if exceeded, would indicate a potential environmental problem, and so 'trigger' a management response, e.g. further investigation and subsequent refinement of the guidelines according to local conditions.

Table 9: Water quality data referenced against EQC (mg/L) (BMT, 2018)

	Ammonium	Ortho-P	Nitrate + Nitrite	Total Phosphorous	Total Nitrogen	Dissolved Organic Carbon	TSS	Lithium	Manganese
EQC	0.005	0.005	0.005	0.02	0.23	N/A	N/A	N/A	N/A
KBT1_T	0.005	0.002	0.003	0.012	0.13	1.3	0.9	0.18 x 10 ⁻³	1 x 10 ⁻³
KBT2_T	0.004	<0.002	0.002	0.012	0.12	1.2	1.2	0.18 x 10 ⁻³	1 x 10 ⁻³
KBT3_T	0.004	0.002	0.003	0.013	0.13	1.1	1	0.18 x 10 ⁻³	1.1 x 10 ⁻³
KBT1_B	0.032	0.006	0.006	0.024	0.18	-	-	-	-
KBT2_B	0.012	0.006	0.005	0.019	0.13	-	-	-	-
KBT3_B	0.011	0.005	0.007	0.02	0.14	-	-	-	-

_T refers to water quality samples collected from approximately 0.5m below sea level.

_B refers to water quality samples collected from approximately 0.5m above the sea bed.

Biological indicators (chlorophyll and pheophytin) were also monitored from water samples along with hydrocarbons. Of the biological indicators EQC exist only for chlorophyll-a, which was met at each reference site near to the Premises (KBT1-3). Chlorophyll-b and pheophytin concentrations fell below laboratory limits of reporting while concentrations of chlorophyll-c was found to be no greater than 0.2µg/L. In addition, all hydrocarbon parameters monitored in marine waters were measured below laboratory limits of reporting (BMT, 2018).

Table 10: Mussel data referenced against EQC (mg/kg) (BMT, 2018)

	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Zinc
EQC	1	2	N/A	30	2	0.5	1	290
KBT1	<0.05	0.1	0.07	0.83	0.06	<0.01	0.5	22
KBT2	<0.05	0.12	0.12	0.83	0.06	<0.01	0.48	23
KBT3	<0.05	0.1	0.09	0.83	0.1	<0.01	0.55	26

Table 11: Sediment data referenced against EQC (mg/kg dry weight) (BMT, 2018)

	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Zinc	Lithium	Manganese
EQC1	20	1.5	80	65	50	0.15	N/A	200	N/A	N/A
EQC2	70	10	370	270	220	1	N/A	410	N/A	N/A
KBT1	5.6	0.13	33	17	12	0.16	0.37	61	14	43
KBT2	4.8	0.10	30	18	10	0.12	0.35	23	14	36
KBT3	3.7	0.09	9.5	5.2	2.9	<0.02	0.11	9.9	2.8	140

EQC1 refers to the Environmental Quality Guideline value for high, moderate and low ecological protection areas. **EQC2** refers to the Environmental Quality Guideline value that triggers resampling and additional sampling points to determine the extent of contamination (EPA, 2017)

Key finding: The Delegated Officer has reviewed marine water quality, sediment and mussel data and notes only minor exceedances of EQC trigger values with the exception of ammonium in deep water samples. Based on the products handled at the Premises, it is likely that nutrient concentrations in the marine environment near to the berth are influenced by external sources.

5.6.3 Product testing – spodumene

Occupational hygiene tests were conducted by placing mobile monitors on various port personnel during trial shipments of spodumene (loader operator, bulk services officer, fitter and electrician) and on static monitors around loading and stockpiling activities to monitor respirable dust and respirable silica. Table 12 shows that maximum occupational exposure levels during the December 2016 and February 2017 trial shipments were below the national exposure standards for respirable silica (0.1mg/m³) and respirable dust (3.0mg/m³) (Safe Work Australia, 2013; Coffee, 2017). Criteria for all parameters in Table 12 have been based on 8-hour time weighted averages, which is used as a standard for safe occupational exposure levels.

Table 12. Maximum measured concentrations of particulates during trial shipments

Parameter	Monitoring location ¹	Criteria ²	Maximum recorded concentration
Respirable silica	Mobile (electrician)	0.1 mg/m ³	0.04 mg/m ³
	Static (all monitors)	0.1 mg/m ³	<0.005 mg/m ³ (Limit of Detection)
Respirable particulate matter	Mobile (electrician)	3.0 mg/m ³	0.3 mg/m ³
	Static (outside the FEL cabin)	3.0 mg/m ³	0.2 mg/m ³
Respirable fibrous minerals (asbestiform)	Static (in FEL cabin and conveyor tunnel)	0.1 f/mL	<0.01f/mL (Limit of Detection)

Note 1: Monitoring location where maximum concentrations were recorded.

Note 2: Safe Work Australia 2013

DWER notes that this data is based on a small dataset (two trial shipments) and that product moisture contents were maintained above the spodumene product's dust extinction moisture (DEM) level. The DEM level is that which a bulk product is deemed to emit no dust as determined using Australian Standard *AS4156.6-2000: Coal preparation - Determination of dust/moisture relationship for coal*.

The ultrafine component of the spodumene product (PM₄) represents approximately 0.51% of total particle size distribution. Approximately 18% of this ultrafine respirable component of the spodumene product is made of mica. Mica, otherwise known as muscovite, is a non-toxic, non-fibrous silicate that can be abrasive when inhaled, having the potential to irritate eyes and skin as well as cause scarring of the lungs following repeated and high exposure (Coffee, 2017; Ambrosino et. al 2017). Occupational mica concentrations are not expected to exceed Safe Work Australia recommended maximum concentrations of 2.5mg/m³ over an 8-hour time weighted average.

Key finding: The Delegated Officer has determined that moisture content is critical to ensure that concentrations of crystalline silica and respirable particulates at the nearest industrial receptors remain below Australian exposure standards.

However, as Australian Standard AS4156.6-2000 has been determined for coal, application of the Standard in the context of other products handled at the Premises is a guide for the likelihood of a product to generate dust only. Further controls are also required for the management of dust.

5.7 Contaminated site matters

On 25 September 2008, the site was classified as Contaminated (restricted use) under the *Contaminated Sites Act 2003*.

The registered contaminated site forms part of a larger industrial complex area that was subject to a variety of industrial uses since 1954 including blast furnace power house, steel merchant, raw material and product storage, production waste disposal, including the disposal of slag, dusts and demolition waste, mixed and putrescible wastes. A leachability study conducted on the impacted soils found no evidence of risk to the underlying groundwater from the leaching of soil contamination.

The site is low risk and considered suitable for its current commercial/industrial land use as confirmed by Environmental Sciences (Contaminated Sites).

5.8 Material Change notifications

Table 13: Summaries Material Change notifications submitted by the Licence Holder:

Date	Summary of Notice of Material Change	DWER response
03/02/2017	Notice of Material Change for a trial to export approximately 15,000 tonnes of spodumene (new commodity) from 5 February 2017. Controls have been included.	DWER provided one response on 15 March 2017 determining that the trial of spodumene export will not have an unacceptable impact on public health, amenity or the environment.
22/02/2017	Addendum to 3 February Material Change Notice to include an addition shipment of spodumene between 13,000 – 17,000 tonnes between 12 – 14 March 2017.	It was stated that should FPA seek to have spodumene exported on a regular basis then an amendment application would be required to be submitted with a determination made by a Delegated Officer.
31/03/2017	Notice of Material Change for three further trial shipments of spodumene, up to 30,000 tonnes per vessel from time of submission until 30 June 2017. Controls have been included.	DWER provided one response on 24 April 2017, determining the shipments will not have an unacceptable impact on public health, amenity or the environment.
20/04/2017	Addendum to 31 March Material Change Notice to advise that due to operational issues, the trial shipments have been limited to 18,000 tonnes (instead of 30,000 tonnes). Therefore, the number of trial shipments is to be increased from three to five.	FPA was advised that the acceptance of the Material Change Notice will not pre-empt the outcome of the Licence amendment application.
21/07/2017	Notification of a shipment of spodumene (21,635 tonnes) completed 14 July 2017.	No response.
31/08/2017	Notification of a shipment of spodumene (33, 547 tonnes) undertaken in August 2017. Notification also included confirmation that the spodumene shipment undertaken 14 July 2017 had an average moisture content above 2.0%, above the specified DEM level of 1.75%.	No response.
02/01/2018	Notification of two shipments of spodumene undertaken in December 2017 with an additional three shipments of up to 35,000 tonnes proposed until 31 March 2018.	Response provided 18 January 2018 determining the shipments will not have an unacceptable impact on public health, amenity or the environment. FPA was advised that the acceptance of the Material Change Notice will not pre-empt the outcome of the Licence amendment

		application.
04/05/2018	Notification of a shipment of spodumene (26,090 tonnes) undertaken on 24 April 2018 with an additional three shipments of up to 35,000 tonnes proposed until 31 July 2018.	As above. Response provided 15 May 2018.
03/08/2018	Notification of a shipment of spodumene (27,133 tonnes) undertaken on 29 July 2018 with an additional three shipments of up to 35,000 tonnes proposed until 31 October 2018. Notification also included confirmation that shipments undertaken in April and May (Trial 16 and 17) had an average moisture content of 2.3 and 3.2% respectively, above the DEM level of 1.75%.	As above. Response provided 17 August 2018.
22/11/2018	Notification of an export shipment of 26,766 tonnes of spodumene undertaken on 14 November 2018 and a further two shipments of approximately 35,000 tonnes each anticipated until 31 January 2019. Notification also included confirmation that shipments undertaken in July and August (Trial 20 and 21) had an average moisture content of 3.0 and 2.9% respectively, above the DEM level of 1.75%.	No response sent at the time of amendment.
23/11/2018	Addendum to notification received by DWER on 22 November 2018 identifying that bauxite throughputs had exceeded greater than 10% of assessed throughputs under the Reviewed Licence (300,000tpa). At 31 October 2018, total bauxite throughputs at the Premises amounted to 270,593 tonnes. Between 6 and 8 November, a total of 44,368 tonnes of bauxite was exported.	No response sent at the time of amendment.

6. Location and Siting

6.1 Siting Context

KBT is located centrally within the KIA, a significant industrial estate in Western Australia established in the early 1950's. The KIA covers an area of approximately eight kilometers (km) north-south and 2km east-west on the eastern side of Cockburn Sound, approximately 30km south of the Perth Central Business District. The KIA contains a highly diverse range of industries from smaller service industries to very large heavy process industries.

6.2 Residential and Industrial Neighbours

Table 14: Distance to residential and industrial neighbours

Residential and Sensitive Premises	Distance from Prescribed Premises
Closest residential premises (zoned residential)	3,130 metres (m) to the south-east
Industrial neighbour A (IN A)	660m to the south-east

(industrial zoning)	
Industrial neighbour B (IN B) (industrial zoning)	980m to the south-west
Industrial neighbour C (IN C) (industrial zoning)	600m to the north-east



Figure 3: Residential and Industrial Neighbours

6.3 Specified Ecosystems

Table 15: KBT's situation in respect of specified ecosystems

Specified ecosystems	Distance from Premises
Resource enhancement wetland - unnamed	1,690m to the north-east
Proclaimed Groundwater area under <i>Rights in Water Irrigation Act 1914</i> – Cockburn	Within and surrounding Premises boundary
Cockburn Sound (proclaimed State Environmental Policy area)	Within and directly adjacent to the Premises boundary Moderate level of ecological protection

6.4 Groundwater and water sources

Table 16: KBT's location in respect of groundwater and water sources

Groundwater and water sources	Distance from Premises	Environmental Value
Bore users (beneficial use)	<p>One bore is located within the Premises boundary. The bore is owned by the Department of Water (DoW) and is located within the Perth – Superficial Swan Aquifer. The bore is listed as a Groundwater Assessment Network: Monitoring. The static water level of this bore site is 3.730m.</p> <p>Eleven other bores are located within 500m from the Premises boundary. These bores are associated with monitoring groundwater, process production, garden irrigation and other operational needs. Groundwater beneath the Premises is only drawn for the purpose of dust suppression.</p>	Beneficial use – industrial and non-potable use

6.5 Meteorology

6.5.1 Wind direction and strength

The Perth region has a dominant spring and summer wind direction from the west-south-west swinging to the south by early evening. In the winter months, lighter winds from the east to north-east prevail. A five-year averaged wind rose for a Kwinana Beach meteorological monitoring site, approximately 4.3km to the south of the Premises, shows that south and south-south-west winds are dominant (Figure 4).

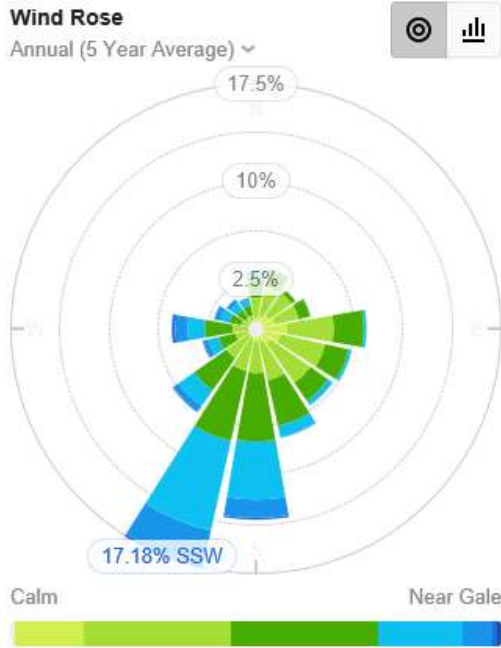


Figure 4: Five year average wind rose for Kwinana Beach (WillyWeather, 2018)

6.5.2 Rainfall and temperature

The Bureau of Meteorology provides the mean rainfall and maximum temperature for nearby the Medina Research Centre (mean maximum temperature 1983-2018 and mean rainfall 1983 to 2018). The Kwinana region is warm to hot between October to April with rainfall predominantly over April to November.

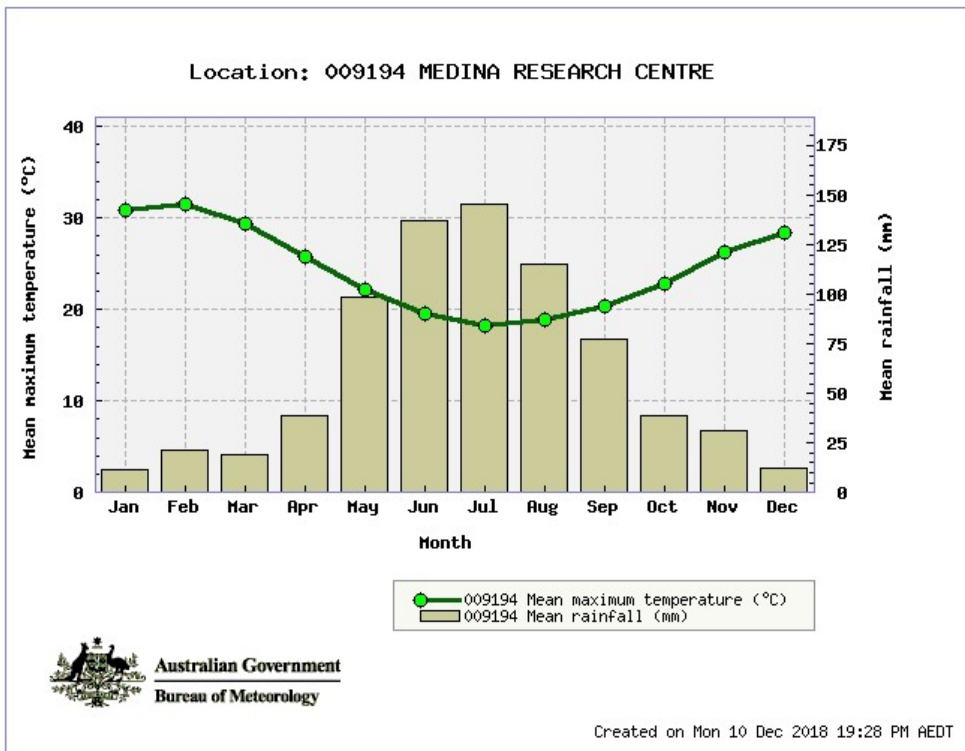


Figure 5: Mean temperature and rainfall Kwinana

7. Risk Assessment

7.1 Hazard – Pathway – Receptor Identification

7.2 Determination of emission, pathway and receptor

In undertaking its risk assessment, DWER will identify all potential emissions pathways and potential receptors to establish whether there is a Risk Event which requires detailed risk assessment.

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission. Where there is no actual or likely pathway and/or no receptor, the emission will be screened out and will not be considered as a Risk Event. In addition, where an emission has an actual or likely pathway and a receptor which may be adversely impacted, but that emission is regulated through other mechanisms such as Part IV of the EP Act, that emission will not be risk assessed further and will be screened out through Table 17.

The identification of the sources, pathways and receptors to determine Risk Events are set out in Table 17 below.

Table 17: Identification of emissions, pathway and receptors during operation

			Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts	Continue to detailed risk assessment	Reasoning
Source	Cat 58 Bulk material loading or unloading	Storage, stockpiling, reclaiming and loading or unloading of bulk product into/ from vessels.	Dust associated with the handling of bulk material using FELs, ground hoppers, conveyance systems and ship loaders.	Residential and industrial receptors (see Table 14)	Air/wind dispersion Limited pathway to residential receptors due to distance from the Premises.	Impacts to public health and amenity	Yes	Refer to risk assessment section 7.5 below.
			Noise associated with additional vehicle movements, hoppers, conveyors and operation of ship loading equipment.	Residential and industrial receptors (see Table 14)	Air/wind dispersion Limited pathway to residential receptors due to distance from the	Impacts to amenity	Yes	Refer to risk assessment section 7.6 below.

				Premises.				
			Spills and stormwater contaminated with bulk product	Aquatic organisms of Cockburn Sound (see Table 15)	Direct discharge Surface water runoff	Reduced water quality resulting in declining ecosystem health	Yes	Refer to risk assessment section 7.7 below.
			Seepage to groundwater	Proclaimed groundwater area (see Table 15) Groundwater in the area is not considered potable although it is extracted for dust suppression. The site has been classified as contaminated (restricted use).	Seepage of contaminated stormwater and washdown water to groundwater (approximately 3.7mbgl) via sandy soils.	No anticipated impact due to insolubility of bauxite and spodumene ores in water.	No	Groundwater contaminated from previous activities and the Premises is registered as a <i>Contaminated Site – restricted use</i> . No third party groundwater users/receptors. No anticipated contamination of groundwater from current Premises activities and products handled.

7.3 Consequence and likelihood of risk events

A risk rating will be determined for risk events in accordance with the risk rating matrix set out in Table 18 below.

Table 18: Risk rating matrix

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

DWER will undertake an assessment of the consequence and likelihood of the Risk Event in accordance with Table 19 below.

Table 19: Risk criteria table

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event occurring:		
			Environment	Public health* and amenity (such as air and water quality, noise, and odour)
Almost Certain	The risk event is expected to occur in most circumstances	Severe	<ul style="list-style-type: none"> onsite impacts: catastrophic offsite impacts local scale: high level or above offsite impacts wider scale: mid-level or above Mid to long-term or permanent impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are significantly exceeded 	<ul style="list-style-type: none"> Loss of life Adverse health effects: high level or ongoing medical treatment Specific Consequence Criteria (for public health) are significantly exceeded Local scale impacts: permanent loss of amenity
Likely	The risk event will probably occur in most circumstances	Major	<ul style="list-style-type: none"> onsite impacts: high level offsite impacts local scale: mid-level offsite impacts wider scale: low level Short-term impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are exceeded 	<ul style="list-style-type: none"> Adverse health effects: mid-level or frequent medical treatment Specific Consequence Criteria (for public health) are exceeded Local scale impacts: high level impact to amenity
Possible	The risk event could occur at some time	Moderate	<ul style="list-style-type: none"> onsite impacts: mid-level offsite impacts local scale: low level offsite impacts wider scale: minimal Specific Consequence Criteria (for environment) are at risk of not being met 	<ul style="list-style-type: none"> Adverse health effects: low level or occasional medical treatment Specific Consequence Criteria (for public health) are at risk of not being met Local scale impacts: mid-level impact to amenity
Unlikely	The risk event will probably not occur in most circumstances	Minor	<ul style="list-style-type: none"> onsite impacts: low level offsite impacts local scale: minimal offsite impacts wider scale: not detectable Specific Consequence Criteria (for environment) likely to be met 	<ul style="list-style-type: none"> Specific Consequence Criteria (for public health) are likely to be met Local scale impacts: low level impact to amenity
Rare	The risk event may only occur in exceptional circumstances	Slight	<ul style="list-style-type: none"> onsite impact: minimal Specific Consequence Criteria (for environment) met 	<ul style="list-style-type: none"> Local scale: minimal to amenity Specific Consequence Criteria (for public health) met

[^] Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting*.

* In applying public health criteria, DWER may have regard to the Department of Health's *Health Risk Assessment (Scoping) Guidelines*.

“onsite” means within the Prescribed Premises boundary.

7.4 Acceptability and treatment of Risk Event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment Table 20 below:

Table 20: Risk treatment table

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable.	Risk Event will not be tolerated. DWER may refuse application.
High	May be acceptable. Subject to multiple regulatory controls.	Risk Event may be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions.
Medium	Acceptable, generally subject to regulatory controls.	Risk Event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and appropriate will be applied.
Low	Acceptable, generally not controlled.	Risk Event is acceptable and will generally not be subject to regulatory controls.

7.5 Risk Assessment – Dust

7.5.1 Description of Risk Event – Dust

Fugitive dust generated during product handling may be transported by wind to the nearest industrial receptor located approximately 660 m from the Premises. Significant dust emissions may result in exceedance of health criteria at residential receptors located over 3 km from the Premises.

In addition, dust generated from the Premises may also result in impacts to the amenity of nearby industrial receptors.

7.5.2 Identification and general characterisation of emission

Fugitive dust is comprised of particulate which ranges in size from 0.005 to 100 micron (μm). TSP is used to measure fractions below 100 μm .

PM₁₀ is used to describe all particles that are 10 μm in diameter and smaller. PM₁₀ is often used and the particle size is small enough to penetrate into the lungs during inhalation (is respirable) and cause adverse human health effects whereas TSP is more often used to describe impacts to amenity.

National and international occupational and environmental health databases (United States Environmental Protection Agency, Agency for Toxic Substances and Disease Registry, International Programme on Chemical Safety (US); National Institute for Occupational Health and Safety, National Occupational Health and Safety Commission (AU)) were used to review toxicology profiles of all materials currently imported or exported at KBT.

Cement clinker, gypsum, granulated slag, nut coke and iron ore

None of these materials were identified on the databases as presenting a toxic or carcinogenic risk to public health or the environment, with the exception of crystalline silica found in within iron ore. Total crystalline silica is present in concentrations of approximately 3.8% of the

product (Polaris Metals NL, 2008) although the respirable fraction is expected to be significantly lower. Crystalline silica is listed as carcinogenic to humans in its respirable form by the International Agency for Research on Cancer (IARC) with occupational levels of exposure potentially leading to scarring of the lungs (silicosis), autoimmune diseases and lung cancer (IARC, 2009).

The key hazard associated with these products is particulate matter, which can be generated through the handling of material. Particulate matter can be emitted as fugitive dust, with the inhalable fraction presenting a risk to public health.

Bauxite ore

A study of the health effects of respirable bauxite dust exposure conducted over a 13 year period for 91 male bauxite miners and 363 male alumina refinery workers in Western Australia identified no associations with respiratory symptoms or lung function (Dennekamp et al., 2015).

DWER notes that the ore product typically contains between 10 and 30% total crystalline silica by volume (Alcoa 2015). Therefore the Delegated Officer has determined it necessary to assess the potential health impacts associated with crystalline silica and respirable particulates as they relate to the proposed bauxite material. For the purpose of this assessment respirable particulates are defined as particulate matter sized less than 10 microns in diameter (PM₁₀).

Based on 332 occupational exposure sampling events conducted in accordance with Australian Standard AS2985-2009 *Workplace atmospheres - Method for sampling and gravimetric determination of respirable dust*, Alcoa have determined that the mean value of crystalline silica within the respirable fraction of overall dust from bauxite product is 4% (Alcoa, 2017). Occupational exposure sampling also measured the daily exposure levels of Alcoa mining and refining workers to respirable silica during their work day and identified that the time weighted average exposure levels were 0.05 mg/m³, below Safe Work Australia standard of 0.1mg/m³ (Alcoa, 2009; Safe Work Australia, 2013).

In addition, naturally occurring radioactive materials can be present in some bauxite. The ore handled at the Premises may contain thorium and uranium but only in concentrations less than 0.04% and the total amount of radioactivity of the product is less than 15.5 Becquerel/gram (Bq/g) (Alcoa, 2009).

Key findings: The Delegated Officer has reviewed the presence of naturally occurring radioactive materials within the bauxite and notes that the product radioactivity specified in the Safety Data Sheet (Alcoa, 2009) remains above the transport exemption limit of 10 Bq/g, which has been set by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) (ARPANSA, 2008; ARPANSA 2014) to apply to bulk materials that “present a very low radiation hazard”. However, the DoH (2018) have advised that based on further information provided from Alcoa:

the bauxite product is not radioactive for the purposes of the Radiation Safety Act 1975 and is not captured under the Radiation Safety (Transport of Radioactive Substances) Regulations 1983 which invokes the Code of Practice for the Safe Transport of Radioactive Material published by ARPANSA. The bauxite product is therefore not deemed to present a radiological risk to public health.

DWER notes that risks associated with the transport of radioactive material is regulated under the *Radiation Safety (Transport of Radioactive Substances) Regulations 2002*, which is administered by the DoH. Further, the safety of those handling the material at the Premises is managed by the Department of Mines, Industry Regulation and Safety (DMIRS) under Part 16 of the *Mines Safety and Inspection Regulations 1995*.

DWER is responsible for assessing the risks to public health from discharges of potentially

radioactive material at the Premises.

Spodumene

Spodumene is a pyroxene mineral consisting of lithium aluminium inosilicate and is a source of lithium. Sampling of the bulk material during the trial shipment in December 2016 detected actinolite and quartz in the spodumene stockpile. This is because in the area where the spodumene is mined (Mount Marion), actinolite and quartz are naturally found (Coffey, 2017). Airborne asbestos fibres and amphibole cleavage fragments, and respirable dust containing crystalline quartz, are also potentially present and hazardous to health if inhaled at harmful concentrations.

Approximately 10 to 12% of the ore product is made up of crystalline silica and the respirable fraction of crystalline silica is very low with a PM₁₀ fraction of 0.146% of particles calculated as being ten microns in diameter and below (Coffee, 2017; Microanalysis, 2016).

Muscovite (mica) is present at up to approximately 18% by weight of the coarse spodumene concentrate although this can vary from sample to sample. Mica is non-toxic it may present risks to human health due to its physical properties potentially resulting in eye and lung irritation from mechanical abrasion.

Key findings: The concentration of respirable fibrous minerals in the coarse spodumene product was detected at low levels. Airborne fibre monitoring conducted during spodumene trials found that fibres were less than or equal to 0.01 f/mL (limit of detection) at handling locations, and therefore below the occupational exposure standard of 0.1 f/mL.

Therefore the Delegated Officer does not consider there to be a risk of exposure to asbestos fibres at the nearest industrial or residential receptors as a result of handling trialled spodumene products at the Premises.

7.5.3 Description of potential adverse impact from the emission

DWER considers the key hazard associated with all products handled at the Premises is particulate matter generated through product stockpiling, storing, transport and shiploading. Particulate matter has the potential to impact public health and affects both the respiratory and cardiovascular systems following both long and short-term exposures. Long term repeated exposure is much more detrimental than short term sporadic exposure.

Dust emissions may result in impacts to amenity following the deposition of dust on vehicles, plant and equipment.

As a listed carcinogen by the IARC, respirable crystalline silica found within iron ore, spodumene concentrate and bauxite products is also considered through this risk assessment.

7.5.4 Criteria for dust

Particulate Matter

The *Environmental Protection (Kwinana) (Atmospheric Wastes) Regulations 1992* (Kwinana EPP) places ambient air quality limits on TSP for within the KIA. The Premises is located in 'Area A' under the Kwinana EPP, meaning that TSP should not exceed 260µg/m³ over a 24-hour averaging period as shown in Table 6. There exist no criteria for particulate matter as PM₁₀ within the KIA, which is more commonly used to reflect impacts to human health when compared to TSP, a measure of potential impact to amenity.

The Kwinana EPP applies only to the contribution of atmospheric wastes (TSP) beyond the Premises boundary and within the KIA. The risk of dust has been assessed against criteria set by the Kwinana EPP for within the KIA and by NEPM for all areas beyond the KIA.

Crystalline silica

Advice from the DoH notes that the public health guideline for crystalline silica is 10 µg/m³ over a 24-hour period and 3 µg/m³ over an annual period, both as TSP. As the Licence Holder does not operate ambient air quality equipment in proximity to the nearest residential receptor, the Delegated Officer has adopted the use of occupational health standards for the purposes of risk assessment. The separation distance between the Premises and the nearest residential receptor (3,130m) suggests that a risk assessment based on occupational health criteria is likely to be conservative.

7.5.5 Assessment of Licence Holder controls

The Licence Holder developed the *Kwinana Bulk Terminal Dust Management Strategy*, dated 14 June 2007 for the management of dust at KBT. Key controls are set out in Table 21 below.

Table 21: Licence Holder's proposed controls for dust

Site infrastructure	Description	Reference to issued licence plan (Schedule 1)
Controls for dust		
Conveyors	Wind shields on conveyor; JC01, JC03, EC06, EC05, IC01, IC11. Water sprays operated on EC03, EC05 and EC06 (not operated on cement clinker).	Conveyor Identification Plan
Transfer station	Dust extraction unit operated on T1 and T2 transfer station. Cement clinker stored in bulk material silos and import storage shed with extended transfer chutes that deliver product to trucks.	Conveyor Identification Plan and Building Identification Plan: T1 and T2 326 Import Storage Shed
Import storage shed	Clinker storage within shed that is enclosed with only one door open when clinker is being handled. Within the Import storage shed cement clinker is loaded into trucks directly by FEL.	Building Identification Plan: Import Storage Shed
Export Storage Shed	Only one door remains open at any time when loading into or out of the shed to prevent wind tunneling.	Building Identification Plan: Export Storage Shed
Hoppers (iron ore and bauxite)	Hoppers fitted with high sides to reduce wind exposure when dropping product. The drop height from FELs to the hoppers is minimised.	Building Identification Plan: H1 – H7
Stockpile sprinklers and water cannons	Sprinklers are located on the southern side of the EC03 stockpile and sprinklers are located on the north and south side of the EC05 stockpile. Sprinklers are operated at first signs of visible dust lift-off. Truck mounted water cannon operated to suppress dust from stockpiles not covered by the sprinkler system.	Not depicted

Site infrastructure	Description	Reference to issued licence plan (Schedule 1)
Rail tippler (iron ore)	Iron ore received by rail is tipped into a below ground hopper within a partially enclosed shed.	Building Identification Plan: 327 Road Tippler Building
Shiploader/unloader	Excavator in the hatch drops material from a low height. Loading rate of clinker may be slowed where visible dust is being generated.	Building Identification Plan: New Unloader No.2 Jetty
Road sweepers	Spilt product is removed by road sweeper to prevent subsequent dust generation.	N/A – mobile
Water truck	Water truck operated in stockpile areas to reduce dust generation from FEL and truck movements.	N/A – mobile
Monitoring		
Boundary dust monitors	Four E-Samplers used for monitoring TSP and two for PM ₁₀ with alert system when internal specified levels are exceeded remedial actions are undertaken in accordance with the Licence Holder's Dust Management Strategy.	Schedule 4 – Dust Monitoring Location Map: KBB1, East, Griffin and T8

Through the amendment application the Licence Holder has proposed maintain the moisture content of coarse spodumene at or above the dust extinction moisture level of 1.75%, with the moisture content being measured at the mine site.

The DEM level for the bauxite product handled at the Premises is 5.5% (Tunra Bulk Solids, 2017). The Licence Holder has proposed to maintain the moisture content of bauxite received at the Premises between a range of 5.5 and 10%.

7.5.6 Key findings

The Delegated Officer has reviewed the information regarding dust and has found:

1. Particulate matter and crystalline silica concentrations in ambient air at the point of industrial and residential receptors are expected to be significantly lower as a result of dispersion over distance from the source.
2. Crystalline silica is present in iron ore, bauxite and spodumene concentrate products. Spodumene concentrate has the greatest fraction of respirable crystalline silica (10 micron and smaller) at approximately 0.146% by weight.
3. Spodumene concentrate has a high mica content (by weight), which can be readily carried by wind and may result in nuisance impacts.
4. As thorium and uranium in the bauxite ore is only expected to be present in concentrations less than 0.04% of overall product, DOH has advised that the product is not considered radioactive for the purposes of the Radiation Safety Act 1975. Further, the radioactive components are not expected to be detectable in any bauxite dust that may reach the nearest residential receptors to handling activities.
5. Asbestiform fibres from the spodumene concentrate product are not expected to be detectable at industrial (600 m) or residential (3,130 m) receptors.
6. The complaint database did not record a substantiated dust complaint in the previous five years.

7.5.7 Consequence

Cement clinker, gypsum, granulated slag, nut coke and iron ore

Cement clinker has been identified by the Licence Holder as a product with high dust potential due to its dry condition and solubility in water. As a result, cement clinker is stored within sheds/silos and loaded into trucks using a telescopic chute.

Gypsum, granulated slag, nut coke and iron ore products are stored in open air stockpiles and handled using stackers and FELs that load product into hoppers. The use of FELs over unsealed areas and the dropping of product from height into hoppers are expected to present the greatest source of dust emissions from these products.

Based on existing handling methods at the Premises off-site dust impacts at a local scale are expected to be minimal with consequence criteria at residential receptors being met. However, air quality criterion is at risk of not being met in Area A of the Kwinana Industrial Area as a result of current handling methods, namely the use of FELs, and from handling cement clinker, which cannot be suppressed with the application of water. Therefore the consequence of dust impacting the health of industrial receptors has been rated as **moderate**.

While reductions in the handling of iron ore and cement clinker of 1.2 Mtpa (19% reduction) and 300,000 tonnes per annum (23% reduction) at the Premises are significant, the consequence rating for these products remains the same due to the continued tonnages handled remaining as significant (6.1 Mtpa combined).

Increased bauxite tonnages – Amendment 2019

Due to the low correlation of bauxite material impacting human health and the low concentrations of respirable silica at occupational levels, health effects from bauxite dust are not anticipated at the nearest sensitive receptors. As Safe Work Australia health criteria for respirable crystalline silica ($0.1\text{mg}/\text{m}^3$) are likely to be met, the Delegated Officer has determined the consequence rating for public health impacts to be minor.

However, proposed increase to the amounts of bauxite handled at the Premises is significant (approximately 830% increase to 2.5 Mtpa) and expected result in greater FEL movements over unsealed areas. DWER considers that the reclamation of product using FELs in an open environment can significantly increase the opportunity for dust generation when compared to other methods used at ports throughout Western Australia.

The Licence Holder has proposed to offset some of the potential dust generation from additional bauxite handling by reducing iron ore throughputs by 1.2 Mtpa and transfer a portion of total cement clinker throughputs to KBJ. However, the increase in bauxite handling represents an overall product handling increase of 1 Mtpa at the Premises. Based upon the information provided in the application, methods of handling and the nature and increased amount of bauxite being loaded, limits for TSP under Kwinana EPP are at risk of not being met as a result of Premises contribution to the air shed TSP.

There is also a potential for exceedances of NEPM criterion ($50 \mu\text{g}/\text{m}^3$ over a 24-hour period) as a result of dust from additional bauxite tonnages adding to the cumulative dust emissions arising from the KIA.

Therefore the Delegated Officer has determined the consequence of dust impacts to be **moderate**.

Spodumene – Amendment 2019

Consequence criteria (Safe Work Australia criteria) for respirable silica and particulates are likely to be met due to the low fraction of respirable silica within the product and low fines content of the spodumene product.

When providing comment on the application, the DoH noted that the potential for health impacts as a result of mica is dependent on the size of the mica particles. Due to the low proportion of finer particles in spodumene, mica presents a greater nuisance risk than a risk to human health. The high overall content (by weight) of mica in spodumene may result in impacts to amenity due to its ability to become buoyant in air and travel with wind to receptors. The Delegated Officer has determined that the consequence rating is **moderate** based on potential mid-level impacts to amenity.

7.5.8 Likelihood of Risk Event

Dust emissions at source have not been measured, although the site ambient monitoring system indicates that the Kwinana EPP limits were exceeded on five days within the premises boundary during the 2017 reporting period. DWER notes that exceedances within premises boundaries do not constitute an exceedance of the Kwinana EPP limits (see clause 6(2) of the Kwinana EPP) and that some of these exceedances may have been the result of external sources. However, there is a possibility that the concentration of PM at the boundary of the premises may also exceed EPP limits at a similar frequency.

As such, it is possible that the nearest industrial receptors (in A, B and C) may experience ambient dust at a concentration greater than the Kwinana EPP limits but will probably not occur in most circumstances.

DWER has taken into consideration the relevant factors discussed in this report, particularly in respect of the proponent controls in place, material quantities and characteristics, meteorological data and complaints data for the last five years. Whilst it remains possible, it is **unlikely** that there may be a potential loss of amenity to receptors in KIA zones A, B and C from iron ore and cement clinker handling.

The potential loss of amenity from the handling of gypsum, granulated slag and nut coke has been assessed as **rare** based on handling quantities and product characterisation.

Increased bauxite tonnages – Amendment 2019

To control dust from the increased bauxite tonnages and to reduce moisture loss during

storage, the Licence Holder proposes to continue the operation of the water truck on unsealed areas and water sprays on stockpile EC05. The Licence Holder will also continue to monitor ambient TSP using the boundary dust monitoring network as per Existing Licence conditions. Bauxite loaded into vessels under the Material Change provisions of the Existing Licence, on 21 and 27 January 2018 contained a moisture content of 8.23% and 8.06% respectively.

The distance between the nearest industrial receptors and the EC05 stockpile area is approximately 670m suggesting a possible pathway for dust to reach receptors. Based on Licence Holder controls, the Delegated Officer has determined that ambient concentrations at nearby industrial receptors are only expected to reach occupational exposure limits of 0.1mg/m³ for respirable silica (Safe Work Australia, 2013) in exceptional circumstances (rare).

Although Licence Holder controls, primarily receiving product with a moisture content above DEM, are expected to reduce dust from product stockpiles, the Delegated Officer anticipates that TSP in the local air shed will increase as a result of large increases in FEL movements. The likelihood of a dust event increases during hot, dry and windy conditions often experienced in summer months. However, based on the distance to receptors and the lack of complaints data from existing operations, impacts to amenity will probably not occur in most circumstances. The Delegated Officer has determined that impacts to amenity could still occur at some time and the likelihood of impacts to amenity is therefore assessed to be **possible**.

Spodumene – Amendment 2019

The moisture content of spodumene received at the Premises will be at or above the DEM level of 1.75%. To manage moisture loss of stockpiles, the Licence Holder has committed to operating a sprinkler system and water truck sprays. In addition, spodumene will be transported to the jetty using an underground (enclosed) conveyor system, and to the ship using a partially covered conveyor system designed to protect product from wind lift-off.

Spodumene will be handled in lower amounts and at less frequent times throughout the year compared to bauxite (12 vessels loaded per year compared to 28 for bauxite). Taking into consideration separation distances and proposed product moisture content, health and amenity impacts to industrial and residential receptors will probably not occur in most circumstances as a result of spodumene handling. Therefore the likelihood is rated **unlikely**.

7.5.9 Overall rating of dust

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 18) and determined that the overall rating for the risk of dust is **Medium**.

7.6 Risk Event – Noise

7.6.1 Description of Risk Event

Noise generated from the normal operations onsite including noise from train shunting, braking and unloading, truck and loader product movement and reverse alarms reaching industrial receptors (IN A, B or C).

7.6.2 Description of potential adverse impact from the emission

Noise has the potential to impact amenity.

7.6.3 Noise Criteria

The Premises' nearest noise sensitive receptors are located within the KIA and are therefore assigned a higher acceptable noise level than other industrial receptors under the *Environmental Protection (Noise) Regulations 1997* (EP Noise Regulations), as shown in Table 22. **Error! Reference source not found.** Excluded from assigned levels are noise

emissions from trains, reverse alarms, equipment start-up alarms and machinery operated on a vessel.

Table 22. Assigned noise level criteria for KIA industrial receptors

Receptor	Time of day	Assigned level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
Industrial and utility premises in the KIA (industrial receptors A, B and C)	All hours	75	85	90
Industrial and utility premises other than those in the KIA	All hours	65	80	90

7.6.4 Licence Holder controls

No proponent controls for noise have been identified.

7.6.5 Consequence

Based on the results of a noise report submitted by the Licence Holder indicating compliance with the EP Noise Regulations, the consequence of noise emissions from Premises activities is assessed as **slight**.

Amendment 2019

Bauxite and spodumene exports will result in the generation of noise from additional truck movements and the mobilisation/operation of loading equipment. As this will involve the operation of existing infrastructure there are not anticipated to be any increases in noise emissions.

7.6.6 Likelihood of Risk Event

The nearest residential receptor is over 3km from the Premises and is not expected to be significantly impacted by noise from Primary Activities unless in exceptional circumstances. Therefore the likelihood of noise impacts to residential receptor amenity is **rare**.

Given the exclusions to noise emissions from trains, reverse alarms, equipment start-up alarms, exceedances of noise emissions at industrial receptors in areas A, B and C are also expected to be **rare**.

Amendment 2019

Noise emissions are expected to be more frequent as a result of proposed increases to overall product handling. However, the likelihood of impacts to residential receptors is expected to remain as rare based on the distance to Premises noise sources.

Industrial receptors may be more likely to experience nuisance noise levels as a result of increased throughputs although the likelihood is still only expected to occur in exceptional circumstances (**rare**).

7.6.7 Overall rating of Risk Event

The overall rating for the risk of noise impacts on sensitive receptors (refer to Table 17) during operation is **Low**.

7.7 Risk Event – Discharges to the marine environment

7.7.1 Description of Risk Event

Material may enter the marine environment directly from spills during ship loading and unloading or through openings (gaps and drainage holes) which allow a direct pathway. Dust deposition in the ocean may also arise during offshore and cross-shore wind conditions.

Direct access of potentially contaminated stormwater from land-based activities to the marine environment from the EC03 stockpile area is restricted by a road and vegetation and therefore is not further considered.

7.7.2 Identification and general characterisation of emission

Due to the nature of diffuse sources, the concentrations of material entering the marine environment has not been quantified. Spill events may arise where product is not sufficiently contained or is dropped from grab buckets.

Cement clinker is soluble and gypsum moderately soluble in water. These materials were not identified as presenting a toxic or carcinogenic risk to public health or the environment. All other products handled at the Premises have been identified as poorly soluble but may result in increased turbidity in the water column.

7.7.3 Description of potential adverse impact from the emission

Contaminated stormwater, dust deposition or spills of material into the marine environment can cause turbidity impacting water quality and visibility. This can also cause shading and smothering of seagrass meadows.

Amendment 2019

Ecotoxicity studies on the bauxite ore have shown that amongst freshwater species, the lethal concentration required for a 50% species death rate (LC₅₀) after a 96-hour exposure period is greater than 100 mg/L (Alcoa, 2009) meaning that an LC₅₀ was not identified through studies.

There is growing evidence that lithium may have a teratogenic impact (effects on embryonic development) on aquatic organisms and effect the cellular function and body systems of some fish species (Ruocco et, al. 2016; Tkatcheva et, al., 2015). However, there have been limited studies on lithium impacts to marine organisms.

7.7.4 Criteria

KBT is located within the marine environment and within the Cockburn Sound Management Council policy area. The berth and Jetty are located within a Moderate Ecological Protection Area (Cockburn Sound Policy Area). Environmental Quality Criteria for water, sediment and mussels are specified in Tables 9 to 11.

There is no criterion for lithium in water, although lithium is present in the marine environment at baseline concentrations of approximately 0.17 mg/L.

7.7.5 Licence Holder controls

The Licence Holder has the following controls in place for spills of material from offshore activities

- unloader AL05 deflector plate in place during loading/unloading using a grab bucket to capture ship to shore cargo spill; and
- jetty sweeping and maintenance.

The Licence Holder also monitors water quality, sediment and mussels for contaminants offshore and in all operational areas annually (refer to section 5.6.2).

7.7.6 Consequence

Taking into consideration the relevant factors discussed in this report, particularly in regard to

the nature of materials and the results of annual water marine quality monitoring around KBB1 and KBB2, it is considered that there is minor impact on the local marine environment from the handling and movement of iron ore, clinker cement, gypsum, granulated slag, bauxite and nut coke at KBT.

Consequence rating is therefore **minor**.

Amendment 2019

Both spodumene and bauxite ores are largely insoluble in water.

Bottle leachate testing of spodumene concentrate was conducted using an extraction fluid with a pH of 5. Results indicates low solubility of metals with slight elevations in dissolved manganese at between 0.17 to 2.5 mg/L across three test samples (Analytical Reference Laboratory, 2016). Therefore spodumene concentrate is not anticipated to cause toxic effects to marine life as its metal constituents are is not readily bioavailable.

Risks to the environment from bauxite and spodumene ore discharges pertain largely to potential turbidity impacts resulting from a spill.

Based upon the nature of bauxite and spodumene ores the off-site impacts of material entering the marine environment will be minimal at a local scale and is therefore assessed as **minor**.

7.7.7 Likelihood of the Risk Event

Taking into consideration the relevant factors discussed in this report, particularly in regard to the proponent controls in place, it is considered that the handling and movement of iron ore, clinker cement, gypsum, granulated slag, and nut coke at KBT having a consequence on the local marine environment is **unlikely** to occur.

Amendment 2019

Spodumene concentrate is loaded into the vessel via partially closed conveyor and loading arm that delivers product directly into the hold. Therefore there is limited potential for either product to access the marine environment and the likelihood of a spill is **rare**.

Increased use of a grab bucket to allow for greater bauxite tonnages increases the likelihood of a spill at the Premises. However, the risk event remains as **unlikely** at these increased throughputs as a spill will still probably not occur in most circumstances.

7.7.8 Overall rating of the Risk Event

The consequence and likelihood ratings determined that the overall rating for impacts to water from all products, including bauxite and spodumene concentrate handling, is **Medium**.

7.8 Summary of acceptability and treatment of Risk Events

A summary of the risk assessment and the acceptability or unacceptability of the risk events set out above, with the appropriate treatment and control, are set out in Table 23 below. Controls are described further in section 7.

Table 23: Risk rating of emissions under the Reviewed Licence

	Emission			Licence Holder controls	Risk Rating	Acceptability with controls
	Emission	Source	Pathway/ Receptor			
1.	Dust from cement clinker and iron ore	Infrastructure and handling process	Air/wind to sensitive receptors causing impacts to amenity and public health.	Infrastructure and management controls.	Moderate consequence Unlikely Medium risk	Acceptable subject to proponent controls conditioned.
2.	Dust from cement clinker, gypsum, granulated slag and nut coke	Infrastructure and handling process	Air/wind to sensitive receptors causing impacts to amenity and public health.	Infrastructure and management controls.	Moderate consequence Rare likelihood Medium risk	Acceptable subject to proponent controls conditioned.
3.	Dust from bauxite (increased tonnages)	Infrastructure and handling process	Air/wind to sensitive receptors causing impacts to amenity and public health.	Infrastructure and management controls.	Moderate consequence Possible Medium risk	Acceptable subject to proponent controls conditioned.
4.	Dust from spodumene	Infrastructure and handling process	Air/wind to sensitive receptors causing impacts to amenity and public health.	Infrastructure and management controls.	Moderate consequence Unlikely Medium risk	Acceptable subject to proponent controls conditioned.
5.	Noise from infrastructure and operations	Infrastructure and handling process	Air/wind to sensitive receptors causing impacts to amenity.	None specified	Insignificant consequence Rare likelihood Low risk	Acceptable, no regulatory controls required.
6.	Discharge to water from spills, wash down water and stormwater	Stormwater; wash down water; jetties	Direct discharges resulting in impacts to the marine environment.	Infrastructure and management controls	Minor consequence Unlikely Moderate risk	Acceptable subject to proponent controls conditioned.

8. Determined Regulatory Controls

8.1 Summary of Controls

Regulatory controls have been determined on a risk-based approach for those risks.

Table 24: Controls and risk items correlation

		Controls (see sections below)			
		8.2 Infrastructure and Equipment	8.3 Particulate Monitoring	8.4 Cockburn Sound Monitoring	8.5 Amendment 2019
Risk Items (see section 7)	1. Dust from cement clinker and iron ore	●	●		
	2. Dust from bauxite, gypsum, granulated slag and nut coke	●	●		
	3. Dust from bauxite (including increased tonnages)	●	●		●
	4. Dust from spodumene				●
	5. Noise from infrastructure and operations	Low risk. No controls required.			
	6. Discharge to waters	●		●	

8.2 Specified Infrastructure and Equipment Controls

8.2.1 Dust Management

The following environmental controls, infrastructure and equipment should be maintained and operated onsite for dust management:

- wind shields and sprinklers on conveyors JC01,JC03 ,EC03, EC06, EC05;
- wind shields IC01 and IC11 clinker conveyor system
- shielded Rail Tippler Building 327 system with water sprays;
- dust extraction unit on T1 transfer station (JC01/IC01) and bag house on unloader AL05;
- sprinklers on southern side of stockpiles;
- water cannon on areas not covered by sprinkler system;

- hoppers with high sides (H1-H7); and
- storage shed to be maintained under negative pressure for the storage of cement clinker.

8.2.2 Spill management

Spill plate on AL05 loading/unloading arm for unloading operations should be maintained and operated onsite for spill management.

8.2.3 Wash water and stormwater management

The following infrastructure and equipment should be maintained and operated onsite for stormwater management for the protection of the Cockburn Sound marine environment:

- all site stormwater drains to three unlined infiltration basins as per Conveyor Identification Plan (Area 'A', 'C' and 'D' Stormwater Infiltration Basins). No stormwater drains to Cockburn Sound; and
- stockpiles are located on compacted limestone pads (as per KBT Stockpile Locations on the Premises Map attached to the Revised Licence).

Note: Specified infrastructure requirements derived from those currently adopted.

Grounds: The infrastructure and equipment is currently used by the Licence Holder and considered appropriate based on the materials handled and the risk to amenity, public health and the marine environment. The condition requires the continued use of the infrastructure and equipment and ensures regulatory oversight.

8.3 Particulate Monitoring Requirements

8.3.1 Monitoring Requirements

The monitoring of particulates through four real time monitors for monitoring of TSP. Monitoring reports must be provided quarterly.

Note: The Licence Holder currently operates four real time monitors that measure particulates as TSP including two monitors (KBB1 and East) that measure PM₁₀. An alert system has also been developed for internal management triggers where TSP exceeds 500 µg/m³ over a 15-minute averaging period and wind conditions place nearby receptors at risk of being effected.

The Licence Holder undertakes extensive monitoring which is not reported to DWER. PM₁₀ monitoring and reporting requirements have been removed from the requirements of the licence (refer to section 5.6.1).

Grounds: DWER requires monitoring data to inform DWER of likely exceedances of the Kwinana EPP. DWER notes that as the Premises is within the Kwinana EPP (an approved policy under the EP Act) and under section 60(1), DWER is required to grant the licence consistently with the Kwinana EPP. On this basis, DWER requires reporting and ongoing monitoring at the premises to be required as a licence condition.

PM₁₀ monitoring is not required under Reviewed Licence conditions as there exist no relevant criteria for PM₁₀ within the KIA.

8.4 Cockburn Sound Monitoring Requirements

The monitoring of water quality, sediment and mussels for contaminants in all operational areas is required. Monitoring reports must be provided annually.

Note: Monitoring of Cockburn Sound is currently being undertaken by the Licence Holder and has been reported to DWER through the annual reporting requirements for Kwinana Bulk

Jetty, but not through a condition within the Existing Licence.

Grounds: DWER requires monitoring data (of the same kind as has been previously provided by the Licence Holder to DWER under the licence for KBJ) to support DWER's consideration of impacts from the premises to Cockburn Sound. The monitoring data will enable DWER to consider whether licence conditions continue to be appropriate. The reliability of monitoring data collected will be ascertained through specified methodology for data collection. This will align with the Licence Holder's current methodology.

8.5 Amendment 2019

The Amended Licence authorises the loading of 0.4 Mtpa of spodumene ore and an increase in annual loading rate of bauxite ore to 2.5 Mtpa using existing infrastructure and on the condition that iron ore handling is reduced from a maximum authorised capacity of 6.3 Mtpa to 5.1 Mtpa. Overall throughput amounts at the Premises may reach 9.6 Mtpa under this amendment.

The key emission associated with the proposed amendments (bauxite and spodumene ore loading) during operations is dust. Conditions have been applied, removed or not applied based on the risk-based approach, provided above.

8.5.1 Dust

Conditions have been applied to the Amended Licence to control the risk of dust associated with the introduction of spodumene ore handling at the Premises and increased handling amounts of bauxite.

Conditions listed in Schedule 3 of the Reviewed Licence requiring the operation of sprinklers and truck mounted water cannons to prevent visible dust lift-off have been amended to manage dust from FEL movements as well as stockpiles.

The ship loader is located over 1,000 m from the nearest industrial receptor and is not expected to present as significant a source of dust when compared to stockpiling and reclaiming activities.

Grounds: The Delegated Officer has determined that stockyard areas where FEL movements occur presents a potentially significant source of dust as a result of increased throughputs.

8.5.2 Product specifications

Extended periods of stockpiling are likely to result in further drying of the top layers of product increasing the risk of dust when reclaiming using FELs. Therefore the Delegated Officer has elected to require the moisture content of spodumene and bauxite to be above the respective DEM for each product as it is received at the Premises and maintained until it is loaded onto a vessel. The requirement to operate truck mounted water cannons or sprinklers when visible dust appears will remain on the Licence.

Note: A compliance rate of 90% has been applied for spodumene product and 95% for bauxite as determined from third party moisture content data provided weekly to the Licence Holder.

Grounds: Product moisture has been determined to be a key Licence Holder-proposed control in the management of dust for both products. Optimising moisture of spodumene and bauxite above the DEM but below the Transportable Moisture Limit TML will also reduce the risks associated with crystalline silica becoming airborne.

Based on the moderate risk determination made in section 7.5, a 90% compliance limit is acceptable for spodumene based on the low fraction of ultrafine crystalline silica, throughput amounts and the distance to the nearest sensitive receptor (600 m). However, 10% of bauxite material received below the product's DEM level represents approximately 250,000 tonnes per

year of dry product. Therefore a 95% compliance limit has been determined as more appropriate for bauxite.

Through the application of the above controls, the risks of dust from the handling of spodumene and increased amounts of bauxite ore are reduced to acceptable levels.

8.5.3 Monitoring

Additional monitoring requirements have been applied to the Amended Licence to assist in the identification of potential dust sources, both internal and external to Premises operations.

Note: Reportable Events have been applied to boundary monitors consistent with limits specified in the Kwinana EPP for Area A. The provision of 15-minute averaged TSP data and other additional information is only required for those dates where Reportable Events occur.

Additional reporting requirements for ambient air quality do not represent limits for the Premises.

8.5.4 Discharges to water

No further controls have been applied to the Licence in relation to the protection of the marine environment as the risks are considered acceptably managed by existing conditions set in rows 7 to 10 of Schedule 3 of the Amended Licence.

Manganese has been added to the parameters listed in Cockburn Sound monitoring and reporting conditions for sediment quality as proposed by the Licence Holder.

8.5.5 Material Change conditions removed

Conditions requiring notification to the CEO of Material Changes that occur at the premises where provided through the Reviewed Licence. Material Changes are defined as changes to the description provided in Schedule 2 of the Licence, including Material Change examples provided below:

- new commodities;
- throughput changes of commodities exceeding 10%;
- changes to the control or ownership of the infrastructure or equipment within the premises; and
- changes to the site layout of infrastructure and equipment specified on the plans in Schedule 1.

The Delegated Officer notes that the Material Change Notification conditions received for the Premises to date have been for matters related to the licence amendment application submitted in March 2017 (refer to Table 13).

The majority of Material Change notifications received by DWER from all Category 58 premises have resulted in the need for licence amendments as the change had required thorough risk assessment. Therefore DWER's experience with the application of the Material Change conditions has not matched the original intent of the condition, which was to authorise operational flexibility for matters that are likely to result in insignificant environmental risk.

DWER has engaged with the Licence Holder, Department of Transport and other Port Authorities to develop an appropriate alternative to the previous Material Change provision. The objective of the revised condition is to improve operational flexibility at the Premises without resulting in an increased risk to public health or the environment.

The Delegated Officer has determined to replace Material Change conditions with the Trial conditions detailed below. DWER notes that following amendments to the Licence, the Licence Holder will not become non-compliant with the Licence by DWER removing these conditions.

8.5.6 Addition of Trial conditions

The addition of trial conditions to the Amended Licence is appropriate and necessary to provide operational flexibility for the Licence Holder and better informing future risk assessments of ongoing handling operations. Trial shipments must not extend beyond 12 months in duration or a cumulative throughput of 1 Mtpa per year. Trial shipment conditions are designed to provide sufficient information, through requiring the provision of monitoring data, for DWER to conduct a detailed risk assessment of each trialled product.

Trial conditions on the Amended Licence restrict the handling of high risk products such as those which contain elevated concentrations of asbestos, respirable silica or radiation. Wastes, or waste-derived products with the exception of clean fill are also not authorised for handling under trial conditions.

The implementation of Trial conditions requires notification 30 days prior to the commencement of the Trial. Notification must be supported by detailed information on the proposed activity, product characteristics, the sensitivity of the receiving environment, potential hazards and the proposed monitoring to be conducted during the Trial.

It is the responsibility of the Licence Holder to determine appropriate handling methods for each product being trialled following demonstrated consideration given to each hazard associated with the trial product. However, DWER reserves the ability to suspend or terminate the trial at any time prior to, or during a trial period where the risk to public health, amenity and the environment is determined by the CEO to be unacceptable or require further, more detailed assessment of the product.

DWER's decision making processes for determining what products are suitable for trial shipments are further detailed in the *Guideline: Port Authority Trial Shipments – Category 58 and 58A*, which is available at DWER's website (www.dwer.wa.gov.au).

Category 58A has been applied to the licence to authorise the loading of salt products and other evaporites such as gypsum and potash under trial conditions. This is an administrative amendment that does not increase the risk of bulk material handling at the Premises.

No increase in daily throughputs is authorised through the addition of Category 58A or trial conditions to the Amended Licence.

8.5.7 Administrative amendments

The inclusion of conveyor EC03 to Schedule 2 is an administrative amendment as it does not impact risk at the Premises being existing infrastructure that has been previously assessed.

DWER has also made minor amendments to reporting requirements to align annual compliance reporting dates with annual marine monitoring reporting dates. This amendment is administrative in nature and does not affect the level of environmental risk. The beginning of the new annual period has been changed from 30 July each year to 1 August each year, consistent with other licenced annual periods that commence at the beginning of the calendar month.

Further minor amendments have been made to align the Licence with updated templates.

9. Setting Conditions

The conditions in the Revised Licence have been determined in accordance with DWER's *Guidance Statement on Setting Conditions*.

DWER's *Guidance Statement on Licence Duration* has been applied and the Revised Licence expires in 20 years from date of issue.

Condition Ref	Grounds
Emissions 1	This condition is valid, risk-based and consistent with the EP Act.
Trial conditions 2 to 7	These conditions are valid, risk-based and enable flexibility in operations.
Infrastructure and Equipment 8 and 9	These conditions are valid, risk-based and contain appropriate controls (see section 7).
Dust Monitoring and Reporting 14 and 15	This condition is valid, risk-based and required under section 60(1) of the EP Act to be consistent with the Kwinana EPP.
Cockburn Sound Monitoring and Reporting 16 and 17	This condition is valid, risk-based and is consistent with the Cockburn Sound Policy.
Information 18 to 22	These conditions are valid and are necessary administration and reporting requirements to ensure compliance.

DWER notes that it may review the appropriateness and adequacy of controls at any time, and that following a review, DWER may initiate amendments to the licence under the EP Act.

10. Consultation

10.1 Department of Jobs, Tourism, Science and Innovation

Prior to issuing the Licence amended 26 February 2019, DWER consulted the Department of Jobs, Tourism, Science and Innovation (DJTSI) on the Licence Holder's proposal to export bauxite ore at a rate of 2.5 million tonnes per year. The DJTSI noted that "in accordance with clause 9(8) of the *Alumina Refinery Agreement Act 1961* (principal State Agreement), in November 2016 the WA Government approved Alcoa exporting up to 2.5 million tonnes per annum (wet) of bauxite through the Kwinana Bulk Terminal (KBT) for up to five years ceasing in December 2021 and subject to Alcoa gaining appropriate export shipping slots."

10.2 Licence Holder's Comments

The Licence Holder's and DWER's response to the Reviewed Licence has been removed from this document for administrative purposes but may be made publicly available on request.

Following the submission of an amendment application on 15 March 2017 the Licence Holder was provided with the draft amended decision report and condition set on 11 June 2018 and again on 4 January 2019. Licence Holder comments and DWER responses on draft amendments to the Licence are provided in Appendix 3.

11. Conclusion

This assessment of the risks of activities on the premises has been undertaken with due consideration of a number of factors, including the documents and policies specified in this decision report (summarised in Appendix 2). This assessment was also informed by site inspections conducted by DWER officers on 16 January 2014 and 20 October 2018.

Based on this assessment, it has been determined that the Amended Licence will be granted subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.



Clarrie Green

A/Manager Licensing – Resources Industries

delegated Officer under section 20 of the *Environmental Protection Act 1986*

Appendix 1: Key Documents

Documents assessed and considered in review:

	Document Title	Availability
1.	Licence L4476/1984/12 – Kwinana Bulk Terminal	www.dwer.wa.gov.au
2.	Works Approval W4966/2011/1 – Kwinana Bulk Terminal	
3.	DWER Guidance Statement on Regulatory principles (July 2015)	
4.	DWER Guidance Statement on Setting conditions (September 2015)	
5.	DWER Guidance Statement on Licence duration (November 2014)	
6.	DWER Guidance Statement on Licensing and works approvals processes (September 2015)	
7.	Ministerial Statement 610	Ministerial Statements accessed at http://www.epa.wa.gov.au
8.	Ministerial Statement 852	
9.	Ministerial Statement 559 and 783	
10.	DWER Compliance Inspections undertaken 16 January 2014 and 20 October 2018	DWER records
11.	Kwinana Bulk Terminal Dust Management Strategy, 14 June 2007	DWER records
12.	Kwinana Bulk Terminal (L4476/1984/12) Annual Monitoring Report 2014 and Annual Audit Compliance Report (AACR)	DWER records
13.	Use of Common User Berths and Stacking Agreement	DWER records
14.	DWER site visit undertaken 20 November 2015	DWER records
15.	BMT (2018) Fremantle Ports Marine Quality Monitoring Program – Annual Report 2018.	DWER records (A1746377)
16.	Environmental Protection (Kwinana) (Atmospheric Wastes) Policy Approval Order 1999 (Kwinana EPP) and Environmental Protection (Kwinana) (Atmospheric Wastes) Regulations	Environmental Protection Policies: Kwinana Atmospheric Waste found accessed at http://www.epa.wa.gov.au/
17.	State Environmental (Cockburn Sound) Policy 2015	EPA Policies and Guidelines accessed at http://www.epa.wa.gov.au/
18.	Fremantle Ports – L4476/1984/12 – Kwinana Bulk Terminal – Licence amendment application March 2017, including all appendices.	DWER records

19.	Alcoa (2009) Material Safety Data Sheet Number 354: Bauxite.	DWER records (A1394620)
20.	Alcoa (2015) Material Safety Data Sheet Number 354: Bauxite.	DWER records (A1533490)
20.	Alcoa (2017) Health Aspects of Bauxite Handling.	DWER records (A1394620)
21.	Ambrosino et. al (2017) European Lung White Book. European Respiratory Society.	Available at: http://www.erswhitebook.org/
22.	Analytical Reference Laboratory (2016) ASLP Laboratory Report (Job No. 16-1510).	DWER records (A1394620)
23.	Australian Radiation Protection and Nuclear Safety Agency (2008) Safety Guide: Management of Naturally Occurring Radioactive Material (NORM) – Radiation Protection Series No. 15.	Available at: www.arpana.gov.au
24.	Australian Radiation Protection and Nuclear Safety Agency (2014) Code for the Safe Transport of Radioactive Material – Radiation Protection Series C-2.	Available at: https://www.arpana.gov.au/sites/g/files/net3086/f/consignor_dec.pdf
25.	Coffee (2017) Coarse Spodumene Concentration Risk Assessment. Prepared for Fremantle Port Authority, 21 February 2017.	DWER records (A1394620)
26.	Dennekamp, M., de Klerk, N., Reid, A., Abramson, M., Cui, J., Del Monaco, A. and Fritschi, L. et al. (2015) Longitudinal analysis of respiratory outcomes among bauxite exposed workers in Western Australia. American Journal of Industrial Medicine.	Available at: https://espace.curtin.edu.au/handle/20.500.11937/21319
27.	Department of Health (2018) <i>Request for Advice – Amendment to Licence (L4476/1984/12)</i> . Letter of response received by DWER on 1 February 2018.	DWER records (A1604566)
28.	Department of Health (2018) <i>RE: Health risk advice – radioactivity of proposed bauxite export, your reference L4476/1984/12</i> . Email of response received by DWER on 18 May 2018.	DWER records (A1677296)
29.	EPA (2017) Environmental Quality Criteria Reference Document for Cockburn Sound – A Supporting Document to the State Environmental (Cockburn Sound) Policy 2015. Environmental Protection Authority, Perth, Western Australia, April 2017	Available at: www.epa.wa.gov.au/sites/default/files/Policies and Guidance/EQC%20Ref%20Doc%20for%20Cockburn%20Sound%20Feb%202017-2.pdf
30.	International Agency for Research on Cancer (2009) Silica Dust, Crystalline, in the Form of Quartz or Cristobalite.	Available at: https://monographs.iarc.fr/ENG/Monographs/vol100C/mono100C-14.pdf
31.	Polaris Metals NL (2008) Half Year Financial Report – 31 December 2008.	Available at: https://www.asx.com.au/asxpdf/20080930/pdf/31cly9fb6s0qmq.pdf

32.	Process Minerals International (2015) Safety Data Sheet: Lithium Concentrate.	DWER records (A1394620)
33.	Ruocco, Costantini and Luigia (2016) New insights into negative effects of lithium on sea urchin <i>Paracentrotus lividus</i> embryos. US National Library of Medicine National Institutes of Health.	Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4999890/
34.	Safe Work Australia (2013) Workplace Exposure Standards for Airborne Contaminants.	Available at: https://www.safeworkaustralia.gov.au/system/files/documents/1705/workplace-exposure-standards-airborne-contaminants-v2.pdf
35.	Tkatcheva, Poirier, Chon-Kit, Furdui, Burr, Leger, Parmar, Wsitzer, Maedler, Reiner, Simmons (2015) Lithium an emerging contaminant: Bioavailability, effects on protein expression, and homeostasis disruption in short-term exposure of rainbow trout. Journal of Aquatic Toxicology, Volume 161, April 2015, p.85-93	Summary available at: http://ec.europa.eu/environment/integration/research/newsalert/pdf/lithium_accumulates_in_plasma_and_brains_of_fish_after_shortterm_exposure_440na1_en.pdf
36.	Tunra Bulk Solids (2017) Report #9054: Bauxite Dust Extinction Moisture Investigation.	DWER records (A1535938)
37.	WillyWeather (2018) Kwinana Beach Wind Forecast.	Available at: https://wind.willyweather.com.au/wa/perth/kwinana-beach.html

Appendix 2: Changes to the Reviewed Licence

Reviewed Licence condition (former)	Amendment condition number	Changes made
<i>Licence amendment 26 February 2019</i>		
Environmental compliance Condition 1	N/A	Condition removed due to reflect template changes that remove duplication with general provisions of the EP Act.
Notification of Material Change Conditions 2 to 4	N/A	Removed. Refer to section 8.5.5.
Trial shipments N/A – new conditions	2 to 7	Additional conditions applied to authorise the trial shipment of new products under specific requirements for monitoring, duration, throughput, reporting and restrictions. Refer to section 8.5.6 and <i>Guideline: Port Authority Trial Shipments</i> on DWER's website.
Infrastructure and equipment Conditions 5 and 6	8 and 9	Change to condition numbers only.
Product specifications N/A – new conditions	10 to 13	Conditions added for the control of dust from spodumene and bauxite. Refer to section 8.5.1 for further justification.
Dust monitoring and reporting Conditions 7 and 8	14 and 15	Change to condition numbers only.
Cockburn Sound monitoring and reporting Conditions 9 and 10	16 and 17	Change to condition numbers only.
Emissions Condition 11	1	Administrative amendments to reflect template changes that remove duplication with general provisions of the EP Act. Removal of reference to Material Change.

Reviewed Licence condition (former)	Amendment condition number	Changes made
Information Conditions 12 to 16	18 to 22	Minor administrative amendments to align with revised licence template. Addition of reporting requirements to confirm compliance with new conditions of the Amended Licence.
Schedule 2: General Description	Schedule 2: General Description	Changes to <i>Table 7: Bulk Material tonnages assessed</i> to reflect conclusions made in this Decision Report. Removal of reference to Material Change.
Schedule 3: Infrastructure and Equipment	Schedule 3: Infrastructure and Equipment	Addition of stockpile EC03 to row 1 of Table 8. Addition of dust suppression requirements using a water truck.

Appendix 3: Licence Holder comments to proposed Licence amendments

Condition/ Section	Summary of Licence Holder comment	DWER Response
Licence amendment application received 17 March 2017 (first draft sent 11 June 2018)		
Material Change Conditions 2, 3, 4 and 11	FPA objects to removal of the Notification of Material Change Conditions in line with comments in the covering letter.	Noted. DWER has worked with the Licence Holder and other Port Authorities to develop Trial conditions (refer to section 8.5.6) as an appropriate alternative to the previous 'Material Change' provision. Trial conditions have been applied to the Amended Licence.
Record keeping Condition 12(b) Addition of Condition 12(c) and 12(d)	FPA requests DWER define the Australian Standard analyses required to appropriately identify the proportion of respirable silica quartz of a bulk material and confirm how often samples are to be taken.	Noted. There is no current Australian Standard for analysing the respirable silica content of a product. <i>Respirable silica concentration analysis by x-ray diffraction (XRD) and scanning electron microscopy (SEM)</i> has recently been accepted by DWER for other lab results that use the modified size-weighted relevant fine fraction (SWeRF) method. Other analytical methods may be developed and determined to be appropriate or more accurate. Results will be used as a guide to identify potential changes to the assessed product over time.
Product specifications Addition of Conditions 17, 18 and Table 3A	As FPA does not have direct control over the moisture content of spodumene or bauxite received from the mine site FPA requests that a compliance target of 90% be incorporated into Condition 17. A compliance target is recommended to ensure moisture content is monitored and improvements can be implemented to ensure 90% of product received at the Premises has a moisture content greater than DEM. FPA requests that Condition 17 be amended to "The Licence Holder must ensure that 90% of all spodumene and bauxite accepted from the mine site, has a moisture content at or above the Dust Extinction Moisture (DEM) level derived from application of AS4156.6-2000."	Based on the moderate risk determined through the risk assessment in section 7.5, a 90% compliance limit is acceptable for spodumene. However, due to the significant tonnages of bauxite handled at the Premises, a 95% limit has been determined as more appropriate as 10% represents approximately 250,000 tonnes per year of dry product. Inclusion of respirable silica was made in error and have been removed. Due to the significant distance

Condition/ Section	Summary of Licence Holder comment	DWER Response
	<p>FPA notes that Condition 18 refers to respirable silica quartz. FPA considers the inclusion of respirable silica quartz in Condition 18 as an error as Condition 17 & Table 3A relate to moisture content and DEM only. FPA recommends that respirable silica quartz be removed from Condition 18.</p> <p>FPA notes that Table 3A requires moisture content sampling to be undertaken at the mine site. As bauxite is conveyed from the mine site to the Pinjarra refinery and stockpiled at the refinery prior to delivery to the premises, moisture content sampling of bauxite is undertaken at the refinery rather than the mine site. FPA recommends that Column 1 (Location) of Table 3A is amended to 'Mine Site (spodumene) or Refinery (bauxite)'.</p> <p>FPA recommends that the moisture content sampling methodology be amended to align with existing moisture content sampling methodology undertaken at the spodumene mine site and bauxite refinery. FPA recommends that Column 3 (Averaging Period) of Table 3A is amended from '12 hourly representative sample' to 'Weekly average calculated from daily samples'. In line with this recommendation FPA requests the definition of 'Representative Sample means a composite sample comprised of samples taken every two hours over a 12 hour period' be deleted from the Definitions in the Licence.</p> <p>FPA is aware that spodumene moisture content analysis undertaken at the mine site conforms with AS5621-2013 Iron ores - Rapid moisture determination. Therefore, FPA requests that the sampling methodology noted in Column 5 (Method) of Table 3A be amended to align with existing moisture content methodology undertaken at the spodumene mine site. FPA recommends that Column 5 of Table 3A is amended to 'AS1289.2.1.1-2005 (bauxite) or AS5621-2013 (spodumene) undertaken by laboratory with technical results in a written report'.</p> <p>For clarification, FPA recommends that Column 4 description 'Frequency' be changed to 'Frequency of Reporting'.</p>	<p>to receptors and low assessed silica content of products, no minimum specifications relating to respirable silica have been placed on bauxite and spodumene products. Annual reporting on silica content will remain a requirement of Record Keeping conditions to ensure risks remain acceptable.</p> <p>Requested changes to moisture content sampling locations and averaging periods for spodumene and bauxite are noted and accepted.</p>
Addition of Conditions 19 and 20	FPA requests a definition for 'appropriately sample' to be added to the definitions listed in the licence.	Noted. Wording of the condition amended for clarity.

Condition/ Section	Summary of Licence Holder comment	DWER Response
Schedule 3, Table 6, Row 6A	<p>FPA requests the removal of Item 6A of Table 6, as FPA notes:</p> <ul style="list-style-type: none"> • A fixed sprinkler system has been fitted to EC03 that adequately covers the EC03 stockpile pad. • Proposed Conditions 17-20 require moisture content monitoring of Spodumene to be maintained DEM. • The existing licence requires a truck mounted water cannon be utilised at first signs of dust lift-off not suppressed by the fixed sprinkler system (Item 5 Table 6). • Moisture content monitoring of spodumene stored on EC03 has consistently been \geq DEM, as presented in the material change notifications submitted to your Department from February 2017 to May 2018. 	<p>Noted. Due to the significant increase in product proposed for handling at the Premises, and the associated increase in FEL movements, the requirement for increased dust suppression at stockpiles has been determined as appropriate and necessary to address dust risks. Amendments have been made to refer only to iron ore and bauxite stockpile areas as these have been identified as the most significant potential source of dust from stockpiling activities due to the amounts handled.</p>
Definitions	<p>FPA requests that the definition of 'AS1289.2.1.1-2005' is added to the Definitions in the Licence.</p> <p>FPA requests the definition of Representative Sample means a composite sample comprised of samples taken every two hours over a 12 hour period' be deleted from the Definitions in the Licence. Please see explanation provided above in 'Addition of Conditions 17 & 18 and Table 3A'.</p>	<p>Noted and accepted.</p>
Draft Decision Report – Page 4, last paragraph	<p>Bauxite is not stored on the EC03 stockpile pad.</p>	<p>Noted. Amended to reference iron ore stockpile and conveyor EC05.</p>
Draft Decision Report – Page 5, 2 nd paragraph	<p>Second sentence - "It will then be loaded onto the EC03 conveyor using FELs that tie into the existing export system at the T1 transfer tower..." The T1 transfer tower is incorrect and FPA requests that 'T1' be replaced with 'T10' transfer tower.</p>	<p>Noted. Amended to reference transfer station T10.</p>
Draft Decision Report – Page 9, last paragraph	<p>The 'Ambient air quality monitoring' section refers to four community monitoring stations. FPA requests community be replaced with boundary.</p>	<p>Amended.</p>

Condition/ Section	Summary of Licence Holder comment	DWER Response
Draft Decision Report – Page 9, 2 nd paragraph	Third sentence - “Potable water is not drawn from groundwater on or in the vicinity of the premises”. FPA would like to note that groundwater is drawn from the premises and is utilised for dust suppression in accordance with Licence to Take Water GWL163607.	Amended.
Draft Decision Report – Page 11, 2 nd paragraph	FPA advises that following this complaint the unloader dust extraction system was upgraded to manage dust emissions from the feeder belt.	Noted. Amendments made to refer to the Licence Holder’s response.
Draft Decision Report – Page 13, 3 rd paragraph	Second sentence - “The premises is located in ‘Area A’ under the Kwinana EPP, meaning that TSP should not exceed 260pg/m* over a 24 hour averaging period.” FPA requests that further clarification in relation to reference of the EPP is provided, specifically the applicability of the 260pg/m* TSP limit to point sources.	TSP limits specified in the <i>Environmental Protection (Kwinana) (Atmospheric Wastes) Regulations 1992</i> are for ambient air quality. No changes made.
Draft Decision Report – Page 14, last paragraph	First sentence - “To further control dust from the increased amounts of bauxite handled and to reduce moisture loss during storage, the Licence Holder proposes to continue the operation of the water truck on unsealed areas and water sprays on stockpile EC03.” FPA notes that bauxite is stored on the EC05 stockpile are therefore requests that EC03 is replaced with EC05.	Noted. Amended to refer to conveyor EC05.
Draft Decision Report – Page 15, 2 nd paragraph	First sentence - “The distance between the nearest industrial receptors and the EC03 stockpile area...” As detailed above, bauxite is stored on the EC05 stockpile area, therefore FPA requests that EC03 is replaced with EC05.	Noted. Amended to refer to conveyor EC05.
Draft Decision Report – Page 17, 1 st paragraph	Last sentence – “In addition, spodumene will be transported to the jetty using an underground (enclosed) conveyor system, and to the ship using a covered (top, bottom and sides) conveyor system.” FPA notes that Jetty Conveyor JC01 is not covered in full, it has a top wind shield for part of the conveyor, a wind shield on the southern side of part of the conveyor and spillage from the underside of the conveyor is captured by the wharf decking.	Noted. Wording amended.
Draft Decision Report – Page 18 3 rd paragraph	Fourth sentence – “In addition the loading arm is fitted with a deflector plate to capture any spilt material” FPA would like this statement removed as there is no deflector plate fitted or	Noted. Reference to the deflector plate removed.

Condition/ Section	Summary of Licence Holder comment	DWER Response
	required.	
Licence amendment application received 17 March 2017 (second draft sent 4 January 2019)		
Prescribed Premises description	FPA requests the addition of Category 58A to the licence to allow for trial conditions to apply to evaporites including gypsum, salt and potash.	Noted. Category 58A has been added to the Amended Licence.
Product specifications: Condition 10	Based on historical high moisture content of Spodumene and Bauxite FPA requests that the requirement to assess DEM annually is removed, and specifically requests the removal of '...as determined annually' from the condition.	Based on the consistency of moisture content remaining above DEM level and distance to receptors DWER accepts this change. The Licence Holder will continue to be required to maintain and provide up to date records of DEM levels for both spodumene and bauxite.
Product specifications: Condition 10	FPA requests that '...95% of bauxite handled at the premises remains at or above the DEM level...' be changed to '...90% of bauxite handled at the premises remains at or above the DEM level...'. This request relates to the limited number of shipments per year (54 ships scheduled annually) where 5% of annual shipments represents only 2-3 shipments, whereas 10% represents 5-6 shipments which is considered a more appropriate target.	Noted and accepted on the basis that at least 95% of in-loaded bauxite (averaged over each train load) must be received with a moisture content above DEM. Changes made.
Product specifications: Condition 12	FPA is aware that the existing Bauxite moisture content monitoring undertaken at the premises prior to and during ship loading currently conforms with AS2932.22002 Aluminium ores - Chemical Analysis Part 2: Determination of the moisture content of bulk material, rather than the standards noted in Table 3. To reflect changes proposed to Table 3, FPA recommends that Condition 12 is expanded to reference Conditions 10, 12 & 13.	Accepted. Condition 13 has been amended to also authorise the use of AS 2932.2-2000 to determine the moisture content of bauxite. DWER notes that the Licence Holder has requested for product moisture content to be "calculated from samples collected at regular intervals during loading." As this terminology is not clear or certain and therefore not in accordance with DWER <i>Guidance Statement: Conditions Setting</i> , the wording has changed to reflect the approximate sampling rate.
Dust monitoring	FPA notes the addition of Reportable Event Criteria of 260µg/m ³ and requests the	Noted and accepted.

Condition/ Section	Summary of Licence Holder comment	DWER Response
and reporting: Condition 14	criteria to be changed to $\geq 260\mu\text{g}/\text{m}^3$.	
Information: Condition 18	<p>FPA requests that 18(d) be amended to read ‘the Moisture Content for all bauxite and spodumene sampled at the refinery (bauxite) and mine site (spodumene) and received at the Premises on a weekly basis’.</p> <p>FPA requests that 18 (f), (f), (g) and (h) be amended to read 18 (f), (g), (h) and (i).</p> <p>For consistency through the licence, FPA requests that the word ‘ore’ be removed from 18 (d) and requests that the word ‘bulk’ be removed from 18 (e) and 18 (f).</p>	Noted and amended.
Schedule 2: Bulk materials loaded and unloaded	<p>FPA notes the addition of conveyor ‘EC03 (to AL04 shiploader)’ to Item 11 and requests this addition be relocated to a new row titled ‘Conveyor System for exports from truck receivals to KBB2’.</p> <p>FPA requests the removal of non-Category 58 infrastructure ‘Administration and workshop buildings’ (row 5).</p> <p>FPA requests that ‘spodumene’ be added to the list of bulk products currently handled through KBT.</p>	Noted and amended.
Schedule 3: Infrastructure and Equipment	<p>FPA requests the removal of Row 7 of Table 8 requiring the operation of water trucks on the iron ore and bauxite storage pad. FPA notes:</p> <ul style="list-style-type: none"> • A fixed sprinkler system has been fitted to EC05 adequately covers the FEL operations area of the stockpile. • The average moisture content per bauxite shipment for the past two years demonstrates bauxite is consistently > DEM prior to and during ship loading. • Annual dust monitoring reporting and the proposed reportable event criteria for the boundary dust monitors provides greater transparency around the dust levels generated. Reporting will inform the necessity for further operational dust controls. • Existing conditions require appropriate mitigation actions for visible dust eg. sprinklers on the southern side of the stockpile to be turned on at the first signs of visible dust; and a truck mounted water cannon to be utilised at the 	<p>Noted. Row 7 has been removed on the grounds that the nearest receptor is 600 m to the south of EC03 with prevailing winds being from the south during windier months.</p> <p>In addition, dust is controlled by the current licence through the application of water onto EC03 by stockpile sprinklers and truck mounted water cannons as required through Rows 4 and 5. These rows have been amended to include the requirement to address any visible dust from the stockyard where FEL movements may generate dust.</p> <p>Additional conditions through this amendment requiring the moisture content of 95% of in-loaded bauxite, and the reduction of overall iron ore</p>

Condition/ Section	Summary of Licence Holder comment	DWER Response
	<p>first signs of dust lift-off not suppressed by the fixed sprinkler system.</p> <ul style="list-style-type: none"> • The FEL operational area on EC05 is in a position with the stockpile (10-15m high) to the north and vegetation line boundary (average 20-25m high) to the south ensuring dust emissions are not easily dispersed across the premise boundary. • Regular and routine inspections have not identified FEL operations on the EC05 stockpile to be a source of on-site dust that triggers operational dust alarms. • No complaints have been received. <p>Note that clinker is unloaded into trucks within the shed using FELs and not via a chute outside the shed as described in Row 10.</p>	<p>tonnages, reduces the opportunity for dust generation during bulk handling using FELs.</p> <p>Noted. Amendments made.</p>
Schedule 4: Monitoring – Dust monitoring reports	The Licence Holder seeks clarification that the reporting of moisture content refers only to bauxite and spodumene.	Noted and confirmed. The Licence has been amended to refer only to bauxite and spodumene.
	The Licence Holder requests the removal of the words “prior to” when referring to the 24 hour reporting period.	Accepted. Reporting of activities on only the 24 hour periods where high dust levels are experienced, and not the periods prior to the dust event, is appropriate.
	The Licence Holder requests changes to the reporting requirements for Reportable Events where events are triggered by regional events or other external sources. This includes the removal of “a description of potential sources of high dust levels” where external sources are the cause.	<p>Noted. It is important to maintain an understanding of site activities as a reporting requirement for all Reportable Events as it helps to provide a clear picture of all possible dust generating activities during dusty these events. As raised by the Licence Holder, these reporting requirements provide greater transparency around the dust levels generated.</p> <p>Reporting will inform the necessity for future operational dust controls.</p>
	The Licence Holder requests the removal of reference to high dust alarms.	Noted. This requirement is replaced with the need to describe what onsite controls were in place/initiated during Reportable Events.

Condition/ Section	Summary of Licence Holder comment	DWER Response
	FPA requests that the dust monitoring map is replaced by the map supplied by FPA which depicts the current premises boundary.	Figure amended.
Additional comments	The Licence Holder requests the source of DWER's statement in section 7.5.8 "Dust emissions at source have not been measured, although site ambient monitoring system indicates that the Kwinana EPP limits may be exceeded three per cent of the time within the premises boundary."	The three per cent figure was made in error based on 2017 boundary monitoring data showing 10 exceedances in that reporting period. On review it is noted that these ten exceedances occurred over five days and that some may not be attributable to premises activities. As determination of source is not possible based on the information received, DWER has conservatively assessed the likelihood of a dust risk event on the possibility of five exceedances of the EPP limits per year. Changes have been made to section 7.5.8.
	The Licence Holder demonstrated concern that the removal of 'Material Change' conditions reduced the flexibility of trade. Although Trial conditions offered a simpler and more efficient pathway to licence amendments, the Licence Holder noted that it would be unable to respond quickly to emergency situations involving bulk cargoes not prescribed on the Licence.	<p>Noted. DWER's experience with the application of the Material Change conditions has not matched the original intent of the condition, which was to authorise operational flexibility for matters that are likely to result in insignificant environmental risk.</p> <p>The concept of handling 'emergency cargoes' removes DWER's regulatory oversight of potential high-risk activities at the Premises and is not acceptable.</p> <p>As noted by the Licence Holder, DWER has worked closely with the Licence Holder and other Port Authorities to develop Trial conditions (refer to section 8.5.6) as an appropriate alternative to the previous 'Material Change' provisions.</p> <p>Trial conditions have been applied to the Amended Licence and allow trade of a new bulk granular material within 30 days of notification. This allows DWER time to assess the risks associated with Trial</p>

Condition/ Section	Summary of Licence Holder comment	DWER Response
		activities and cease a Trial where the handling controls do not satisfy DWER's <i>Guideline: Port Authority bulk handling trials</i> .

Attachment 1: Revised Licence L4476/1984/12
