Government of Western Australia
Department of Water and Environmental Regulation

Amendment Notice 1

Works Approval Number	W6090/2017/1
Works Approval Holder	BMT Australia Pty Ltd
ACN	614 363 647
File Number:	DER2017/001541
Premises	Kwinana Mercury Treatment Plant Lot 101 Donaldson Rd KWINANA BEACH WA 6167 Part of Lot 101 on Plan 7374
Date of Amendment	22/05/2019

Amendment

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

Caron Goodbourn Digitally signed by Caron Goodbourn
Date: 2019.05.22 15:21:59 +08'00'

Manager, Process Industries

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

Definitions and interpretation

Definitions

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

Table 1: Definitions

Term	Definition
ACN	Australian Company Number
Amendment Notice	refers to this document
Application	An application for an amendment to a works approval or Licence made under section 59(2) of the EP Act
AS4323.1-1995	means the Australian Standard *Stationary source emissions - Selection of sampling positions* (Standards Australia, 1995)
Category/ Categories/ Cat.	categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department Administering the *Environmental Protection Act 1986* Locked Bag 10 JOONDALUP DC WA 6919 info@dwer.wa.gov.au
Controlled Waste Regulations	*Environmental Protection (Controlled Waste) Regulations 2004*
Delegated Officer	an officer under section 20 of the EP Act
Department	means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DWER	Department of Water and Environmental Regulation
EP Act	*Environmental Protection Act 1986* (WA)
EP Regulations	*Environmental Protection Regulations 1987* (WA)
H_2S	Hydrogen Sulphide
HVAC system	The mercury treatment process building Heating, Ventilation and Air Conditioning system
KIA	Kwinana Industrial Area
m^3	cubic metres
MCW	Mercury Contaminated Waste
MTP	Mercury Treatment Plant
tpa	tonnes per annum

Term	Definition
Noise Regulations	*Environmental Protection (Noise) Regulations 1997* (WA)
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Amendment Notice applies, as specified at the front of this Amendment Notice.
Risk Event	as described in *Guidance Statement: Risk Assessment*
VOCs	Volatile Organic Compounds
Works Approval Holder	BMT Australia Pty Ltd

Amendment Notice

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

This Notice is limited only to an amendment to authorise storage of mercury contaminated waste (MCW) within storage infrastructure established at the Kwinana Mercury Treatment Plant (MTP), increase the capacity for storage of MCW, as well as to authorise commissioning and time limited operation of the Kwinana MTP under the works approval.

The guidance statements that have informed the decision made on this amendment are listed in Appendix 1.

Amendment description

Works Approval W6090/2017/1 was issued to BMT Australia Pt Ltd (Works Approval Holder) on 8 May 2018 to authorise construction of the Kwinana MTP (Categories 39 and 61A). The Kwinana MTP will accept, store and treat MCW, including sludges, catalysts and filters, from liquefied natural gas (LNG) projects in Western Australia, to recover mercury.

The mercury recovery process will involve heating MCW in electrical furnaces (retorts) to an appropriate temperature to break mercury bonds. This results in the vaporisation of volatile contaminants, including volatile organic compounds (VOCs), hydrogen sulphide (H_2S) and mercury from the waste. Off-gas from the heating process will be condensed by a vacuum distillation unit to remove traces of mercury, VOCs and H_2S present in the process off-gas. Uncondensed vapours from the process, and fugitive emissions from the Process Building will be treated through a two stage activated carbon filtration system prior to release to atmosphere via an emissions stack. It is expected that after mercury is recovered from the MCW, the residual waste will be suitable for disposal to a Class III landfill, or for recycling.

Recovered liquid mercury will be collected in specialised sealed storage vessels (United Nations approved for storage of liquid mercury) pending stabilisation. The liquid mercury will be stabilised in a reactor through the addition of powdered sulphur to form solid stabilised mercury sulphide, also referred to as cinnabar. The stabilised mercury sulphide, will not contain free mercury and will be stored in sealed steel drums within a warehouse on the premises pending transport to an approved long-term storage facility. Further detail relating to the mercury treatment process can be found in the W6090/2017/1 Decision Report.

This Amendment Notice is the result of an application from the Works Approval Holder received by DWER on 11 February 2019. Appendix 1 contains a list of documents which form the application. The Works Approval Holder has applied for the following amendments to be made to works approval W6090/2017/1:

- Authorisation of commissioning and operation of the Kwinana MTP pending the issue of an operational licence for the premises. The initial Works Approval application did not include commissioning, therefore commissioning was not assessed or authorised under the issued Works Approval;
- Authorisation of the storage of MCW on the premises to provide feed for commissioning of the MTP;
- Increase to the storage capacity for MCW on the premises from 200 to 400 tonnes due to the final warehouse racking layout and design allowing for a larger quantity of waste to be stored within the Warehouse than was originally designed; and
- Removal of the requirement to install a weighbridge on the premises as an alternate means of weighing incoming MCW and outgoing stabilised mercury sulphide will be implemented (forklift with weighing capability).

Based on information in the application it was also determined that the Works Approval Holder

requires the assessed production capacity (Category 39 and Category 61A) of the premises to be increased from 1,000 tonnes per annum (tpa) to 2,000 tpa. This change is required to account for storage of MCW and stabilised mercury sulphide, at the same time as treatment through the MTP. The increased storage capacity therefore accounts for both the waste inventory and processing capacity of the Kwinana MTP.

Table 2 below outlines the proposed design capacity changes to the Works Approval

Table 2: Proposed design capacity changes

Category	Current design throughput capacity	Proposed design throughput capacity	Description of proposed amendment
39 and 61A	1,000 tpa	2,000 tpa	Increased capacity to account for waste inventory and processing capacity

The Works Approval Holder submitted a Commissioning Plan to DWER as part of the Works Approval W6090/2017/1 amendment application, to enable commissioning to be assessed and incorporated into the works approval.

Commissioning will commence following completion of design checks, visual inspection and operational testing of all systems, automatic controls and alarms without load. Commissioning will comprise a four stage batch testing process as outlined below:

- Stage 1 – An individual bank of five empty retorts will be operated from start up to shut down.
- Stage 2 – An individual bank of five retorts will be filled with uncontaminated waste and operated from start up to shut down
- Stage 3 – An individual bank of five retorts will be filled with contaminated waste and operated from start up to shut down. Laboratory tests of the waste will be undertaken to confirm satisfactory removal of mercury has been achieved. This stage will be repeated if needed until this is confirmed.
- Stage 4 – Two banks of five retorts will be filled with contaminated waste and operated from start up to shut down. The third bank of five retorts will be in cool down phase or loading/unloading while the other two are operating. This stage will not commence until confirmation by laboratory testing that removal of mercury from the waste has been satisfactorily completed during Stage 3.

Additional activities and monitoring which the Works Approval Holder has proposed to undertake during the commissioning stage to confirm the performance of environmental controls include:

- Confirmation of sump/bund integrity through filling with water and monitoring water level to confirm there are no leaks.
- Measurement of noise levels from the Heating, Ventilation and Air Conditioning (HVAC) system fan once commissioned to confirm acceptable levels are achieved.
- Premises boundary noise assessment once the MTP has been fully commissioned;
- Smoke test within the Process Building to confirm negative pressure is maintained during operation of the MTP.
- Stack testing of the emission stack will be undertaken when the plant is operating at maximum capacity which is with two full banks of five retorts in operation while the third bank is in cool down phase. The stack testing will be performed to measure mercury, benzene (VOC's) and H_2S emissions. The tests will be undertaken when the maximum emission rates are expected to occur (30 minutes after the operating temperature is reached inside the retorts).

- Analysis of a sample of the first stage activated carbon filters for sulphur and mercury content after two, four and eight weeks of operation of the MTP (with contaminated load) to predict the lifespan of the filters and schedule planned filter changes.

The Works Approval Holder has requested to continue operation of the MTP following commissioning pending the issue of a licence for the premises. Operation will be on an ongoing 24 hours per day, seven day per week basis. At any one time there will be two banks of retorts in operation while the third bank is in cool down phase.

Commissioning of the Kwinana MTP will require waste input, therefore MCW will be required to be stored at the Premises prior to commissioning of the MTP commencing. Incoming MCW will be received in wrapped, sealed steel or heavy duty plastic drums secured onto pallets in accordance with dangerous goods transport requirements. The waste will be unloaded via a forklift in a dedicated unloading area immediately adjacent to the warehouse, and transferred into the warehouse for storage prior to processing. If MCW arrives in containment which is damaged it will be immediately transferred into the process building for treatment. The unloading area was not included in the original works approval application and therefore has been assessed through this Amendment.

The following MCW types are proposed to be accepted for storage and treatment by the Works Approval Holder. The wastes will be grouped into similar waste types and batch processed through the MTP.

- Sludges and residues – oily hydrocarbon, semi-solid material. The water content of the sludges will vary dependent on oil and gas company processes;
- spent catalysts/absorbents – solid pelletised materials with no moisture. Metals include mercury or mercury compounds, copper and nickel;
- filters – solid filter cloth contaminated with sludge. Moisture content is similar to sludges but typically no free water;
- mercury impregnated activated carbon – solid carbon powder. Typically, moist but no free water;
- articles containing mercury such as fluorescent lamps, thermometers and sphygmomanometers;
- dental amalgam waste;
- articles contaminated with mercury such as used process equipment and personal protective equipment;
- quicksilver (liquid mercury);
- industrial wash waters or produced waters containing mercury; and
- metal and steel – solid metal equipment that has mercury contamination on surface. Also includes emptied steel drums that incoming MCW were stored inside.

Mercury contaminated wastes will be transported to the premises by a controlled waste carrier licensed in accordance with the *Environmental Protection (Controlled Waste) Regulations 2004* (Controlled Waste Regulations). Transport of stabilised mercury sulphide to an offsite long term storage facility will also be undertaken by a licensed controlled waste carrier.

Other approvals

The Works Approval Holder has provided the following information relating to other approvals as outlined in Table 3.

Table 3: Relevant approvals

Legislation	Number	Approval
Health Act 1911	Approval to be obtained prior to operational phase	Application to construct or install an apparatus for the treatment of sewage
Planning and Development Act 2005	Planning approval 25 April 2018, Parcel Number 14964 / Application Number: 9105 / Assessment Number: 19438	Planning and Development approvals for the Premises under City of Kwinana
Dangerous Goods Safety Act 2004	NA	A Dangerous Goods Storage Licence is required to be obtained prior to accepting MCW onto the premises for storage.
Land Administration Act 1997	General Lease O011510L	BMT Australia Pty Ltd hold a long-term (20 year) lease over the prescribed premises (with landowner the Western Australian Land Authority). The lease commenced on 1 August 2018.
Environmental Protection (Controlled Waste) Regulations 2014	NA	On receipt of this Amendment Notice the Works Approval Holder should submit a *Form 14 – Application to list a waste facility* to the DWER to seek registration as a waste facility on the Department's Controlled Waste Tracking System.

Amendment history

Table 4 provides the amendment history for Works Approval W6090/2017/1.

Table 4: Works approval amendments

Instrument	Issued	Amendment
W6090/2017/1	22/05/2019	Amendment Notice 1 – Amendment to authorise commissioning, time limited operation and MCW storage on the premises under the works approval.

Exclusions to the Premises

The following general matters are excluded from DWER's assessment and control under Part V of the EP Act:

- Location of the proposal from a strategic context: applications are assessed and determined by DWER on a case by case basis with regards to the environmental risk

posed by the specific proposal and any relevant cumulative impact implications due to surrounding emission sources.

- The Department of Planning, Lands and Heritage and the Western Australian Planning Commission (WAPC) are responsible for the overall strategic direction of government on urban, rural and regional land-use planning and land development matters throughout Western Australia.
- Human health risks posed to site staff, visitors or contractors working on the Premises: In accordance with *DWER's Guidance Statement: Risk Assessments* (February 2017), DWER excludes employees, visitors or contractors of the Applicant as potential receptors of emissions. Protection of these parties is provided for under other state legislation and jurisdictions (i.e. the Department of Mines, Industry Regulation and Safety (DMIRS) / WorkSafe and the *Occupational Health and Safety Act 1984*). DWER's risk assessment therefore only focuses on potential public health impacts to receptors outside the Premises.
- The transport of MCW and residual waste streams outside the Premises: The Applicant will be required to obtain licences from DMIRS for the storage and transport of hazardous substances under Dangerous Goods legislation, which will specify safety requirements for the on-site storage of hazardous substances and the packaging of wastes during transport.

  Incoming and outgoing controlled waste products will be required to be transported by appropriately licensed controlled waste carriers, in accordance with the Controlled Waste Regulations which is administered by DWER under a separate approval process.

Location and receptors

The Kwinana MTP is located within the Kwinana Industrial Area (KIA) at the corner of Burton Place and Donaldson Road, Kwinana Beach (Lot 101 Donaldson Rd).

Table 5 below lists the relevant sensitive land uses in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 5: Receptors and distance from activity boundary

Residential and sensitive premises	Distance from Prescribed Premises
Residential premises (Medina)	Approximately 2 km southeast
Ovals, sporting facilities and other recreational facilities including Chalk Hill Lookout	1.8km southeast
Medina Primary School	2.5km southeast
Wombat Willow Child Care Centre	2.5km southeast
Kwinana Medical Centre	2.8km southeast

Table 6 below lists the relevant environmental receptors in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 6: Environmental receptors and distance from activity boundary

Environmental receptors	Distance from Prescribed Premises
Geomorphic Wetlands	• Resource enhancement category Sumpland approximately 1.1km and 2.3km southeast of the Premises • Resource enhancement category Dampland approximately 2km northeast from the Premises
Bush Forever: Regional open space or proposed regional open space	• 800m southeast of the Premises
Threatened Ecological Communities (TEC) and Priority Ecological Communities	Multiple TEC's to the south and east of the Premises, including (but not limited to): • TEC 500m buffer edge containing 5 sites located 1.4km south of Premises • TEC 500m buffer edge containing 1 site located 2.1km south of Premises • TEC 500m buffer edge containing 1 site located 2.5km south of Premises • TEC 500m buffer edge containing 1 site located 2.5km northeast of Premises
Major watercourses/ waterbodies	Cockburn Sound 1.8km east north-east of Premises
Groundwater	The Perth Groundwater Atlas indicates that depth to groundwater at the site is likely to be 6.0m below ground level (or 1.0 mAHD, with ground level being at 7.0 mAHD). The base of the aquifer is estimated to be 32m below ground level (or -25.0 mAHD). There are a number of bores (>30) located within 1km of the Premises (based on available GIS dataset –WIN Groundwater Sites). Most of these bores are located towards the south and southwest of the Premises and a large proportion are listed as having been installed as project bores for observation/ monitoring purposes. Three bores (150m northwest, 375m southeast and 875m east-southeast) of the Premises are listed as being installed for 'irrigation' purposes; however all three are listed as having no current owners and unknown current status.
State Environmental (Cockburn Sound) Policy 2015 boundary	Premises is located inside the Policy boundary

Risk assessment

Table 7 below describes the Risk Events associated with the amendment consistent with the Guidance Statement: Risk Assessments. The table identifies whether the emissions present a material risk to public health or the environment, requiring regulatory controls.

Table 7: Risk assessment for proposed amendments during construction/commissioning

Risk Event						Consequence rating	Likelihood rating	Risk*	Reasoning	Regulatory controls
Source/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**					
Cat 61A **Solid waste facility**	Delivery and storage of MCW, and storage and loading of stabilised mercury sulphide (powdered cinnabar) within the Warehouse building	Noise (trucks)	Personnel at neighbouring industrial premises Sensitive/public receptors at Medina ≥1.8km southeast		Amenity	Minor	Rare	Low	The Premises is located in the KIA and is therefore subject to higher assigned levels under the *Environmental Protection (Noise) Regulations 1997* (Noise Regulations) (refer to W6090/2017/1 Decision Report for details of the KIA assigned levels). The Works Approval Holder expects to receive infrequent truck deliveries of MCW (typically 1-2 per week) based on the production capacity of the MTP. Collection of stabilised mercury sulphide is only expected to occur approximately annually. Noise from truck deliveries is therefore expected to be intermittent and of short duration and in line with the existing noise profile of the surrounding industrial area.	The Delegated Officer considers the level of noise emissions likely to be generated due to MCW delivery/collection will not impact on the nearest sensitive receptors due to the separation distance and higher assigned levels for the area. The provisions of the Noise Regulations will apply.
		Fugitive emissions to air (spent filter, catalyst and stabilised mercury sulphide which may be dry)		Air/wind dispersion	Amenity and public health (inhalation)	Minor	Rare	Low	The Works Approval Holder has proposed the following controls to minimise the likelihood of fugitive emissions to air occurring: • Incoming MCW will be received packaged within sealed drums or other enclosed containers (UN approved Dangerous Goods containers) which are secured on pallets. • Damaged containers will be removed to the Process building (an enclosed building under negative pressure). • MCW will be transferred from delivery trucks into the Warehouse building (enclosed area) for storage. • Stabilised mercury sulphide will be stored within sealed steel drums within the Warehouse building pending transport offsite (UN approved Dangerous Goods containers). • Storage of no more than 400 tonnes of MCW within the Warehouse (inclusive of stabilised mercury sulphide) restricting the source of potential fugitive emissions. The Delegated Officer considers that the Works Approval Holder's proposed controls for the delivery and storage of MCW, and storage of stabilised mercury sulphide ensure there is a limited pathway, and therefore a very low likelihood, for fugitive emissions to air to occur.	The Works Approval Holder's controls have been included in the amended Works Approval in accordance with DWER's Guidance Statement: Risk Assessments (DER 2017a) which specifies that a Works Approval Holder's controls will be conditioned where they lower the likelihood and/or consequence of a risk event. The Works Approval Holder's controls have been included in as operational requirements in condition 10 and waste acceptance requirements in conditions 11, 13 and 16.
		Spillage or leakage of MCW (solid or liquid) or stabilised mercury sulphide	Shallow groundwater (6m below ground level) Closest surface water bodies	Infiltration through soil to groundwater could occur, recharging nearby	Impacts related to bioaccumulation of mercury in the ecosystems of nearby surface water systems, and/or Cockburn	Minor	Rare	Low	The Works Approval Holder has proposed the following controls to minimise the risk of MCW or stabilised mercury sulphide spills or leaks impacting on soils or waters: • Unloading of MCW / loading of all stabilised mercury sulphide will occur at a dedicated	The Works Approval Holder's controls have been included in the amended Works Approval in accordance with DWER's Guidance Statement: Risk Assessments (DER 2017a)

Risk Event						Consequence rating	Likelihood rating	Risk*	Reasoning	Regulatory controls
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
			(resource enhancement sumpland 1.1km southeast) Cockburn Sound (1.8km west)	surface water	Sound. Secondary impacts on bird and human health (reproduction, nervous system and brain development).				loading bay immediately adjacent to the warehouse. • The loading bay will drain to a collection sump to ensure if a spill occurs during unloading or loading of trucks it will be contained within the sump. • All MCW and stabilised mercury sulphide will be stored within the Warehouse building within sealed containers (UN approved Dangerous Goods containers). • The Warehouse building has been designed and constructed with a sealed hardstand floor impermeable to mercury and hydrocarbons. The floor drains to an impermeable sump and is surrounded by an equally impermeable bund which can hold at least 35 m^3 of liquid. Collected spillage is able to be returned for processing if mercury contamination is present, or stored and transported to an appropriate disposal facility if mercury is not present. • Any MCW received in damaged packaging will transferred to and stored within the Process building pending treatment. • The Process building will be designed and constructed with a sealed hardstand floor impermeable to mercury and hydrocarbons. The floor will be surrounded by an equally impermeable bund and will drain to an impermeable sump sized to hold a volume at least 10% greater than the largest vessel housed within the Process Building (3.5m^3 minimum). Collected spillage is able to be returned for processing if mercury contamination is present, or stored and transported to an appropriate disposal facility if mercury is not present. The Delegated Officer considers that the Works Approval Holder's proposed controls for the delivery and storage of MCW, and storage of stabilised mercury sulphide, ensure there is a limited pathway, and therefore a low likelihood, for emissions to water or soils to occur.	which specifies that a Works Approval Holder's controls will be conditioned where they lower the likelihood and/or consequence of a risk event. The Works Approval Holder's controls have been included in as operational requirements in condition 10 and waste acceptance requirements in conditions 11, 13 and 16. Construction requirements for the loading bay have been included in amended Schedule 2, Table 3 as the infrastructure was not included in the assessment of the original Works Approval application.
		Radiation (naturally occurring radioactive materials; NORM) due to receival and handling of waste containing radiation.	Personnel at neighbouring industrial premises Sensitive/public receptors at Medina ≥1.8km southeast	Dispersion through air and settling on ground surface (inhalation, direct exposure on skin)	Public health – unsafe amounts/ forms of ionising radiation can increase risks of cancer, tumours or genetic damage. High exposures can cause	Slight	Rare	Low	The Works Approval Holder has proposed the following controls to prevent radiation release from the premises: • Wastes defined as radioactive substances under the *Western Australian Radiation Safety Act 1975* will not be accepted for treatment. • The transportation contractor will use a radiation scanner to check for the presence of radioactive materials at the point of MCW	The Works Approval Holder's commitment to not accepting radioactive substances has been included as a waste acceptance specification in condition 11 in the amended Works Approval in accordance with DWER's Guidance Statement: Risk Assessments (DER 2017a)

Risk Event						Consequence rating	Likelihood rating	Risk*	Reasoning	Regulatory controls
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
					microscopic damage to living tissue, leading to burning of the skin or radiation sickness.				collection. • The Works Approval Holder will conduct spot checks with a radiation scanner, on a minimum monthly basis, to confirm received MCW does not contain radiation (the frequency of checks is likely to be reduced over time once the effectiveness of the transport contractors controls is confirmed). • During the commissioning phase full analysis of all incoming waste types will be undertaken to confirm waste received at the premises does not contain radiation. The Delegated Officer considers that restricting the acceptance of MCW to exclude waste containing radiation during the works approval commissioning and Time Limited Operational Phase will remove the pathway for radiation release.	which specifies that a Works Approval Holder's controls will be conditioned where they lower the likelihood and/or consequence of a risk event. Condition 12 has also been included requiring waste which doesn't meet acceptance specifications to be removed from the premises.
		Emission of potentially toxic smoke to air from the burning of infrastructure and MCW due to fire ignition in the Warehouse.	Personnel at neighbouring industrial premises Sensitive/public receptors at Medina ≥1.8km southeast	Air / wind dispersion	Public health	Major	Rare	Medium	The Delegated Officer has referred to the detailed risk assessment pertaining to the risk of toxic emissions to air resulting from fire outbreak included in the Decision Report for W6090/2017/1. The Delegated Officer has also considered the following controls proposed by the Works Approval Holder within the Emergency Response Plan for the Premises which was submitted to the DWER in accordance with Condition 5 of W6090/2017/1. The proposed controls intended to detect and respond to the outbreak of fire within the Warehouse are: • The Warehouse will have a two stage fire detection system comprising a Very Early Smoke Detection Apparatus (VESDA) which will activate a first stage site wide emergency alarm. The second stage will comprised a heat detection alarm which will activate a back to base alarm for automated notification to Department of Fire and Emergency Services (DFES) to respond. • Dry powder fire extinguishers will be located around the premises. A minimum of four will be located within the Warehouse. • There will be two fire hydrants on the premises. • Fire detection and firefighting equipment will be inspected and maintained as per the manufacturer's specifications. The Delegated Officer considers the Works Approval Holders proposed controls to detect and respond to fire within the Warehouse are appropriate to minimise the likelihood of the risk event occurring.	The Works Approval Holder's proposed fire detection and response equipment has been included as specified equipment within condition 10 (Table 4) of the amended Works Approval to ensure effective and operational fire detection and response is maintained on the premises to minimise the likelihood of a significant fire outbreak.

Risk Event						Consequence rating	Likelihood rating	Risk*	Reasoning	Regulatory controls
Source/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**					
		Emission of potentially contaminated wash water or firefighting water to the environment from the Warehouse building	Shallow groundwater (6m below ground level) Closest surface water bodies (resource enhancement sumpland 1.1km southeast) Cockburn Sound (1.8km west)	Infiltration through soil to groundwater, which may recharge nearby surface waters	Impacts related to bioaccumulation of mercury and/or other heavy metals the ecosystems of nearby surface water systems, and/or Cockburn Sound. Secondary impacts on bird and human health (reproduction, nervous system and brain development).	Minor	Rare	Low	The Works Approval Holder has proposed the following controls to minimise the risk of potentially contaminated water from the Warehouse impacting on soils or waters: • The Warehouse building has been designed and constructed with a sealed hardstand floor impermeable to mercury and hydrocarbons. The floor drains to an impermeable sump and is surrounded with an equally impermeable bund sized to hold at least 35 m^3 of liquid. • Water collected in the sump will be tested for contamination to determine if the collected water requires direction to the process (mercury present) or to the storage tank for offsite disposal via a licensed contractor. The Delegated Officer considers that the Works Approval Holder's proposed controls for the containment of potentially contaminated water within the Warehouse building, are appropriate to minimise the risk of release of potentially contaminated water to the environment.	The Works Approval Holder's controls have been included in the amended Works Approval in accordance with DWER's Guidance Statement: Risk Assessments (DER 2017a) which specifies that a Works Approval Holder's controls will be conditioned where they lower the likelihood and/or consequence of a risk event. The Works Approval Holder's controls have been included in condition 10.
Cat 39 Chemical or oil recycling and Cat 61A Solid waste facility	Transfer of MCW from the Warehouse to the Process Building and of stabilised mercury sulphide from the Process Building to the Warehouse	Spillage or leakage of MCW or stabilised mercury sulphide when being transferred	Shallow groundwater (6m below ground level) Closest surface water bodies (resource enhancement sumpland 1.1km southeast) Cockburn Sound (1.8km west)	Infiltration through soil to groundwater could occur, recharging nearby surface water	Impacts related to bioaccumulation of mercury in the ecosystems of nearby surface water systems, and/or Cockburn Sound. Secondary impacts on bird and human health (reproduction, nervous system and brain development).	Minor	Rare	Low	The Warehouse and the Process Building will be constructed directly adjacent to each other with abutting walls. Transfers of MCW from the Warehouse to the Process Building, and of stablished mercury sulphide from the Process Building to the Warehouse will occur via an interconnecting electric roller door. Both the Warehouse and the Process Building will be designed and constructed to have sealed hardstand floors impermeable to mercury and hydrocarbons. The floors will be surrounded with an equally impermeable bund which drains to an impermeable catchment sump. Collected spillage is able to be returned for processing if mercury contamination is present, or stored and transported to an appropriate disposal facility if mercury is not present. All MCW and stabilised mercury sulphide will be contained within sealed drums (UN approved Dangerous Goods containers). The Delegated Officer considers that as transfers of the MCW and stabilised mercury sulphide occur within the confines of the Process Building and Warehouse any spillage or leakage which occurs will be contained within the buildings' catchment bunding.	The Works Approval Holder's controls relating to containment of spillage and leakages of MCW or stablished mercury sulphide have been included in the amended Works Approval in accordance with DWER's Guidance Statement: Risk Assessments (DER 2017a) which specifies that a Works Approval Holder's controls will be conditioned where they lower the likelihood and/or consequence of a risk event. The Works Approval Holder's controls have been included in conditions 10, 11 and 13.

Risk Event						Consequence rating	Likelihood rating	Risk*	Reasoning	Regulatory controls
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
		Fugitive emissions to air (spent filter, catalyst and stabilised mercury sulphide which may be dry) when being transferred	Personnel at neighbouring industrial premises Sensitive/public receptors at Medina ≥1.8km southeast	Air / wind dispersion	Amenity and public health (inhalation)	Minor	Rare		The Warehouse and the Process Building will be constructed directly adjacent to each other with abutting walls. Transfers of MCW from the Warehouse to the Process Building, and of stabilised mercury sulphide from the Process Building to the Warehouse will occur via an interconnecting electric roller door with an air lock. The Process Building is fully enclosed and kept under negative atmospheric pressure, with emissions from the building via an activated carbon filtration system and stack. The Warehouse building is also enclosed which will limit the potential for fugitive emissions. All MCW and stabilised mercury sulphide will be contained within sealed drums (UN approved Dangerous Goods containers). The Delegated Officer considers that as transfers of the MCW and stabilised mercury sulphide occur within the confines of the Process Building and Warehouse (and the material will be packaged) there is a limited pathway, and therefore a very low likelihood, for fugitive emissions to air to occur during transfer of materials between the buildings.	The Works Approval Holder's controls relating to containment of fugitive emissions from MCW or stablished mercury sulphide have been included in the amended Works Approval in accordance with DWER's Guidance Statement: Risk Assessments (DER 2017a) which specifies that a Works Approval Holder's controls will be conditioned where they lower the likelihood and/or consequence of a risk event. The Works Approval Holder's controls have been included in conditions 10, 11 and 13.
	Commissioning of the Kwinana MTP with no load and uncontaminated load	Noise emissions (associated with commissioning / operation of the MTP and HVAC system)	Personnel at neighbouring industrial premises Sensitive/public receptors at Medina ≥1.8km southeast	Air / wind dispersion	Amenity	Minor	Unlikely	Medium	The Premises is located in the KIA and is therefore subject to higher assigned levels under the Noise Regulations (refer to W6090/2017/1 Decision Report for details of the KIA assigned levels). The waste shredder and cyclone (key noise sources) will be located within the Process Building which is fully enclosed and kept under negative atmospheric pressure. The building will act to minimise noise emissions associated with waste processing. The HVAC system extraction fan is the only significant noise source located outside of a building. Existing works approval conditions require that the fan achieves an overall sound level of less than 80dB(A) measured at 1 m distance from the fan. Sound levels will be measured during the commissioning phase to demonstrate the specified sound level is able to be achieved. A boundary noise assessment will also be conducted during the commissioning stage to confirm assigned levels under the Noise Regulations are not exceeded by the operation of the Premises. The Delegated Officer considers that as the majority of noise sources are located within an enclosed building, and existing works approval conditions require the noise source which is located outside the process building (HVAC fan) to be constructed to meet a nominated sound level, that it	The Delegated Officer considers the existing works approval conditions are adequate to minimise the risk of noise emissions impacting on nearby sensitive receptors. The provisions of the Noise Regulations will apply. Compliance documentation for the Works is required to be submitted under existing condition 6 and requires the Works Approval Holder to confirm sound levels specified in the Works Approval can be achieved by the HVAC system fan.

Risk Event						Consequence rating	Likelihood rating	Risk*	Reasoning	Regulatory controls
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
									is unlikely that noise emissions will impact on nearby receptors.	
	Commissioning and limited operation of the Kwinana MTP with contaminated load (storage and processing of MCW)	Noise emissions (associated with commissioning / operation of the MTP and HVAC system)	Personnel at neighbouring industrial premises Sensitive/public receptors at Medina ≥1.8km southeast	Air / wind dispersion	Amenity	Minor	Unlikely	Medium	The Premises is located in the KIA and is therefore subject to higher assigned levels under the Noise Regulations (refer to W6090/2017/1 Decision Report for details of the KIA assigned levels). The waste shredder and cyclone (key noise sources) will be located within the Process Building which is fully enclosed and kept under negative atmospheric pressure. The building will act to minimise noise emissions associated with waste processing. The HVAC system extraction fan is the only significant noise source located outside of a building. Existing works approval conditions require that the fan achieves an overall sound level of less than 80dB(A) measured at 1 m distance from the fan. Sound levels will be measured during the commissioning phase to confirm this level is achieved. A boundary noise assessment will also be conducted during the commissioning stage to confirm assigned levels under the Noise Regulations are not exceeded by the operation of the Premises. The Delegated Officer considers that as the majority of noise sources are located within an enclosed building, and current works approval conditions already require the noise source located outside the process building (HVAC fan) to be constructed to meet a nominated sound level, that it is unlikely that noise emissions will impact on nearby receptors.	The Delegated Officer considers the existing works approval conditions are adequate to minimise the risk of noise emissions impacting on nearby sensitive receptors. The provisions of the Noise Regulations will apply. Compliance documentation for the Works is required to be submitted under existing condition 6 and requires the Works Approval Holder to confirm sound levels specified in the Works Approval can be achieved by the HVAC system fan.
		Air emissions (benzene, H_2S, mercury) from the mercury treatment process.	Personnel at neighbouring industrial premises Sensitive/public receptors at Medina ≥1.8km southeast	Air/wind dispersion	Amenity and public health (inhalation)	Minor	Unlikely	Medium	The Delegated Officer has referred to the detailed risk assessment included in the Decision Report for W6090/2017/1 pertaining to emissions to air. The risk assessment identifies the key emissions resulting from treatment of MCW as mercury, benzene (as a key indicator of VOC's) and H_2S. All heating processes are electric therefore combustion products (i.e. oxides of nitrogen and carbon monoxide) are not expected to be emitted to air. Particulates and heavy metal emissions are not expected to be present given the comparatively high volatility of mercury therefore heating will be to a significantly lower temperature than required to volatilise other metals. A review of the Works Approval Holder's air modelling assessment for operation of the MTP was undertaken as part of the risk assessment which found that the modelled ground level concentrations for benzene, mercury and H_2S are predicted to be	Existing works approval conditions require that the process building is constructed with a two stage activated carbon filtration system able to scrub air to achieve overall levels of ≤0.002ppm mercury and ≤1 ppm of benzene and H_2S in stack exit gases. A limit equivalent to ten times the Works Approval Holder's predicted emission rate for mercury has been included in condition 18 together with reporting of exceedances in condition 23 for the protection of public health. Operational requirements for

Risk Event						Consequence rating	Likelihood rating	Risk*	Reasoning	Regulatory controls
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
									below all human health criteria where available. The Works Approval Holder will implement the following controls to maintain emission levels within the predicted maximum rates of ≤0.002ppm of mercury, and ≤1 ppm of benzene and H_2S: • The Process Building will be designed and constructed to be fully enclosed and maintained under negative atmospheric pressure during all processing, pre-processing, mercury stabilisation and maintenance activities to prevent fugitive emissions from the process being released from the building. • Processing vapours will pass through a vacuum distillation unit to condense vapours and remove mercury, VOCs and H_2S. • Remaining uncondensed vapours (scrubbed vapours) will then pass through a series of two activated carbon filters to remove residual contaminants prior to release to atmosphere via a stack. • The Process Building will be designed and constructed with a HVAC system through which all fugitive emissions from within the building pass. • The HVAC system is designed with an interlock associated with the extraction fan to prevent processing from occurring unless the extraction fan is operational to ensure negative is maintained during processing. • Fugitive emissions collected by the HVAC system will pass through the two stage activated carbon filtration system to remove fugitive atmospheric concentrations of mercury, VOC's and H_2S that may be present prior to release to atmosphere via the stack. • The first stage activated carbon filter is a dual redundant system with two filters installed in parallel so a filter is always available even when one is being replaced. • The emission stack will have a continuous H_2S analyser installed upstream of the second activated carbon filter to detect H_2S. The first stage filter will be replaced when H_2S is detected upstream of the second stage filter. • Replacement of filters is expected to be required at a frequency of six to twelve monthly. During the works approval commissioning and limited operation period samples will be collected from the first stage activated carbon filters and analysed after 2, 4 and 8 weeks of operation with the results used to predict the remaining life of the filters and	the process building and equipment have been included in condition 10 to ensure there is a low risk of emissions to air from the mercury treatment process impacting on nearby receptors. Conditions17-22 have also been included specifying requirements for discharges to air and stack emission monitoring to confirm the performance of the HVAC and activated carbon filtration system.

Risk Event						Consequence rating	Likelihood rating	Risk*	Reasoning	Regulatory controls
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
									plan replacement timeframes. • Periodic sampling of the second stage filter will be undertaken to predict capacity and ensure it is sufficient to deal with any breakthrough from the first stage. • The Kwinana MTP Commissioning Plan includes commitment to undertake stack testing during the commissioning and limited operation phase. Two tests will be conducted targeted to occur approximately 30 minutes after the process operating temperature is reached in the retorts as this is when maximum emission rates are expected to occur. The Delegated Officer considers that the Works Approval Holder's proposed controls relating to process emissions are appropriate to minimise the likelihood of process emissions impacting on nearby receptors. Monitoring of emissions to air will be included as a condition to confirm whether emissions are within predicted levels and therefore unlikely to impact on the health of nearby receptors.	
		Emissions of potentially toxic smoke to air from the burning of infrastructure and MCW due to fire ignition in the Process Building.	Personnel at neighbouring industrial premises Sensitive/public receptors at Medina ≥1.8km southeast	Air / wind dispersion	Public health	Major	Rare	Medium	The Delegated Officer has referred to the detailed risk assessment pertaining to the risk of toxic emissions to air resulting from fire outbreak included in the Decision Report for W6090/2017/1. The Delegated Officer has also considered the following controls proposed by the Works Approval Holder within the Emergency Response Plan for the Premises which was submitted to the DWER in accordance with Condition 5 of W6090/2017/1. The proposed controls intended to detect and respond to the outbreak of fire within the Process Building are: • The process includes nitrogen purging during start-up to ensure removal of any oxygen which may have entered the process vessels during start up. The presence of oxygen within the process vessels presents a potential fire and explosion risk. • The Process Building will have a two stage fire detection system comprising a VESDA which will activate a first stage site wide emergency alarm. The second stage will comprised a heat detection alarm which will activate a back to base alarm for automated notification to DFES to respond. • The second stage alarm will also activate a fire suppression system in the Process Building. This system is based on pre-action aerosol (water mist) suppression to minimise free water. • There will be two fire hydrants on the premises.	The Works Approval Holder's proposed fire detection and firefighting equipment has been included as specified equipment within condition 10 (Table 4) of the amended Works Approval to ensure effective and operational fire detection and response is maintained on the premises to minimise the likelihood of a fire outbreak leading to toxic smoke emissions which impact on nearby public receptors.

Risk Event						Consequence rating	Likelihood rating	Risk*	Reasoning	Regulatory controls
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
									• Fire detection and firefighting equipment will be inspected and maintained as per the manufacturer's specifications. The Delegated Officer considers the Works Approval Holders proposed controls to detect and respond to fire within the Process Building are appropriate to minimise the likelihood of the risk event occurring.	
		Emission of potentially contaminated wash water or firefighting water to the environment	Shallow groundwater (6m below ground level) Closest surface water bodies (resource enhancement sumpland 1.1km southeast) Cockburn Sound (1.8km west)	Infiltration through soil to groundwater, which may recharge nearby surface waters	Impacts related to bioaccumulation of mercury and/or other heavy metals the ecosystems of nearby surface water systems, and/or Cockburn Sound. Secondary impacts on bird and human health (reproduction, nervous system and brain development).	Minor	Rare	Low	The Works Approval Holder has proposed the following controls to minimise the risk of potentially contaminated water from the Process Building impacting on soils or waters: • The Process building will be designed and constructed with a sealed hardstand floor impermeable to mercury and hydrocarbons. The floor will drain to an impermeable sump and will be surrounded with an equally impermeable bund which drains to an impermeable sump sized to hold a minimum of 3.5m^3. • Water collected in the sump will be tested for contamination to determine if the collected water requires treatment (mercury present) or will be transferred to a storage tank pending offsite disposal via a licensed contractor. • The fire suppression system in the Process Building is based on pre-action aerosol (water mist) suppression to minimise free water. The Delegated Officer considers that the Works Approval Holder's proposed controls for the containment of potentially contaminated water within the Process building, are appropriate to minimise the risk of release of potentially contaminated water to the environment.	The Works Approval Holder's controls have been included in the amended Works Approval in accordance with DWER's Guidance Statement: Risk Assessments (DER 2017a) which specifies that a Works Approval Holder's controls will be conditioned where they lower the likelihood and/or consequence of a risk event. The Works Approval Holder's controls have been included in condition 10.
		Emission of recovered liquid mercury to the environment while temporarily stored	Shallow groundwater (6m below ground level) Closest surface water bodies (resource enhancement sumpland 1.1km southeast) Cockburn Sound (1.8km west)	Infiltration through soil to groundwater, which may recharge nearby surface waters	Impacts related to bioaccumulation of mercury and/or other heavy metals the ecosystems of nearby surface water systems, and/or Cockburn Sound. Secondary impacts on bird and human health (reproduction, nervous system and brain development).	Minor	Rare	Low	Recovered liquid mercury is gravity fed into sealed containment vessels which are temporarily stored within the Process building pending stabilisation. The stabilisation process is undertaken infrequently (frequency is typically less than monthly) within the Process Building. The Works Approval Holder has proposed the following controls to minimise the risk of recovered liquid mercury entering the environment: • The Process building will be designed and constructed with a sealed hardstand floor impermeable to mercury and hydrocarbons. The floor will drain to an impermeable sump and will be surrounded with an equally impermeable bund which drains to an impermeable sump sized to hold a minimum of	The Works Approval Holder's controls have been included in the amended Works Approval in accordance with DWER's Guidance Statement: Risk Assessments (DER 2017a) which specifies that a Works Approval Holder's controls will be conditioned where they lower the likelihood and/or consequence of a risk event. The Works Approval Holder's infrastructure and operational controls have been included

Risk Event						Consequence rating	Likelihood rating	Risk*	Reasoning	Regulatory controls
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
									3.5m^3. • Liquid mercury will be stored within sealed United Nations approved containers for storage of liquid mercury. • If spills of liquid mercury occur they will be recovered. The Delegated Officer considers that the Works Approval Holder's proposed controls for the containment of liquid mercury within the Process building, are appropriate to minimise the risk of release of recovered liquid mercury to the environment.	in condition 10 and 16.
	Stabilisation of recovered mercury within a reactor	Spillage of mercury or stabilised mercury sulphide when being transferred into and out of the reactor	Shallow groundwater (6m below ground level) Closest surface water bodies (resource enhancement sumpland 1.1km southeast) Cockburn Sound (1.8km west)	Infiltration through soil to groundwater, which may recharge nearby surface waters	Impacts related to bioaccumulation of mercury and/or other heavy metals the ecosystems of nearby surface water systems, and/or Cockburn Sound. Secondary impacts on bird and human health (reproduction, nervous system and brain development).	Minor	Rare	Low	The stabilisation process is undertaken infrequently (frequency is typically less than monthly) within the Process Building. The Works Approval Holder has proposed the following controls to minimise the risk of mercury or stabilised mercury sulphide spills impacting on soils or waters as a result of undertaking stabilisation of recovered mercury: • Liquid mercury will be transferred into the reactor via a small transfer pump. • The mercury stabilisation reactor will be connected to the process vacuum system during operation to ensure leakage does not occur during operation. • The Process building will be designed and constructed with a sealed hardstand floor impermeable to mercury and hydrocarbons. The floor will drain to an impermeable sump and will be surrounded with an equally impermeable bund which drains to an impermeable sump sized to hold a minimum of 3.5m^3. • Spills collected in the sump will be tested for contamination to determine if the collected water requires treatment (mercury present) or will be transferred to a storage tank pending offsite disposal via a licensed contractor. • Spills of sulphur or mercury sulphide which occur during loading or unloading of the reactor will be recovered (swept up).	The Works Approval Holder's controls have been included in the amended Works Approval in accordance with DWER's Guidance Statement: Risk Assessments (DER 2017a) which specifies that a Works Approval Holder's controls will be conditioned where they lower the likelihood and/or consequence of a risk event. The Works Approval Holder's controls have been included in condition 10.
		Fugitive emissions to air when transferring mercury/stabilised mercury sulphide into and out of the reactor	Personnel at neighbouring industrial premises Sensitive/public receptors at Medina ≥1.8km	Air / wind dispersion	Amenity and public health (inhalation)	Minor	Rare	Low	The stabilisation process is undertaken infrequently (frequency is less than monthly) within the Process Building. The Works Approval Holder has proposed the following controls to minimise the risk of fugitive emissions from the Process Building: • The Process Building is designed and will be	The Works Approval Holder's controls relating to containment of fugitive emissions from MCW or stablished mercury sulphide have been included in the amended Works Approval in accordance with DWER's

Risk Event						Consequence rating	Likelihood rating	Risk*	Reasoning	Regulatory controls
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
			southeast						constructed as a fully enclosed building and kept under negative atmospheric pressure, with emissions from the building via an activated carbon filtration system and stack. • The mercury stabilisation reactor will be connected to the process vacuum system during operation to ensure emissions do not occur during operation. The Delegated Officer considers that as mercury stabilisation will occur within the confines of the Process Building, under a vacuum, there is a limited pathway, and therefore a very low likelihood, for fugitive emissions to air to occur during the stabilisation of recovered mercury.	Guidance Statement: Risk Assessments (DER 2017a) which specifies that a Works Approval Holder's controls will be conditioned where they lower the likelihood and/or consequence of a risk event. The Works Approval Holder's controls have been included in condition 10.
	Storage of residual waste products post processing (including liquid waste)	Release of potentially contaminated water to ground	Shallow groundwater (6m below ground level) Closest surface water bodies (resource enhancement sumpland 1.1km southeast) Cockburn Sound (1.8km west)	Infiltration through soil to groundwater, which may recharge nearby surface waters	Potential soil and groundwater contamination due to contaminants (metals, hydrocarbons) leaching into groundwater	Minor	Rare	Low	The Works Approval Holder has proposed the following controls to minimise the risk of residual waste products impacting on soils or waters: • Residual waste products including liquid waste will be stored within a designated covered outdoor storage area that has a roof over the entire area to minimise rainwater ingress. • The liquid waste storage tank will be surrounded by a bund designed to contain a volume equal to the largest vessel plus 10% with sufficient bund wall height to capture jetting. • Bunded areas will be inspected on a regular basis as part of a site inspection schedule for evidence of spills or leakage. • The outdoor storage area will have an apron which is sealed with material suitable for short term exposure to and containment of liquids. The apron will direct spills to the process building containment sump.	The Works Approval Holder's controls have been included in the amended Works Approval in accordance with DWER's Guidance Statement: Risk Assessments (DER 2017a) which specifies that a Works Approval Holder's controls will be conditioned where they lower the likelihood and/or consequence of a risk event. The Works Approval Holder's infrastructure and operational controls have been included in condition 10 and 16.
	Other deliveries or collection from the premises (residual waste products, liquid nitrogen, supplies etc) by transport contractors	Noise	Personnel at neighbouring industrial premises Sensitive/public receptors at Medina ≥1.8km southeast	Air/wind dispersion	Amenity	Minor	Rare	Low	The Premises is located in the KIA and is therefore subject to higher assigned levels under the Noise Regulations (refer to W6090/2017/1 Decision Report for details of the KIA assigned levels). Transport noise The Delegated Officer considers that transport deliveries and collections are unlikely to contribute significant noise emissions, in particular within the industrial setting the premises is located within, and in consideration of the distance to the nearest sensitive residential area. The Delegated Officer considers any issues related to transport noise associated with the Premises can be adequately regulated under the Noise Regulations.	The provisions of the Noise Regulations will apply.

*Consequence ratings, likelihood ratings and risk descriptions are detailed in the Department's Guidance Statement: Risk Assessments (February 2017)

Decision

Based on the application supporting documentation and the risk assessment in Table 7, the Delegated Officer has determined that amendment of the works approval to authorise storage of MCW on the premises, and commissioning of the MTP will not result in emissions which are unacceptable to public health or to the environment. The Delegated Officer has also referred to the risk assessment and recommended licence controls detailed in the Decision Report for W6090/2017/1 in making this determination.

The risks of fugitive mercury and stablished mercury sulphide emissions to air, emissions of mercury, stabilised mercury sulphide or contaminated water to soil or waters, noise emissions, radiation and toxic smoke emissions have been assessed together with the Works Approval Holder's proposed controls to address these. The Delegated Officer considers the Works Approval Holder's proposed controls are adequate to minimise the risk associated with these emissions during commissioning and time limited operation of the MTP.

The Delegated Officer has therefore determined to grant an amendment to the works approval to authorise commissioning of the MTP and storage of MCW together with the associated emissions on the premises. Condition 10 has been included in this Amendment Notice specifying operational requirements for the infrastructure and condition 11 has been included to permit specified wastes to be accepted and stored on the premises. Condition 6 has been amended to require that construction compliance documentation is submitted prior to the commissioning of the works. This is to ensure the Delegated Officer has the opportunity to confirm infrastructure controls have been constructed as per the works approval requirements before commissioning commences.

The Delegated Officer notes that the Works Approval Holder wishes to continue operation of the works following commissioning until such time a licence is granted for the Premises (Time Limited Operational Phase). Accordingly, condition 4 has been amended through this Amendment Notice to authorise emissions from commissioning and time limited operation for a period of six months. This timeframe is expected to allow sufficient time for the infrastructure to be commissioned and a licence application to be submitted and granted for the Premises under Part V, Division 3 of the EP Act. Additional conditions 7 and 8 have also been included requiring notification of the commencement and conclusion of commissioning to ensure the DWER is informed of the operational status of the MTP, as well as condition 9 requiring submission of a commissioning report at the completion of commissioning to provide details of the commissioning outcomes, and environmental monitoring undertaken which can be incorporated into the assessment of the licence application for the Premises.

The Process Building emission stack has been specified as an authorised discharge point for emissions to air through addition of condition 17. A limit for emissions of mercury which is equivalent to ten times the predicted emission rate has been included in condition 18 together with reporting requirements in the event the limit is exceeded in condition 23. The emission limit has been set at a level which is considered to be sufficient for the protection of public health.

The Delegated Officer notes that the Works Approval Holder has committed to undertake monitoring of emissions to air from the emissions stack during the commissioning period to confirm proposed emission rates are achieved. The air modelling assessment undertaken for the MTP works approval application predicts that if the proposed emission rates are achieved modelled ground level concentrations for benzene, mercury and H_2S will all be well below all human health criteria where available. Conditions 19-22 have been included in the Amendment Notice to specify monitoring requirements during the commissioning and limited operation phase.

The Delegated Officer has also determined that the proposed increase to the storage capacity for MCW on the premises from 200 to 400 tonnes, and the increase to the annual throughput

for Categories 39 and 61A from 1,000 to 2,000 tpa will not increase the risk associated with these activities. Conditions 10 and 11 are included in the Amendment Notice to set limits on the quantity of MCW which can be stored on the premises at any one time, and the quantity of MCW which can be accepted within an annual period. The Delegated Officer has also included restrictions through conditions 11 to 13 on the types of waste which can be accepted onto the premises and restriction on the acceptance of waste containing radiation to ensure only suitable wastes which are radiation free are accepted onto the premises for treatment. A time limit has been included on the storage of recovered liquid mercury and stabilised mercury sulphide on the premises through condition 16 to ensure the material is not stored for significant periods of time at the premises. Conditions 14 and 15 requiring the waste volumes accepted onto, and removed from, the premises to be recorded have also been included as Delegated Officer requirements to allow verification that throughput limits are not exceeded.

The Delegated Officer notes the Works Approval Holder's request to exclude the requirement to install a weighbridge at the facility, and instead proposes to use a forklift with weighing capability to quantify the amount of MCW received at the Premises, and the amount of residual waste and stabilised mercury sulphide removed from the Premises. The Delegated Officer is satisfied that the Works Approval Holder has proposed a suitable alternate means of weighing waste received at and removed from the Premises, and has therefore removed the requirement to install a weighbridge from Schedule 2, Table 3 and included a forklift with weighing capability as specified equipment within condition 10, Table 4 of the Amendment Notice.

The Delegated Officer has included amendments and additions to the definitions table to address requirements associated with new conditions and the Department's change of contact details. Due to the hazardous nature of mercury the Delegated Officer has also included an additional condition 24 requiring the premises to be securely locked when unattended to prevent unauthorised access.

The Delegated Officer considers the additional conditions which have been applied to the Works Approval are sufficient to manage commissioning and operational emissions relating to the storage and treatment of MCW on the Premises and has therefore amended Works Approval W6090/2017/1 in accordance with section 59(1) of the EP Act. The changes are detailed below in Amendment Section below.

Works Approval Holder's comments

The Works Approval Holder was provided with the draft Amendment Notice on 14 May 2019. The Works Approval Holder responded on 20 May 2019 and requested a change to wording used to describe the material which will be used for commissioning of the MTP from catalyst to waste to more accurately describe the material. The Works Approval Holder waived the remaining comment period.

Amendment

1. Definitions of the Works Approval are amended by the deletion of the text shown in strikethrough below and insertion of the red text shown in underline below:

Table 1: Definitions

Term	Definition
AS4323.1-1995	*means the Australian Standard Stationary source emissions – Selection of sampling positions (Standards Australia, 1995)*
CEO	*means Chief Executive Officer.* *CEO for the purposes of notification means:* *Director General* *Department Administering the Environmental Protection Act 1986* ~~*Locked Bag 33 Cloisters Square*~~ ~~*PERTH WA 6850*~~ *Locked Bag 10* *JOONDALUP DC WA 6919* *info@dwer.wa.gov.au*
Commissioning	*means an activity or sequence of activities undertaken after Pre-commissioning has demonstrated the integrity of the plant and equipment. The purpose of Commissioning is to test equipment, infrastructure, and processes after the input of raw materials, to confirm design specifications, optimize process conditions, and to monitor/validate emissions or discharges in order to establish a steady-state operation.* *Commissioning also includes the acceptance of waste material onto the premises for storage pending processing.*
Condition	*means a condition to which this Works Approval is subject under s.62 of the EP Act.*
Department	*means the department established under section 35 of the Public Sector Management Act 1994 and designated as responsible for the administration of Part V, Division 3 of the EP Act.*
Discharge	*has the same meaning given to that term under the EP Act.*
DWER	*Department of Water and Environmental Regulation*
Emission	*has the same meaning given to that term under the EP Act.*
Environmental Harm	*has the same meaning given to that term under the EP Act.*
EP Act	*means the Environmental Protection Act 1986 (WA).*
EP Regulations	*means the Environmental Protection Regulations 1987 (WA).*
H_2S	*Hydrogen Sulphide*
HVAC	*means the mercury treatment process building Heating, Ventilation and Air Conditioning system*
Implementation Agreement or	*has the same meaning given to that term under the EP Act.*

Term	Definition
Decision	
MCW	*means mercury contaminated waste, including but not limited to sludges, catalysts and filters from LNG projects,*
Material Environmental Harm	*has the same meaning given to that term under the EP Act.*
Mg/m³	*milligrams per cubic metre*
Pollution	*has the same meaning given to that term under the EP Act.*
Pre-commissioning	*Means an activity or sequence of activities undertaken after construction (but prior to Commissioning) to test equipment and infrastructure for functionality, and for any installation defects or failures. Examples include hydraulic pump, pipeline and valve testing; hydrostatic testing of vessels, tanks and ponds; electrical component testing; and liner integrity tests for landfills, tailings storage facilities, and wastewater treatment ponds.* *During this time, no emissions to the environment are authorised to occur and/or no waste or process material or chemicals are authorised to be deposited in the containment infrastructure.*
Premises	*refers to the premises to which this Works Approval applies, as specified at the front of this Works Approval and as shown on the Premises map in Schedule 1 (Maps) to this Works Approval.*
Prescribed Premises	*has the same meaning given to that term under the EP Act.*
Serious Environmental Harm	*has the same meaning given to that term under the EP Act.*
STP	*Standard temperature (25℃) and pressure (101.3kPA)*
Time Limited Operational Phase	*means full processing operations permitted under this Works Approval, subject to the Conditions, whilst an application for licence is being assessed*
Unreasonable Emission	*has the same meaning given to that term under the EP Act.*
USEPA	*means United States [of America] Environmental Protection Agency.*
USEPA Method 2	*means USEPA Method 2 Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)*
USEPA Method 11	*means USEPA Method 11 Determination of Hydrogen Sulphide Content of Fuel Gas Streams in Petroleum Refineries*
USEPA Method 18	*means USEPA Method 18 Determination of Gaseous Organic Compounds Emissions by Gas Chromatography*
USEPA Method 29	*means USEPA Method 29 Determination of Metals Emissions from Stationary Sources*
VESDA	*Very Early Smoke Detection Apparatus*
VOCs	*Volatile Organic Compounds*
Waste	*has the same meaning given to that term under the EP Act.*
Works	*refers to preparation, construction/installation and Pre-commissioning*

Term	Definition
	works for all infrastructure and equipment described in Table 3 of Schedule 2 (Infrastructure and equipment) of this Works Approval, to be carried out at the Premises subject to the Conditions.
Works Approval	*refers to this document, which evidences the grant of the works approval by the CEO under s.54 of the EP Act, subject to the Conditions.*
Works Approval Holder	*refers to the occupier of the Premises being the person to whom this Works Approval has been granted, as specified at the front of this Works Approval.*

2. The Works Approval is amended by the deletion of the following Conditions shown in strikethrough.

~~*1. The Works Approval Holder must not undertake Commissioning of the Works.*~~

3. Condition 4 of the Works Approval is amended by the insertion of the red text shown in underline below:

4. *The Works Approval Holder must not cause any Emissions from the Works authorized through this Works Approval, and during commissioning and the Time Limited Operational Phase, except for specified Emissions and general Emissions described in*
5. *Table 2, subject to the exclusions, limitations or requirements specified in*
6. *Table 2.*
7.

Table 2: Authorised Emissions table

Emission type	Exclusions, limitations or requirements
Specified Emissions	
Discharges to air	*Subject to compliance with conditions 2, 3, 6, 10, 17,18, 19, 20, 21, 22, 23* *Emissions must not exceed a period of 6 months.*
General Emissions (excluding Specified Emissions)	
Fugitive emissions which arise from undertaking the construction or Pre-commissioning of infrastructure and equipment set out in Table 3 of Schedule 2	*Emissions excluded from General Emissions are:* • *Unreasonable Emissions; or* • *Emissions that result in, or are likely to result in, Pollution, Material Environmental Harm or Serious Environmental Harm; or* • *Discharges of Waste in circumstances likely to cause Pollution; or* • *Emissions that result, or are likely to result in, the Discharge or abandonment of Waste in water to which the public has access; or* • *Emissions or Discharges which do not comply with an Approved Policy; or*

Emission type	*Exclusions, limitations or requirements*
	• *Emissions or Discharges which do not comply with prescribed standard; or* • *Emissions or Discharges which do not comply with the conditions in an Implementation Agreement or Decision; or* • *Emissions or Discharges the subject of offences under regulations prescribed under the EP Act, including materials discharged under the Environmental Protection (Unauthorised Discharges) Regulations 2004.*

8. Condition 6 of the Works Approval is amended by the insertion of the red text shown in underline below:

6. *The Works Approval Holder must submit a construction compliance document to the CEO following the construction of the Works, and at least 10 days prior to commissioning of the same that:*

   (a) includes a detailed description addressing how each as-constructed item of infrastructure and equipment meets the requirements and the location specified in Table 3 of ***Error! Reference source not found.****Schedule 2 (Infrastructure and equipment) as required by Condition 2****Error! Reference source not found.****;*

   (b) includes a description of, and explanation for, any departure from the requirements specified in Table 3 of ***Error! Reference source not found.****Schedule 2 (Infrastructure and equipment), including how the departure complies with Condition 3;*

   (c) contains photographs of as-constructed Works to support the descriptions provided under (a);

   (d) contains as-constructed plans for the Works;

   (e) is signed by a person authorised to represent the Works Approval Holder and contains the printed name and position of that person within the company; and

   (f) is accompanied by a construction quality assurance validation report that:

      (i) is written and certified by a suitably qualified, independent, third party professional engineer that has undertaken construction quality assurance on the completed Works;
      (ii) confirms the details reported by the Works Approval Holder under (a) and (b); and
      (iii) is signed by the suitably qualified independent third party professional engineer and contains the printed name, position and company of that person.

9. Schedule 2 (Table 3) of the Works Approval is amended by deletion of the text shown in strikethrough and insertion of the red text shown in underline below:

   The minimum design and construction requirements for infrastructure and equipment on the Premises are detailed in Table 3 below.

Table 3: Infrastructure and equipment requirements

Infrastructure and equipment	***Requirements***	***Location***
Process Building overall	*a) Designed and constructed to be fully enclosed and fit for the purpose of maintaining a negative atmospheric pressure generated by the HVAC system.* *b) Designed and constructed to include a sealed hardstand floor which is impermeable to mercury and hydrocarbons, and is surrounded with an equally impermeable bund which is fit for the purpose of preventing spilt material escaping the hardstand.* *c) Designed and constructed so that the sealed hardstand floor drains to an impermeable sump to contain any spillage/wash down water, sized to hold a volume at least 10% greater than the largest vessel housed within the Process Building (3.5 m^3 minimum).*	*Location labelled "Process" as shown in the Premises map in Schedule 1 (Maps)*
Process Building – Level 1	*a) Contains 6 process vessels with alarms and interlocks to prevent overfilling; designed, constructed and fit for the purpose of allowing sufficient residence time for the separation of condensed liquids.* *b) Contains 2 pumps designed, constructed and fit for the purpose of transferring liquids from separation process vessels to liquid collection/storage process vessels, and adequately sized to match maximum condensate production.* *c) Contains 2 liquid ring vacuum pumps designed, constructed and fit for the purpose of creating a vacuum in the process to aid in distillation.* *d) Contains a reactor designed, constructed and fit for the purpose of safely stabilising at least 10 tonnes per annum of recovered mercury into mercury sulphide, with no free mercury present.*	*Location labelled "Process" as shown in the Premises map in Schedule 1 (Maps)*
Process Building – Level 2	*a) Contains cooling package designed, constructed and fit for the purpose of achieving a level of cooling that adequately condenses process gases.* *b) Contains gas cyclone designed, constructed and fit for the purpose of separating solids from process gases to reduce fouling of downstream equipment.* *c) Contains 2 heat exchangers designed, constructed and fit for the purpose of condensing vapour from vessels.* *d) Contains chiller designed, constructed and fit for the purpose of cooling the cooling water to enable efficient operation of the cooling package.* *e) Contains process vessel with alarms and interlocks to prevent overfilling; designed, constructed and fit for the purpose of separating condensed gases, including appropriate sizing for sufficient residence times.*	*Location labelled "Process" as shown in the Premises map in Schedule 1 (Maps)*
Process Building – Level	*a) Contains 15 retorts designed, constructed and fit for the purpose of heating MCW to a sufficient*	*Location labelled "Process" as*

Infrastructure and equipment	*Requirements*	*Location*
3	*temperature to break organic mercury bonds.*	*shown in the Premises map in Schedule 1 (Maps)*
HVAC System building	*a) Housed within the Process building.* *b) Contains an extraction fan designed, constructed and fit for the purpose of extracting fugitive process emissions and maintaining negative atmospheric pressure within the internal environment of the process building.* *c) Designed and constructed to achieve overall sound levels of less than 80 dB(A) at 1 metre distance.* *d) Contains a refrigerated cooling system designed, constructed and fit for the purpose of removing process heat from within the process building to achieve a safe and comfortable working environment for personnel.* *e) Design incorporates an interlock associated with the extraction fan to prevent a process batch from starting unless the extraction fan is operational.* *f) Alarms on run signal for the HVAC fan and on suction pressure to the fan to indicate it is functional.*	*All within the location labelled "Process" as shown in the Premises map in Schedule 1 (Maps)*
Activated carbon filtration system and stack	*a) Designed and constructed for the dispersion of scrubbed process gas and building air from the HVAC system.* *b) Stack is designed and constructed to be 24.9 m in height; 0.37 m in diameter and achieving 5,520 m^3/hr exit gas velocity, fit for the purpose of minimising stack downwash.* *c) Incorporates two stage activated carbon filtration system designed to be in operation at all times for scrubbing air from process gas and removal of residual mercury, H_2S and VOCs to achieve overall levels of ≤0.002 ppm of mercury, ≤1 ppm of benzene (indicator for VOC's) and ≤1 ppm of H_2S in stack exit gases.* *d) First stage of activated carbon filtration is a dual redundant system comprising two independent activated carbon filters, each containing at least 7 m^3 of activated carbon and installed in parallel such that one can be operated when the other is offline.* *e) Second stage activated carbon filtration consists of an activated carbon filter containing at least 7 m^3 of activated carbon.* *f) Design incorporates an interlock associated with the extraction fan to prevent a process batch from starting unless the extraction fan is operational.* *g) Design incorporates overpressure interlocks to automatically shut down the heating system if there is*	*Within the location labelled "Emission stack" as shown in the Premises map in Schedule 1 (Maps)*

Infrastructure and equipment	Requirements	Location
	a restriction in flow detected to the activated carbon filtration system. *h) H_2S detector with a minimum level of detection of no greater than 100ppm installed upstream of second stage activated carbon filtration, designed, constructed and fit for the purpose of continuously detecting the presence of any H_2S during process operation.* *i) Includes a stack sampling port that is designed in accordance with AS4323.1-1995.*	
Warehouse	*a) Designed, constructed and fit for the purpose of storing up to ~~200~~ 400 tonnes of MCW at a time.* *b) Designed and constructed to include a sealed hardstand floor which is impermeable to mercury and hydrocarbons, and surrounded with an equally impermeable bund which is adequately sized for the purpose of containing spillages and/or fire-fighting water in the event of a fire, or holds at least 35 m^3 of liquid (whichever is greater).* *c) Designed and constructed so that the sealed hardstand floor drains to an impermeable sump to enable the pumping of collected spillage/fire water back into the process, if necessary.*	*Location labelled "Warehouse" as shown in the Premises map in Schedule 1 (Maps)* *Sump c) in location labelled "Contaminated Water Basin" as shown in the Premises map in Schedule 1 (Maps)*
Warehouse loading/ unloading bay	*a) Designed and constructed with a concrete loading apron which is contoured to prevent runoff from the apron, and to direct runoff to a collection sump.* *b) Designed and constructed with an awning intended to prevent rain ingress into the Warehouse.*	*Location labelled "Warehouse" as shown in the Premises map in Schedule 1 (Maps)*
Covered outside storage:	*a) Designed and constructed to include discrete areas fit for the purpose of safe storage of liquid nitrogen, residual waste products and activated carbon filters.* *b) Constructed with a roof over entire area.* *c) Designed and constructed with a sealed apron for the containment of any spillage during truck transfer movements, sealed with material fit for the purpose of short term exposure to and containment of residual liquids, and which directs contents to the containment sump in the process building.* *d) Liquid waste storage tank for the storage of water contaminated with soluble hydrocarbons from the treatment process, surrounded by a bund to prevent the jetting of contents which is impervious to the contents and sized to contain at least 110% of the tank contents.*	*Location labelled "Outside" as shown in the Premises map in Schedule 1 (Maps)*
Other outside equipment	*a) Includes a stormwater system, designed, constructed and fit for the purpose of collecting clean rainwater from the roofed areas on the Premises and preventing runoff from the Premises.*	*a) Area labelled "Storm water containment (soak wells)";~~;~~*

Infrastructure and equipment	*Requirements*	*Location*
	~~*b) Includes a weighbridge designed, constructed and fit for weighing all incoming and outgoing waste for accurate waste tracking.*~~	~~*and*~~ ~~*b) Area labelled "Weighbridge"*~~ *as shown in the Premises map in Schedule 1 (Maps)*

10. The Works Approval is amended by the insertion of new Conditions 7 to 24 shown in underlined text below.

7. *The Works Approval Holder shall notify the CEO in writing within 7 days of commencing commissioning of the Works.*

8. *The Works Approval Holder shall notify the CEO in writing within 7 days of completing commissioning of the Works.*

9. *The Works Approval Holder must provide to the CEO a commissioning report within one month of the completion of commissioning of the Works which includes:*

    (a) a description of the commissioning activities and environmental monitoring undertaken during the commissioning phase;

    (b) a summary of monitoring results recorded under Condition 22;

    (c) a list of any original monitoring reports submitted to the Works Approval Holder from third parties for the commissioning period;

    (d) a summary of the environmental performance of the plant as installed, against the design specifications set out in Schedule 2 (Table 3);

    (e) a review of performance against the works approval conditions; and

    (f) where they have not been met, measures proposed to meet the design specification and/or works approval conditions, together with timescales for implementing the proposed measures.

10. *Following construction of the Works, the Works Approval Holder must ensure that the site infrastructure and equipment listed in Table 4 and located at the corresponding infrastructure location is maintained and operated in accordance with the corresponding operational requirements set out in Table 4.*

Table 4: Infrastructure and equipment requirements

Site infrastructure and equipment	*Operational requirements*	*Infrastructure location*
Warehouse building	• *No more than 400 tonnes of MCW and stabilised mercury sulphide shall be stored within the building.* • *Pre-processing, processing and handling of MCW outside of sealed containers is not permitted within the Warehouse building.*	*Location labelled "Warehouse" as shown in the Premises map in Schedule 1 (Maps)*

Site infrastructure and equipment	*Operational requirements*	*Infrastructure location*
	• *External doors shall be kept closed except when personnel are entering or exiting the building, or waste transfer is occurring between the Warehouse and a transport vehicle.* • *The building sealed bunded floor shall be maintained so it is impermeable to mercury and hydrocarbons, free of liquid and obstructions to maintain a capacity of at least 35 m^3 of liquid, and to drain to a collection sump.* • *The collection sump shall be maintained free of liquids and obstructions to permit full capacity.*	
Forklift	• *Shall be capable of accurately weighing all incoming and outgoing waste.* • *The measuring device shall be maintained and calibrated in accordance with manufacturers specifications.*	*NA*
Warehouse loading/ unloading bay	• *Apron is constructed of concrete, graded in a manner which prevents runoff, and drains to a collection sump.* • *The collection sump shall be maintained free of liquids and obstructions to permit full capacity.*	*Location labelled "Warehouse" as shown in the Premises map in Schedule 1 (Maps)*
Process Building	• *A negative atmospheric pressure shall be maintained through operation of the HVAC system whenever pre-processing, processing or handling of MCW outside of sealed containers occurs, stabilisation of mercury to form mercury sulphide or maintenance activities on the mercury treatment plant are undertaken.* • *Emissions to air shall only be released from the Process Building via the Emissions Stack.* • *MCW waste shall not be stored within the Process Building for more than 24 hours prior to treatment.* • *The building shall be kept free of combustible and flammable materials.* • *The building sealed bunded floor shall be maintained so it is impermeable to mercury and hydrocarbons, free of liquid and obstructions to maintain a capacity of at least 3.5 m^3 of liquid, and to drain to a collection sump.* • *The collection sump shall be maintained free of liquids and obstructions to permit full capacity.*	*Within the location labelled "Process" as shown in the Premises map in Schedule 1 (Maps)*

Site infrastructure and equipment	*Operational requirements*	*Infrastructure location*
Mercury Treatment Plant	• *Comprises fifteen retorts and a vacuum distillation unit.* • *Interlocks shall prevent operation of the process unless the HVAC fan is operational and the process building is under negative pressure.* • *All off-gases from the vacuum distillation unit shall be directed to the Activated Carbon Filtration System.* • *Overpressure interlocks shall result in progressive shutdown of the process if flow to the Active Carbon Filtration system is restricted.*	*Within the location labelled "Process" as shown in the Premises map in Schedule 1 (Maps)*
HVAC System	• *Shall be in operation prior to, and for the duration of, all pre-processing, processing, mercury stabilisation or maintenance activities occurring within the Process Building.* • *Linked to an alarm which initiates a controlled shutdown in the event of a loss of negative pressure.* • *Noise levels shall not exceed 80 dB(A) measured at a distance of 1 m from the HVAC fan.*	*Within the location labelled "Process" as shown in the Premises map in Schedule 1 (Maps)*
Activated Carbon Filtration System	• *Shall be in operation prior to, and for the duration of, all pre-processing, processing, mercury stabilisation or maintenance activities occurring within the Process Building.* • *Comprises two stages of activated carbon filtration.* • *The first stage shall be a dual-redundant system comprising two parallel sulfur impregnated activated carbon filters containing at least 7m^3 of carbon each.* • *The second stage shall comprise an activated carbon filter containing at least 7m^3 of carbon.* • *A continuous H_2S monitor shall operate upstream of the second stage activated carbon filter.* • *If H_2S ≥1 ppm is detected by the continuous H_2S monitor an alarm shall alert the control room and the applicable first stage activated carbon filter shall be immediately replaced.* • *The second stage carbon filter shall*	*Within the location labelled "Process" as shown in the Premises map in Schedule 1 (Maps)*
Emission Stack	• *24.9 m height* • *0.37 m diameter* • *Stack monitoring port maintained in*	*Within the location labelled "Emission Stack" as shown in the Premises map*

Site infrastructure and equipment	Operational requirements	Infrastructure location
	accordance with AS4323.1-1995 • *Process emissions and fugitive emissions from the HVAC system shall be directed through the activated carbon filtration system prior to release from the emission stack.*	*in Schedule 1 (Maps)*
Reactor (Mercury Stabilisation)	• *Spills of sulphur, mercury and mercury sulphide will be immediately recovered.* • *The reactor is only permitted to be operated when connected to the process vacuum system.* • *The reactor is only permitted to be operated within the process building.*	*Within the location labelled "Process" as shown in the Premises map in Schedule 1 (Maps)*
Onsite fire detection and response system	• *A two-stage alarm comprising a VESDA (first stage), and a heat detection alarm (second stage) within both the Warehouse and Process Building.* • *Heat detection alarms shall activate a back to base alarm for automated notification to external Emergency Services.* • *A pre-action aerosol fire suppression system in the Process Building activated by the second stage alarm.* • *Minimum four dry powder fire extinguishers (Warehouse).* • *Minimum three dry powder fire extinguishers. (Process Building)* • *The system components are operated and maintained in accordance with the manufacturer's specifications.*	*Location labelled "Warehouse" and the location labelled "Process" as shown in the Premises map in Schedule 1 (Maps)*
Liquid waste storage tank	• *Located within an impermeable sealed bund free capable of containing 110% of the liquid waste storage tank volume.* • *Maintained to prevent leaks.*	*Location labelled "Outside" as shown in the Premises map in Schedule 1 (Maps)*
Covered waste storage area	• *Apron is constructed of concrete, graded in a manner which prevents runoff, and drains to a collection sump.* • *The collection sump is to be maintained free of liquids and obstructions to permit full capacity.*	*Location labelled "Outside" as shown in the Premises map in Schedule 1 (Maps)*

11. The Works Approval Holder must only accept onto the premises waste of a waste type, which does not exceed the corresponding rate at which waste is received, and which meets the corresponding acceptance specification set out in Table 5.

Table 5: Types of waste authorised to be accepted onto the premises

Waste type	*Rate at which waste is received*	*Acceptance specification*
Liquid wastes • *D120 Mercury and mercury compounds* • *J120 Waste oil and water mixtures of emulsions and hydrocarbon and water mixtures or emulsions* • *L150 Industrial wash water*	*Combined total of up to 2,000 tonnes per annual period*	• *Must be packaged within sealed United Nations approved Dangerous Goods containers.* • *Waste must be unloaded within the Warehouse loading/ unloading bay and transferred directly into the Warehouse for storage.* • *If waste is received in damaged packaging it must be transferred into the Process Building.* • *Radioactive substances (as defined by the Radiation Safety (General) Regulations 1983) must not be accepted onto the premises.*
Solid wastes • *D120 Mercury and mercury compounds* • *N100 Containers and drums contaminated with residues of a controlled waste* • *N160 Encapsulated or chemically fixed, solidified or polymerised controlled waste* • *N190 Filter cake containing a controlled waste* • *N205 Industrial waste treatment plant residue*		

12. *The Works Approval Holder shall ensure that where waste does not meet the waste acceptance criteria set out in condition 11 it is removed from the Premises by the delivery vehicle.*

13. *The Works Approval Holder shall ensure that wastes accepted onto the Premises are only subjected to the processes and in accordance with any process limits set out in Table 6.*

Table 6: Waste accepted onto the premises

Waste type	*Process*	*Process Limits*
Liquid Waste types as specified in Table 5 (condition 11)	• *Stored within the Warehouse within sealed United Nations approved Dangerous Goods containers.* • *MCW waste shall not be stored within the Process Building for more than 24 hours prior to treatment.* • *Pre-processing, and handling of MCW outside of sealed containers within the Process building only.* • *Processing within the Mercury Treatment Plant*	*2,000 tonnes per annual period*
Solid waste types as specified in Table 5 (condition 11)		

14. *The Works Approval Holder must record the total amount of waste accepted onto the premises, for each waste type listed in Table 7, in the corresponding unit, and for each corresponding time period, as set out in Table 7.*

Table 7: Waste accepted onto the premises

Waste type	***Unit***	***Time period***
Liquid Waste types as specified in Table 5 (condition 11)	*tonnes*	*Each monthly period.*
Solid waste types as specified in Table 5 (condition 11)		

15. *The Works Approval Holder must record the total amount of waste removed from the premises, for each waste type listed in Table 8, in the corresponding unit, and for each corresponding time period set out in Table 8.*

Table 8: Waste removed from the premises

Waste type	***Unit***	***Time period***
Stabilised mercury sulphide (D120 Mercury and mercury compounds)	*tonnes*	*Each load removed from the premises.*

16. *The Works Approval Holder must ensure that wastes produced on the premises, specified in Table 9 are managed in accordance with the corresponding requirements specified in Table 9.*

Table 9: Waste management specifications

Waste type	***Disposal strategy***	***Specified requirements***
Recovered pure liquid mercury	*Stablised within a reactor prior to form stabilised mercury sulphide.*	• *Shall only be stored within the Process building within sealed United Nations approved containers for storage of liquid mercury.* • *Shall not be stored for a period of greater than 6 months.*
Stabilised mercury sulphide (D120 Mercury and mercury compounds)	*Removed from the premises*	• *Shall only be stored within the Warehouse building within sealed United Nations approved Dangerous Goods containers.* • *Shall be removed from the premises within 12 months of being generated.* • *Shall not contain free mercury.*
Solid waste suitable for disposal at a Class I, II or III landfill		• *Shall be stored within a covered waste storage area.* • *Shall not contain free mercury.*
Liquid waste		• *Shall be stored within a liquid waste storage tank surrounded by an impermeable steel bund with capacity to contain 110% of the*

		tank capacity. • *Shall not contain free mercury.*

17. *The Works Approval Holder must ensure that the emissions specified in Table 10, are discharged only from the corresponding discharge point and only at the corresponding discharge point location.*

Table 10: Authorised discharge points

Emission	***Discharge point***	***Discharge point location***
Mercury	***Emission stack***	*As shown in Schedule 1: Maps Premises Map (of W6090/2018/1)*
Benzene		
H_2S		

18. *The Works Approval Holder must ensure that emissions from the discharge point listed in Table 11 for the corresponding parameter do not exceed the corresponding limit.*

Table 11: Emission and discharge limits

Discharge point	***Parameter***	***Limit***
Emission stack	*Mercury*	*0.15 mg/m^3*

19. *The Works Approval Holder must monitor emissions:*

(a) from each discharge point;

(b) at the corresponding monitoring location;

(c) for the corresponding parameter;

(d) at the corresponding frequency;

(e) for the corresponding averaging period;

(f) in the corresponding unit; and

(g) using the corresponding method,

as set out in Table 12.

Table 12: Emissions and discharge monitoring

Discharge point	Monitoring location	Parameter	Frequency	Averaging period	Unit [1, 2]	Method
Emission stack	*SP-01*	*Mercury*	*Minimum of two separate sample events separated by at least one week. The sample events shall be undertaken prior to the completion of commissioning*	*120 minutes*	*mg/m³*	*USEPA Method 29*
		Benzene		*30 minutes*		*USEPA Method 18*
		Total VOCs				
		H_2S		*10 minutes*		*USEPA Method 11*
		Volumetric Flow rate		*30 minutes*	*m³/s*	*USEPA Method 2*

Note 1: All units are referenced to STP dry.
Note 2: Concentration units for all gases are referenced to 11% O_2.

20. *The Works Approval Holder must ensure that sampling required by condition 19 is undertaken at sampling locations in accordance with the current version of AS4323.1-1995.*

21. *The Works Approval Holder must ensure that all non-continuous sampling and analysis undertaken required by condition 19 is undertaken by a Holder of NATA accreditation for the relevant methods of sampling and analysis.*

22. *The Works Approval Holder must record the results of all monitoring activity required by condition 19.*

23. *The Works Approval Holder must, within 7 days of becoming aware of any non-compliance with an emission limit specified in condition 18 of this works approval, notify the CEO in writing of that non-compliance and include in that notification the following information:*

    a) *the emission limit that was not complied with;*
    b) *the time and date when the non-compliance occurred;*
    c) *if any environmental impact occurred as a result of the non-compliance and if so what that impact is and where the impact occurred;*
    d) *the details and result of any investigation undertaken into the cause of the non-compliance;*
    e) *what action has been taken and the date on which it was taken to prevent the non-compliance occurring again; and*
    f) *what action will be taken and the date by which it will be taken to prevent the non-compliance occurring again.*

24. *The Works Approval Holder must securely lock the Premises when not attended to prevent unauthorised access.*

Appendix 1: Key documents

	Document title	In text ref	Availability
1	Works Approval W6090/2017/1 and Decision Report –Kwinana Mercury Treatment Plant	W6090/2017/1	accessed at www.dwer.wa.gov.au
2	Works Approval Amendment Application – W6090 (including supporting documents)	BMT 2019a	DWER records (A1763990)
3	Works Approval Amendment Application – W6090 – Response to Request for Further Information	BMT 2019b	DWER records (DWERDT137052)
4	Works Approval Amendment Application – W6090 – Request for additional amendments	BMT 2019c	DWER records (DWERDT138733)
5	Works Approval Amendment Application – W6090 – Response to Queries	BMT 2019d	DWER records (DWERDT144418)
6	KMTF Emergency Plan and Extract from Risk Register	BMT 2019e	DWER records (DWERDT150550)
7	W6090/2017/1 – Kwinana Mercury Treatment Plant Construction Compliance Document – Warehouse and Stormwater System	BMT 2019f	DWER records (A1779735)
8	Works Approval Amendment Application – W6090 – Clarifications regarding Works Approval Amendment Application	BMT 2019g	DWER records (DWERDT152992)
9	DER, July 2015. *Guidance Statement: Regulatory principles.* Department of Environment Regulation, Perth.	DER 2015a	accessed at www.dwer.wa.gov.au
10	DER, October 2015. *Guidance Statement: Setting conditions.* Department of Environment Regulation, Perth.	DER 2015b	
11	DER, February 2017. *Guidance Statement: Risk Assessments*. Department of Environment Regulation, Perth.	DER 2017a	
12	DER, February 2017. *Guidance Statement: Decision Making*. Department of Environment Regulation, Perth.	DER 2017b	