



<b>Works approval number</b>	W6090/2017/1
<b>Works approval holder</b>	Ecocycle Pty Ltd
<b>ACN</b>	146 190 516
<b>Registered business address</b>	Unit 3, 81-85 Heatherdale Road RINGWOOD VIC 3134
<b>DWER file number</b>	DER2017/001541-1
<b>Duration</b>	8/05/2018 to 7/05/2025
<b>Date of amendment</b>	17 July 2024
<b>Premises</b>	Kwinana Mercury Treatment Plant Lot 101 Donaldson Rd, KWINANA BEACH WA 6167  Legal description - Part of Lot 101 on Plan 73740 As defined by the coordinates in the premises map in Schedule 1: Maps

Prescribed premises category description (Schedule 1, Environmental Protection Regulations 1987)	Assessed production capacity
Category 39: Chemical or oil recycling: premises on which waste liquid hydrocarbons or chemicals are refined, purified, reformed, separated or processed.	2,000 tonnes per annual period
Category 61A: Solid waste facility: premises (other than premises within category 67A) on which solid waste produced on other premises is stored, reprocessed, treated or discharged onto land.	2,000 tonnes per annual period

This works approval is granted to the works approval holder, subject to the following conditions, on 17 July 2023, by:

**Manager, Process Industries**

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

## Works approval history

Date	Ref number	Summary of changes
08/05/2018	W6090/2017/1	New works approval granted.
22/05/2019		Amendment Notice 1: <ul style="list-style-type: none"> <li>increase the storage capacity for MCW from 200 to 400 tonnes.</li> <li>increase throughput from 1,000 tonnes per year to 2,000 tonnes per year; and</li> <li>authorise commissioning and time limited operation of the premises infrastructure.</li> </ul>
10/01/2020		Amendment to increase the storage capacity for MCW and stabilised mercury sulphide from 400 to 500 tonnes at any one time.
20/04/2021		Amendment to extend the expiry date by 18 months, to allow for completion of commissioning (this amendment).
7/01/2022		Works approval holder-initiated amendment to: <ul style="list-style-type: none"> <li>include Sea Container Storage Area within premises boundary;</li> <li>reflect as constructed the carbon filtration scrubbers;</li> <li>reword mercury stabilisation infrastructure name;</li> <li>specify maximum amount of waste stored on site at any one time;</li> <li>specify storage and disposal options for treated mercury waste (elemental mercury sludge); and</li> <li>allow for storage of overflow MCW in sea containers.</li> </ul>
04/08/2022		Works approval holder-initiated amendment to remove Sea Container Storage Area (Part F of Lot 101 on Deposited Plan 73740) from premises boundary and extend works approval duration
31/07/2023		Works Approval Holder initiated amendment to extend the duration of the Works Approval from 7/11/2023 to 7/11/2024 and to allow installation and operation of a prefabricated mercury stabilisation unit at the premises.
24/08/2023		Transfer of Works Approval from BMT Australia Pty Ltd to Ecocylce Pty Ltd
04/06/2024		Works approval initiated amendment to extend the expiry date by six months to 7 May 2025.
17/07/2024		Department initiated amendment to increase storage time of mercury from 6 to 12 months.

## Interpretation

In this works approval:

- (a) the words 'including', 'includes' and 'include' in conditions mean 'including but not limited to', and similar, as appropriate;
- (b) where any word or phrase is given a defined meaning, any other part of speech or other grammatical form of that word or phrase has a corresponding meaning;
- (c) where tables are used in a condition, each row in a table constitutes a separate condition;
- (d) any reference to an Australian or other standard, guideline or code of practice in this works approval:
  - (i) if dated, refers to that particular version; and
  - (ii) if not dated, refers to the latest version and therefore may be subject to change over time;

- (e) unless specified otherwise, any reference to a section of an Act refers to that section of the EP Act; and
- (f) unless specified otherwise, all definitions are in accordance with the EP Act.

**NOTE:** This works approval requires specific conditions to be met but does not provide any implied authorisation for other emissions, discharges, or activities not specified in this works approval.

## Works approval conditions

The works approval holder must ensure the following conditions are complied with:

### Infrastructure and equipment

1. The works approval holder must undertake the works:
  - (a) for the infrastructure and equipment;
  - (b) to the requirements; and
  - (c) at the location
 specified in Table 12 of Schedule 2 (Infrastructure and equipment).
2. The works approval holder must not depart from the requirements specified in Table 12 of Schedule 2 (Infrastructure and equipment) except:
  - (a) where such departure does not increase risks to public health, public amenity or the environment; and
  - (b) all other conditions in this works approval are still satisfied.

### Emissions

3. The works approval holder must not cause any emissions from the works authorised through this works approval, and during commissioning and the time limited operational phase, except for general emissions described in Table 1, subject to the exclusions, limitations or requirements specified in Table 1.

**Table 1: Authorised emissions table**

Emission type	Exclusions, limitations or requirements
<b>Specified emissions</b>	
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.
<b>General emissions (excluding Specified emissions)</b>	
Fugitive emissions which arise from undertaking the construction or pre-commissioning of infrastructure and equipment set out in Table 12 of Schedule 2 (Infrastructure and equipment)	Emissions excluded from General Emissions are: <ul style="list-style-type: none"> <li>• Unreasonable emissions; or</li> <li>• Emissions that result in, or are likely to result in, pollution, material environmental harm or serious environmental harm; or</li> <li>• Discharges of waste in circumstances likely to cause pollution; or</li> <li>• Emissions that result, or are likely to result in, the discharge or abandonment of waste in water to which the public has access; or</li> <li>• Emissions or discharges which do not comply with an approved policy, a prescribed standard or the conditions in an implementation agreement or decision; or</li> <li>• 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.</li> </ul>

## Records

4. The works approval holder must prepare and submit to the CEO a revised Emergency Response Plan prior to the 31 December 2023, which includes:
  - (a) hazard identification planning: the identification and risk assessment of all hazardous areas (e.g. areas with potentially toxic or flammable gas atmospheres) within the premises; and
  - (b) a description of the potential risk events associated with hazardous areas which could have adverse impacts on the public or the environment;
  - (c) hazard analysis planning: all relevant design and storage details which support the mitigation and allow analysis of the consequence and likelihood of risk events identified in part (a) and part (b), at the premises should they occur; and
  - (d) hazard operations planning the details of emergency procedures and controls in place for risk events identified in part (a) if they occur, including fire.
5. 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 12 of Schedule 2 (Infrastructure and equipment), as required by condition 1;
  - (b) includes a description of, and explanation for, any departure from the requirements specified in Table 12 of Schedule 2 (Infrastructure and equipment), including how the departure complies with Condition 2;
  - (c) contains photographs of as-constructed works to support the descriptions provided under condition 5(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 conditions 5(a) and 5(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.
6. The works approval holder must notify the CEO in writing within 7 days of commencing commissioning of the works.
7. The works approval holder must notify the CEO in writing within 7 days of completing commissioning of the works.
8. 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 21;
  - (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 12);

- (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.

9. Following construction of the works, the works approval holder must ensure the site infrastructure and equipment listed in Table 2 and located at the corresponding infrastructure location is maintained and operated in accordance with the corresponding operational requirements set out in Table 2.

**Table 2: Infrastructure and equipment requirements**

Site infrastructure and equipment	Operational requirements	Infrastructure location
Warehouse building	<ul style="list-style-type: none"> <li>No more than 500 tonnes of MCW and stabilised mercury sulphide shall be stored within the building.</li> <li>Pre-processing, processing and handling of MCW outside of sealed containers is not permitted within the Warehouse building.</li> <li>External doors must be kept closed except when personnel are entering or exiting the building, or waste transfer is occurring between the warehouse and a transport vehicle.</li> <li>The building sealed bunded floor must be maintained so it is impermeable to mercury and hydrocarbons, free of liquid and obstructions to maintain a capacity of at least 35 m<sup>3</sup> of liquid, and to drain to a collection sump.</li> <li>The collection sump must be maintained free of liquids and obstructions to permit full capacity.</li> <li>Building must be surrounded by secure fencing with lockable gates.</li> </ul>	Location labelled "Warehouse" as shown in the Premises map Figure 1 in Schedule 1 (Maps)
Forklift scales	<ul style="list-style-type: none"> <li>Must be capable of accurately weighing all incoming and outgoing waste.</li> <li>The measuring device must be maintained and calibrated in accordance with manufacturers specifications.</li> </ul>	NA
Warehouse loading/unloading bay	<ul style="list-style-type: none"> <li>Apron is constructed of concrete, graded in a manner which prevents runoff, and drains to a collection sump.</li> <li>The collection sump must be maintained free of liquids and obstructions to permit full capacity.</li> </ul>	Location labelled "Warehouse" as shown in the Premises map Figure 1 in Schedule 1 (Maps)
Process Building	<ul style="list-style-type: none"> <li>A negative atmospheric pressure must be maintained through operation of the HVAC system whenever pre-processing, processing or handling of MCW or stabilised mercury outside of sealed containers occurs, or maintenance activities on the mercury treatment plant are undertaken.</li> <li>Emissions to air must only be released from the Process Building via the Emissions Stack.</li> <li>MCW waste must not be stored within the Process Building for more than 24 hours prior to treatment.</li> </ul>	Within the location labelled "Process" as shown in the Premises map Figure 1 in Schedule 1 (Maps)

Site infrastructure and equipment	Operational requirements	Infrastructure location
	<ul style="list-style-type: none"> <li>• The building must be kept free of combustible and flammable materials.</li> <li>• The building sealed bunded floor must 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<sup>3</sup> of liquid, and to drain to a collection sump.</li> <li>• The collection sump must be maintained free of liquids and obstructions to permit full capacity.</li> <li>• Any processed mercury wastes (such as elemental mercury sludge) shall be contained within fit for purpose fire retardant containers.</li> <li>• The building must be surrounded by secure fencing with lockable gates.</li> </ul>	
Mercury Treatment Plant	<ul style="list-style-type: none"> <li>• Comprises fifteen retorts and a vacuum distillation unit.</li> <li>• Interlocks must prevent operation of the process unless the HVAC fan is operational, and the process building is under negative pressure.</li> <li>• All off-gases from the vacuum distillation unit must be directed to the Activated Carbon Filtration System.</li> <li>• Overpressure interlocks must result in progressive shutdown of the process if flow to the Active Carbon Filtration system is restricted.</li> <li>• Plant must be surrounded by secure fencing with lockable gates.</li> </ul>	Within the location labelled "Process" as shown in the Premises map Figure 1 in Schedule 1 (Maps)
HVAC System	<ul style="list-style-type: none"> <li>• Must be in operation prior to, and for the duration of, all pre-processing, processing, mercury handling or maintenance activities occurring within the Process Building.</li> <li>• Linked to an alarm which initiates a controlled shutdown in the event of a loss of negative pressure.</li> <li>• Noise levels must not exceed 80 dB(A) measured at a distance of 1 m from the HVAC fan.</li> </ul>	Within the location labelled "Process" as shown in the Premises map Figure 1 in Schedule 1 (Maps)
Activated Carbon Filtration System	<ul style="list-style-type: none"> <li>• Must be in operation prior to, and for the duration of, all pre-processing, processing, mercury handling or maintenance activities occurring within the Process Building.</li> <li>• Comprises three vertical upflow activated carbon filtration towers.</li> <li>• Each filtration tower consists of an activated carbon filter containing at least 7m<sup>3</sup> of carbon each.</li> <li>• The activated carbon filter substrate within each tower must comprise at least 7m<sup>3</sup> of carbon and contain adsorption materials Anticarb EA1000, Anticarb EA1000K and Anticarb EA700S or similar.</li> <li>• A continuous H<sub>2</sub>S monitor must operate downstream of the final activated carbon filter at all times during</li> </ul>	Within the location labelled "Process" as shown in the Premises map Figure 1 in Schedule 1 (Maps)



Site infrastructure and equipment	Operational requirements	Infrastructure location
	<p>operation.</p> <ul style="list-style-type: none"> <li>• If <math>H_2S \geq 1</math> ppm is detected by the continuous <math>H_2S</math> monitor an alarm must alert the control room and the applicable first stage activated carbon filter must be immediately replaced.</li> <li>• Bypass of more than one activated carbon filtration tower at a time must not occur during operation.</li> </ul>	
Emission Stack	<ul style="list-style-type: none"> <li>• 24.9 m height.</li> <li>• 0.37 m diameter.</li> <li>• Stack monitoring port maintained in accordance with AS4323.1-1995.</li> <li>• Process emissions and fugitive emissions from the HVAC system must be directed through the activated carbon filtration system prior to release from the emission stack.</li> </ul>	Within the location labelled "Emission Stack" as shown in the Premises map Figure 1 in Schedule 1 (Maps)
Mobile Mercury Stabilisation Unit (MMSU)	<ul style="list-style-type: none"> <li>• heat detection and fire alarms.</li> <li>• Spills of sulphur, mercury and mercury sulphide must be immediately recovered.</li> <li>• Spill kit located inside the MMSU container.</li> <li>• The MMSU is only permitted to be operated when positioned in location A.</li> <li>• transfer to occur within UN approved mercury storage container which is attached to forklift.</li> <li>• The area surrounding the MMSU shall be cordoned off from vehicular and pedestrian traffic while in operation.</li> <li>• the MMSU shall be stored in location B when not in use.</li> <li>• Transfer of elemental mercury from the process building to the MMSU shall only occur within an approved UN container with a blind flange suitable to allow transfer of mercury to occur via interlocking with the needle flange that forms part of the hermetically sealed mercury stabilisation processing equipment.</li> <li>• Stabilised mercury sulphide will be transferred into a steel drum approved for containment of mercury containing wastes immediately after.</li> <li>• If air monitoring within the MMSU detects any mercury vapour at all then processes valves and equipment shall be immediately sealed and shut down until the source is determined and fixed.</li> </ul>	Within the area labelled "A and B" as shown in the Premises map Figure 3 in Schedule 1 (Maps)
Onsite fire detection and response system	<ul style="list-style-type: none"> <li>• A two-stage alarm comprising a VESDA (first stage), and a heat detection alarm (second stage) within both the Warehouse and Process Building.</li> <li>• Heat detection alarms must activate a back to base alarm for automated notification to external Emergency Services.</li> <li>• A pre-action aerosol fire suppression system in the</li> </ul>	Location labelled "Warehouse" and the location labelled "Process" as shown in the Premises map Figure 1 in

Site infrastructure and equipment	Operational requirements	Infrastructure location
	<p>Process Building activated by the second stage alarm.</p> <ul style="list-style-type: none"> <li>• Minimum four dry powder fire extinguishers (Warehouse).</li> <li>• Minimum three dry powder fire extinguishers (Process Building).</li> <li>• The system components must be operated and maintained in accordance with the manufacturer's specifications.</li> </ul>	Schedule 1 (Maps)
Liquid waste storage tanks	<ul style="list-style-type: none"> <li>• Located within an impermeable sealed bund free capable of containing 110% of the liquid waste storage tank volume.</li> <li>• Must be maintained to prevent leaks.</li> <li>• Must be surrounded by secure fencing with lockable gates.</li> </ul>	Location labelled "Outside" as shown in the Premises map Figure 1 in Schedule 1 (Maps)
Covered waste storage area	<ul style="list-style-type: none"> <li>• Apron is constructed of concrete, graded in a manner which prevents runoff, and drains to a collection sump.</li> <li>• The collection sump must be maintained free of liquids and obstructions to permit full capacity.</li> <li>• Must be surrounded by secure fencing with lockable gates.</li> </ul>	Location labelled "Outside" as shown in the Premises map Figure 1 in Schedule 1 (Maps)

10. 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 3.

**Table 3: Types of waste authorised to be accepted onto the premises**

Waste type	Rate at which waste is received	Acceptance specification
<p>Liquid wastes</p> <ul style="list-style-type: none"> <li>• D120 Mercury and mercury compounds.</li> <li>• J120 Waste oil and water mixtures of emulsions and hydrocarbon and water mixtures or emulsions.</li> <li>• L150 Industrial wash water.</li> </ul>	Combined total of up to 2,000 tonnes per annual period.	<ul style="list-style-type: none"> <li>• Must be packaged within sealed United Nations approved Dangerous Goods containers.</li> <li>• Waste must be unloaded within the Warehouse loading/ unloading bay and transferred directly into the Warehouse for storage.</li> <li>• If waste is received in damaged packaging it must be transferred into the Process Building.</li> <li>• Radioactive substances (as defined by the Radiation Safety (General) Regulations 1983) must not be accepted onto the premises.</li> <li>• Overflow solid MCW held within approved United Nations approved Dangerous Goods bags or drums may be stored within locked and sealed sea containers.</li> </ul>
<p>Solid wastes</p> <ul style="list-style-type: none"> <li>• D120 Mercury and mercury compounds.</li> <li>• N100 Containers and drums contaminated with residues of a controlled waste.</li> <li>• N160 Encapsulated or chemically fixed, solidified or polymerised controlled waste.</li> <li>• N190 Filter cake containing a controlled waste.</li> </ul>		



• N205 Industrial waste treatment plant residue.		
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11. The works approval holder must ensure that where waste does not meet the waste acceptance criteria set out in condition 10 it is removed from the premises by the delivery vehicle.
12. The works approval holder must ensure that wastes accepted onto the premises are only subjected to the processes and in accordance with any process limits set out in Table 4.

**Table 4: Waste accepted onto the premises**

Waste type	Process	Process limits
Liquid Waste types as specified in Table 3 (condition 10)	<ul style="list-style-type: none"> <li>Stored within the Warehouse, within sealed United Nations approved Dangerous Goods containers.</li> <li>Overflow solid MCW held within approved United Nations approved Dangerous Goods bags or drums may be stored within locked and sealed sea containers.</li> <li>MCW waste shall not be stored within the Process Building for more than 24 hours prior to treatment.</li> <li>Pre-processing, and handling of MCW outside of sealed containers within the Process building only.</li> <li>Processing within the Mercury Treatment Plant</li> <li>Elemental mercury processed within the MMSU.</li> </ul>	2,000 tonnes per annual period with no more than 510 tonnes stored on the premises at any time
Solid waste types as specified in Table 3 (condition 10)		

13. The works approval holder must record the total amount of waste accepted onto the premises, for each waste type listed in Table 5, in the corresponding unit, and for each corresponding time period, as set out in Table 5.

**Table 5: Waste accepted onto the premises**

Waste type	Unit	Time period
Liquid Waste types as specified in Table 3 (condition 10)	tonnes	Each monthly period
Solid waste types as specified in Table 3 (condition 10)		

14. The works approval holder must record the total amount of waste removed from the premises, for each waste type listed in Table 6, in the corresponding unit, and for each corresponding time period set out in Table 6.

**Table 6: 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

15. The works approval holder must ensure that wastes produced on the premises, specified in Table 7 are managed in accordance with the corresponding requirements specified in Table 7.

**Table 7: Waste management specifications**

Waste type	Disposal strategy	Specified requirements
Recovered pure liquid mercury	Stabilised within a mercury treatment	<ul style="list-style-type: none"> <li>Must only be stored within the Process building within sealed United Nations approved</li> </ul>

	stabilisation unit prior to form stabilised mercury sulphide.	containers for storage of liquid mercury. <ul style="list-style-type: none"> <li>Must not be stored for a period of greater than 12 months.</li> </ul>
Elemental mercury sludge	Shall not be removed from the premises without written approval from the CEO.	<ul style="list-style-type: none"> <li>Must only be stored within the Process Building within sealed United Nations approved Dangerous Goods containers.</li> </ul>
Stabilised mercury sulphide (D120 Mercury and mercury compounds)	Removed from the premises.	<ul style="list-style-type: none"> <li>Must only be stored within the Warehouse building within sealed United Nations approved Dangerous Goods containers.</li> <li>Must be removed from the premises within 12 months of being generated.</li> <li>Must not contain free mercury.</li> </ul>
Solid waste suitable for disposal at a Class I, II or III landfill		<ul style="list-style-type: none"> <li>Must be stored within a covered waste storage area.</li> <li>Must not contain free mercury.</li> </ul>
Liquid waste		<ul style="list-style-type: none"> <li>Must be stored within a liquid waste storage tank surrounded by an impermeable steel bund with capacity to contain 110% of the tank capacity.</li> <li>Must not contain free mercury.</li> </ul>

16. The works approval holder must ensure that the emissions specified in Table 8, are discharged only from the corresponding discharge point and only at the corresponding discharge point location.

**Table 8: 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 <sub>2</sub> S		

17. The works approval holder must ensure that emissions from the discharge point listed in Table 9 for the corresponding parameter do not exceed the corresponding limit.

**Table 9: Emission and discharge limits**

Discharge point	Parameter	Limit
Emission stack	Mercury	0.15 mg/m <sup>3</sup>

18. The works approval holder must monitor emissions:

- from each discharge point;
- at the corresponding monitoring location;
- for the corresponding parameter;
- at the corresponding frequency;
- for the corresponding averaging period;
- in the corresponding unit; and
- using the corresponding method,

as set out in Table 10.

**Table 10: Emissions and discharge monitoring**

Discharge point	Monitoring location	Parameter	Frequency	Averaging period	Unit <sup>1,2</sup>	Method
Emission stack	SP-01	Mercury	Minimum of two separate sample events separated by at least one week.	120 minutes	mg/m <sup>3</sup>	USEPA Method 29
		Benzene		30 minutes		USEPA Method 18
		Total VOCs	The sample events must be undertaken prior to the completion of commissioning	10 minutes		USEPA Method 11
		H <sub>2</sub> S		30 minutes	m <sup>3</sup> /s	USEPA Method 2
		Volumetric Flow rate				

Note 1: All units are referenced to STP dry.

Note 2: Concentration units for all gases are referenced to 11% O<sub>2</sub>.

19. The works approval holder must ensure that sampling required by condition 18 is undertaken at sampling locations in accordance with the current version of AS4323.1-1995.
20. The works approval holder must ensure that all non-continuous sampling and analysis undertaken required by condition 18 is undertaken by a holder of NATA accreditation for the relevant methods of sampling and analysis.
21. The works approval holder must record the results of all monitoring activity required by condition 18.
22. The works approval holder must, within 7 days of becoming aware of any non-compliance with an emission limit specified in condition 17 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.

23. The works approval holder must securely lock the premises when not attended to prevent unauthorised access.

## Definitions

In this works approval, the terms in Table 11 have the meanings defined.

**Table 11: Definitions**

Term	Definition
AS4323.1-1995	means the Australian Standard <i>Stationary source emissions - Selection of sampling positions</i> (Standards Australia, 1995)
annual period	means 1 January to 31 December each year
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department Administering the <i>Environmental Protection Act 1986</i> Locked Bag 10 JOONDALUP DC WA 6919 <a href="mailto:info@dwer.wa.gov.au">info@dwer.wa.gov.au</a>
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, optimise 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 <i>Public Sector Management Act 1994</i> 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
Elemental mercury sludge	Derived from the processing of MCW within the mercury treatment plant; prior to stabilisation stage of the process (using the mercury stabilisation unit)
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 <i>Environmental Protection Act 1986</i> (WA).
EP Regulations	means the Environmental Protection Regulations 1987 (WA).
H <sub>2</sub> S	Hydrogen Sulphide
HVAC	means the mercury treatment process building Heating, Ventilation and Air Conditioning system
implementation agreement or decision	has the same meaning given to that term under the EP Act.

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/m <sup>3</sup>	milligrams per cubic metre
MMSU	means Mobile Mercury Stabilisation Unit
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.
time limited operational phase	means full processing operations permitted under this works approval, subject to the conditions, whilst an application for 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 works for all infrastructure and equipment described in Table 12 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	refers to the occupier of the Premises being the person to whom this works

holder	approval has been granted, as specified at the front of this works approval.
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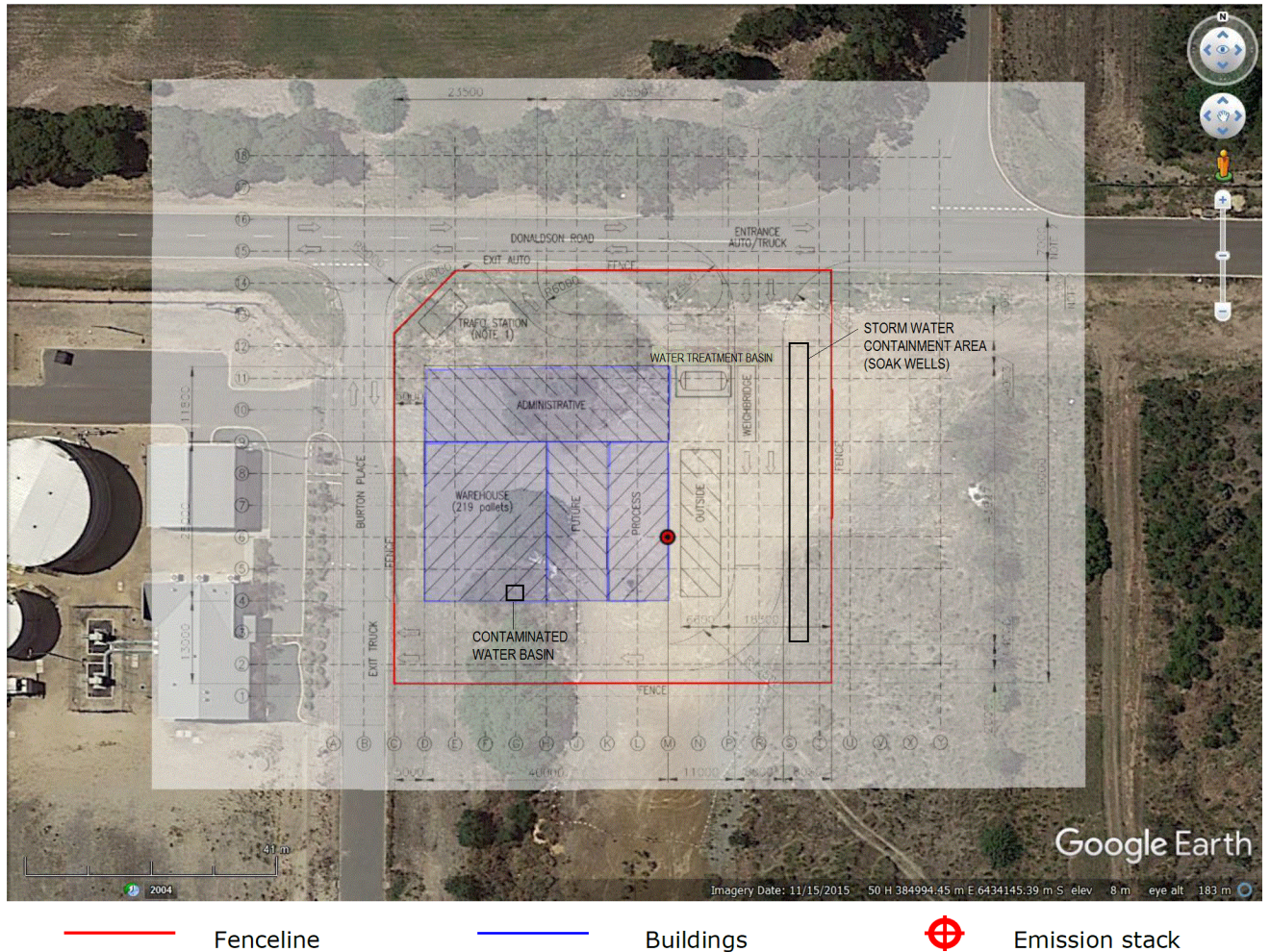
**END OF CONDITIONS**



## Schedule 1: Maps

### Premises maps

The premises operational areas are shown in the two maps below.



**Figure 1: Map showing the location of the building operational areas and stormwater wells and basins**

Premises boundary

The premises boundary is defined by the lease area, shown below.



GPS Coordinates	
32.22319° S	115.77987° E
32.22375° S	115.77989° E
32.22375° S	115.77911° E
32.22329° S	115.77908° E
32.22318° S	115.77925° E

Figure 2: Map showing the visual and relevant Global Positioning System (GPS) co-ordinates for the premises boundary





**Figure 3: Map showing the mobile mercury stabilization unit location when in use (location A) and when not in use (location B)**

## Schedule 2 (Infrastructure and equipment)

The minimum design and construction requirements for infrastructure and equipment on the premises are detailed in Table 12 below.

**Table 12: Infrastructure and equipment requirements**

Infrastructure and equipment	Requirements	Location
Process Building overall	<ul style="list-style-type: none"> <li>(a) Designed and constructed to be fully enclosed and fit for the purpose of maintaining a negative atmospheric pressure generated by the HVAC system.</li> <li>(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.</li> <li>(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<sup>3</sup> minimum).</li> <li>(d) Shall be contained within a secured fence or compound of at least 1,8m height that is capable of being locked while the premises is unattended</li> </ul>	Location labelled "Process" as shown in the Premises map Figure 1 in Schedule 1 (Maps)
Process Building – Level 1	<ul style="list-style-type: none"> <li>(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.</li> <li>(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.</li> <li>(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.</li> </ul>	Location labelled "Process" as shown in the Premises map Figure 1 in Schedule 1 (Maps)
Process Building – Level 2	<ul style="list-style-type: none"> <li>(a) Contains cooling package designed, constructed and fit for the purpose of achieving a level of cooling that adequately condenses process gases.</li> <li>(b) Contains gas cyclone designed, constructed and fit for the purpose of separating solids from process gases to reduce fouling of downstream equipment.</li> <li>(c) Contains 2 heat exchangers designed, constructed and fit for the purpose of condensing vapour from vessels.</li> <li>(d) Contains chiller designed, constructed and fit for the purpose of cooling the cooling water to enable efficient operation of the cooling package.</li> <li>(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</li> </ul>	Location labelled "Process" as shown in the Premises map Figure 1 in Schedule 1 (Maps)

Infrastructure and equipment	Requirements	Location
	residence times.	
Process Building – Level 3	(a) Contains 15 retorts designed, constructed and fit for the purpose of heating MCW to a sufficient temperature to break organic mercury bonds.	Location labelled “Process” as shown in the Premises map Figure 1 in Schedule 1 (Maps)
HVAC System building	<ul style="list-style-type: none"> <li>(a) Housed within the Process building.</li> <li>(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.</li> <li>(c) Designed and constructed to achieve overall sound levels of less than 80 dB(A) at 1 metre distance.</li> <li>(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.</li> <li>(e) Design incorporates an interlock associated with the extraction fan to prevent a process batch from starting unless the extraction fan is operational.</li> <li>(f) Alarms on run signal for the HVAC fan and on suction pressure to the fan to indicate it is functional.</li> </ul>	All within the location labelled “Process” as shown in the Premises map Figure 1 in Schedule 1 (Maps)
Activated carbon filtration system and stack	<ul style="list-style-type: none"> <li>(a) Designed and constructed for the dispersion of scrubbed process gas and building air from the HVAC system.</li> <li>(b) Stack is designed and constructed to be 24.9 m in height; 0.37 m in diameter and achieving 5,520 m<sup>3</sup>/hr exit gas velocity, fit for the purpose of minimising stack downwash.</li> <li>(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<sub>2</sub>S 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<sub>2</sub>S in stack exit gases.</li> <li>(d) First stage of activated carbon filtration is a dual redundant system comprising two independent activated carbon filters, each containing at least 7 m<sup>3</sup> of activated carbon and installed in parallel such that one can be operated when the other is offline.</li> <li>(e) Second stage activated carbon filtration consists of an activated carbon filter containing at least 7 m<sup>3</sup> of activated carbon.</li> <li>(f) Design incorporates an interlock associated with the extraction fan to prevent a process batch from starting unless the extraction fan is operational.</li> </ul>	Within the location labelled “Emission stack” as shown in the Premises map Figure 1 in Schedule 1 (Maps)

Infrastructure and equipment	Requirements	Location
	<ul style="list-style-type: none"> <li>(g) Design incorporates overpressure interlocks to automatically shut down the heating system if there is a restriction in flow detected to the activated carbon filtration system.</li> <li>(h) H<sub>2</sub>S 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<sub>2</sub>S during process operation.</li> <li>(i) Includes a stack sampling port that is designed in accordance with AS4323.1-1995.</li> </ul>	
Warehouse	<ul style="list-style-type: none"> <li>(a) Designed, constructed and fit for the purpose of storing up to 500 tonnes of MCW at a time.</li> <li>(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<sup>3</sup> of liquid (whichever is greater).</li> <li>(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.</li> </ul>	<p>Location labelled "Warehouse" as shown in the Premises map Figure 1 in Schedule 1 (Maps)</p> <p>Sump c) in location labelled "Contaminated Water Basin" as shown in the Premises map in Schedule 1 (Maps)</p>
Warehouse loading/unloading bay	<ul style="list-style-type: none"> <li>(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.</li> <li>(b) Designed and constructed with an awning intended to prevent rain ingress into the Warehouse.</li> </ul>	<p>Location labelled "Warehouse" as shown in the Premises map Figure 1 in Schedule 1 (Maps)</p>
Covered outside storage:	<ul style="list-style-type: none"> <li>(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.</li> <li>(b) Constructed with a roof over entire area.</li> <li>(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.</li> <li>(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.</li> </ul>	<p>Location labelled "Outside" as shown in the Premises map Figure 1 in Schedule 1 (Maps)</p>
Other outside equipment	<ul style="list-style-type: none"> <li>(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.</li> </ul>	<p>Area labelled "Storm water containment (soak wells)" as shown in the Premises map Figure 1 in Schedule 1 (Maps)</p>



Infrastructure and equipment	Requirements	Location
Mobile Mercury Stabilisation Unit	<ul style="list-style-type: none"> <li>(a) Designed within 40 foot transportable sea container with mobile mercury stabilisation unit inside;</li> <li>(b) Designed for zero emissions during operation;</li> <li>(c) Off gases generated through evacuation volumes of air during filling of mixer and directed through an activated carbon filtration unit in a single vent (less than 1 m<sup>3</sup> of air per batch from feed tank and less than 3.6m<sup>3</sup> from the mixer/reactor);</li> <li>(d) Off gases less than 5 µg/m<sup>3</sup> mercury to be monitored during commissioning;</li> <li>(e) Under a nitrogen atmosphere in a hermetically sealed closed reactor under continuous; intensive mixing to ensure a complete stoichiometric reaction to form mercury sulphide;</li> <li>(f) 150L mixer, horizontal design with no direct handling of mercury;</li> <li>(g) Batch processing of up to 200kg of elemental mercury per batch, one batch every 6 hours;</li> <li>(h) Operation under ambient pressure;</li> <li>(i) Heating and cooling system contained within reactor;</li> <li>(j) Control system for temperature control continuously measured and recorded;</li> <li>(k) Semi-automatic processing with automated dosing of elemental mercury over a fixed time period into granular heated sulphur to fully convert reactants to produce red mercury sulphide in dryer; and</li> <li>(l) Spent activated carbon from filter to be reprocessed through premises to recover mercury.</li> </ul>	Area labelled "A and B" as shown in the Premises map Figure 3 in Schedule 1 (Maps)