



Application for a works approval amendment

Division 3, Part V *Environmental Protection Act 1986*

Works approval number	W6090/2017/1
Works approval holder	Ecocycle Pty Ltd
ACN	146 190 516
File number	DER2017/001541-1
Premises	Kwinana Mercury Treatment Plant Plant lot 101 Donaldson Rd KWINANA BEACH WA 6167 Part of Lot 1 on Deposited Plan 73740 As defined by the premises maps attached to the revised works approval
Date of report	5 May 2025
Proposed decision	Granted

1. Decision summary

The Delegated Officer has determined to make an amendment to Works Approval W6090/2017/1 (W6090). The amendment has been initiated by the works approval holder and includes department-initiated amendments.

This amendment report documents the amendments made pursuant to section 59 and 59(B) of the Environmental Protection Act 1986 (EP Act).

The decision report for the original works approval will remain on the department's website for future reference and will act as a record of the department's decision making.

2. Purpose and scope of assessment

A risk assessment has been completed to evaluate the potential emissions and discharges from the proposed amendments, including their likelihood and impact on sensitive receptors. The assessment covers the installation, construction, and time-limited operations of the proposed equipment and infrastructure.

In completing the assessment documented in this decision report, the Department of Water and Environmental Regulation (the department; DWER) has considered and given due regard to its regulatory framework and relevant policy documents which are available at <https://dwer.wa.gov.au/regulatory-documents>.

2.1 Background

W6090 is held by Ecocycle Pty Ltd (Works Approval Holder) for the Kwinana Mercury Treatment Plant (the Premises), located at Lot 101 Donaldson Road, Kwinana Beach, Western Australia.

The Premises relates to the categories: Category 39: chemical or oil recycling; and Category 61A: solid waste facility for the production capacities under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which have been assessed and defined in existing Works Approval W6090/2017/1.

3. Proposed amendments

On 4 March 2025, the works approval holder submitted an application to the department to amend W6090 under section 59B of the *Environmental Protection Act 1986* (EP Act).

The proposed amendments include:

- installing a new Battery-in-Device-Shredder (BIDS) on level 3 of the process building.
- installing a Batch Distiller (BD), a Mobile Mercury Conversion Unit (MMCU); and a mercury Fine Distiller (MFD) on the ground level;
- construction of a weighbridge; and
- permission to conduct time-limited operations following submission of a compliance report for new works.

The amendment will also remove the Mobile Mercury Stabilisation Unit (MMSU) and the Activated Carbon Filtration System from the works approval.

The application also included an LP600 Lamp Processor and a Horizontal Baler, which the Delegated Officer has rejected for this works approval as they are already present on site and will be included in the operating licence application which is currently under assessment.

4. Consultation

4.1 Works Approval holder comments on the draft decision

The Works Approval Holder provided a draft Amendment Report and draft Works Approval on 14 April 2025

Condition	Summary of applicant's comment	Department's response
In Condition 3, Table 1: Authorised emissions table	Condition number 10 and 17 have been removed from this table. Number 10 is not important regarding emissions, but Condition 17 might still be relevant for authorised emissions.	Condition 11 and 18 (formerly 10 and 17) are included. Condition 12 (formerly condition 11) was missing from the Table; this is now included.
Condition 10, Table 2: Infrastructure and equipment operational requirements. Mobile Mercury Conversion Unit (MMCU)	Please can we ask for the correct nomenclature. Sometimes, it is MCU, and other times, it is MMCU. We would like to have it as Mercury Conversion Unit (MCU) used across the whole document.	All acronyms referring to the Mercury Conversion Unit are now changed to MCU.
Condition 10, Table 2: Infrastructure and equipment operational requirements. Mobile Mercury Conversion Unit (MMCU), Section 'f'	The MCU is going to be heated to more than 35°C. could we change wording to something like: "When processing mercury waste, the atmosphere around the MCU must be maintained at an optimal temperature between 10 and 35°C".	These are optimal temperatures for efficiency based on the manufacturer's manual. Likely can be removed as not essential in controlling emissions.
Condition 10, Table 2: Infrastructure and equipment operational requirements. BIDS requirement 'f' and Condition 10, Table 2: Infrastructure and equipment operational requirements. HVAC system, requirement 'f'	A HEPA filter is not proposed as a part of the facilities HVAC system. The facilities HVAC system will have replaceable panel filters for prevention of particles and dirt accumulating in the ventilation system. Each piece of equipment (BIDS, BD, MCU and MFD) is designed to mitigate emissions via activated carbon, wet scrubbers and/or HEPA filters as deemed necessary by the manufacture and in accordance with EU standards.	The panel filters are a suitable alternative to a HEPA filter in the HVAC system. Need to add a requirement for the frequency of panel filter replacement. Maybe based on manufacturer guidance or regular checks.

Condition 19, Table 10	Please can we clarify the frequency for this monitoring? i.e. commissioning only or are there other requirements.	Only until commissioning. Post-commissioning monitoring will be conditioned on the licence when created. This was not part of the amendment
Schedule 1: Maps, Figure 1	Please remove the legend and symbol “Emission stack” as it is not in the correct location? Check Figure 3 for correct location.	Updated to remove emission stack from legend
Schedule 2, Table 12. Batch Distiller, Condition ‘g’	It is not known if well-shutting valves will be installed for all connections and this level of detail is not available on the equipment/technology specifications. All equipment will be designed and installed such that the risk of uncontrolled release of product is adequately controlled.	Requirement will be changed to “well-shutting valves will be installed on all connections where an uncontrolled release of product is possible.”
Schedule 2, Table 12. BIDS, Condition ‘j’ Schedule 2, Table 12. Batch Distiller, Condition ‘l’ Schedule 2, Table 12, MMCU, Condition ‘j’ AND Schedule 2, Table 12, MFD, Condition ‘f’	It is not planned to have back up vacuum pumps for all equipment. Each piece of equipment (BIDS, BD, MCU and MFD) is designed to mitigate emissions via activated carbon, wet scrubbers and/or HEPA filters as deemed necessary by the manufacture and in accordance with EU standards. These systems will be maintained in during loss of power via a generator or uninterruptable power supply (battery etc.).	If the emission controls are all backed up by a generator or power supply, then no back up vacuum pumps will be necessary. All mentions of vacuum pumps removed.

5. Risk assessment

Determination of emission, pathway and receptor

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the Guideline: Risk Assessments (DWER 2020). To establish a risk event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission.

The table below describes the risk events associated with the amendments consistent with the *Guidance Statement: Risk Assessments* (DER 2017). The table identifies whether the risk events are acceptable and tolerated, or unacceptable and not tolerated, and the appropriate treatment and degree of regulatory control, where required.

Table 4: Risk Event, Risk Rating and Controls

Risk Event					Consequence rating ¹	Likelihood rating ¹	Risk ¹	Reasoning	Regulatory controls
Risk Event #	Source/ Activities	Potential emissions	Potential receptors, pathway and impact	Works approval holder proposed controls					
PROPOSED AMENDMENT									
Installation/Construction									
	Construction and Installation of: A weighbridge, Mobile Mercury Conversion Unit (MMCU), Batch Distiller (BD), Mercury Fines Distiller (MFD) and Battery-in-Device-Shredder (BIDS	Dust and Noise	The likelihood of the installation and construction works impacting sensitive receptors is almost none. Risk event is screened out.						
	Operation including time-limited operations								
	BIDS processing/crushing e-waste and batteries (Level 3) and storage of process waste.	Noise	Air/windborne pathway impacting amenity. Residential receptor 2km southeast of premises. Industrial/ commercial receptors: AGL Kwinana Power Station, 100 metres West of emission stack.	Operational noise will be managed through the strategic placement of infrastructure to dampen noise. Roller doors used to access the warehouse will remain closed where possible during operational hours. Regular maintenance of equipment will ensure they operate without excessive noise.	Minimal impacts on local scale amenity. Slight	The risk event may only occur in exceptional circumstances Rare	Low Acceptable, not controlled	Applicant controls sufficient	- EP Noise Regulations will apply. - Program Logic Controller (PLC) used to regulate processing conditions and initiate auto shutdown in the event of any irregularities. - Annual maintenance of machinery. - BIDS features a wet scrubber to mitigate air emissions. - Air emissions captured by the facilities HVAC system and passed through panel filters before discharge - Roller doors used to access the warehouse and process building will remain closed where possible during processing of waste. The risk is acceptable with these control in place.
		Air Emissions: Mercury Vapours and dust (black mass – lithium, manganese, cobalt and nickel metals) from emission stack	Air emissions from stack could potentially travel to residential area 2km southeast via prevailing winds causing health issues. Industrial/ commercial receptors: AGL Kwinana Power Station, 100 metres West of emission stack	BIDS features a wet scrubber to mitigate air emissions. Air emissions that escape this process are captured by the facilities HVAC system and pass-through panel filters before discharge Roller doors used to access the warehouse and process building will remain closed where possible during processing of waste. Program Logic Controller (PLC) used to regulate processing conditions and initiate auto shutdown in the event of any irregularities.	Offsite impacts local scale: low level Moderate	The risk event will probably not occur in most circumstances Unlikely	Medium Acceptable with controls	The design of the BIDS machine as specified by the manufacturer include controls adequate to mitigate air emissions. Applicant controls sufficient.	
		Groundwater contaminants: Mercury black mass, metals and hydrocarbons.	Breach of containment of spills or leaks of mercury black mass from bunding resulting in run off to the environment contaminating soil and	Program Logic Controller (PLC) used to regulate processing conditions and initiate auto shutdown in the event of any irregularities.			Low Acceptable , not controlled	Existing infrastructure includes necessary bunding and constructed with mercury impermeable materials. The drainage system is adequate to contain any spills or leaks in the event of a breach of	

			shallow groundwater (6mbgl).					containment.	
	Batch Distiller (BD) – processing phosphor powder and producing liquid mercury (ground floor) (Located in a fully bunded process building.)	Noise	Air/windborne pathway impacting amenity. Residential receptor 2km southeast. Industrial/ commercial receptors: AGL Kwinana Power Station, 100 metres West.	Operational noise will be managed through the strategic placement of infrastructure to dampen noise. Roller doors used to access the warehouse and process building will remain closed where possible during processing of waste. Regular maintenance of equipment will ensure they operate without excessive noise.	Minimal impacts on local scale amenity. Slight	The risk event may only occur in exceptional circumstances Rare	Low Acceptable, not controlled	Applicant controls sufficient	- EP Noise Regulations will apply. - Program Logic Controller (PLC) used to regulate processing conditions and initiate auto shutdown in the event of any irregularities. - Annual maintenance of machinery. - Operates in a closed, pressurised system to avoid any fugitive emissions of mercury. - Exhaust air is filtered through activated carbon filters to capture any remaining mercury and prevent discharge to the environment. - Processing of waste will only occur in process building which is fully bunded with drainage to sealed sumps. - An emergency response plan will be prepared to deal with accidental spills or leaks to prevent contaminants from reaching sensitive receptors. The risk is acceptable with these control in place.
		Air emissions: Mercury vapours and particulates.	Air/windborne pathway impacting health. Residential receptor 2km southeast of premises. Industrial/ commercial receptors: AGL Kwinana Power Station, 100 metres West of the emission stack	Operates in a closed, pressurised system to avoid any fugitive emissions of mercury. Exhaust air is filtered through activated carbon filters to capture any remaining mercury and prevent discharge to the environment. The exhaust vent is connected to a HEPA filter and the facilities HVAC system, which discharges the clean off gas, via an emission stack to the environment Program Logic Controller (PLC) used to regulate processing conditions and initiate auto shutdown in the event of any irregularities. . Annual maintenance of machinery	Offsite impacts local scale: low level Moderate	The risk event will probably not occur in most circumstances Unlikely	Medium Acceptable with controls	The design of the batch distiller as specified by the manufacturer include controls adequate to mitigate air emissions. Applicant controls sufficient.	
		Groundwater contaminants: Phosphor powder and liquid mercury	Breach of containment of spills or leaks of phosphor powder and liquid mercury from bunding resulting in run off to the environment contaminating soil and shallow groundwater (6mbgl).	Processing of waste will only occur in process building which is fully bunded with drainage to sealed sumps. An emergency response plan will be prepared to deal with accidental spills or leaks to prevent contaminants from reaching sensitive receptors Program Logic Controller (PLC) used to regulate processing conditions and initiate auto shutdown in the event of any irregularities...	Onsite impacts: low level Minor	The risk event may only occur in exceptional circumstances Rare	Low Acceptable, not controlled	Existing infrastructure includes necessary bunding and constructed with mercury impermeable materials. The drainage system is adequate to contain any spills or leaks in the event of a breach of containment.	
7	Mercury Fine Distiller (MFD) – Refining liquid mercury to near virgin grade purity (99.9999%) (Ground Floor)	Noise	Air/windborne pathway impacting amenity. Residential receptor 2km southeast of Industrial/ commercial receptors: AGL Kwinana Power Station, 100 metres West of emission stack.	Operational noise will be managed through the strategic placement of infrastructure to dampen noise. Roller doors used to access the warehouse and process building will remain closed where possible during processing of waste. Regular maintenance of equipment	Minimal impacts on local scale amenity. Slight	The risk event may only occur in exceptional circumstances. Rare	Low Acceptable, not controlled	Applicant controls sufficient	- EP Noise Regulations will apply. - Roller doors used to access the warehouse and process building will remain closed where possible during processing of waste. - Annual maintenance of machinery. - An emergency response plan will be prepared to deal with accidental spills or leaks to prevent contaminants from reaching sensitive receptors. - Process air from the MFD is discharged through two series activated carbon filters to remove any fugitive mercury emissions. The risk is acceptable with these control in place.
		Air emissions: Mercury vapour, gaseous impurities – Volatile organic compounds (VOCs).	Air emissions from stack could potentially travel to residential area 2km southeast via prevailing winds causing health issues. Industrial/ commercial receptors: AGL Kwinana Power Station, 100 metres West of emission stack	Process air from the MFD is discharged through two series activated carbon filters to remove any fugitive mercury emissions.	Offsite impacts local scale: low level Moderate	The risk event will probably not occur in most circumstances Unlikely	Medium Acceptable with controls	The design of the MFD as specified by the manufacturer include controls adequate to mitigate air emissions. Applicant controls sufficient.	
8		Groundwater contaminants: Liquid mercury, mercury oxide, mercury sulfide, metallic (lead, zinc, copper) and non-metallic (Sulphur, arsenic) impurities. Hydrocarbons	Breach of containment of spills or leaks of liquid mercury, mercury oxide, mercury sulfide, metallic (lead, zinc, copper) and non-metallic (Sulphur, arsenic) impurities. Hydrocarbons from	Processing of waste will only occur in process building which is fully bunded with drainage to sealed sumps. An emergency response plan will be prepared to deal with accidental spills or leaks to prevent contaminants from reaching sensitive receptors	Onsite impacts: low level Minor	The risk event may only occur in exceptional circumstances Rare Processing of waste will only	Low Acceptable, not controlled	Existing infrastructure includes necessary bunding and constructed with mercury impermeable materials. The drainage system is adequate to contain any spills or leaks in the event of a breach of containment.	

			bunding resulting in run off to the environment contaminating soil and shallow groundwater (6mbgl).			occur in process building which is fully bunded with drainage to sealed sumps.			
9	Mercury Conversion Unit (MCU) – Mercury and sulphur feeding and conversion (Ground Floor)	Noise	Air/windborne pathway impacting amenity. Residential receptor 2km southeast of premises. Industrial/ commercial receptors: AGL Kwinana Power Station, 100 metres West of emission stack.	Operational noise will be managed through the strategic placement of infrastructure to dampen noise. Roller doors used to access the warehouse and process building will remain closed where possible during batch processing of waste. Regular maintenance of equipment will ensure they operate without excessive noise.	Minimal impacts on local scale amenity. Slight	The risk event may only occur in exceptional circumstances Rare	Low Acceptable, not controlled	Applicant controls sufficient	- EP Noise Regulations will apply. - Roller doors used to access the warehouse and process building will remain closed where possible during batch processing of waste. - Annual maintenance of machinery. - Operates in a closed, pressurised system to avoid any fugitive emissions of mercury. - Exhaust air is filtered through activated carbon filters to capture any remaining mercury and prevent discharge to the environment. The exhaust vent is connected to a HEPA filter and the facilities HVAC system, which discharges the clean off gas, via an emission stack to the environment. - Liquid mercury must be transferred to the MMCU using an approved UN container with a blind flange, ensuring safe transfer via interlocking with the needle flange of the sealed equipment. - Processing of waste will only occur in process building which is fully bunded with drainage to sealed sumps. The risk is acceptable with these control in place.
		Air emissions: Mercury vapours and sulphur dioxide when feeding liquid mercury and sulphur powder into machine.	Air emissions from stack could potentially travel to residential area 2km southeast via prevailing winds causing health issues. Industrial/ commercial receptors: AGL Kwinana Power Station, 100 metres West of emission stack	Operates in a closed, pressurised system to avoid any fugitive emissions of mercury. Exhaust air is filtered through activated carbon filters to capture any remaining mercury and prevent discharge to the environment. The exhaust vent is connected to a panel filters and the facilities HVAC system, which discharges the clean off gas, via an emission stack to the environment. Annual maintenance of machinery.	Offsite impacts local scale: low level Moderate	The risk event will probably not occur in most circumstances Unlikely	Medium Acceptable with controls	The design of the MFD as specified by the manufacturer include controls adequate to mitigate air emissions. Applicant controls sufficient.	
		Odour: Hydrogen sulphide (H ₂ S) production during conversion if oxygen purge fails.	Odour emissions could potentially travel to residential area 2km southeast via prevailing winds causing amenity issues. Industrial/ commercial receptors: AGL Kwinana Power Station, 100 metres West of emission stack.	The MCU carries out the process under a nitrogen purged atmosphere to prevent oxygen from causing undesirable chemical reactions. Exhaust air is filtered through activated carbon filters to capture any remaining mercury and prevent discharge to the environment. Odour is monitored at the site by noting odours at selected locations around the site. If an odour complaint is received, an assessment of odour will be conducted.	Local scale impacts: Low level impact to amenity. Minor	The risk event may only occur in exceptional circumstances. Rare	Low Acceptable, not controlled	Odour production is unlikely due to the MCU's emission controls as per the manufacturer's design and any fugitive odour will be captured by the HVAC system and filtered before emission. H2S monitoring is already conditioned in the works approval.	
10		Groundwater contaminants: Liquid mercury during feeding and mercury sulphide after processing.	Breach of containment of spills or leaks of liquid mercury and mercury sulphide from bunding resulting in run off to the environment contaminating soil and shallow groundwater (6mbgl).	Liquid mercury must be transferred to the MMCU using an approved UN container with a blind flange, ensuring safe transfer via interlocking with the needle flange of the sealed equipment. Processing of waste will only occur in process building which is fully bunded with drainage to sealed sumps.	Offsite impacts local scale: minimal Minor	The risk event may only occur in exceptional circumstances Rare	Low Acceptable, not controlled	Existing infrastructure includes necessary bunding and constructed with mercury impermeable materials. The drainage system is adequate to contain any spills or leaks in the event of a breach of containment.	
11		Groundwater contaminants: Liquid Waste types and Solid waste types as specified in Condition 10, Table 3	Breach of containment of spills or leaks from liquid storage tanks running off bunding and hardstand areas Infiltration and leaching, contaminating shallow groundwater.	Works approval holder must be licensed for storage and handling of Dangerous Goods - Batteries, Mercury and Sulphur storage on site. Dangerous Goods License No: DGS022523 (amendment currently with DMIRS) Processing of waste will only occur in process building which is fully bunded with drainage to sealed sumps. All operations including waste receipt and storage, occur on hardstand areas that drain to sealed sumps. Wastewater is disposed of offsite. E-waste - Mixed batteries will be brought to site in storage bins and collection containers for sorting, storage and distribution.	Offsite impacts local scale: minimal Minor	The risk event will probably not occur in most circumstances. Unlikely	Low Acceptable, not controlled		Low risk, no additional controls
12	Receipt and transfer of waste from warehouse loading/unloading bay to designated storage areas								

				Liquid Mercury - Will be brought to site in UN rated mercury transport containers, for temporary storage and processing using the BD, MFD and MMCU. Waste oil and waste mixtures of emulsions and hydrocarbon, and water mixtures or Emulsions generated - This liquid will be suitable for storage in Liquid waste storage tanks developed at the site. Amalgamate - Liquid waste collected from dental industry in liquid waste containers.					
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Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the Guidance Statement: Risk Assessments (DER 2017).

6. Decision

The Delegated Officer has determined the amendment to W6090 be approved to install and construct the proposed equipment and infrastructure at the Kwinana Mercury Treatment Plant and extend the duration of the expiry date to 7 December 2026.

The Delegated Officer determines that the regulatory controls relating to construction, installation, and time-limited operations, as outlined in Section 3, Table 4 of this document, be adhered to and the works approval holder controls which have been deemed suitable for inclusion as conditions in the amended works approval.

The proposed changes will not result in material changes to the overall risk profile of the site. However, if the works approval holder controls are not adhered to, the risks associated with inappropriate handling of elemental mercury and mercury-containing waste are increased.

The Delegated Officer notes that the department has received a Construction Compliance Report as required by Condition 5 of W6090 for the construction of the process building, the warehouse, the covered outside waste storage area, and HVAC system as listed in Table 12 of W6090. Therefore, the Delegated Officer has determined to remove these items from the infrastructure and equipment construction table (Table 12 of the Works Approval).

7. Conclusion

Based on this assessment, it has been determined to amend the existing works approval, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

8.1 Summary of amendments

The below table provides a summary of the proposed amendments and will act as a record of implemented changes. All proposed changes have been incorporated into the revised works approval as part of the amendment process.

Condition no.	Proposed amendments
Cover Page	Expiry date revised to '07/12/2026'
Condition 9	Added – time-limited operations requirements.
Condition 10 (previously Condition 9) – Table 2	'Forklift scales' amended to 'pallet scales.'
	'Mercury treatment plant' removed from table.
	'HVAC system' amend point 2, 'Linked to an alarm which initiates a controlled shutdown in the event of a loss of negative pressure' amended to 'HVAC system is timed to start up prior to any other site activities and has a delayed shut down.'
	'Activated carbon filtration system' removed 'from Table 2.
	'Emission stack' amend point 4, 'activated carbon filtration system' is removed from Table 2.
	'Mobile Mercury Stabilisation Unit (MMSU)' removed from Table 2.
	'Battery-in-Device-Shredder (BIDS)' added to Table 2.
	'Batch Distiller (BD)' added to Table 2.

	'Mobile Mercury Conversion Unit' added to Table 2.
	'Mercury Fine Distiller' added to Table 2.
<i>Schedule 1 – Figure 3</i>	'Figure 3' redundant, replaced with new site layout map.
<i>Schedule 2 – Table 12</i>	'Process Building overall' removed from Table 12.
	'Process Building level 1' removed from Table 12.
	'Process Building level 2' removed from Table 12.
	'Process Building level 3' removed from Table 12.
	'HVAC System Building,' removed from Table 12.
	'Activated Carbon Filtration System and Stack,' removed from "Table 12."
	'Warehouse' removed from Table 12.
	'Warehouse loading/unloading bay' removed from Table 12.
	'Covered outside storage' removed from Table 12.
	'Other outside equipment' removed from Table 12.
	'Mobile Mercury Stabilisation Unit (MMSU)' removed from Table 12.
	'Battery-in-Device-Shredder (BIDS)' added to Table 12.
	'Batch Distiller (BD)' added to Table 12.
	'Mobile Mercury Conversion Unit' added to Table 12.
	'Mercury Fine Distiller' added to Table 12.
	'Weighbridge' added to Table 12.

Caron Goodbourn
MANAGER, PROCESS INDUSTRIES
REGULATORY SERVICES

An officer delegated by the CEO under section 20 of the EP Act

References

1. Department of Environment Regulation (DER) 2017, *Guidance Statement: Risk Assessments*, Perth, Western Australia.
2. Department of Water and Environmental Regulation (DWER) 2019, *Guideline: Decision Making*, Perth, Western Australia.
3. Ramboll Australia Pty Ltd (2025), Attachment 6a: Emissions and Discharges, Ecocycle Pty Ltd, 6 Donaldson Road, Kwinana Beach. Perth, Western Australia.