Government of Western Australia
Department of Environment Regulation

Amended Works Approval

Works Approval Number	W5911/2015/1	
Issue Date	31 March 2016	
Last Amendment Date	22 November 2019	
Works Approval Holder	Kwinana WTE Project Co Pty Ltd	
Works Approval Holder ACN number	165 661 263	
Registered Business Address	KPMG Level 38, Tower 3, International Towers Sydney, 300 Barangaroo Avenue, Sydney NSW 2000	
Address for Notifications	Lot 9501 Leath Road, Kwinana Beach	
Duration	**Commencement date** 04-04-2016	**Expiry Date** 03-04-2023
Premises Location	Part of Lot 9501 on Plan 407762; within the coordinates 1:E384720.47, N6435668.39; 2:E384980.06, N6435668.44; 3:E384979.59, N6435538.32 and 4:E384704.40, N6435538.35	

Category number	Category description	Category production or design capacity	Approved premises production or design capacity
52	Electric Power Generation	20 MW or more in aggregate (using natural gas) 10 MW or more in aggregate (using a fuel other than natural gas)	36MW
60	Incineration	100 kg or more per hour	400,000 tpa (45.6tph)
61(A)	Solid Waste Facility	1000 tonnes or more per year	400,000 tpa
67	Fuel Burning	In aggregate 500 kg or more per hour (fuel with a sulphur content of 0.25% or more) or In aggregate 2 000 kg or more per hour (fuel with a sulphur content of less than 0.25%)	400,000 tpa (45.6tph)

This Amended Works Approval is granted in respect of activities to be carried out on the Premises, subject to conditions, to the Works Approval Holder on	
22 November 2019 **By** Chris Malley Digitally signed by Chris Malley Date: 2019.11.22 10:03:39 +08'00'	
Position of delegate	**A/Manager, Process Industries**
an officer delegated under s20 of the *Environmental Protection Act 1986 (WA)* (EP Act)	

Premises Description

The Premises are located at part of Lot 9501 on Plan 407762 see Schedule 1. The Premises are situated within the Kwinana Industrial Area, with other industrial premises directly adjacent and the nearest residential area is approximately 2.9 km to the South East.

The Works Approval Holder is carrying out activities at the Premises which fall within Categories 52, 60 and 61(a), and as such the Premises are deemed a Prescribed Premises under the EP Act. The Works Approval Holder is proposing to construct a Municipal Solid Waste to Energy Plant.

General Conditions

1. The Works Approval Holder must comply with the EP Act and all regulations prescribed under the EP Act applicable to the Premises including:

(a) the duties of an occupier under s 61;

(b) the duty to notify the CEO of discharges of waste under s 72; and

(c) not causing, or doing anything that is likely to cause, an offence under the EP Act, except where the Works Approval Holder does something in accordance with a Condition which expressly states that a defence under s 74A of the EP Act may be available.

2. The Works Approval Holder must carry out the Works within the Premises in accordance with the requirements set out in *the Infrastructure Requirements Table*.

3. This Works Approval applies to the Premises defined in the *Premises Description Table*, and as depicted in the Premises Map in Schedule 1.

Premises Description	
General Location	Legal land description, reserve or tenement (all or part)
Leath Road, Kwinana Beach WA	Part Lot 9501 on Plan 407762 within the coordinates 1:E384720.47, N6435668.39; 2:E384980.06, N6435668.44; 3:E384979.59, N6435538.32 and 4:E384704.40, N6435538.35 as outlined in Schedule 1.

Infrastructure Conditions

4. The Works Approval Holder must locate the Works generally in accordance with the Site Plan in Schedule 2.

5. Key items of infrastructure which are required to be built are listed in the *Infrastructure Requirements Table*. The Works Approval Holder must not depart from the requirements specified in column 2 of *the Infrastructure Requirements Table* except:

(a) where such departure does is minor in nature and does not materially change or affect the infrastructure; or

(b) where such departure improves the functionality of the infrastructure and does not increase risks to public health, public amenity or the environment;

and all other Conditions in this Works Approval are still satisfied.

Infrastructure Requirements Table	
Infrastructure	Requirements (Design and Construction)
Waste Acceptance Area: Weighbridge	- Weighbridge capable of measuring the weight of all incoming trucks to determine the amount of waste being processed by the plant; - Radiation detection equipment to determine the presence of radioactive material.
Waste Receiving Area: Tipping Hall	- Rapid opening and closing roller doors and louvres; - Air-curtain above roller entry and exit doors that prevent the exit of air from the Tipping Hall whenever doors are open; - Concrete flooring within the Tipping Hall to ensure that no waste or wastewater will be discharged to the environment from these areas; and - CCTV monitoring to identify and facilitate removal of large objects which are unsuitable for incineration.
Waste Receiving Area: Waste Bunker	- The waste bunker to be equipped with automatic doors, designed to ensure the bunker remains sealed while no waste is being deposited; - Mixing cranes to mix the waste to ensure a suitably homogenous feedstock for incineration to meet all emission limits; - Air extraction system from the secondary air fan to each incinerator, located above the waste bunker to ensure negative pressure within the waste bunker; and - Concrete flooring within the Waste Bunker to ensure that no waste or wastewater will be discharged to the environment from these areas.
Waste incineration	- Two combustion lines, each containing a furnace using Keppel Seghers moving grate combustion technology, designed to move the incoming waste forward, while sequentially mixing and aerating the waste on the grate; - Startup burners, capable of firing as auxiliary burners to maintain incineration temperature in the incineration chamber such that minimum burning temperatures (850^{o}C) and residence times (2 seconds) are maintained at all times during operation; - Temperature sensors to be installed which are capable of the representative measurement across the entire incineration chamber and waste gases produced therein; - Oxygen sensors to be installed which facilitate the measurement of combustion efficiency; and - Urea injection system capable of minimizing NOx emissions to below 400mg/m^{3}.
Automated Combustion Control System (ACCS)	- Automated monitoring and control system capable of controlling the feed to the grate, combustion air flows and other ACCS parameters in order to control the grate-boiler combustion, minimise excess combustion air and minimise NOx formation.
Boiler Economiser	- Boiler Economiser capable of reducing flue gas temperature to below 200^{o}C.

Infrastructure Requirements Table	
Infrastructure	Requirements (Design and Construction)
Air Pollution Control System	- Capable of cooling flue gas rapidly to between 135 and 160^{o}C; - Lime Injection System capable of injecting lime or sodium bicarbonate into the flue gas stream and reducing: • SO_2 emissions to below 200 mg/m^3; • HF emissions to below 4 mg/m^3; and • HCl emissions to below 60 mg/m^3. - Activated Carbon Injection System capable of injecting activated carbon into the flue gas and reducing: • VOC emissions to below 20 mg/m^3, • Dioxin and furan emissions to below 0.1 ng/m^3 as I-TEQ; • Mercury emissions to be below 0.05 mg/m^3. - Bag filter capable of: • minimising particulate matter emissions to be below 30mg/m^3; • capturing activated carbon, sodium bicarbonate and/or lime for the purposes of treating flue gas emissions; and • Quick detection and isolation of broken bags, without requiring a baghouse bypass situation to exchange or replace the broken bag.
CEMS	- CEMS capable of accurately measuring the following pollutants from the waste gas emissions: • Particulate matter; • NOx; • SO2; • HCl; • CO; and • VOCs.
Stack and associated ducting	- Multi-Flue stack of minimum stack height of 87.5m above ground level; and - Sampling ports for emissions monitoring that are compliant with AS4323.1
Solid Residues Storage Area	- Concrete flooring within the Bottom Ash Bunker to ensure that no waste or wastewater will be discharged to the environment; - Concrete flooring within the Metal Recovery Area to ensure that no waste or wastewater will be discharged to the environment; and - Enclosed conveyors to transport fly ash, and APC residues.

6. On completion of the Works, the Works Approval Holder must provide to the CEO an engineering certification from a qualified engineer confirming each item of infrastructure or component of infrastructure specified in column 1 of the *Infrastructure Requirements Table* has been constructed in accordance with the requirements specified in column 2, with no material defects.

7. If any departures to the specified Works have occurred, the Works Approval Holder must provide the CEO with a list of departures which are certified as complying with Condition 5 at the same time, and from the same engineer, as the certification under Condition 6.

Commissioning Conditions

8. During the Commissioning Period, the Works Approval Holder must monitor the emissions specified in the *Emissions Monitoring Table* from the locations specified therein. Emissions must be calculated as an average over the period specified, in accordance with the frequency and method specified in the *Emissions Monitoring Table*.

Emissions Monitoring Table

Location	Emission	Averaging period	Frequency	Method
Stack 1 and Stack 2	Particulates	30 minutes 24 hours	Continuous monitoring, once CEMS has been commissioned, verified and calibrated (to occur within 500 operational hours of initial waste input)	DER Guideline: Continuous Emission Monitoring System (CEMS) Code
	VOCs as Total Organic Carbon	30 minutes 24 hours		
	HCl	30 minutes 24 hours		
	SO_2	30 minutes 24 hours		
	NO_x	30 minutes 24 hours		
	CO	30 minutes 24 hours		
	HF	60 minutes per test	Three sampling events, conducted to represent stable operation conditions under full or near-full load. Each sampling event to be conducted in duplicate (non-concurrent).	USEPA Method 26A
	NH_3	60 minutes per test		USEPA Conditional Test Method 027
	Group I Metals - Cd and TI	120 minutes per test		USEPA Method 29 or 30B
	Group II Metals – Hg	30 minutes per M30B test		
	Speciated (Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V) and total metals	120 minutes per test		USEPA Method 29
	Dioxins and Furans	360 minutes per test		USEPA Method 23

Note: Concentration results to be provided on a dry basis, corrected to standard temperature (273.15oK) and pressure (101.3 kPa) at 11% oxygen.

9. The Works Approval Holder must not cause any emissions from the Premises during the Commissioning Period except for specified emissions which are of the types, and within the limits, specified in the *Specified Emissions Limit Table*.

Emission	Units	Periodic Test	Emission Limit – 30 minute averages at 100% compliance (figure in brackets is 30 minute average at 97% compliance over a year, unless otherwise specified)	Emission limits – Average of 30 minute averages over a 24 hour day (100% compliance unless otherwise specified)	Source (Location and Description)
CO	mg/m^3	-	100 (150 for 95% of all 10 minute average measurements)	50 (97% over a year)	Stack 1 and 2
Particulates	mg/m^3	-	30 (10)	10	Stack 1 and 2
VOCs as Total Organic Carbon	mg/m^3	-	20 (10)	10	Stack 1 and 2
HCl	mg/m^3	-	60 (10)	10	Stack 1 and 2
HF	mg/m^3	4	-	-	Stack 1 and 2
SO_2	mg/m^3	-	200 (50)	50	Stack 1 and 2
NO_x	mg/m^3	-	400 (200)	200	Stack 1 and 2
Cd and Tl	mg/m^3	Total 0.05	-	-	Stack 1 and 2
Hg	mg/m^3	0.05	-	-	Stack 1 and 2
Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V	mg/m^3	Total 0.5	-	-	Stack 1 and 2
Dioxins and Furans as I-TEQ	ng/m^3	0.1	-	-	Stack 1 and 2

Note 1: Concentration results to be provided on a dry basis, corrected to standard temperature (273.15oK) and pressure (101.3 kPa) at 11% oxygen.
Note 2: At the daily emission limit value level, the values of the 95 % confidence intervals of a single measured result shall not exceed the following percentages of the emission limit values:

Emission	Units
CO	10 %
SO_2 / NOx	20 %
Particulate / Total organic carbon	30 %
HCl/HF	40 %

Note 3: The half-hourly average values and the 10-minute averages shall be determined within the effective operating time (excluding start-up and shut-down periods if no waste is being incinerated) from the measured values after having subtracted the value of the confidence interval specified in Note 2. The daily average values shall be determined from those validated average values.

10. The Works Approval Holder must submit to the CEO a Commissioning Report which includes:

(a) details of the CEMS specifications and location, as determined prior to the initial operation of the incinerator (i.e. incinerator offline) in accordance with Phase I and II of the CEMS Code;

(b) the Quality Assurance plan, as required under Section 2 of the CEMS Code;

(c) details of the successful calibration and verification of the CEMS, as conducted within 500 operational hours of the incinerator initially processing waste feedstock, (i.e. incinerator online) in accordance with Phase III of the CEMS Code;

(d) details of the ongoing calibration and verification of the CEMS, as conducted in accordance with Phase IV of the CEMS Code;

(e) a summary of the techniques and method used to optimise NOx emissions; and

(f) emission monitoring data, in accordance with the *Emissions Monitoring Table*.

11. The Commissioning Report must also provide details of the following key parameters during each monitoring/sampling event:

(a) Waste source at time of incineration;

(b) Incinerator waste feed rate (tonnes/hr);

(c) Incineration chamber temperature profile (^{o}C, one minute average);

(d) Incinerator gas residence time (sec);

(e) Urea injection rate and NOx emission concentration (kg/min and mg/m^3, one minute average, respectively);

(f) Boiler economiser flue gas exit temperature (^{o}C, one minute average);

(g) Gas Cooling Tower flue gas exit temperature (^{o}C, one minute average);

(h) Bag filter inlet flue gas exit temperature (^{o}C, one minute average);

(i) Activated carbon injection rate and VOC emission concentration (kg/min and mg/m^3, 1-minute average respectively); and

(j) Hydrated lime or sodium bicarbonate injection rate and acid gas emission concentration (kg/min and mg/m^3, 1-minute average respectively);

12. The Commissioning Report is to be received by the CEO within 90 calendar days of the completion of the Commissioning Period and, where applicable, in conjunction with an application for a licence if not already submitted.

Administrative Conditions

Records and Information

13. The Works Approval Holder must maintain accurate records including information, reports and data in relation to the Works.

14. All information and records required under this Works Approval must:

(a) be legible;

(b) if amended, be amended in such a way that the original and subsequent amendments remain legible or are capable of retrieval; and

(c) be retained for 6 years after the expiry of this Works Approval.

Reports

15. If requested by the CEO from time to time, the Works Approval Holder must provide the CEO with reports or information relating to the Works, the Premises or any condition in this Works Approval (including data from any monitoring conditions or environmental risk assessment studies).

16. Reports or information must be in such form as the CEO may require in a CEO Request.

Requests for Information

17. The Works Approval Holder must comply with a CEO Request, within 7 days from the date of the CEO Request or such other period specified in the CEO Request.

Definitions and Interpretation

Definitions

In this Works Approval, the following terms have the following meanings:

Authorised Activities means those activities within the relevant category of prescribed premises to be carried out by the Licensee at the premises, as specified at the front of this Licence. 'Category of prescribed premises' refers to the relevant category specified in Schedule 1 to the EP Regulations.

CEO Request means a request made by the CEO to the Works Approval Holder in writing, sent to the Works Approval Holder's address for notifications, as described at the front of this Works Approval, in relation to:

(a) information, records or reports in relation to specific matters in connection with this Works Approval including in relation to compliance with any conditions and the calculation of fees (whether or not a breach of condition or the EP Act is suspected); or

(b) reporting, records or administrative matters:

(i) which apply to all Works Approvals granted under the EP Act; or

(ii) which apply to specified categories of Works Approvals within which this Works Approval falls.

Commissioning Period means the period of operation where the plant is brought online and allows the proponent to operate whilst applying for an ongoing operating licence. The Commissioning period is defined as beginning at the date where the engineering certification is received by the CEO, for a period not totaling more than 12 months and occurring within the valid period of this works approval.

Condition means a condition to which this Works Approval is subject under s 62 of the EP Act.

discharge has the same meaning given to that term under the EP Act and, in relation to waste or other matter, includes deposit it or allow it to escape, or cause or permit it to be, or fail to prevent it from being, discharged, deposited or allowed to escape.

environmental harm has the same meaning given to that term under the EP Act and means direct or indirect —

(a) harm to the environment involving removal or destruction of, or damage to —

(i) native vegetation; or

(ii) the habitat of native vegetation or indigenous aquatic or terrestrial animals; or

(b) alteration of the environment to its detriment or degradation or potential detriment or degradation; or

(c) alteration of the environment to the detriment or potential detriment of an environmental value; or

(d) alteration of the environment of a prescribed kind.

environmental value has the same meaning given to that term under the EP Act and means —

(a) a beneficial use; or

(b) an ecosystem health condition.

EP Act means the *Environmental Protection Act 1986* (WA).

EP Regulations means the *Environmental Protection Regulations 1987* (WA).

Incinerator and Incineration as used within this document are synonymous with the terms “combustor” and “combustion”, as used within Ministerial Statement 1016.

material environmental harm has the same meaning given to that term under the EP Act and means environmental harm that —

(a) is neither trivial nor negligible; or

(b) results in actual or potential loss, property damage or damage costs of an amount, or amounts in aggregate, exceeding the threshold amount.

pollution has the same meaning given to that term under the EP Act and means direct or indirect alteration of the environment —

(a) to its detriment or degradation; or

(b) to the detriment of an environmental value; or

(c) of a prescribed kind, that involves an emission.

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 map in Schedule 1 to this Works Approval.

serious environmental harm has the same meaning given to that term under the EP Act and means environmental harm that —

(a) is irreversible, of a high impact or on a wide scale; or

(b) is significant or in an area of high conservation value or special significance; or

(c) results in actual or potential loss, property damage or damage costs of an amount, or amounts in aggregate, exceeding 5 times the threshold amount.

Specified Emissions refers to emissions that comply with the emissions detailed in Schedule 4 of this Works approval.

Toxic Equivalent Quotient (I-TEQ) refers to toxic equivalency of Dioxin and Furan compounds when compared 2,3,7,8 tetrachlorodibenzodioxin, in accordance with Part 2 of Annex VI of the European Union Directive 2010/75/EU.

threshold amount has the same meaning given to that term under the EP Act and means $20 000, or if a greater amount is prescribed by regulation, that amount.

unreasonable emission has the same meaning given to that term under the EP Act and means an emission or transmission of noise, odour or electromagnetic radiation which unreasonably interferes with the health, welfare, convenience, comfort or amenity of any person.

Works Approval refers to this document, which evidences the grant of Works Approval by the CEO under s 57 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.

Interpretation

In this Works Approval:

(a) the words ‘including’, ‘includes’ and ‘include’ will be read as if followed by the words ‘without limitation’;

(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;

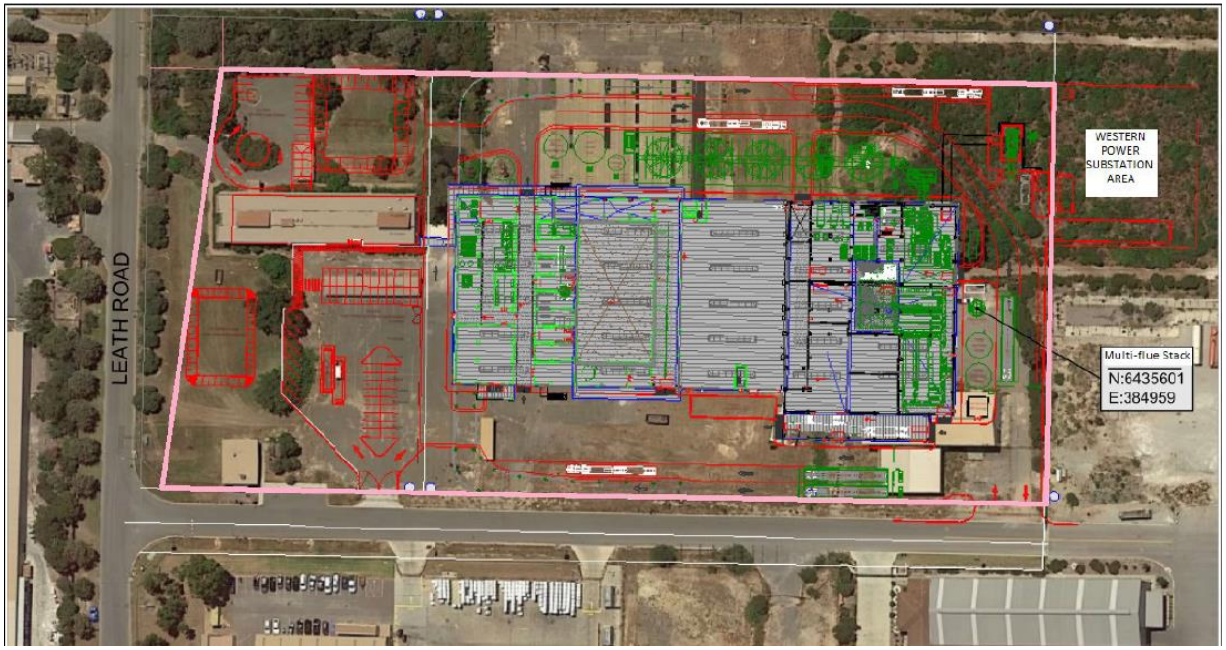
(c) where tables are used in a Condition, each row in a table constitutes a separate Condition; and

(d) any reference to an Australian or other standard, guideline or code of practice in this Works Approval means the version of the standard, guideline or code of practice in force at the time of granting of this Works Approval and includes any amendments to the standard, guideline or code of practice which may occur from time to time during the course of the Works Approval.

Schedule 1: Maps

1. Premises Map

The Premises is shown in the map(s) below. The pink line depicts the boundary to the Premises.



The corners of the premises are located at the following coordinates:

Coordinate No	Easting	Northing
1	384720.47	6435668.39
2	384980.06	6435668.44
3	384979.59	6435538.32
4	384704.40	6435538.35

Schedule 2: Site Plan