



Decision Document

Environmental Protection Act 1986 (WA)(CKI), Part V

Proponent: Shire of Cocos (Keeling) Islands

Licence: L8684/2012/2

Registered office: Shire of Cocos (Keeling) Islands
Lot 256 Jalan Melati Home Island
Cocos (Keeling) Islands
Indian Ocean Territories WA 6799

Premises address: Home Island Transfer Station
Jalan Balok Mem Home Island
Cocos (Keeling) Islands
Indian Ocean Territories WA 6799
Being Lot 1106 on Plan 30520

Issue date: Monday, 8 September 2014

Commencement date: Thursday, 18 September 2014

Expiry date: Tuesday, 17 September 2019

Decision

Based on the assessment detailed in this document the Department of Environment Regulation (DER), has decided to issue an amended licence.

Decision Document prepared by: Caroline Conway-Physick
Licensing Officer

Decision Document authorised by: Stephen Checker
Delegated Officer



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1 Purpose of this Document

This decision document explains how the DER has assessed and determined the application and provides a record of the DER's decision-making process and how relevant factors have been taken into account. Stakeholders should note that this document is limited to the DER's assessment and decision making under Part V of the *Environmental Protection Act 1986 (WA)* (CKI). Other approvals may be required for the proposal, and it is the proponent's responsibility to ensure they have all relevant approvals for their Premises.



2 Administrative summary

Administrative details											
Application type	Works Approval <input type="checkbox"/> New Licence <input type="checkbox"/> Licence amendment <input checked="" type="checkbox"/> Works Approval amendment <input type="checkbox"/>										
Activities that cause the premises to become prescribed premises	<table border="1"> <thead> <tr> <th>Category number(s)</th> <th>Assessed design capacity</th> </tr> </thead> <tbody> <tr> <td>64 – Putrescible landfill</td> <td>1,800 tonnes per year</td> </tr> <tr> <td>60 - Incineration</td> <td>1,000 kilograms per hour</td> </tr> <tr> <td>59 – Biomedical waste incineration</td> <td>1,000 kilograms per hour</td> </tr> <tr> <td>57 – Used tyre storage</td> <td>500 tyres per year</td> </tr> </tbody> </table>	Category number(s)	Assessed design capacity	64 – Putrescible landfill	1,800 tonnes per year	60 - Incineration	1,000 kilograms per hour	59 – Biomedical waste incineration	1,000 kilograms per hour	57 – Used tyre storage	500 tyres per year
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	64 – Putrescible landfill	1,800 tonnes per year									
	60 - Incineration	1,000 kilograms per hour									
	59 – Biomedical waste incineration	1,000 kilograms per hour									
57 – Used tyre storage	500 tyres per year										
Application verified	Date: N/A (P4 Form received 11/09/2015)										
Application fee paid	Date: N/A										
Works Approval has been complied with	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>										
Compliance Certificate received	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/> The installation/ construction of the incinerator was not carried out under a works approval.										
Commercial-in-confidence claim	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>										
Commercial-in-confidence claim outcome	N/A										
Is the proposal a Major Resource Project?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>										
Was the proposal referred to the Environmental Protection Authority (EPA) under Part IV of the <i>Environmental Protection Act 1986</i> ?	<table border="1"> <tr> <td>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></td> <td>Referral decision No:</td> </tr> <tr> <td></td> <td>Managed under Part V <input type="checkbox"/></td> </tr> <tr> <td></td> <td>Assessed under Part IV <input type="checkbox"/></td> </tr> </table>	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Referral decision No:		Managed under Part V <input type="checkbox"/>		Assessed under Part IV <input type="checkbox"/>				
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	Managed under Part V <input type="checkbox"/>										
	Assessed under Part IV <input type="checkbox"/>										
Is the proposal subject to Ministerial Conditions?	<table border="1"> <tr> <td>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></td> <td>Ministerial statement No:</td> </tr> <tr> <td></td> <td>EPA Report No:</td> </tr> </table>	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Ministerial statement No:		EPA Report No:						
Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Ministerial statement No:										
	EPA Report No:										
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the <i>Environmental Protection Act 1986</i>)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Department of Water consulted Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>										
Is the Premises within an Environmental Protection Policy (EPP) Area	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If Yes include details of which EPP(s) here.										
Is the Premises subject to any EPP requirements?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If Yes, include details here, eg Site is subject to SO ₂ requirements of Kwinana EPP.										



3 Executive summary of proposal and assessment

The Shire of Cocos (Keeling) Islands (Shire) manages the Home Island Transfer Station which is located on Lot 1106 on Plan 30520, Cocos (Keeling) Home Island, Indian Ocean Territories and services approximately 600 people.

Home Island Transfer Station consists of an unmanned, unlocked landfill site that is open seven days per week. Shire staff visit the site daily to assess usage at the premises and to identify any issues of concern. The landfill accepts putrescible waste for burial after incineration, inert waste for disposal and other waste streams for storage for later disposal offsite. Public disposal of waste at the Premises is of small volumes due to the type of transportation available on Island (electric vehicles only, except for vehicles operated by the Shire).

Waste is generally not buried at the premises but disposed of above ground. This is due to the high groundwater levels at Cocos Islands and the influences of seawater ingress. Sludge biosolids are currently the only waste type that is trenched and buried at the landfill, after it has been tested prior to being received from Water Corporation. The green waste is burned in a designated area well away from all other waste streams. Asbestos waste is wrapped, labelled and crated for export for off-island disposal. This waste is shipped to Perth for appropriate disposal to a licenced facility.

An incinerator (WR1T) was purchased from Scholer Industries in 2015 for the incineration of general, industrial and medical waste at the premises. This was undertaken by the Shire predominantly to address the disposal issues for household putrescible waste and special waste type 2 on the Cocos Islands. The incinerator consists of a multi-chamber construction which operates in a "controlled excess air mode" with fan-forced air supplied to the primary chamber at pre-set cycle times which is then fed into the secondary chamber under the same conditions (Scholer Industries).

The incinerator is fitted with one two-stage (High-Low) primary burner and two two-stage (High-Low) secondary burners. A Programmable Logic Control system is linked to thermocouples in the primary and secondary chambers and maintains the burners in their correct operating stage (modulating high or low) to ensure optimum pre-set temperatures and fuel economy are maintained during the combustion process. Two water spray nozzles are fitted to the primary chamber roof (lid) to optimize combustion control and performance when destroying highly volatile chemical and synthetic waste. The incinerator is designed to maintain a secondary chamber operating temperature of not less than 850°C and up to 1400°C, with secondary chamber gas retention time of not less than two (2) seconds. The stack maintains a temperature of 400+ °C to inhibit the reformation of dioxins and furans held within any minute particulates (Scholer Industries).

The incinerator has a burning rate of 1,000kg/ hour with a load capacity within the primary chamber of up to 3,000kg, depending on the waste properties, and can be operated on diesel or natural gas with a power rating of 0.75kW (Scholer Industries).

Groundwater on Home Island consists of a series of freshwater lenses which are recharged via rainfall infiltration, and with a depth to groundwater varying between 1 to 2 metres below ground level. This is the main drinking water supply for the Island which is highly susceptible to contamination.

A number of groundwater monitoring bores have been placed on the Island by Water Corporation to monitor groundwater parameters. The Shire obtains all sparameter sampling data from Water Coporation for their assessment of groundwater at the premises.

The distance to surface water from the premises is approximately 33m (Indian Ocean).

The method of disposal of waste on the Island has been an issue of concern due to the difficulty of managing waste within a finite area of space, the inability to effectively dispose of waste through burial (minimal cover material) and the financial and logistical limitations of removing waste types from the Island.



The most significant risks from the Premises operation are the contamination of groundwater (through disposal of ash waste) and emissions to air (from the stack).

This Licence is the result of an amendment sought by the Licensee for the installation and operation of an incinerator within the prescribed premises, Home Island Transfer Station. The Licence will include additional categories - Category 59 (Biomedical waste incineration) and Category 60 (Incineration) as a result of the waste type incineration requirements within the Cocos Keeling Islands, and the design of the 'WR1T' Incinerator purchased from 'Scholer Industries'. It is expected that wastes will also be brought over from Cocos Keeling West Island for incineration as well, in the future.

An improvement condition has been included in the Licence for the management and disposal of ash from the incineration of waste at the premises.



4 Decision table

All applications are assessed in line with the *Environmental Protection Act 1986*, the *Environmental Protection Regulations 1987* and the DER's Operational Procedure on Assessing Emissions and Discharges from Prescribed Premises. Where other references have been used in making the decision they are detailed in the decision document.

DECISION TABLE			
Licence section	Condition number L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
General conditions	L1.2.1 L1.2.3	<p>Operation</p> <p>Categories 59 (Biomedical waste incineration) and 60 (Incineration) have been included into the prescribed premises category table within the amended Licence.</p> <p>Administrative changes have been undertaken to update the 'Definitions' section.</p> <p>Condition 1.2.1 has been moved to Condition 1.1.5 in accordance with current DER licence template.</p> <p>Condition 1.2.3 has been removed as part of the Licence format update in accordance with current DER procedure.</p>	<p>General provisions of the <i>Environmental Protection Act 1986 (WA)(CKI)</i>.</p> <p><i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>.</p>
Premises operation	L1.3.1 L1.3.3 L1.3.5 L1.3.6 L1.3.10 L1.3.11	<p>Construction and Operation</p> <p>Condition 1.3.1, Table 1.3.1, has been updated for putrescible waste and special waste type 2 specifications in relation to incineration and recording of waste accepted, respectively.</p> <p>Condition 1.3.3, Table 1.3.2, 'Waste processing' has been updated with the inclusion of process limits for 'incinerated wastes', 'contaminated wastes', 'putrescible waste' and 'special waste type 2'. The incineration of plastics has been permitted. The Island currently does not have an alternative approach to addressing plastics management. Current practice on the Cocos Keeling Islands results in the open burning of wastes (effective separation or recycling is</p>	<p>Application supporting documentation.</p> <p><i>Western Australian Guidelines for Biosolids Management</i>, Department of Environment and Conservation, December 2012.</p>



DECISION TABLE			
Licence section	Condition number L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p>still pending). The incinerator is an improved method of disposal as compared against open burning practices, however continuous improvement measures are considered appropriate for the management of waste streams on the Islands (More than 90% of waste is considered putrescible with a significant percentage constituting plastics, Synergetics Environmental Engineering, 'Air quality assessment of a proposed incinerator at Cocos Islands V02, pg. 9). Incineration of plastics will be managed, with appropriate meteorological monitoring during start-up and operation of the incinerator, until alternative sustainable waste initiatives/ strategies have been put in place.</p> <p>Wastes excluded from incineration have been defined from the supporting documentation 'Towards Zero Waste', pg's 2-3. This has been further supported by the submitted 'Air Quality Assessment' report submitted by consultants Synergetics Environmental Engineering (completed on behalf of Scholer Industries, 21 August 2015) within the conclusion and recommendations section, pg 45 ('Air quality assessment of a proposed incinerator at Cocos Islands V02').</p> <p>Biosolids have been approved for incineration in accordance with the 'Guidelines for Biosolids Management' document.</p> <p>Special waste type 2 process limits have been further detailed to more clearly define the waste streams for the waste type category. Additional definitions have been included within the definitions section of the Licence in support of the detail included within the process limits section for Special waste type 2.</p> <p>Condition 1.3.5, Table 1.3.4, has been included for the management of the incinerator as a result of failure, malfunction or abnormal operational periods or the operation of the incinerator outside of optimal wind direction conditions. This inclusion was undertaken with input from the supplier 'Scholer Industries' (Pers. comm. Neal Scholer, 9/10/2015 and information supplied in the 'Air quality assessment of a proposed incinerator at Cocos Islands V02', pg 39).</p>	



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Licence section	Condition number L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p>Condition 1.3.6 defines the process underwhich the incinerator may be re-started after the operation has been shut down subsequent to a failure, malfunction, abnormal operation period or incorrect wind direction (Refer to pg. 13, 'Appendix A' – Risk Assessment of the Decision document).</p> <p>Condition 1.3.10 has been included to define the operating temperature for the secondary chamber of the incinerator. This has been obtained from the supporting documentation supplied for the 'WR1T Waste Incinerator', pg's 4-10 (final revised version, received 11/09/2015) (Refer to pg. 13 'Appendix A' – Risk assessment of the decision document).</p> <p>According to 'Synergetics Environmental Engineering', 99% of the waste received at the premises is considered putrescible solid waste, with the remainder of the waste constituting clinical/ medical waste. "Waste is to be burned in batches, with carefully controlled waste segregation" (Air quality assessment of a proposed incinerator at Cocos Islands V02, pg 39).</p> <p>Condition 1.3.11 includes the requirements for the 'construction and operation' of the incinerator as defined in the documentation submitted by the Licensee.</p>	
Point source emissions to air including monitoring	L2.2.1	<p>Operation A risk assessment for emissions to air has been included within 'Appendix A' of the decision document.</p> <p>Condition 2.2.1 defines the point source emissions to air which is defined as a 12.5m stack as per the supporting documentation 'Air quality assessment of a proposed incinerator for Cocos Islands V02' report submitted from Synergetics Environmental Engineering, pg 17, and Scholer Industries 'WR1T Waste Incinerator revised version' documentation, pg 5.</p>	<p>Application supporting documentation.</p> <p>General provisions of the <i>Environmental Protection Act 1986 (WA)(CKI)</i>.</p> <p><i>Environmental Protection (Unauthorised Discharges) Regulations 2004.</i></p>



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Licence section	Condition number L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
Fugitive emissions	NA	<p>Operation Condition 2.7.1 originally replaced condition 9 of the previous Licence. The generic condition is to be removed from the Licence through this amendment process.</p> <p>Dust emissions at the premises are considered low risk due to the type (99% putrescible waste) and volume of waste received at the premises for incineration (approximately 2 tonnes/ week). With the additional generation of ash from the operation of the incinerator the risk of dust emissions is still expected to be low due to the relatively small volume received to the premises weekly. This will result in a maximum of 5-10% of the original waste mass placed in incinerator to be produced as ash, at a frequency of approximately once a week from the incinerator. The ash will be buried at the landfill after completion of the incineration process (Synergetics Environmental Engineering, 'Air quality assessment of a proposed incinerator at Cocos Islands V02, pg. 3).</p> <p>Closest sensitive receptor (single residence) is 250m south of the premises with prevailing winds predominantly in a south easterly or easterly direction (away from the sensitive residential receptor). Additional control measures have been proposed within the Licence to manage potential dust issues from stack emissions through condition 1.3.5, condition 3.3, process monitoring, 3.9 'Meteorological monitoring' (Refer to Appendix A – Risk Assessment in decision document).</p> <p>In accordance with current DER procedure, premises with low risk dust emissions are to be managed under section 49 of the <i>Environmental Protection Act 1986 (WA)(CKI)</i>.</p>	<p>Application supporting documentation.</p> <p>General provisions of the <i>Environmental Protection Act 1986 (WA)(CKI)</i>.</p>
Monitoring of inputs and outputs	L3.2.1	<p>Operation Condition 3.2.1, Table 3.2.1, includes additional monitoring requirements for the incinerator ash. The ash is proposed for landfilling within the prescribed premises boundary after incineration and will constitute 5-10% of the volume</p>	<p>General provisions of the <i>Environmental Protection Act 1986 (WA)(CKI)</i>.</p>



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Licence section	Condition number L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		mass incinerated (approximately 2 tonnes/ week) according to 'Synergetics Environmental Engineering'.	
Process monitoring	L3.3.1	<p>Operation Condition 3.3.1 has been included to manage exhaust gases and stack temperatures, and monitoring of retention time within the secondary chamber. This is expected to assist with the management of pollutants from air emissions out the stack and is related to conditions 1.3.10 and 1.3.11 (Refer to risk assessment within Appendix A).</p> <p>The incinerator consists of a number of automated control sequences which have been defined within the updated 'Scholer Industries Control sequence of WR1T Incinerator operation' documentation, received 2/12/2015 from Ian Evans. These processes assist in ensuring optimal use and performance of the incinerator.</p>	<p>Application supporting documentation.</p> <p>General provisions of the <i>Environmental Protection Act 1986 (WA)(CKI)</i>.</p>
Meteorological monitoring	L3.5.1 L3.5.2	<p>Operation Condition 3.5.1 has been included to ensure that waste incinerated at the premises is only undertaken when wind direction is blowing away from residential premises i.e. from a south easterly and easterly direction as per supporting documentation.</p> <p>Condition 3.5.2 has been included to require the Licensee to record wind direction on start up and shut down of the incinerator. This is expected to assist in the assessment of any potential air emissions being directed over any sensitive receptor areas (residential areas) (Refer to Appendix A – Risk Assessment).</p>	<p>General provisions of the <i>Environmental Protection Act 1986 (WA)(CKI)</i>.</p>
Improvements	L4.1.1	<p>Operation 'IR1' has been amended to extend the date of completion to 31/01/2016. The Licensee has not completed this matter and has requested an extension (email</p>	<p>Application supporting documentation.</p>



DECISION TABLE			
Licence section	Condition number L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p>received from I. Evans, Shire of Cocos Keeling Islands on 29/10/2015).</p> <p>'IR2' has been removed as a result of the installation of the incinerator at the premises as this is expected to address a significant amount of issues with regards to improved disposal of waste types. The Shire of Cocos Keeling will continue to recycle waste types where possible as defined within the 'Towards zero waste' management plan submitted by the Shire.</p> <p>'IR3' has been changed to 'IR2' as a result of the removal of the above improvement condition. This improvement condition is still pending completion.</p> <p>A new 'IR3' has been included within the improvement programme for the management of incinerator ash at the premises from the installed incinerator. This was recommended within the 'Air quality assessment of a proposed incinerator at Cocos Islands V02, pg 49' of the submitted documentation and is considered appropriate considering depth to groundwater and sensitivity of groundwater on the Island.</p> <p><u>Emission Description</u> <i>Emission:</i> Disposal of incineration ash to landfill. <i>Impact:</i> Contamination of groundwater and surface water drainage systems. Potential impacts on ecology of surface water and drinking water supply from the addition of nutrients and heavy metals, chemical constituents. Depth to groundwater is 0.5-2m below ground level with the Indian Ocean located approximately 33m east of the premises. <i>Controls:</i> The proponent has located the landfill within an area that does not occur over any drinking water lenses for the island. Waste that is incinerated is done so at temperatures that will destroy the majority of potential harmful chemicals, significantly reducing the level of potential harm to the environment. The process of incineration of waste types proposed is considered a significant improvement to waste disposal than direct landfilling operations which were</p>	<p>General provisions of the <i>Environmental Protection Act 1986 (WA)(CKI)</i>.</p>



DECISION TABLE			
Licence section	Condition number L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p>occurring historically.</p> <p><u>Risk Assessment</u> <i>Consequence:</i> Moderate <i>Likelihood:</i> Possible <i>Risk Rating:</i> Moderate</p> <p><u>Regulatory Controls</u> Conditions 1.3.3, Table 1.3.2 and 4.1.1 Improvement programme 'IR3' has been added to the licence to require the operator to ensure waste is incinerated in the correct manner required for the waste type, and to develop a management strategy for the disposal of ash from the incinerator. This is further supported by condition 1.3.10 of the Licence.</p> <p><u>Residual Risk</u> <i>Consequence:</i> Moderate <i>Likelihood:</i> Unlikely <i>Risk Rating:</i> Moderate</p>	
Information	L5.2.1 L5.3.1	<p>Operation Condition 5.2.1, Table 5.2.1 has been updated to reflect the additional reporting and monitoring requirements within the amended Licence.</p> <p>Condition 5.3.1, Table 5.3.1 has been updated as a result of administrative changes within the Licence template format.</p> <p>The maps within 'Schedule 1' have been updated to reflect the location of the incinerator.</p> <p>Reporting templates have been updated within Section C.</p>	General provisions of the <i>Environmental Protection Act 1986 (WA)(CKI)</i> .



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Licence section	Condition number L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
Licence Duration	N/A	The current Licence expires on 17 September 2019. There are no known issues or concerns that would require an amendment to the licence duration for the premises.	

5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
10/11/2015	Proponent sent a copy of draft instrument	Enquiry received from the Shire (Ian Evans) via email on 24/11/2015 regarding the	Response to Shire sent 25/11/2015: "DER approach for quarantine waste is usually



Date	Event	Comments received/Notes	How comments were taken into consideration
		<p>storage of quarantine waste and the burning of plastics within the incinerator.</p>	<p>direct incineration to reduce handling and potential risk of contamination or pathogen transfer. Department of Agriculture (DoA) and Department of Health (DoH) were emailed for their advice.” DoH emailed back on 26/11/2015 confirming that they do not manage quarantine waste. “The DoA have specific handling and storage requirements stated on their website which the Shire should review as well. ...[The website confirms that] storage should only be done at a ‘QAP or DAFF Approved Storage Area’. The Shire would have to investigate this aspect with DoA to see how they can become a recognised/ approved storage area and compliant to the relevant Act (<i>Quarantine Act 1908</i>).”</p> <p>The Shire is to investigate storage suitability with the relevant authorities for quarantine waste. The Licence has undertaken an assessment of the potential emissions and discharges in accordance with DER requirements for acceptance and disposal of quarantine waste.</p> <p>Current practice on the Cocos Keeling Islands results in the open burning of plastics within the putrescible waste stream (no separation or recycling which was originally considered in place). The incinerator is an improved method of disposal as compared against open burning practices, however continuous improvement</p>



Date	Event	Comments received/Notes	How comments were taken into consideration
		<p>Comments received from Neal Scholer on behalf of the Shire via email on 26/11/2015 regarding changes to process descriptions for the Primary and Secondary Combustion Chambers within the documentation. Telephonic discussions with Mr Scholer on 27/11/2015 confirmed fail safe measures on system.</p>	<p>measures are considered appropriate for the management of waste streams on the Islands. Plastics disposal is an issue currently on the island with alternative initiatives/ strategies for the reuse, recycling or reduction of this waste type required. Meteorological monitoring is considered important in the management of potential risk to human receptors on the island has been incorporated within the conditions of the Licence.</p> <p>The stack temperature has been confirmed at 400+ degrees celcius; Condition 1.3.10 has been removed and replaced, with control determined within the secondary chamber temperature management; Mr Scholer confirms that the incinerator has a number of automated fail safe measures that ensure that once the burner is operational it cannot be opened and the thermocouples are set to a specific temperature range which will comply to the conditions of the Licence; Mr Sholer to supply written confirmation of automated systems and fail safe measures to the DER.</p>



6. Risk Assessment

Note: This matrix is taken from the DER Corporate Policy Statement No. 07 - Operational Risk Management

Table 1: Emissions Risk Matrix

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Severe
Almost Certain	Moderate	High	High	Extreme	Extreme
Likely	Moderate	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	Extreme
Unlikely	Low	Moderate	Moderate	Moderate	High
Rare	Low	Low	Moderate	Moderate	High



Appendix A

Point source emissions to air including monitoring

For a waste incinerator, the principle emissions of concern are emissions to air. The DER has reviewed the proponents impact assessment for emissions to air from the premises and is satisfied that the assessment provided by the proponent has been undertaken in an appropriate manner. The DER has assessed the proponents proposals to ensure they minimise emissions to air and is satisfied that appropriate controls will be adopted at the premises.

The primary waste for disposal within the incinerator is considered putrescible waste. Small quantities of biosolids, clinical and related wastes, cooking oils and machinery lubricants will be incinerated as well (Synergetics Environmental Engineering).

Design of the primary and secondary combustion chambers has automatic controls to ensure accurate temperature control prior to the acceptance and burning of batched waste streams at the appropriate temperatures defined (Pers. comm. Neal Scholer).

Primary Combustion Chamber (PCC)

The PCC is designed for loading waste via a automatically operated top loading door with hopper and bin tipper. Loading door has a coded safety limit switch mounted which disables primary burner when door(s) is open for operator safety.

The incinerator operates in a controlled excess air mode, by which the necessary supply of fan forced air enters into the primary chamber at pre-set cycle times through orifices strategically located in the primary chamber.

PCC includes:

- 1 x Primary Combustion burner.
- 1 x Stainless Steel sheath thermocouple to monitor chamber temperature.
- Visual sight glass for operator.
- Air ducting to aid combustion.

The shell of the incinerator is constructed from 6mm mild steel casing and structural supports. Internally the chamber is lined with insulating ceramic fibre board (100mm Thick) and firebrick (115mm Thick) hot face suitable for temperatures up to 1400°C. The Primary Hearth is cast out of high density high temperature durable refractory castable suitable for temperatures up to 1400°C.

Secondary Combustion Chamber (SCC)

At pre-set cycle times, the secondary combustion chamber is also fed with a controlled supply of fan forced air providing a fast rate of secondary combustion and optimum fuel efficient destruction of smoke and volatile, toxic waste gases.

The SCC is baffled which creates turbulence and settling of fine particulates.

SCC includes:

- 2 x Ash clean out doors.
- 2 x Secondary Combustion Burners.
- 2 x Ceramic Sheath thermocouples to monitor chamber temperatures.
- Air ducting to aid combustion.

The shell of the incinerator is constructed from 6mm mild steel casing and structural supports. Internally the chamber is lined with insulating ceramic fibre board (100mm Thick) and firebrick (115mm Thick) hot face suitable for temperatures up to 1600°C.



Burners

Primary and secondary burners are gas or diesel fired Nu-Way (U.K.)/Bentone (Sweden) type with all necessary safety interlocks and controls.

The burner models as supplied have a proven record of reliability and low maintenance. Heat back switches (thermostat sensors) are fitted inside the burner nozzles to protect the internal wiring against radiant heat.

During commissioning the burners are fine-tuned by adjusting the operating pressure of the fuel pump and the air damper setting on the inlet side of the air fan. The burner motors are each rated at 250W, single phase (50Hz).

Operation

Emission Description

Emission: Air emission contaminants emitted from the incinerator stack.

Impact: Contamination of surrounding air shed from the addition of contaminants burned within the incinerator. Potential impact on human health. Potential contamination of groundwater (1m below ground level) through disposal of waste ash.

Controls: The proponent proposes to operate the incinerator infrequently in batches, with carefully controlled waste segregation and at carefully controlled operating times and processes.

The planned operating time for the incinerator will be one day a week, starting in the morning on Thursdays depending on weather and staff availability (Bowman and Evans 2015). A separation distance of 560m exists to 99% of human sensitive receptors with one residential building 260m down wind of the predominant prevailing wind direction (Synergetics Environmental Engineering).

Scholer Industries confirm that the “primary combustion waste gases exit into the burner supported, high temperature secondary combustion zone where 850°C - 1200°C temperatures expand and destroy volatile toxic gases in a “3T Formula” process (Time, Turbulence, Temperature) for a minimum retention time of two (2) seconds. The necessary turbulence is created by the tortuous path of the gases through the secondary chamber’s dividing wall baffles. The secondary combustion process is designed to meet stringent air emission standards for volatile dioxin (PCDD) and furan (PCDF) substances. Following adequate high temperature secondary chamber treatment the clean, clear gases enter the vertical flue stack and rise to atmosphere. The “hot” stack (+600°C) allows the gases to exit to atmosphere at temperatures above the “de novo synthesis range” (250°C-400°C) so that the possibility of the reformation of dioxins and furans held within any minute particulates will not occur.”

The “hot” stack is attached to the secondary combustion chamber with a height of 12.5m, with the stack tip fitted with a cone to achieve >15m/s velocity and minimise the risk of stack tip downwash (Synergetics Environmental Engineering).

Monitoring points can be located on the incinerator stack and are compliant with Australian Standard AS4323.1-1995, *Stationary source emissions Method 1 Selection of sampling planes*, requirements will also be fitted (Synergetics Environmental Engineering).

Scholer Industries has committed to assisting the Shire of Cocos Keeling Islands administration with training of operators, and management and provision of relevant documentation, to assure ongoing protection of human health, amenity, and other beneficial uses of the local environment during operation.



According to Synergetics Environmental Engineering, the predominant prevailing wind directions for the Cocos Keeling Home Island is south easterly to easterly which assists in ensuring that any air emissions from the incinerator do not blow over local residential areas on the island (Air quality assessment of a proposed incinerator at Cosos Island V02, pg 39).

Risk Assessment

Consequence: Minor

Likelihood: Possible

Risk Rating: Moderate

Regulatory Controls

Incinerator ash will represent 5-10% of the putrescible waste mass. Waste management procedures for the residual ash has been proposed through an improvement condition within section 4.1.1 of the amended licence.

Process monitoring conditions have been proposed within the amended licence for exhaust gases and the stack, and monitoring of retention time within the secondary chamber. This is further supported through additional conditions included within condition 1.3.5, Table 1.3.4, 'Management Actions'.

Meteorological monitoring conditions have been included to assist in ensuring emissions from the incinerator are not directed over residential areas on the island through the monitoring of wind direction prior to start-up and during operation of the incinerator.

Residual Risk

Consequence: Minor

Likelihood: Possible

Risk Rating: Moderate

Air Quality Management Services (DER) reviewed the submitted 'Air quality assessment of a proposed incinerator at Cocos Islands V02' documentation from Synergetics Environmental Engineering, and against relevant guidelines. The criteria used within the report were found acceptable. With the proposed operation of the incinerator identified as once a week under appropriate meteorological conditions, the operation was considered to be low risk of affecting the air quality of local residents. The operation of a controlled, purpose build system as opposed to open air incineration is considered a significant improvement in the management of waste disposal at the premises.