Government of Western Australia
Department of Environment Regulation

# Licence

## *Environmental Protection Act 1986,* Part V

## Licensee: SITA Medicollect Australia Pty Ltd

## Licence: L6537/1994/13

**Registered office:** 3 Rider Boulevard
RHODES NSW 2138

**ACN:** 119 885 700

**Premises address:** SITA Medicollect
Lot 9 on Diagram 14206 and Lot 341 on Diagram 85
WELSHPOOL WA 6106
as depicted in Schedule 1.

**Issue date:** Friday, 26 February 2016

**Commencement date:** Sunday, 28 February 2016

**Expiry date:** Wednesday, 27 February 2019

**Prescribed premises category**
Schedule 1 of the *Environmental Protection Regulations 1987*

| Category number | Category description | Category production or design capacity | Approved Premises production or design capacity |
|---|---|---|---|
| 59 | Biomedical waste incineration | Not applicable | 2000 tonnes per annual period cumulative |
| 60 | Incineration | 100 kilograms or more per hour | |
| 61A | Solid waste facility | 1000 tonnes or more per year | 2000 tonnes per annual period |

**Conditions**
This Licence is subject to the conditions set out in the attached pages.

Date signed: 26 February 2016
.....
Officer delegated under section 20
of the *Environmental Protection Act 1986*

# Contents



# Introduction

This Introduction is not part of the Licence conditions.

**DER's industry licensing role**
The Department of Environment Regulation (DER) is a government department for the state of Western Australia in the portfolio of the Minister for Environment. DER's purpose is to advise on and implement strategies for a healthy environment for the benefit of all current and future Western Australians.

DER has responsibilities under Part V of the *Environmental Protection Act 1986* (the Act) for the licensing of prescribed premises. Through this process DER works with the business owners, community, consultants, industry and other representatives to prevent, control and abate pollution and environmental harm to conserve and protect the environment. DER also monitors and audits compliance with works approvals and licence conditions, takes enforcement action as appropriate and develops and implements licensing and industry regulation policy.

**Licence requirements**
This Licence is issued under Part V of the Act. Conditions contained within the Licence relate to the prevention, reduction or control of emissions and discharges to the environment and to the monitoring and reporting of them.

Where other statutory instruments impose obligations on the Premises/Licensee the intention is not to replicate them in the licence conditions. You should therefore ensure that you are aware of all your statutory obligations under the Act and any other statutory instrument. Legislation can be accessed through the State Law Publisher website using the following link:
http://www.slp.wa.gov.au/legislation/statutes.nsf/default.html

For your Premises relevant statutory instruments include but are not limited to obligations under the:

- *Environmental Protection (Unauthorised Discharges) Regulations 2004* – these Regulations make it an offence to discharge certain materials such as contaminated stormwater into the environment other than in the circumstances set out in the Regulations.

- *Environmental Protection (Controlled Waste) Regulations 2004* - these Regulations place obligations on you if you produce, accept, transport or dispose of controlled waste.

- *Environmental Protection (Noise) Regulations 1997* – these Regulations require noise emissions from the Premises to comply with the assigned noise levels set out in the Regulations.

You must comply with your licence. Non-compliance with your licence is an offence and strict penalties exist for those who do not comply.

Licence holders are also reminded of the requirements of section 53 of the Act which places restrictions on making certain changes to prescribed premises unless the changes are in accordance with a works approval, licence, closure notice or environmental protection notice.

**Licence fees**
If you have a licence that is issued for more than one year, you are required to pay an annual licence fee prior to the anniversary date of issue of your licence. Non payment of annual licence fees will result in your licence ceasing to have effect meaning that it will no longer be valid and you will need to apply for a new licence for your Premises.

**Ministerial conditions**
If your Premises has been assessed under Part IV of the Act you may have had conditions imposed by the Minister for Environment. You are required to comply with any conditions imposed by the Minister.

**Premises description and Licence summary**

SITA Medicollect process medical waste by incineration and by a solid waste lime reaction system known as the Matrix System at the premises. The premises receives biomedical waste which consists of clinical, pharmaceutical, anatomical, cytotoxic and general clinical wastes from hospitals, doctors, dentists, veterinary and other types of medical facilities located throughout the state. The company also accepts solid waste for destruction by incineration which consists of police uniforms, contraband (illegal imports) seized by police and customs, surveillance tapes and documents. The maximum annual throughput of waste for incineration is 2 000 tonnes.

Waste to be incinerated is loaded into the feed hopper before it is pushed by rams into the primary combustion chamber where it is burnt at a temperature between 700°C and 900°C. Ash generated in this chamber is pushed into a rotary chamber, where it is mixed with water and discharged as slurry into bins for transfer to a licensed landfill site for disposal.

The waste gas produced in the incineration process is treated as follows:

- passing the exhaust gas through adiabatic cooler (quench tank) to minimise dioxin formation;
- activated carbon and lime injection to treat acid gases; and
- filtration in a bag house.

The Premises has been in operation since the 1990s (originally operated as Stephenson and Ward incinerator) and is located in an industrial area. Residential development in the area has progressively reduced separation distance between the premises and sensitive receptors. Nearest residential dwelling is now less than 100 meters from the Premises boundary. Through this licence renewal process, DER has initiated a review licence conditions to ensure that appropriate level of environmental and public health protection is maintained. Key concerns associated with operations at the premises include:

- Inadequate separation distance between the premises and receptors;
- Variability of air emissions profile due to heterogeneous incoming waste stream which the licensee has limited control over;
- Limitations on quantifying air emissions variability during different operating scenarios including abnormal operations, bypass events and frequent start-up/ shut-downs due to absence of continuous emissions monitoring;
- Operational and process controls during normal operations and bypass events; and
- Unavailability of auxiliary burners in primary and secondary combustion chambers to achieve desired incineration temperatures prior to loading clinical waste.

Air emissions modelling undertaken by the Licensee has identified that contaminants of significant concern include nitrogen oxides, acid gases and heavy metals including lead, mercury, cadmium and arsenic. Predicted ground level concentrations of cadmium and arsenic at sensitive receptors are likely to be significant during normal operations and with possible exceedances of ambient health criteria likely under bypass conditions.

Through the risk assessment conducted DER has identified the need for establishing stronger waste acceptance procedures, increased monitoring frequency and operational and process controls for normal and abnormal operating conditions which are commensurate with the heterogeneous feedstock processed at the premises. Specific conditions have been included on the licence requiring SITA Medicollect to undertake ambient air monitoring for heavy metals to assess potential exposure of sensitive receptors. Stack emission limits have been reviewed in line with the risk assessment outcome and a requirement for installing continuous emissions monitoring system has been specified. The licence also specifies management actions for start up/ shut-downs and abnormal operations. Improvement requirements have been added to the licence requiring the licensee to submit operational plan for the incinerator, process monitoring plan detailing techniques used to ensure compliance with optimum incineration temperature and an abatement plant bypass management plan.

DER has considered changes to the receiving environment (receptor proximity); evidence available through published research reports on potential health impacts of incinerators, technological advances and industry standards for similar installations. Department of Health, Western Australia, document *Clinical and related Waste Management Policy* identifies potential health risks associated with segregation, storage, transport and disposal of these waste streams.

Biomedical waste is also treated in the Matrix System which is a non-thermal (alkaline oxidation) treatment. Waste not containing sharps, cytotoxic, pharmaceutical, or anatomical material is loaded into a hopper. It is then passed through a fine shredder before it is dosed with lime and then processed in a rotary reactor where the lime aids sterilisation of the waste by oxidation. The sterilised waste is loaded into bins for transfer to a licensed landfill for disposal. Key emissions associated with matrix system include potential for pathogen dispersal into air during waste shredding operations, potential for public health hazard during handling, storage, transfer of product that has detectable pathogen concentrations due to optimum pH and residence time not being maintaiend and generation of process wastewater. The licence includes conditions specifying monitoring requirements for matrix system output. Improvement Requirement has also been specified requiring the Licensee to submit a Process Monitoring Plan for the Matrix Waste Treatment System with details of performance objectives, proposal for routine sampling programme and proposal to monitor key operational parameters such as temperature and pH.

This licence has been issued for a duration of three year in accordance with DER's guidance statement on Licence Duration, published May 2015. The Premises also incinerates waste streams that cannot be classified as 'biomedical waste'. The licence has been updated to include 'Category 60: Incineration' as specified in Schedule 1 of the *Environmental Protection Regulations 1987* as the premises also accepts waste streams not classified as 'clinical waste' for incineration.

This Licence is the successor to licence L6537/1994/12 and includes reassessment of key emissions and discharges from the operations.

The licences and works approvals issued for the Premises since 24/11/2011:

| **Instrument log** | | |
|---|---|---|
| **Instrument** | **Issued** | **Description** |
| L6537/1994/11 | 24/11/2011 | Licence renewal |
| L6537/1994/12 | 28/11/2014 | Licence renewal. Short term licence granted. |
| L6537/1994/12 | 26/3/2015 | Licence amendment to extend completion date for improvement requirement |
| L6537/1994/13 | 26/2/2016 | Licence renewal and changes to new format. |

**Severance**

It is the intent of these Licence conditions that they shall operate so that, if a condition or a part of a condition is beyond the power of this Licence to impose, or is otherwise *ultra vires* or invalid, that condition or part of a condition shall be severed and the remainder of these conditions shall nevertheless be valid to the extent that they are within the power of this Licence to impose and are not otherwise *ultra vires* or invalid.

**END OF INTRODUCTION**

# Licence conditions

## 1 General

### 1.1 Interpretation

1.1.1 In the Licence, definitions from the *Environmental Protection Act 1986* apply unless the contrary intention appears.

1.1.2 For the purposes of this Licence, unless the contrary intention appears:

**'abatement plant'** means the air pollution control system which is used to treat incineration exhaust gases. This includes the adiabatic quench system, lime and activated carbon dosing system, and bag filter operating both individually and as part of the comprehensive series of treatment;

**'abnormal operating conditions'** means period of any technically unavoidable stoppages, disturbances, or failures of the abatement devices or the measurement devices, during which the concentrations in the discharges into the air may exceed the specified emission limit values;

**'Act'** means the *Environmental Protection Act 1986;*

**'animal waste'** means waste arising from the whole or any part of an animal, or excreta;

**'annual period'** means the inclusive period from 1 July until 30 June in the following year;

**'AS 4323.1'** means the Australian Standard AS4323.1 *Stationary Source Emissions Method 1: Selection of sampling positions;*

**'averaging period**' means the time over which a limit is measured or a monitoring result is obtained;

**'BaP-TEQ'** means Benzo(a)Pyrene Toxic Equivalence Quotient (TEQ);

**'CEMS'** means Continuous Emissions Monitoring System;

**'CEMS Code'** means the current version of the Continuous Emission Monitoring System (CEMS) Code for Stationary Source Air Emissions, Department of Environment & Conservation, Government of Western Australia;

**'CEO'** means Chief Executive Officer of the Department of Environment Regulation;

**'CEO'** for the purpose of correspondence means;
Chief Executive Officer
Department Administering the *Environmental Protection Act 1986*
Locked Bag 33
CLOISTERS SQUARE WA 6850
Email:info@der.wa.gov.au;

**'chemical waste'** means waste material generated from the use of chemicals in medical, dental, veterinary, laboratory, ancillary and disposal procedures;

**'clinical waste'** means waste that has the potential to cause disease, sharps injury or public offence. This includes sharps, human tissue waste, laboratory waste, animal waste, and any other relevant waste specific to an establishment [1];

**'combustion efficiency (%)'** means the percentage of the concentration of carbon monoxide (CO) and carbon dioxide ($CO_2$) in the exhaust gas and is calculated by:

$$\text{Combustion efficiency (\%)} = \frac{\text{Concentration of } CO_2}{(\text{Concentration of } CO_2 + \text{Concentration of CO})} \times 100;$$

**'cytotoxic waste'** means waste material,that is, or may be, contaminated with a cytotoxic drug during the preparation, transport or administration of cytotoxic therapy;

**'fugitive emissions'** means emissions not arising from point sources identified in sections 2.2,;

**'hardstand'** means a surface with a permeability of $10^{-9}$ metres/second or less;

**'interlock mode'** means that no waste will be fed to the incinerator, and the wastes cannot be re-introduced to the incinerator until the malfunction causing the problem has been corrected;

**'I-TEQ'** means International Toxic Equivalents for dioxins and furans;

**'laboratory waste**' means a specimen or culture discarded in the course of medical, dental or veterinary practice or research, including genetically manipulated material and imported biological material or any material grossly contaminated thereby;

**'Licence'** means this Licence numbered L6537/1994/13 and issued under the Act;

**'Licensee'** means the person or organisation named as Licensee on page 1 of the Licence;

**'Matrix waste treatment system'** means an exothermic alkaline oxidation process in which shredded waste is exposed to a high pH environment generated by the addition of a metred quantity of calcium oxide and water, in which the heat of reaction increases the temperature to greater than $70^{o}C$;

**'NATA'** means the National Association of Testing Authorities, Australia;

**'NATA accredited'** (in relation to the collection of a sample) means that the service provider is NATA accredited for the specified sampling method at the time of sampling;

**'NATA accredited'** (in relation to the analysis of a sample) means that the laboratory is NATA accredited for the specified analysis at the time of analysis;

**'normal operating conditions'** means any operation of the incineration process (including abatement equipment) excluding start-up, shut-down and abnormal operating conditions, where the Licensee can undertake waste charging operations in a manner such that operational requirements specified in Condition 1.3.4 of this Licence can be achieved;

**'NOx'** means oxides of nitrogen, calculated as the sum of nitric oxide (NO) and nitrogen dioxide ($NO_2$) and expressed as nitrogen dioxide;

**'other waste'** means paper documents, uniforms, surplus hospital consumables and items from Police and Customs seizure or Quarantine seizures;

[1] *Operational Directive: Clinical and Related Waste Management Policy OD0651/16*, Department of Health, 21 January 2016.

**'PAH'** means polycyclic aromatic hydrocarbons as identified in the *Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions* including:

(i) Anthanthrene;
(ii) Benzo[a]anthracene;
(iii) Benzo[b]fluoranthene;
(iv) Benzo[k]fluoranthene;
(v) Benzo(b)naph(2,1-d)thiophene;
(vi) Benzo(c)phenanthrene;
(vii) Benzo[ghi]perylene;
(viii) Benzo[a]pyrene;
(ix) Cholanthrene;
(x) Chrysene;
(xi) Cyclopenta(c,d)pyrene;
(xii) Dibenzo[ah]anthracene;
(xiii) Fluroranthene
(xiv) Indo[1,2,3-cd]pyrene; and
(xv) Naphthalene.

**'pharmaceutical waste'** means waste material that may arise from pharmaceutical products that have passed their recommended shelf life, discarded pharmaceuticals due to off-specification batches or contaminated packaging, drugs returned by patients or discarded by the public, drugs that are no longer required by the establishment and drug components generated during manufacture of pharmaceuticals. This excludes pharmaceutical drugs and their metabolic by-products excreted by patients undergoing therapy, uncontaminated packaging material including empty pill bottles and strip packages, used syringes and intravenous giving sets (unless contaminated with cytotoxic drugs), simple intravenous solutions such as saline or glucose without added drugs. Used syringes and intravenous giving sets may be classed as Clinical waste- sharps;

**'PM'** means total particulate matter including both solid fragments of material and miniscule droplets of liquid;

**'Premises'** means the area defined in the Premises Map in Schedule 1 and listed as the Premises address on page 1 of the Licence;

**'quarterly'** means the 4 inclusive periods from 1 July to 30 September, 1 October to 31 December and in the following year 1 January to 31 March and 1 April to 30 June;

**'qualifying zone'** means area within the combustion chamber of the incinerator which does not include areas where primary combustion occurs and relates to completion of combustion. It commences at a location after the last injection of secondary air and excludes the residence time achieved in the primary combustion unit or zone.

**'radioactive waste'** means waste material, including sharps, contaminated with a radioisotope which arises from the medical or research use of radionuclide, e.g. during nuclear medicine, radioimmunoassay and bacteriological procedures, which may be of solid, liquid or gaseous form, and which emit a level of radiation above the level set in the *Radiation Safety (General) Regulation 1983*;

**'Schedule 1'** means Schedule 1 of this Licence unless otherwise stated;

**'Schedule 2'** means Schedule 2 of this Licence unless otherwise stated;

**'sharps'** means any object or device that has sharp points or protuberances or cutting edges capable of causing a penetrating injury to humans;

**'shut-down'** means the period when plant or equipment is brought from normal operating conditions to inactivity;

**'six monthly'** means the 2 inclusive periods from 1 July to 31 December and in following year, 1 January to 30 June;

**'spot sample'** means a discrete sample representative at the time and place at which the sample is taken;

**'stack test'** means a discrete set of samples taken over a representative period at normal operating conditions;

**'start-up'** means the period when plant or equipment is brought from inactivity to normal operating conditions;

**'STP dry'** means standard temperature and pressure ($0^{o}$Celsius and 101.325 kilopascals respectively), dry;

**'USEPA'** means United States (of America) Environmental Protection Agency;

**'usual working day'** means 0800 – 1700 hours, Monday to Friday excluding public holidays in Western Australia; and

**'waste pre-acceptance'** means any procedures or practices implemented by the Licensee prior to delivery of waste to the premises. Procedures shall demonstrate measures undertaken by the Licensee to establish the likely nature and type of waste received from existing customers and measures undertaken to establish the likely nature and type of waste prior to receiving waste from new customers.

1.1.3 Any reference to an Australian or other standard in the Licence means the relevant parts of the standard in force from time to time during the term of this Licence.

1.1.4 Any reference to a guideline or code of practice in the Licence means the version of that guideline or code of practice in force from time to time, and shall include any amendments or replacements to that guideline or code of practice made during the term of this Licence.

1.1.5 Nothing in the Licence shall be taken to authorise any emission that is not mentioned in the Licence, where the emission amounts to:
(a) pollution;
(b) unreasonable emission;
(c) discharge of waste in circumstances likely to cause pollution; or
(d) being contrary to any written law.

## 1.2 General conditions

1.2.1 The Licensee shall operate and maintain all pollution control and monitoring equipment to the manufacturer's specification.

1.2.2 The Licensee shall immediately recover, or remove and dispose of, spills of environmentally hazardous materials outside an engineered containment system.

1.2.3 The Licensee shall ensure that environmentally hazardous material, where total volume of each substance stored on the premises exceeds 250 litres, are stored within low permeability ($10^{-9}$ metres per second or less) compound(s) designed to contain not less than 110% of the volume of the largest storage vessel or inter-connected system, and at least 25% of the total volume of substances stored in the compound.

1.2.4 The Licensee shall ensure that the compound(s) described in Condition 1.2.3 of this condition will:
(a) be graded or include a sump to allow recovery of liquid;
(b) be chemically resistant to the substances stored;

(c) include valves, pumps and meters associated with transfer operations wherever practical. Otherwise the equipment shall be adequately protected and contained in an area designed to permit recovery of spilled chemicals;
(d) be designed such that jetting from any storage vessel or fitting will be captured within the bunded area in accordance with Australian Standard 1940;
(e) be designed such that chemicals which may react dangerously if they come into contact, are in separate bunds in the same compound or in different compounds; and
(f) be controlled such that the capacity of the bund is maintained.

### 1.3 Premises operation

1.3.1 The Licensee shall only accept waste on to the Premises if:
(a) it is of a type listed in Table 1.3.1; and
(b) the quantity accepted is below any quantity limit listed in Table 1.3.1;
(c) it meets any specification listed in Table 1.3.1; and
(d) the Licensee's Waste Pre-acceptance practices can demonstrate compliance with the acceptance criteria specified Table 1.3.1.

**Table 1.3.1: Waste acceptance**

| Waste type | Quantity limit | Specification |
|---|---|---|
| Clinical waste | 2000 tonnes per annual period cumulative (for waste streams authorised for incineration in Table 1.3.2) | i. Information on source, type and size of the bin and receival date must be clearly recorded for each batch or load of waste received.<br>ii. Waste Containers must be clearly labelled to identify the type of waste. |
| Chemical waste | | |
| Pharmaceutical waste | | |
| Cytotoxic waste | | |
| Other waste | 2000 tonnes per annual period cumulative (for waste streams determined suitable for treatment in Matrix System) | |

1.3.2 The Licensee shall ensure that where waste does not meet the waste acceptance criteria set out in condition 1.3.1, it is removed from the Premises by the delivery vehicle or, where that is not possible, stored in a quarantined storage area or container and removed to an appropriately authorised facility as soon as practicable.

1.3.3 The Licensee shall ensure that wastes accepted onto the Premises are only subjected to the process(es) set out in Table 1.3.2 and in accordance with any process limits described in that Table.

**Table 1.3.2: Waste processing**

| Waste type | Process | Process limits |
|---|---|---|
| Clinical waste, Chemical waste, Cytotoxic waste, Pharmaceutical waste, Other waste | Receipt | i. Waste may be received at the Premises during an event which is likely to suspend normal operation of the incinerator or Matrix System for 48 hours or more only if adequate refrigerated storage capacity is available.<br>ii. The Licensee must record information about the incoming waste stream to demonstrate compliance with the Waste Acceptance Criteria in Table 1.3.1 or any specification in this Licence and to prevent operation outside the design envelope that could lead to possible breaches of emission limits specified in this Licence.<br>iii. Radioactive waste must not be received at the Premises. |
| Clinical waste, Chemical waste, Cytotoxic waste, Pharmaceutical waste | Handling and storage | i. All waste must be stored within impervious concrete areas with a sealed bund wall of at least 150mm in height; and<br>ii. Clinical waste shall not be stored at the premises for a period in excess of 30 days from the date of receipt. |
| Wastewater | Handling and storage | i. All wastewater from the clinical waste receipt, storage or washdown areas must be stored in an impervious tank for offsite disposal at an authorised facility. |
| Clinical waste excluding Sharps | Incineration | i. Incinerate within 48 hours of receipt unless it is stored in the approved refrigerated storage facility.<br>ii. Infectious Clinical Waste must be placed straight in the primary combustion chamber without first being mixed with other waste types and without direct handling. |
| | Refrigerated storage | i. The refrigerated storage facility must be maintained at a temperature of $5^{o}$C or lower. |
| Clinical Waste, Chemical Waste, Cytotoxic Waste, Pharmaceutical Waste, Other Waste | Incineration | i. Radioactive Waste must not be incinerated at the Premises.<br>ii. Process must comply with Operational Requirements specified in this Licence. |
| Clinical waste not contaminated with Chemical Waste, Cytotoxic Waste or Pharmaceutical waste | Treatment in Matrix Waste Treatment system | i. The Matrix Waste Treatment System must be operated only under Negative Pressure.<br>ii. Liquid waste generated from the process must not be discharged to the environment.<br>iii. The Matrix Waste Treatment System must be operated such that the solid waste produced has no detectable levels for faecal coliforms, E. Coli and thermotolerant coliforms when tested using Amies Transport Swabs. |

1.3.4 The Licensee must ensure that the incineration process is undertaken to comply with the requirements specified in Table 1.3.3.

**Table 1.3.3: Operational requirements - normal operations**

| Process parameter | Operational Limit |
|---|---|
| Waste charging | i. Cytotoxic waste and any waste with a content of more than 1% halogenated organic substances, expressed as chlorine, must not be charged until a temperature of no less than 1100 °C is achieved over the Qualifying Zone.<br>ii. Abatement Plant must be operational before any waste is charged and as long as unburned waste is present in the combustion chamber. |
| Incineration temperature over Qualifying Zone | i. No less than 1100 °C when Cytotoxic waste or any waste with a content of more than 1% halogenated organic substances, expressed as chlorine, is incinerated.<br>ii. Subject to management actions specified in Table 1.3.4; the temperature must be maintained during operation and at the end of an incineration cycle and for as long as unburned waste is present in the combustion chamber.<br>iii. The Licensee must ensure that the temperature sensors in the Primary and Secondary chambers are located so that they do not receive direct radiation from the chamber's burner or flame. |
| Residence Time of gases over Qualifying Zone | >1 seconds |
| Incinerator combustion efficiency | 99.8% |
| Exhaust gas temperature from the adiabatic gas cooling device | <250 °C |
| Interlock Mode to prevent waste feed | i. The Interlock must be fitted to the charging door to prevent loading of the primary chamber when Inetrlock Mode has been activated.<br>ii. The Interlock Mode to prevent waste feed must be operated as specified in Table 1.3.4 |

1.3.5 The Licensee shall take the specified management action in the case of an event in Table 1.3.4.

**Table 1.3.4: Management actions**

| Emission point reference | Event/ action reference | Event | Management action |
|---|---|---|---|
| **A1** | **EA1** | Temperature over Qualifying Zone falls below 1100$^{o}$C or 850 $^{o}$C as specified for the waste type being incinerated | Interlock Mode to prevent waste feed must be activated if specified temperatures are not achieved within 120 seconds of the start of the event. |
| | **EA2** | Failure or malfunction of the Abatement Plant or abnormal operation period which results in bypass of the Abatement plant | The Licensee must activate Interlock Mode or shut down until cause of failure or malfunction is resolved<br><br>Restore normal operation of failed equipment or replace the failed equipment prior to re-introducing feed.<br><br>The Licensee must record the beginning and end of the Abnormal Operation period and ensure that the root cause is identified. |
| | **EA3** | Shut down | The Licensee must ensure that temperatures specified in Table 1.3.3 are maintained as long as unburned waste is present in the combustion chamber.<br><br>Abatement Plant must continue to operate as long as unburned waste is present in the combustion chamber. |

1.3.6 The Licensee shall record and investigate the exceedance of any descriptive or numerical limit specified in any part of section 1 of this Licence.

# 2 Emissions

## 2.1 General

2.1.1 The Licensee shall record and investigate the exceedance of any descriptive or numerical limit specified in any part of section 2 of this Licence.

## 2.1 Point source emissions to air

2.2.1 The Licensee shall ensure that where waste is emitted to air from the emission points in Table 2.2.1 and identified on the map of emission points in Schedule 1 it is done so in accordance with the conditions of this Licence.

**Table 2.2.1: Emission points to air**

| Emission point reference and location on premises map | Emission point reference on premises map | Emission point height (m) | Source, including any abatement |
|---|---|---|---|
| A1 | A1 | 18.5 | Incinerator exhaust that has been through adiabatic cooling system and is injected with activated carbon and lime before passing through the fabric filter prior to discharge to air |

2.2.2 The Licensee shall not cause or allow point source emissions to air greater than the limits listed in Table 2.2.2 during normal operating conditions.

**Table 2.2.2: Point source emission limits to air- normal operations**

| Emission point Reference | Parameters | Limit[1] (including units) | Averaging period |
|---|---|---|---|
| A1 | Exhaust gas velocity | >12m/s | Stack test (Minimum 30 minutes average ) |
| | Oxygen concentration | >6% | |
| | Smoke | < = 1 on Ringelmann scale | |
| | Contaminants other than water vapour | No visible emissions | |
| | Total particulate matter | 30 $mg/m^3$ | |
| | VOCs (as total organic carbon - TOC) | 20 $mg/m^3$ | |
| | Hydrogen chloride | 60 $mg/m^3$ | |
| | Hydrogen fluoride | 4 $mg/m^3$ | |
| | Carbon monoxide | 100 $mg/m^3$ | |
| | Sulphur dioxide | 200 $mg/m^3$ | |
| | Oxides of nitrogen (as $NO_2$) | 400 $mg/m^3$ | |
| | Cadmium and thallium and their compounds (total) | 0.05 $mg/m^3$ | |
| | Mercury and its compounds | 0.05 $mg/m^3$ | |
| | Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total) | 0.5 $mg/m^3$ | |
| | Dioxins and furans (I-TEQ) | 0.1 $ng/m^3$ | |

Note 1: Prescribed reference conditions:
- temperature 0°C (273K);
- pressure 101.3 kPa;
- 11% oxygen, dry gas.

2.2.3 The Licensee must operate and maintain the baghouse system fitted to Emission Point A1 to comply with the following requirements:
(a) Pressure sensors must be used to monitor the pressure build-up across the system and to determine integrity of fabric filters;
(b) Collection efficiency of the fabric filters must be maintained using mechanical rapping or reverse pulse air cleaning systems;
(c) Mechanical rapping or reverse pulse air cleaning system fitted to the baghouse must be tested at least weekly and repaired immediately as necessary;
(d) Fabric filters must be examined at least weekly for evidence of leaks or excessive material build-up and replaced immediately as necessary;
(e) An opacity meter must be installed on the outlet of the baghouse; and
(f) An audible alarm must be installed to alert the operator of failure or malfunction of the baghouse or deviation from the design performance specifications.

# 3 Monitoring

## 3.1 General monitoring

3.1.1 The Licensee shall ensure that :
(a) quarterly monitoring is undertaken at least at least 45 days apart;
(b) six monthly monitoring is undertaken at least 5 months apart; and
(c) annual monitoring is undertaken at least 9 months apart.

3.1.2 The Licensee shall record production or throughput data and any other process parameters relevant to any non-continuous or CEMS monitoring undertaken.

3.1.3 The Licensee shall ensure that all monitoring equipment used on the Premises to comply with the conditions of this Licence is calibrated in accordance with the manufacturer's specifications .

3.1.4 The Licensee shall, where the requirements for calibration cannot be practicably met, or a discrepancy exists in the interpretation of the requirements, bring these issues to the attention of the CEO accompanied with a report comprising details of any modifications to the methods.

3.1.5 The Licensee shall record type, quantity and source of waste being incinerated for the duration of any non-continuous monitoring required by Condition 3.2.1 of this Licence.

### 3.2 Monitoring of point source emissions to air

3.2.1 The Licensee shall undertake the monitoring in Table 3.2.1 according to the specifications in that table.

**Table 3.2.1: Monitoring of point source emissions to air**

| Emission point reference | Parameter | Units[1, 3] | Averaging period | Frequency[2] | Method |
|---|---|---|---|---|---|
| A1 | Exhaust gas velocity | m/s | Minimum 30 minute average | Quarterly (until CEMS are installed) | USEPA Method 2 |
| | Oxygen concentration | $mg/m^3$ g/s | | | USEPA Method 3A |
| | Water vapour | % | | | USEPA Method 4 |
| | Total particulate matter | $mg/m^3$ g/s | | | USEPA Method 5 /17 |
| | VOCs (as total organic carbon - TOC) | | | | USEPA Method 25A |
| | Hydrogen chloride | | | | USEPA Method 26A |
| | Hydrogen fluoride | | | | USEPA Method 26A |
| | Carbon monoxide | | | | USEPA Method 10 |
| | Sulphur dioxide | | | | USEPA Method 6C |
| | Oxides of nitrogen (as $NO_2$) | | | | USEPA Method 7E |
| | Sb, As, Cd, Cr, Co, Cu, Hg, Pb,Mn, Ni, Tl and V and their compounds (total) | $mg/m^3$ g/s | Minimum 180 minute average | Quarterly | USEPA Method 29 |
| | Dioxins and furans as ITEQ | $mg/m^3$ g/s | Minimum 240 minute average | Six monthly | USEPA Method 23 |
| | Polycyclic Aromatic Hydrocarbons (as BaP-TEQ) and Polychlorinated biphenyls (PCBs) | | | | USEPA SW846 Method 0010 |
| | Visible emissions | - | n/a | Continuous | Using the video monitor and recorder installed |

Note 1: All units concentration units are referenced to STP dry
Note 2: Monitoring shall be undertaken to reflect normal operating conditions and any limits or conditions on inputs or production.
Note 3: Concentration units for A1 are referenced to 11% $O_2$ .

3.2.2 The Licensee shall ensure that sampling required under Condition 3.2.1 of the Licence is undertaken at sampling locations in accordance with the AS 4323.1 or relevant part of the CEMS Code.

3.2.3 The Licensee shall ensure that all non-continuous sampling and analysis undertaken pursuant to condition 3.2.1 is undertaken by a holder of NATA accreditation for the relevant methods of sampling and analysis.

### 3.3 Monitoring of inputs and outputs

3.3.1 The Licensee shall undertake the monitoring in Table 3.3.1 according to the specifications in that table.

**Table 3.3.1: Monitoring of inputs and outputs**

| Input/Output | Parameter | Units | Averaging period | Method | Frequency |
|---|---|---|---|---|---|
| All waste received at the Premises | Date of acceptance of each batch of waste | n/a | n/a | n/a | Each load arriving at the Premises |
| | Source of each batch of waste | n/a | | | |
| | Number of bins for each batch of waste received | Number | | | |
| Fuel input to the incinerator | Quantity of natural gas | $m^3$/day | Daily | n/a | Daily |
| Waste Output from incinerator | Date that each batch of waste is incinerated | n/a | n/a | n/a | Each load incinerated the Premises |
| | Total weight of waste incinerated | tonnes | Daily | | |
| Output of the Matrix system | Presence of faecal coliforms, *E.Coli* and thermotolerant coliforms | - | Spot sample | Amies Transport Swabs | Monthly |

### 3.4 Process monitoring

3.4.1 The Licensee shall undertake the monitoring in Table 3.4.1 according to the specifications in that table.

**Table 3.4.1: Process monitoring**

| Process description | Parameter | Units | Frequency | Method |
|---|---|---|---|---|
| Incineration | Incineration temperature over Qualifying Zone | $^oC$ | Continuous | None specified |
| | Combustion Efficiency | % | Daily | None specified |
| | Temperature of exhaust gases leaving the adiabatic gas cooling device | $^oC$ | Continuous | None specified |
| | Total hours of operation of the incinerator each day | hours | Daily | None specified |

# 4 Improvements

## 4.1 Improvement program

4.1.1 The Licensee shall complete the improvements in Table 4.1.1 by the date of completion in Table 4.1.1.

**Table 4.1.1: Improvement program**

| Improvement reference | Improvement | Date of completion |
|---|---|---|
| **IR1** | The Licensee shall submit a Continuous Emissions Monitoring System (CEMS) Implementation Plan for monitoring temperature, flow rate, oxygen, TPM, CO, $CO_2$, TOC, HCl,HF,$SO_2$,NOx, emissions from emission point A1. The Plan shall include but not be limited to the following:<br>(i) Identification of the CEMS technology of choice in accordance with the CEMS code; and<br>(ii) Timeframe for installation, calibration and operation of the CEMS within 8 months of the date of the grant of this Licence; and<br>(iii) Proposed action plan, which addresses any constraints identified, with the objective of having the CEMS technology identified above operational as early as possible. | 5 months from grant of this Licence |
| **IR2** | The Licensee must submit a Process Monitoring Plan which details techniques or procedures that will be used to demonstrate ongoing compliance with combustion temperatures and gas residence time requirements specified in any condition of this Licence. | 3 months from grant of this Licence |
| **IR3** | The Licensee shall undertake a review of existing infrastructure and operating techniques and submit a proposal to the CEO investigating improvements required or alternative techniques that could be used to achieve following key criteria:<br>(i) temperature of 1100$^{o}$C and residence time of at least 2 seconds can be maintained over the Qualifying Zone when waste Cytotoxic waste and any waste containing >1% halogenated organic substances, expressed as chlorine, is incinerated; and<br>(ii) temperature of 850$^{o}$C and residence time of at least 2 seconds can be maintained over the Qualifying Zone when any other waste is incinerated.<br>The Propsoal shall include a commitment to complete any improvements identified within 15 months from the grant of this licence. | 10 months from grant of this Licence |

| | | |
|---|---|---|
| **IR4** | The Licensee shall submit to the CEO an Abatement Plant Bypass Management Plan. The Plan shall include but not be limited to:<br>(i) Identification of root-causes which may lead to Abatement Plant Bypass; and<br>(ii) Procedures for estimation of the characteristics and quantity of the emission and assessment of potential environmental impact from each bypass event. This should consider:<br>(a) concentration or mass flow of contaminants and duration of bypass;<br>(b) assessment of worst case emission scenario during the bypass event, comparison of potential emissions during bypass with current licence limits;<br>(c) criteria for assessment of significance of potential bypass emissions, likely impact on the environment and measures to be implemented to minimise duration and frequency of the bypass; and<br>(d) Recordkeeping procedures for identifying all Abatement Plant Bypass events including the date, time, duration, reason for the bypass, characteristics of the emissions. | 2 months from grant of this Licence |
| **IR5** | The Licensee shall submit to the CEO a proposal to install critical infrastructure, such as:<br>• a multicompartment baghouse to ensure that maintenance and repairs can occur whilst the baghouse is online;<br>• an emergency power source, with the capability of maintaining the plant online in the event of a power loss; and<br>• any other infrastructure<br><br>required to ensure that ground level concentrations of cadmium do not exceed the hourly ambient criteria of 0.018µg/$m^3$ and ground level concentrations of arsenic do not exceed the hourly ambient criteria of 0.09 µg/$m^3$ during normal operations and bypass operating conditions.<br><br>The Propsoal shall include a commitment to complete the work within 12 months from the grant of this licence. | 6 months from grant of the licence |

| | | |
|---|---|---|
| **IR6** | The Licensee shall submit to the CEO a proposal to undertake ambient air monitoring programme, for not less than 12 calendar months, to determine ground level concentration of heavy metals at those sensitive receptors that are most likely to be impacted as predicted in the air emissions modelling report titled *SITA- Medicollect Australia, Welshpool, Western Australia, Incinerator Air Emissions Screening Assessment*, dated 26 November 2015 and authored by Golder Associates.<br><br>The Proposal shall include information on:<br><br>(i) monitoring locations which will be proposed in consultation with DER and sited in accordance with *AS/NZS 3580.1.1: Methods for sampling and analysis of ambient air - Guide to siting air monitoring equipment;*<br>(ii) parameters to be monitored;<br>(iii) proposed monitoring methodology in accordance with *AS/NZS 3580.9.3: Determination of total suspended particulates (TSP): High volume sampler gravimetric method* and detection limit for each parameter being monitored;<br>(iv) sampling methodology proposed including details of any quality assurance/ quality control procedures which will be established;<br>(v) proposed duration of each sampling event and justification for the same;<br>(vi) proposed analysis frequency and justification for the same;<br>(vii) proposed duration for the ambient air monitoring programme with the objective to capture representative data based on seasonal and annual wind profiles; and<br>(viii) plan for commencing ambient monitoring within three months of the Proposal being submitted | 30 days from grant of the licence |
| **IR7** | The Licensee shall undertake correlation between opacity and total particulate matter concentration for the existing Opacity Monitor installed on the baghouse stack in accordance with USEPA performance specification 11. | 12 months from grant of this licence |

# 5 Information

## 5.1 Records

5.1.1 All information and records required by the Licence shall:
(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;
(c) except for records listed in 5.1.1(d) be retained for at least 6 years from the date the records were made or until the expiry of the Licence or any subsequent licence; and
(d) for those following records, be retained until the expiry of the Licence and any subsequent licence:
(i) off-site environmental effects; or
(ii) matters which affect the condition of the land or waters.

5.1.2 The Licensee shall ensure that:
(a) any person left in charge of the Premises is aware of the conditions of the Licence and has access at all times to the Licence or copies thereof; and
(b) any person who performs tasks on the Premises is informed of all of the conditions of the Licence that relate to the tasks which that person is performing.

5.1.3 The Licensee shall complete an Annual Audit Compliance Report indicating the extent to which the Licensee has complied with the conditions of the Licence, and any previous licence issued under Part V of the Act for the Premises for the previous annual period.

5.1.4 The Licensee shall implement a complaints management system that as a minimum records the number and details of complaints received concerning the environmental impact of the activities undertaken at the Premises and any action taken in response to the complaint.

## 5.2 Reporting

5.2.1 The Licensee shall submit to the CEO an Annual Environmental Report within 21 calendar days after the end of the annual period. The report shall contain the information listed in Table 5.2.1 in the format or form specified in that table.

**Table 5.2.1: Annual Environmental Report**

| Condition or table (if relevant) | Parameter | Format or form[1] |
|---|---|---|
| - | Summary of any failure or malfunction of any pollution control equipment and any environmental incidents that have occurred during the annual period and any action taken | None specified |
| 3.2.1 | Monitoring data for point source emissions to air | None specified |
| 3.3.1 | Monitoring results for output of the Matrix System | As received by the Licensee from third parties |
| 3.4.1 | Process monitoring data | Excel sheet summary and graphical representation |
| 5.1.3 | Compliance | Annual Audit Compliance Report (AACR) |
| 5.1.4 | Complaints summary | None specified |

Note 1: Forms are in Schedule 2

5.2.2 The Licensee shall ensure that the Annual Environmental Report also contains:
(a) any relevant process, production or operational data recorded under Condition 3.1.3; and
(b) an assessment of the information contained within the report against previous monitoring results and Licence limits.

5.2.3 The Licensee shall submit the information in Table 5.2.2 to the CEO according to the specifications in that table.

**Table 5.2.2: Non-annual reporting requirements**

| Condition or table (if relevant) | Parameter | Reporting period | Reporting date (after end of the reporting period) | Format or form[1] |
|---|---|---|---|---|
| 1.3.4 | Report on availability and performance of continuous gas (Oxygen, CO and CO2) monitoring equipment | Quarterly | 14 calendar days | None specified |
| 3.1.3, 3.2.1 | Copies of original monitoring reports submitted to the Licensee by third parties and any relevant information pertaining to non-continuous monitoring | Six monthly | 14 calendar days | As received by the Licensee from third parties |
| 3.3.1 | Parameters specified for waste received at the premises and waste output from the incinerator, fuel input to the incinerator | As specified by the CEO | Within 14 calendar days of CEO's request | As specified by the CEO |
| 2.2.4 | Summary of all events that have led to the incinerator being placed in Interlock Mode, including:<br>(a) Date and time of each interlock mode was activated;<br>(b) Cause of each interlock event;<br>(c) Actions taken to remedy the cause identified;<br>(d) Actions taken to prevent recurrence. | Six monthly | 21 calendar days | None specified |

Note 1: Forms are in Schedule 2

## 5.3 Notification

5.3.1 The Licensee shall ensure that the parameters listed in Table 5.3.1 are notified to the CEO in accordance with the notification requirements of the table.

**Table 5.3.1: Notification requirements**

| Condition or table (if relevant) | Parameter | Notification requirement[1] | Format or form[2] |
|---|---|---|---|
| 2.1.1 | Breach of any limit specified in the Licence | As soon as practicable but no later than 5pm of the next usual working day. | N1 |
| - | Any failure or malfunction of any pollution control equipment | | None specified |
| - | Bypass of pollution control equipment resulting in unabated emissions being discharged to air | | |
| 1.3.4,3.7.1, 3.1.4 | Calibration report for the temperature sensors which identifies an error of 10% or more | As soon as practicable but no later than 2 working days from being aware of the non-conformance | None specified |
| 3.6.1 | Presence of faecal coliforms, *E.Coli* and thermotolerant coliforms | As soon as practicable but no later than 5 working days from being aware of the results | None specified |

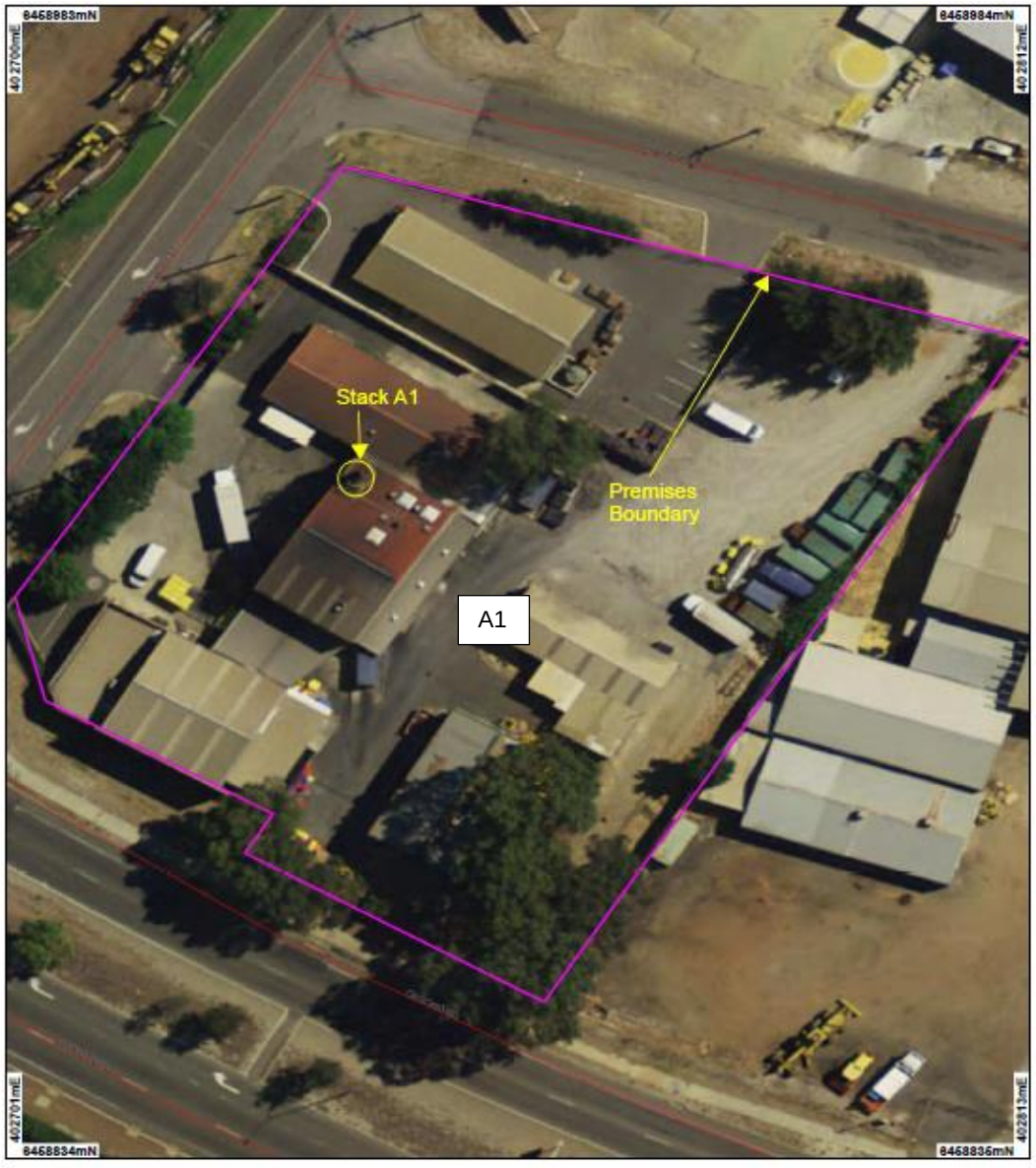
Note 1: Notification requirements in the Licence shall not negate the requirement to comply with s72 of the Act

Note 2: Forms are in Schedule 2

# Schedule 1: Maps

### Premises map

The Premises is shown in the map below. The pink line depicts the Premises boundary.



# Schedule 2: Reporting & notification forms

These forms are provided for the proponent to report monitoring and other data required by the Licence. They can be requested in an electronic format.

---

## ANNUAL AUDIT COMPLIANCE REPORT PROFORMA

## SECTION A

**LICENCE DETAILS**

| | |
|---|---|
| Licence Number: | Licence File Number: |
| Company Name:<br><br>Trading as: | ABN: |
| Reporting period:<br><br>_____ to _____ | |

**STATEMENT OF COMPLIANCE WITH LICENCE CONDITIONS**

1. Were all conditions of the Licence complied with within the reporting period? (please tick the appropriate box)

Yes ☐ Please proceed to Section C

No ☐ Please proceed to Section B

Each page must be initialled by the person(s) who signs Section C of this Annual Audit Compliance Report (AACR).

Initial:

# SECTION B
## DETAILS OF NON-COMPLIANCE WITH LICENCE CONDITION.

Please use a separate page for each Licence condition that was not complied with.

| |
|---|
| a) Licence condition not complied with: |
| |
| b) Date(s) when the non compliance occurred, if applicable: |
| |
| c) Was this non compliance reported to DER?: |
| ☐ Yes ☐ Reported to DER verbally<br>Date _____<br>☐ Reported to DER in writing<br>Date _____ ☐ No |
| d) Has DER taken, or finalised any action in relation to the non compliance?: |
| |
| e) Summary of particulars of the non compliance, and what was the environmental impact: |
| |
| f) If relevant, the precise location where the non compliance occurred (attach map or diagram): |
| |
| g) Cause of non compliance: |
| |
| h) Action taken, or that will be taken to mitigate any adverse effects of the non compliance: |
| |
| i) Action taken or that will be taken to prevent recurrence of the non compliance: |
| |

Each page must be initialled by the person(s) who signs Section C of this AACR

Initial:

# SECTION C

## SIGNATURE AND CERTIFICATION

This Annual Audit Compliance Report (AACR) may only be signed by a person(s) with legal authority to sign it. The ways in which the AACR must be signed and certified, and the people who may sign the statement, are set out below.

Please tick the box next to the category that describes how this AACR is being signed. If you are uncertain about who is entitled to sign or which category to tick, please contact the licensing officer for your premises.

| If the licence holder is | | The Annual Audit Compliance Report must be signed and certified: |
|---|---|---|
| An individual | □ | by the individual licence holder, or |
| | □ | by a person approved in writing by the Chief Executive Officer of the Department of Environment Regulation to sign on the licensee's behalf. |
| A firm or other unincorporated company | □ | by the principal executive officer of the licensee; or |
| | □ | by a person with authority to sign on the licensee's behalf who is approved in writing by the Chief Executive Officer of the Department of Environment Regulation. |
| A corporation | □ | by affixing the common seal of the licensee in accordance with the *Corporations Act 2001*; or |
| | □ | by two directors of the licensee; or |
| | □ | by a director and a company secretary of the licensee, or |
| | □ | if the licensee is a proprietary company that has a sole director who is also the sole company secretary – by that director, or |
| | □ | by the principal executive officer of the licensee; or |
| | □ | by a person with authority to sign on the licensee's behalf who is approved in writing by the Chief Executive Officer of the Department of Environment Regulation. |
| A public authority (other than a local government) | □ | by the principal executive officer of the licensee; or |
| | □ | by a person with authority to sign on the licensee's behalf who is approved in writing by the Chief Executive Officer of the Department of Environment Regulation. |
| a local government | □ | by the chief executive officer of the licensee; or |
| | □ | by affixing the seal of the local government. |

It is an offence under section 112 of the *Environmental Protection Act 1986* for a person to give information on this form that to their knowledge is false or misleading in a material particular. There is a maximum penalty of $50,000 for an individual or body corporate.

I/We declare that the information in this annual audit compliance report is correct and not false or misleading in a material particular.

SIGNATURE: _____

NAME:
(printed) _____

POSITION: _____

DATE: _____/_____/_____

SIGNATURE: _____

NAME:
(printed) _____

POSITION: _____

DATE: _____/_____/_____

SEAL (if signing under seal)

Licence: L6537/1994/13 Licensee: SITA Medicollect Australia Pty Ltd
Form: N1 Date of breach:

**Notification of detection of the breach of a limit.**

These pages outline the information that the operator must provide.
Units of measurement used in information supplied under Part A and B requirements shall be appropriate to the circumstances of the emission. Where appropriate, a comparison should be made of actual emissions and authorised emission limits.

| | |
|---|---|
| Licence Number | |
| Name of operator | |
| Location of Premises | |
| Time and date of the detection | |

| **Notification requirements for the breach of a limit** | |
|---|---|
| Emission point reference/ source | |
| Parameter(s) | |
| Limit | |
| Measured value | |
| Date and time of monitoring | |
| Measures taken, or intended to be taken, to stop the emission | |

| | |
|---|---|
| Name | |
| Post | |
| Signature on behalf of SITA Medicollect Australia Pty Ltd | |
| Date | |

Government of Western Australia
Department of Environment Regulation

# Decision Document

## *Environmental Protection Act 1986,* Part V

**Proponent:** **SITA Medicollect Australia Pty Ltd**
**Licence:** **L6537/1994/13**

| | |
|---|---|
| **Registered office:** | 3 Rider Boulevard<br>RHODES NSW 2138 |
| **ACN:** | 119 885 700 |
| **Premises address:** | SITA Medicollect<br>Lot 9 on Diagram 14206 and Lot 341 on Diagram 85<br>WELSHPOOL WA 6106<br>as depicted in Schedule 1. |
| **Issue date:** | Friday, 26 February 2016 |
| **Commencement date:** | Sunday, 28 February 2016 |
| **Expiry date:** | Wednesday, 27 February 2019 |

**Decision**

Based on the assessment detailed in this document the Department of Environment Regulation (DER), has decided to issue a licence. DER considers that in reaching this decision, it has taken into account all relevant considerations.

| | |
|---|---|
| Decision Document prepared by: | Gargi Joshi<br>Licensing Officer |
| Decision Document authorised by: | Ed Schuller<br>Delegated Officer |

# Contents



# 1 Purpose of this Document

This decision document explains how DER has assessed and determined the application and provides a record of DER's decision-making process and how relevant factors have been taken into account. Stakeholders should note that this document is limited to DER's assessment and decision making under Part V of the *Environmental Protection Act 1986.* 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 ☐<br>New Licence ☒<br>Licence amendment ☐<br>Works Approval amendment ☐ | |
| Activities that cause the premises to become prescribed premises | **Category number(s)** | **Assessed design capacity** |
| | 59 and 60 | 2000 tonnes per annual period cumulative |
| | 61A | 2000 tonnes per annual period |
| Application verified<br>Application fee paid | Date: 2 July 2015<br>Date: 15 July 2015 | |
| Works Approval has been complied with<br>Compliance Certificate received | Yes☐ No☐ N/A☒<br>Yes☐ No☐ N/A☒ | |
| Commercial-in-confidence claim | Yes☐ No☒ | |
| Commercial-in-confidence claim outcome | | |
| Is the proposal a Major Resource Project? | Yes☐ No☒ | |
| Was the proposal referred to the Environmental Protection Authority (EPA) under Part IV of the *Environmental Protection Act 1986*? | Yes☐ No☒ | Referral decision No:<br>Managed under Part V ☐<br>Assessed under Part IV ☐ |
| Is the proposal subject to Ministerial Conditions? | Yes☐ No☒ | Ministerial statement No:<br>EPA Report No: |
| Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the *Environmental Protection Act 1986*)? | Yes☐ No☒<br>Department of Water consulted Yes ☐ No ☒ | |
| Is the Premises within an Environmental Protection Policy (EPP) Area Yes☐ No☒ | | |
| Is the Premises subject to any EPP requirements? Yes☐ No☒ | | |

# 3 Executive summary of proposal and assessment

**OVERVIEW**

SITA Medicollect receives biomedical waste from hospitals, doctors, dentists, veterinary and other types of medical facilities for destruction and disposal. The company also accepts waste from Police and Customs including police uniforms, seized contraband, surveillance tapes and documents. The Premises receives clinical and related wastes, including pharmaceutical waste, chemical waste, cytotoxic waste and laboratory waste, generated at various healthcare providers in Western Australia. Other wastes received by the Facility include:

- Paper documents
- Animal carcasses from vet schools and research institutions (but not from vets or members of the public);
- Surplus hospital consumables; and
- Sharps from non-clinical outlets (e.g. tattooists, acupuncture);

The waste received at the Facility has previously been sorted at the source, with two types of bins been accepted at the Facility:

1) Purple lid bins for pharmaceutical, anatomical and cytotoxic waste;
2) Yellow lid bins for clinical waste.

Each of these sorted waste streams is processed differently at the Facility. Waste contained in orange lid bins is incinerated, whilst waste in the yellow lid bins can either be incinerated or treated by the Matrix Waste Treatment System, depending on client requirements. Waste originating from Police and Customs is incinerated.

The Premises has been in operation since the 1990s (originally operated as Stephenson and Ward incinerator) and is located in an industrial area. Residential development in the area has progressively reduced separation distance between the premises and sensitive receptors. Nearest residential dwelling is now approximately 100 meters from the Premises boundary.

**PROCESS DESCRIPTION**

**Incineration**

The maximum annual throughput of waste for incineration is 2,000 tonnes per annum.
Waste to be incinerated is loaded into the feed hopper before it is pushed by rams into the Primary Combustion Chamber where it is burnt. Bottom ash generated in this chamber is pushed into a rotary chamber, where it is mixed with process wastewater and discharged as a damp residue into uncovered storage bins. The bottom ash consists of combusted organic material, as well as uncombusted glass and metal fragments. The bottom ash is transferred to a licensed Class II landfill site for disposal.

The waste gas produced in the Primary Combustion Chamber is passed through an Aspiration Chamber containing three burners, one of which is in continuous operation; the remaining two buners are operated on an ‘as required’ basis. The waste gases pass through the Aspiration Chamber into the Secondary Combustion Chamber, which can be operated to maintain a temperature of 1100$^{o}$C for 1 second.

The hot waste gases (including flyash generated in the combustions chambers) are subsequently passed through a ceramic Heat Exchanger, a stainless steel Heat Exchanger and a Quench Tower in order to reduce gas temperature and minimise dioxin formation.

The cooled gases are then passed through a Rotary Lime Contactor in which the gas stream comes in contact with a mix of lime and activated carbon. The role of the lime is to treat the acid gases and volatile organic compounds (VOCs), whilst the activated carbon adsorbs dioxins and furans.

The treated cooled gas stream is passed through a bag filter to collect particulate matter (flyash and Rotary Lime Contactor residues). These solid residues are collected, transported via the Residue Conveyor and re-treated in the Matrix System (see below).[1]

Upstream of the bagfilter, the treated gas stream is emitted to air via a single stack. Currently, no Continuous Emission Monitoring System (CEMS) is in place.

**Matrix System**
Biomedical waste received at the Facility may also be treated in the Matrix Waste Treatment System which is a non-thermal (alkaline oxidation) treatment. Specifically, waste not containing sharps, cytotoxic, pharmaceutical or anatomical material (accepted in yellow lid bins) is treated by this method In addition, solid residues collected on the bagfilter are recycled into the Matrix System for further treatment prior to disposal to a Class II landfill.

Waste from the yellow lid bins is loaded into a hopper and then transferred to a Macerating Unit, where it is shredded to approximately 10mm x 10mm in size. The shredded waste is then dosed with lime solution and rolled for approximately 20 minutes in a Rotary Drum. The lime acts as an oxidizing agent, aiding in the sterilisation of the waste.

The wet sterilised waste is loaded into bins which are then transferred to a Bin Storage Area and stored for approximately 24 hours to allow for drainage of any wastewater. The wastewater is collected via a drainage system, and then recycled into the process. The drained waste is then transferred to a licensed landfill for disposal.

Key emissions associated with the Matrix System include:

- Potential for pathogen dispersal into air during waste shredding operations;
- Potential for public health hazard during handling, storage, transfer of product that has detectable pathogen concentrations due to optimum pH and residence time not being maintained
- Generation of process wastewater.

**Wastewater**
Two types of wastewater are generated at the Facility:

1) Contaminated wastewater
2) Rinse water

Rinse water is generated by the washing of the storage bins in a caustic solution. The waste water is collected in a Wastewater Pit which then drains into an underground storage tank.

**Other Key Infrastructure**

1) Plastics Recycling Shed: SITA Medicollect accept plastic waste from medical facilities (e.g. tubing, pans) which is not deemed to be contaminated. The items are washed in an industrial washing machine at approximately 90-95 $^{o}$C and then sold to a plastic recycler.
2) Emergency Refrigerated Storage: A refrigerator is available on site to store biomedical wastes for a 24 hour period in the event that the incinerator is not available.

[1] Solid residues, as collected on the bag filter, are not suitable for disposal to a Class II landfill.

**AIR QUALITY MODELLING**

Under an Improvement Requirement issued by DER in August 2015, SITA conducted air emissions modelling for the Facility. This modelling was presented in the report, "*Incinerator Air Emissions Screening Assessment",* Golder Associates, 26 November 2015, which was subsequently reviewed by the DER's Air Quality Branch. This modelling identified that contaminants of significant concern include nitrogen oxides, acid gases and heavy metals. In particular, predicted ground level concentrations of cadmium and arsenic at sensitive receptors were shown to be likely to be significant during normal operations, with potential exceedance of ambient health criteria likely under bypass conditions.

**LICENCE RENEWAL**

Through this licence renewal process, the following issues were identified:

- Inadequate separation distance between the Premises and receptors;
- Variability of the air emissions profile due to a heterogeneous incoming waste stream;
- Limitations on quantifying air emissions variability during different operating scenarios including abnormal operations, bypass events and frequent start-up/ shut-downs due to absence of continuous emissions monitoring;
- Operational and process controls during normal operations and bypass events; and
- Unavailability of auxiliary burners in primary and secondary combustion chambers to achieve desired incineration temperatures prior to loading clinical waste.

Conditions have been included in this Licence to address the issues mentioned above. In addition, specific conditions have been included on the Licence requiring SITA Medicollect to undertake ambient air monitoring for heavy metals to assess potential exposure of sensitive receptors.

Stack emission limits have been reviewed in line with industry standards and a requirement for installing a Continuous Emissions Monitoring System (CEMS) has been specified. The licence also specifies management actions for start up/ shut-downs and abnormal operations.

Improvement requirements (IR) have been added to the licence requiring the licensee to submit operational plan for the incinerator, process monitoring plan detailing techniques used to ensure compliance with optimum incineration temperature and an abatement plant bypass management plan.

An Improvement Requirement has also been specified requiring the Licensee to submit a Process Monitoring Plan for the Matrix System, with details of performance objectives, proposal for routine sampling programme and proposal to monitor key operational parameters such as temperature and pH. In addition, the Licence includes conditions specifying monitoring requirements for the waste product generated by the Matrix System.

DER has considered changes to the receiving environment (receptor proximity); evidence available through published research reports on potential health impacts of incinerators, technological advances and industry standards for similar installations. Department of Health, Western Australia, document *Clinical and related Waste Management Policy* identifies potential health risks associated with segregation, storage, transport and disposal of these waste streams.

This licence has been issued for duration of three year in accordance with DER's guidance statement on Licence Duration, published May 2015. As the Premises also incinerates waste streams that are not classified as 'biomedical waste', the licence has been updated to include 'Category 60: Incineration' as specified in Schedule 1 of the *Environmental Protection Regulations 1987*.

# 4 Decision table

All applications are assessed in line with the *Environmental Protection Act 1986*, the *Environmental Protection Regulations 1987* and 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** | | | |
|---|---|---|---|
| **Works Approval / Licence section** | **Condition number W = Works Approval L= Licence** | **Justification (including risk description & decision methodology where relevant)** | **Reference documents** |
| **General conditions** | L 1.2.1<br><br>L1.2.2, 1.2.3, L1.3.3 | Conditions relating to abatement, process control and monitoring of emissions are included in the licence. L1.2.1 requires the licensee to operate and maintain pollution control and monitoring equipment in accordance with manufacturer's specifications or any internal management systems. L1.2.1 replaces condition 65 on previous licence.<br><br><u>Emission Description</u><br>*Emission*: Stormwater contamination from spillage/ loss of containment .The Premises stores a range of waste types including clinical waste, chemical waste, pharmaceutical waste, cytotoxic waste and general waste. Chemicals such as lime, activated carbon which are used in abatement process are stored on premises. Process residues including fly ash and incineration ash and output of the non-thermal treatment process (matrix system) is stored in containers on premises awaiting disposal offsite. Process wastewater from binwashing activities is stored onsite in an impervious tank for offsite disposal. Flyash from incineration process, which may contain heavy metals, leachable compounds is stored in bins, outside the roofed area, for subsequent use in the non-thermal treatment (matrix system). Improper storage, failure of containment or spillage/ accidents can lead to release of these materials in environment.<br>*Impact:* There is potential for stormwater contamination if any spillage outside an engineered containment system is not immediately recovered or removed. The Premises is located in an industrial area and has concrete floors. There are no sensitive surface water bodies nearby.<br>*Controls:* The premises is not connected to sewers. Stormwater onsite is discharged | N/A |

| DECISION TABLE | | | |
|---|---|---|---|
| **Works Approval / Licence section** | **Condition number W = Works Approval L= Licence** | **Justification (including risk description & decision methodology where relevant)** | **Reference documents** |
| | | through soak wells. Process wastewater generated on the premises is contained for disposal offsite. Incoming waste is stored in bins in roofed areas with impervious floors.<br><br>Risk Assessment<br>*Consequence:* Minor<br>*Likelihood*: Possible<br>*Risk Rating:* Moderate<br><br>Regulatory Controls<br><br>L1.2.2 replaces condition 78 on previous licence. Condition 75 on previous licence is incorporated in Condition 1.3.3. Condition 76 and 77 on previous licence have been retained as condition 1.2.3 and 1.2.4.<br><br>Any discharge of stormwater from the site will be regulated by the Unauthorised Discharge Regulations.<br><br>Residual Risk<br>*Consequence:* Minor<br>*Likelihood*: Unlikely<br>*Risk Rating:* Moderate | |
| **Premises operation** | L1.3.1-1.3.5 | See *Appendix A* '*Point source emissions to air'* for details of risk assessment. | N/A |
| **Emissions general** | L2.1.1 | Numeric and descriptive limits have been set through section 2 of the licence and therefore condition regarding recording and investigation of exceedances of limits has been included. | N/A |

| DECISION TABLE | | | |
|---|---|---|---|
| **Works Approval / Licence section** | **Condition number<br>W = Works Approval<br>L= Licence** | **Justification (including risk description & decision methodology where relevant)** | **Reference documents** |
| **Point source emissions to air including monitoring** | L1.3.4- L1.3.7<br>L2.2.1 -L2.2.3<br>L3.2.1-L3.2.3 | DER's assessment and decision making are detailed in *Appendix A*. | National Environmental Protection Measure (Ambient Air Quality)- Schedule 2, commenced 8 July 1998<br><br>Report and recommendations of the Environmental Protection Authority and the Waste Authority *Environmental and health performance of waste to energy technologies*, Report 1468, March 2013 |

| DECISION TABLE | | | |
|---|---|---|---|
| **Works Approval / Licence section** | **Condition number W = Works Approval L= Licence** | **Justification (including risk description & decision methodology where relevant)** | **Reference documents** |
| **Fugitive emissions** | - | Emission Description (normal operations)<br>*Emission*: Fugitive emissions of lime and activated carbon, which are used in abatement process, may be possible during storage, handling, and transfer operations. Improper storage, failure of containment or spillage/ accidents can cause fugitive emissions.<br>*Impact:* Residential development is less than 100 metres away from the premises. Fugitive emissions may cause localised impact alead to complaints. Lime dust can be corrosive.<br>*Controls:* Lime and activated carbon is stored in a shed. Incineration ash is slurried prior to disposal offsite. Flyash from incineration process, which may contain heavy metals, leachable compounds is stored in bins, outside the roofed area, for subsequent use in the non-thermal treatment (matrix system).<br><br>Risk Assessment<br>*Consequence:* Insignificant<br>*Likelihood*: Unlikely<br>*Risk Rating:* Low<br><br>Regulatory Controls<br>General provisions of the EP Act.<br><br>Residual Risk<br>*Consequence:* Insignificant<br>*Likelihood*: Rare<br>*Risk Rating:* Low | |

| DECISION TABLE | | | |
|---|---|---|---|
| **Works Approval / Licence section** | **Condition number W = Works Approval L= Licence** | **Justification (including risk description & decision methodology where relevant)** | **Reference documents** |
| **Odour** | - | Emission Description (abnormal operations)<br><br>*Emission*: The Premises accepts clinical waste which may include infectious waste, human tissue waste, and animal waste. During normal operations, the Licensee stores these wastes in a refrigerated storage facility. However failure of the refrigerated storage or failure to store these wastes into the refrigerated facility may lead to odour emissions.<br>*Impact:* Residential development is less than 100 metres away from the premises. Odour emissions can affect amenity and may have limited localised impact with potential complaints.<br>*Controls:* Clinical waste is not stored at the premises for a period in excess of 30 days from the date of receipt. Clinical waste is incinerated within 48 hours of receipt unless stored in refrigerated storage.<br><br>Risk Assessment<br>*Consequence:* Minor<br>*Likelihood*: Unlikely<br>*Risk Rating:* Moderate<br><br>Regulatory Controls<br>Condition 1.3.3 specifies that the licensee may receive waste only if adequate refrigerated storage capacity is available and that clinical waste (excluding sharps) is incinerated within 48 hours of receipt.<br><br>Residual Risk<br>*Consequence:* Minor<br>*Likelihood*: Rare<br>*Risk Rating:* Low | |

| DECISION TABLE | | | |
|---|---|---|---|
| **Works Approval / Licence section** | **Condition number W = Works Approval L= Licence** | **Justification (including risk description & decision methodology where relevant)** | **Reference documents** |
| **Monitoring general** | L3.1.1-3.1.5 | Point source emissions monitoring and process monitoring requirements are specified in section 3 of the licence. Condition 3.1.1 specifies duration between periodic stack monitoring events. Condition 3.1.2 requires that the licensee notes relevant production or throughput data for non-continuous monitoring events. Conditions 3.1.3 and 3.1.4 specify calibration requirements for monitoring equipment. Condition 3.1.5 requires that the licensee records type and quantity of waste being incinerated at the time of monitoring as these parameters have an impact on emissions profile. See risk assessment for point source emissions to air for details. | |
| **Monitoring of inputs and outputs** | L3.3.1 | DER's assessment and decision making are detailed in *Appendix A*. | |
| **Process monitoring** | L3.4.1 | DER's assessment and decision making are detailed in *Appendix A*. | |
| **Improvements** | IR1-IR8<br><br>L4.1.1 | DER's assessment and decision making are detailed in *Appendix A*.<br><br>Specifies completion dates for improvement requirements prescribed in the licence. | |

| DECISION TABLE | | | |
|---|---|---|---|
| **Works Approval / Licence section** | **Condition number W = Works Approval L= Licence** | **Justification (including risk description & decision methodology where relevant)** | **Reference documents** |
| **Information** | L5.1.1-5.1.4<br>L5.2.1-5.2.3<br>L5.3.1 | Condition 5.1.1 specifies records keeping requirements. Condition 5.1.2 requires the licensee to ensure that any person in charge of the premises is aware of requirements of the licence and has access to it and that any person performing tasks on the premises are aware of relevant requirements set in the licence. L5.1.3 requires the licensee to undertake self-compliance assessment and submit the Annual Audit Compliance Report. Condition 5.1.4 requires the licensee to implement a complaints management system to ensure that appropriate actions can be initiated to address any issues.<br><br>Annual Environmental Report submission is required through condition 5.2.1 and 5.2.2 to enable DER to review operations of the premises on an ongoing basis. Additional non-annual reporting requirements relating to submission of monitoring data and operational data are specified through condition 5.2.3. Notification requirements relating to breach of licence conditions and failure / malfunction of the abatement are specified in condition 5.3.1. | |
| **Licence Duration** | - | The Premises is classified as a Moderate Risk premises. However, taking into account the risk assessment outcome for emissions to air and information requested through improvement requirements in the licence to enable re-assessment of emissions and discharges from the premises, it is considered appropriate to grant the licence for three years duration, | |
| **Previous licence conditions** | - | This review and risk assessment has included conversion of the old format of the licence to new template. See *Appendix A* Table 1 for summary of how new licence has considered conditions from previous version. | L6537/1994/12 |

# 5 Advertisement and consultation table

| Date | Event | Comments received/Notes | How comments were taken into consideration |
|---|---|---|---|
| 27/07/2015 | Application advertised in West Australian (or other relevant newspaper) | No comments received | Not applicable. |
| 29/09/2015 | Formal advice sought from Radiological Council regarding identification and management of radioactive or potentially radioactive waste or wastes containing radiation levels below the exempt quantities defined under the *Radiations Act* | No comments received. | Licence does not authorise receipt of radioactive waste on the premises. The requirement has been retained. Radiological council is listed as a stakeholder for final input if required. |
| 08/01/2016 | DER met with representatives from SITA Medicollect to discuss the outcome of air emissions modelling assessment submitted by the proponent and recommended that ambient air monitoring be conducted for a period of 12 months to determine potential exposure of sensitive receptors, located in areas where modelling outcomes have predicted potential exceedances of ambient health criteria.<br><br>SITA Medicollect agreed to submit an Ambient Air Monitoring proposal for DER's consideration and requested DER to clarify minimum requirements which need to be addressed. Advice was provided to SITA Medicollect on 15 January 2016. | On 3 February 2016 SITA Medicollect submitted Ambient Air Sampling Proposal for DER's consideration.<br><br>SITA Medicollect have proposed to undertake ambient monitoring for a span on 1 month only rather than the 12 months recommended by DER. | DER's view is that ambient air monitoring for one month will not be valuable in terms of assessing potential exposure risk of sensitive receptors as various meteorological conditions that are expected to occur in a year, will not be captured.<br><br>Improvement requirement has been added to the licence requiring SITA Medicollect to submit a proposal to undertake ambient air monitoring programme proposal for not less than 12 months. |
| 11/01/2016 | Comments requested from local government authority- City of Canning regarding application for licence renewal. | No comments received. | Not applicable. |

| Date | Event | Comments received/Notes | How comments were taken into consideration |
|---|---|---|---|
| 18/02/2016 | A copy of proposed licence conditions sent to Licensee for comment. | Key issues raised by Licensee include:<br><br>***Condition 1.3.1- Waste acceptance criteria :***<br>• Seeking supporting documentation from customers demonstrating compliance with waste acceptance criteria is not feasible given small generators, collection times and location of waste to be collected. To require such documentation this from large customers will need buy-in from Department of Health.<br>• SITA recommended rewording the condition text to include that waste may be accepted on to premsies if it is generated by customers known to the Licensee, already engaged as customers, and whose type of business is fully understood; or in case of new customers, where the likely nature and type of waste is clearly established before any waste is accepted.<br>• SITA raised that specification in Table 1.3.1 should be reviewed as obtaining information on contents of waste stream and contaminants of concern is not feasible. | As detailed in the risk assessment, key objective of establishing waste acceptance criteria is to identify non-conforming waste. Also, it is expected that such practices identify whether the waste stream is likely to contain greater than 1% halogenated content which requires incineration at 1100$^{o}$C. Waste acceptance procedures should also be able to identify source/ generator of waste to enable further investigation into any future limit exceedances.<br><br>DER has considered comments provided by SITA and updated condition 1.3.1 to state that Licensee's 'waste pre-acceptance procedures' should demonstare compliance with waste acceptance criteria. Parameters specified in Table 1.3.1 which must be recorded for incoming aste streams have been reviewed as per SITA's comments. |
| | | ***Incineration temperature and residence time***<br>• *Waste Incineration Directive, UK* requires that secondary temperature above 1100$^{o}$C be achieved for substances that contain >1% halogenated substances. This criteria should not be applied to Pharmaceuticals waste. SITA agrees to incinerating cytotoxic waste above 1100 $^{o}$C.<br>• Due to design constraints of the plant, residence time of 2 seconds at 1100 $^{o}$C cannot be achieved for secondary combustion. Residence time of 1 second can be achieved at that temperature. Retrofitting a larger secondary chamber is not considered to be a viable option. Initial investigation conducted by SITA indicates that installing burners in primary chamber is not feasible. Improvement requirement IR3 should be reviewed. | Incineration temperature, residence time are key operational controls to achieve volatile organic compounds destruction efficiency.<br><br>Risk assessment based on air emissions modelling results submitted by SITA classifies VOC emissions as High risk (after considering existing proponent controls). This is particularly important in light of the fact that the term 'VOC' can indicate a large range of chemical substances with varying toxicities which have not been specifically modelled or identified.<br><br>DER has considered SITA's comments and made following changes: |

| Date | Event | Comments received/Notes | How comments were taken into consideration |
|---|---|---|---|
| | | • Continuous emissions monitoring system (CEMS) to be installed will highlight any limit exceedances. | Operational requirement for residence time, specified in Table 1.3.3, has been updated to 1 second (instead of 2 seconds) which is currently achieved by SITA to allow operation in the interim.<br><br>However, this is on the understanding that, in accordance with Improvement Requirement 3, SITA submits a proposal investigating improvements required or alternative techniques to be employed to prevent feeding waste to primary chamber at start-up and to maintain residence time of at least 2 seconds.<br><br>DER has highlighted to SITA that, given the proximity of receptors and outcome of risk assessment, DER considers this as a key issue which requires control to ensure environmental and public health risks are minimised. |
| | | **Improvement requirement IR 5**<br>• Licensee does not agree that multi-compartment baghouse is required. Existing opacity meter and proposed CEMS will identify any bag failures immediately and the plan can shut-down within 90 minutes after which the bag house could be taken off-line and repaired.<br>• Installation of emergency power source is not feasible. Licensee has engineered out by-passes due to power outages of a duration less than one minute. | Risk assessment undertaken classifies heavy metals emissions as High Risk during both normal operations and bypass scenarios. Based on predicted air emissions modelling outcomes, there is potential for severe consequence during bypass scenario- given receptor proximity and magnitude of exceedance predicted.<br><br>Key regulatory strategy to minimise the potential for such an impact occurring is to ensure that bypass scenarios are eliminated. While SITA may have minimised bypasses, associated with power failure, modelling results indicate that this still presents significant risk to receptors. Also, recent data shows that there is potential for longer duration over failure occurring.<br><br>Bypass that is triggered by failure of baghouse is also considered critical and installing multi-compartment |

| Date | Event | Comments received/Notes | How comments were taken into consideration |
|---|---|---|---|
| | | | baghouse is the recommended option. Response time of 90 minutes until shut-down to be able to repair failed bag/s is long and modelling results show that there is potential for receptors to be impacted. Multi-compartment baghouses are standard for most new installations and is considered appropriate for this site given inadequate separation distance from sensitive receptors.<br><br>IR 5 has been retained. |
| | | **Improvement requirement IR6- ambient monitoring proposal:**<br><br>Undertaking ambient monitoring for 12 months is not commercially viable and the sum involved would be better spent on upgrading the plant. SITA proposes to undertake one month survey. | As above, risk assessment shows that heavy metals emissions during both normal operations and bypass scenarios are High Risk. DER acknowledges SITA's comment that the sum involved would be better spent on plant upgrades.<br><br>Ambient monitoring as a regulatory strategy is recommended to determine and assess the ground level concentrations of heavy metals (including cadmium) which the receptors are potentially exposed to. DER notes the status of the plant as the only biomedical waste incinerator in the state and has considered this in its regulatory strategy to provide time for SITA to address ground level impacts. Ambient monitoring is a critical element in this strategy to ensure the<br><br>As such one month monitoring will not provide valuable data to aid this assessment. Duration of ambient monitoring may be reviewed where SITA |

| Date | Event | Comments received/Notes | How comments were taken into consideration |
|---|---|---|---|
| | | | provide solid proposal or commitments regarding infrastructure upgrades targeted at minimising or controlling the root cause.<br><br>In the absence of it and given associated risk to environment and public health, ambient monitoring is considered appropriate, whilst the facility continues to operate with its current emission profile.<br><br>IR6 has been retained. |

# 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**

The Premises has been in operation since the 1990s (originally operated as Stephenson and Ward incinerator) as the only incinerator in Western Australia for Biomedical waste incineration. The site is located in an industrial area, however residential development in the area has progressively reduced separation distance between the premises and sensitive receptors. Nearest residential dwelling is now less than 100 meters from the Premises boundary.

Previous versions of the licence have required the Licensee to comply with emissions limits that were set in accordance with the Environmental Protection Authority's *Guidance Statement No 13. Management of Air Emissions from Biomedical Waste Incinerators, March 2000*. This Guidance Statement has now been rescinded so the relevance of existing licence limits needs to be reviewed.

Key concerns associated with operations at the premises are:

- Inadequate separation distance between the premises and receptors;
- Variability of air emissions profile due to heterogeneous incoming waste stream which the licensee has limited control over;
- Limitations on quantifying air emissions variability during different operating scenarios including abnormal operations, bypass events and frequent start-up/ shut-downs due to absence of continuous emissions monitoring;
- Operational and process controls during normal operations and bypass events; and
- Unavailability of auxiliary burners in primary and secondary combustion chambers to achieve desired temperatures prior to loading clinical waste.

Through previous licence renewal process, DER issued a short term licence in 2014 and required the licensee to complete an assessment of the current operation at the premises against industry standards or justify achieving a lower level of performance by demonstrating that there are no ground level impacts. The Licensee has now completed a detailed air emissions modelling study, in accordance with DER's (the then DoE's) *Air Quality Modelling Guidance Notes 2006*. Historical stack emissions monitoring data was used to develop an emissions profile of key contaminants during normal operating conditions. By-pass conditions were represented by scaling normal operation condition emission rates by factors derived from controlled and uncontrolled emission rates provided in USEPA AP 42 '*Compilation of Air Pollutant Emission Factors: Solid Waste Disposal: Medical Waste Incineration'*.

The air emissions modelling report titled *Incinerator Air Emissions Screening Assessment, SITA-Medicollect Australia, Welshpool, Western Australia*, authored by Golder Associates and dated 26 November 2015 A has been reviewed by DER's air quality experts. Key outcomes based on DER's assessment of the air emissions modelling study submitted are as below:

- The modelling assessment has been undertaken using acceptable methodology.
- It should be noted that dispersion models typically used for air quality impact assessments, including the AERMOD model used in this study, have significant limitations at near-field distances when stack downwash, owing to complex building arrangements, is involved. As such, results should be interpreted as being indicative only.

The modelling has been undertaken with following assumptions which are considered to be conservative for normal operations.

- The incinerator operates Monday to Friday, 05:00- 19:00 however, for the purposes of modelling, the hours of operation were considered 05:00- 19:00, 7 days a week.
- Maximum emissions as reported in SITA Medicollect's past monitoring reports were used to model normal operating conditions.

By-pass scenario conditions were conservatively modelled for each hour of normal operating hours. SITA Medicollect have noted that, based on past experience, it is expected that by-pass conditions would occur less than five times per year, each for less than 1 hour (usually less than 10 minutes). However, there is potential for bypass to occur for longer than 10 minutes.

Emission factors based on USEPA's *AP 42 Compilation of Air Pollutant Emission, Chapter 2: 'Solid Waste Disposal: Medical Waste Incineration*' have been used to predict emissions during by-pass conditions. Start-up/ shut-down has been modelled as normal operations based on the assumption that no waste is incinerated during start-up/ shut-down (i.e. at least 45 minutes after the incinerator burners are switched on and at least 90 minutes before the incinerator burners are switched off). Consultation with Licensee has revealed that baghouse is bypassed during start-up until the exhaust gas temperature exceeds 140$^{o}$C when no waste is in the combustion chamber. However the licensee incinerates waste containing flammable components (including alcohol/ spirits and general waste- defined in the licence) to reach temperatures higher than 700$^{o}$C. The primary combustion chamber does not have any auxiliary burners installed. While this practice is not ideal, it is expected that as the abatement plant is operational at this stage, any emission peaks during start-up/shut-down will be representative of normal operations.

Table 1 presents a comparison of maximum predicted ground level concentrations (GLCs) (highest value of normal and bypass operations) of key contaminants against DER adopted criteria for ambient air emissions.

**Table 1: Model predicted maximum GLCs (highest value of normal and bypass operations) at discrete receptors**

| Pollutant | Maximum modelled one hour GLC (µg/m$^3$) | Modelled annual average GLC (µg/m$^3$) | Criteria (µg/m$^3$) | | Percentage of Criteria[1] | |
|---|---|---|---|---|---|---|
| | | | Hourly | Annual | Hourly | Annual |
| $NO_2$ | 73[4] | 14 | 246 | 62 | 30%[2] | 23%[2] |
| $H_2SO_4$ | 3.4[5] | - | 18 | - | 19%[2] | - |
| HCl | 34[5] | - | 140 | - | 24%[2] | - |
| As | 0.21[5] | - | 0.09 | - | 233%[3] | - |
| Cd | 0.46[5] | 0.0021 | 0.018 | 0.005 | 2556%[3] | 42%[2] |
| Pb | 80[5] | 0.075 | - | 0.5 | - | 15%[2] |
| Hg | 0.51[5] | 0.0058 | 1.8 | 1 | 28%[2] | 1% |

Note 1: Criteria specified in DER's DRAFT *Environmental Risk Assessment Framework* (December 2015).
Note 2: GLC exceeds 10% of specified criteria.
Note 3: GLC exceeds the specified criteria.
Note 4: GLC predicted at discrete receptors during normal operating condition
Note 5: GLC predicted at discrete receptors during bypass conditions

Notwithstanding the modelling limitations, analysis presented in Table 1 shows that concentrations of Arsenic and Cadmium during both normal and bypass operations are of significant concern and require further investigation. GLCs of other modelled contaminants are not predicted to exceed ambient criteria specified during normal and bypass operations; however for those other contaminants included in Table 1, predicted GLC are still considered significant for the purpose of regulation due to model uncertainties.

Regulatory strategy discussed in following section focusses on:

- Assessment of potential ground level impacts of heavy metals (including Cd and As) on sensitive receptors using ambient monitoring to validate the assumptions made in modelling;
- Installation of critical infrastructure for the monitoring of key process parameters/emissions and abatement plant for the elimination of bypass events;
- Determination of variability of emissions profile from incinerator stack during normal, abnormal (bypass) and start-up/ shut-down operating conditions using continuous stack emissions monitoring (CEMS); and
- Maintaining key process parameters such as incineration temperature and residence time.

***Emission Risk Assessment – Normal Operations and Bypass conditions***

Profile of emissions generated from incineration process is dependent on a number of parameters including characteristics of the waste stream and potential contaminants present in incoming waste, temperature of incineration process, residence time of flue gas generated in the secondary combustion zone, efficiency of the incineration process, process controls and end of pipe controls. Chemical and physical characteristics of different waste materials vary widely. Clinical wastes can also vary considerably in composition and consequently in heat release, moisture content and bulk density from one container to the next.

Biomedical/ clinical waste incineration has the potential to release a wide variety of contaminants including particulate matter( fly ash), heavy metals (arsenic, cadmium, chromium, copper, mercury, manganese, nickel, lead, etc.), acid gases (hydrogen chloride, hydrogen fluoride, sulfur oxides, nitrogen oxides), carbon monoxide, dioxins, furans, polycyclic aromatic hydrocarbons (PAHS) and volatile organic compounds (eg: benzene, carbon tetrachloride, chlorophenols, trichloroethylene, toluene, xylenes, trichloro-trifluoroethane, polycyclic aromatic hydrocarbons, vinyl chloride, etc).

The Licensee also incinerates waste including police uniforms, contraband seized by police and customs, surveillance tapes and documents and quarantine waste. DER does not have information on characteristics of these wastes to risk assess potential emissions from incineration of these waste streams however regulatory control specified below, when implemented, are expected to be adequate to address potential risks.

Pathogens may be present in solid residues and in the exhaust of incinerators where optimum temperature and residence time requirements are not met. In addition, radioactive contamination of clinical waste, presence of radionuclides in clinical or laboratory waste and presence of technically enhanced naturally occurring radioactive waste is also considered possible in waste received from healthcare facilities.

The section below demonstrates DER's risk assessment and decision making process for each contaminant during normal and abnormal (bypass) operating conditions.

Various regulatory controls targeting more than one contaminant have been recommended. To aid in clarity, these regulatory controls have been summarised at the end of the risk assessment for emissions to air.

For the purpose of risk assessment, normal and abnormal operating conditions for which risk assessment has been conducted are considered as below:

**Normal operations:** When incineration temperature of 850$^{o}$C is maintained for clinical waste and incineration temperature of 1100 $^{o}$C is maintained for chemical waste, pharmaceutical waste, cytotoxic waste or any waste with a content of more than 1% halogenated organic substances, expressed as chlorine and when the pollution control system which is used to treat incineration exhaust gases (including the adiabatic quench system, lime and activated carbon dosing system and bag filter) is operational.

**Abnormal operations:** Means period of any technically unavoidable stoppages, disturbances, or failures of the abatement devices or the measurement devices or any events that result in the abatement plant being bypassed. Consultation with Licensee indicates that failure of process temperature monitoring equipment (thermocouples) can result in abnormal process conditions until the failed equipment is replaced. The Licensee has indicated that rate of failure of thermocouples is low. Other events when air pollution abatement may be bypassed include, power failure, loss of air pressure, failure of water cooling system on adiabatic quench system or baghouse damper failure. Baghouse installed is a single zone design and any failure or replacement of bag will require bypassing the equipment.

**Table 2: Predicted GLCs of contaminants modelled**

| Contaminant | Maximum Predicted GLC (µg/m$^3$) | | Criterion (µg/m$^3$) | % of Criterion | |
|---|---|---|---|---|---|
| | Normal operations | Bypass | | Normal operations | Bypass |
| NOx | 73 | 56 | 246 | 30% | 23% |
| CO | 240 | 300 | 30000 | 0.8% | 1% |
| PM*(24 hr) | 20 | 22 | 50 | 40% | 44% |
| Sb | 0.011 | 0.31 | 9 | 0.12% | 3.44% |
| As | 0.040 | 0.21 | 0.09 | 44.4% | 233% |
| Pb(1year) | 0.031 | 0.075 | 0.5 | 6.2% | 15% |
| Hg | 0.14 | 0.51 | 1.8 | 7.8% | 28.3% |
| Mo | 0.028 | Not modelled | 120 | 0.023% | - |
| Cd | 0.026 | 0.46 | 0.018 | 144% | 2555.6% |
| HCl | 2.8 | 34 | 140 | 2.1% | 24.28% |
| HF(24hr) | 0.045 | 0.074 | 2.9 | 1.55% | 2.55% |
| $H_2SO_4$ | 1.7 | 3.4 | 18 | 9.44% | 18.89% |
| $SO_2$ | 22 | 30 | 572 | 3.85% | 5.24% |
| Dioxin and furan | $4.6*10^{-9}$ | $1.5*10^{-7}$ | $2*10^{-6}$ | 0.23% | 7.5% |
| VOCs (modelled as Benzene) | 11 | 10 | 29 | 37.9% | 34.5% |

Emission Description – Nitrogen Oxides ($NO_2$)

*Emission:* Nitrogen oxides (mainly NO and NO2) are formed during combustion by oxidation of nitrogen chemically bound in waste and reaction between molecular nitrogen and oxygen in the combustion air.

*Impact:* Key environmental impacts associated with $NO_2$ emissions arise due to their potential photochemical activity. Nitrogen oxide is also known irritant gas. The Premises is located in an industrial area however residential development is less than 100 meters away. Air emissions modelling data indicates that during normal operations, NOx emissions are likely to be 30% of the 1 hour ambient air emissions criteria. There is potential for localised impact.

Ambient NOx emissions during bypass conditions are likely to be 23% of the 1 hour ambient emissions criteria. The decrease compared to normal operating conditions can be attributed to difference in estimation of emissions based on source emission factors (bypass conditions) and predicting emissions based on actual stack monitoring results (normal operations).

Control: Primary process controls including maintain combustion temperature and controlling fuel-air ratio of combustion process. No other end of pipe controls are used.

Risk Assessment: Normal operations and bypass
*Consequence:* Minor
*Likelihood*: Likely
*Risk*: Moderate

Emission Description – Carbon monoxide

*Emission:* CO is the product of incomplete combustion. Its presence can be related to insufficient oxygen, combustion (residence) time, temperature and fuel/air mixing in the combustion zone.

Impact: CO above recommended ambient criteria can be toxic. Modelled data shows that CO emissions during bypass (300 µg/$m^3$) are likely to be 1% of the criterion and emissions during normal operations are likely to be 0.8% of the criterion.

Control: Controlling combustion efficiency is the key control. No other end of pipe controls are used.

Risk Assessment: Normal operations
*Consequence:* Insignificant
*Likelihood*: Likely
*Risk*: Moderate

Risk Assessment: Bypass
*Consequence:* Insignificant
*Likelihood*: Possible
*Risk*: Low

Emission Description – Particulate Matter

*Emission:* Particulate matter is emitted as a result of incomplete combustion of organics (soot) and by the entrainment of non-combustible ash due to the turbulent movement of combustion gases. Particulate matter may exist as a solid or aerosol, and may contain heavy metals, acids, and/or trace organics. Abnormal operations can result in emission peaks where abatement equipment is bypassed or if waste is incinerated at a temperature below optimum.

*Impact:* Particulate matter concentrations above ambient criteria can potentially impact public health and cause respiratory illness. Environmental impacts associated with high particulate concentration include reduced visibility, deposition of particulates on ground and in waterways and aesthetic damage. The Premises is located in an industrial area however residential development is less than 100 meters away.

The air emission modelling assessment indicates that during normal operations, particulate matter concentration (expressed as $PM_{10}$) are likely to be 40% of the 24 hour criteria. Predicted $PM_{10}$ concentrations during bypass conditions are likely to be 44% of the 24 hour criteria.

*Control:* Bag filter is used during normal operations. However it is noted that the air emissions modelling is based on actual stack monitoring results and as such indicates ambient concentrations expected when the control is operational.

The process control has a number of warning alarms to indicate upset/ abnormal conditions. The Licensee has indicated that they have the ability to either reduce the charging rate or place the incinerator on an interlock mode or to initiate shut-down as necessary to avoid having to bypass the abatement equipment. Hydraulic Power pack for the incinerator loader was replaced in 2013 to eliminate problems with fire doors sticking which could release smoke into the environment. Ceramic heat exchanger tubes were replaced in 2013 to maintain adequate draught and to eliminate the possibility of smoking due to poor combustion caused by leaking tubes.

Risk Assessment: Normal operations
*Consequence:* Minor
*Likelihood*: Likely
*Risk*: Moderate

Risk Assessment: Bypass
*Consequence:* Minor
*Likelihood*: Possible
*Risk*: Moderate

Emission Description – Heavy metals

*Emission:* Trace metals, including mercury, emitted from stack relate to the metals contained in the waste stream. Most metal emissions will be contained in particulate matter except mercury (due to its high vapour pressure). Cadmium emitted from combustion processes has been shown to occur as metallic cadmium and as cadmium oxide, often as mixed oxide with other metals whereas emissions from refuse incineration consist predominantly of $CdCl_2$. Abnormal operations can result in emission peaks where abatement equipment is bypassed or if waste is incinerated at a temperature below optimum.

*Impact:* Heavy metals can build up in biological systems and present public health hazard. The Premises is located in an industrial area however residential development is less than 100 meters away. Based on data presented in Table 2, ambient concentrations of Arsenic and cadmium are considered significant during both normal operating condition and bypass events. Predicted ambient concentrations of Mercury are considered significant during bypass events.

Cadmium and many of its compounds are quite volatile, condensation on aerosols is common after the emission from high temperature processes. This leaves cadmium compounds condensed on the surface of particles which may increase the bioavailability. Cadmium is known carcinogen to humans.

Acute (short-term) high-level inhalation exposure to arsenic dust or fumes can resulted health effects including gastrointestinal effects. Chronic (long-term) inhalation exposure to inorganic arsenic may lead to irritation of the skin and mucous membranes and effects in the brain and nervous system. Long term exposure to high concentrations of mercury and its compounds through inhalation, ingestion is also associated with various health effects.

The Premises is located in an industrial area however residential development is less than 100 meters away. There is potential for medium to long term impact, localised health effects and potential alteration of the environment or breach of legal requirements.

*Control:* The exhaust gases are passed through adiabatic cooling system, injected with activated carbon and lime and passed through the fabric filter prior to discharge into air.
Source segregation of waste is undertaken by generators and incoming waste is delivered in labelled containers. The licensee collects information on source of each batch of waste received and tonnage etc. However detailed characterisation of incoming waste stream, that could be used to identify presence of unsuitable components is not available. The Licensee mainly relies on customer education and declarations signed by waste generators to determine compliance with waste acceptance specifications in the licence.
The Licensee states that they voluntarily follow the *Waste Management Association of Australia's Industry Code of Practice for the management of clinical and related wastes, 2010* however no third-party audits are undertaken to confirm compliance.

The process control has a number of warning alarms to indicate upset/ abnormal conditions. The Licensee has indicated that they have the ability to either reduce the charging rate or place the incinerator on an interlock mode or to initiate shut-down as necessary to avoid having to bypass the abatement equipment.

Risk Assessment: Normal Operations
*Consequence:* Major
*Likelihood*: Likely
*Risk*: High

Risk Assessment: Bypass
*Consequence:* Severe
*Likelihood*: Unlikely
*Risk*: High

Emission Description – Acid gases (HCl,HF $SO_2$, $SO_3$ as $H_2SO4$)

*Emission:* Acid gas concentration in incineration flue gas is related to the chlorine and sulphur content of the waste. Most of the chlorine, chemically bound within the waste in the form of polyvinyl chloride (PVC) and other chlorinated compounds, will be converted to HCl. Sulphur is also chemically bound within waste stream and is oxidised during incineration.

*Impact:* Key environmental impacts associated with acid gas emissions include potential for acid rain. Acid gases can interact in the atmosphere to form fine sulphate and nitrate particles that can be transported by wind and have the potential to impact human health when inhaled.

Modelled data indicates that during normal operations, all acid gases modelled are below 10% of respective ambient criterion specified. During bypass operations, modelled GLCs of HF and $SO_2$ are not significant however predicted GLCs of HCl and $H_2SO_4$ are significant when compared to 1 hr criterion specified. The Premises is located in an industrial area however residential development is less than 100 meters away.

*Control:* The exhaust gases are passed through adiabatic cooling system, injected with activated carbon and lime and passed through the fabric filter prior to discharge into air. These end of pipe controls are targeted at minimising emissions of acid gases, dioxins, heavy metals, volatile organic compounds and particulates.

Source segregation of waste is undertaken by generators and incoming waste is delivered in labelled containers. The licensee collects information on source of each batch of waste received and tonnage etc. However detailed characterisation of incoming waste stream, that could be used to estimate calorific value or to identify presence of unsuitable components is not available. The Licensee mainly relies on customer education and declarations signed by waste generators to determine compliance with waste acceptance specifications in the licence. The Licensee states that they voluntarily follow the *Waste Management Association of Australia's Industry Code of Practice for the management of clinical and related wastes, 2010* however no third-party audits are undertaken to confirm compliance.

The process control has a number of warning alarms to indicate upset/ abnormal conditions. The Licensee has the ability to either reduce the charging rate or place the incinerator on an interlock mode or to initiate shut-down as necessary to avoid having to bypass the abatement equipment.

Risk Assessment: Normal Operations
*Consequence:* Minor
*Likelihood*: Likely
*Risk*: Moderate

Risk Assessment: Bypass
*Consequence:* Minor
*Likelihood*: Unlikely
*Risk*: Moderate

Emission Description – Dioxins and Furans

*Emission:* Failure to achieve complete combustion of organic materials in the waste can result in emissions of a variety of organic compounds. Products of incomplete combustion can include dioxins and furans. Thermal breakdown of precursor compounds such as chlorinated aromatic hydrocarbons can also lead to dioxin formation. De novo synthesis. Both organic and inorganic chlorine in the waste provide the chlorine source for dioxin formation. When released from incinerator stacks, dioxins are primarily adsorbed on airborne particulates.

*Impact:* Literature review identifies that there may have been an association between emissions (particularly dioxins) in the past from industrial, clinical and municipal waste incinerators and some forms of cancer, before more stringent regulatory requirements were implemented. However, for individual incineration waste streams (clinical, hazardous, industrial and municipal), the evidence for an association with (non-occupational) adverse health effects is inconclusive.

The modelled data shows that predicted ground level concentrations of dioxins and furans are likely to be 0.23% of the criteria during normal operations and 7.5% of the criteria during bypass. The Premises is located in an industrial area however residential development is less than 100 meters away.

Control: Regulating incineration process temperature and relying on incoming waste being appropriately segregated and identified are primary process controls. The exhaust gases are passed through adiabatic cooling system, injected with activated carbon and lime and passed through the fabric filter prior to discharge into air. These end of pipe controls are targeted at minimising emissions of acid gases, dioxins, heavy metals, volatile organic compounds and particulates. Six monthly stack emissions monitoring is undertaken in accordance with conditions of current licence to demonstrate compliance with limits specified.

Source segregation of waste is undertaken by generators and incoming waste is delivered in labelled containers. The licensee collects information on source of each batch of waste received and tonnage etc. However detailed characterisation of incoming waste stream, that could be used to estimate calorific value or to identify presence of unsuitable components is not available. The Licensee mainly relies on customer education and declarations signed by waste generators to determine compliance with waste acceptance specifications in the licence. The Licensee states that they voluntarily follow the *Waste Management Association of Australia's Industry Code of Practice for the management of clinical and related wastes, 2010* however no third-party audits are undertaken to confirm compliance.

The process control has a number of warning alarms to indicate the upset/ abnormal conditions. Clinical waste, pharmaceutical waste, cytotoxic waste is not charged in the primary chamber during start-up until desired temperature is reached.

Manufacturer's guarantee on reliability of thermocouples is the only failsafe to ensure adequate incineration temperatures. In the event that thermocouple/s fail, the Licensee has limited control over the incineration process until the failed component is replaced.

The Licensee has indicated that the down time is minimised by stocking spare thermocouples on the premises and calibrating them as per manufacturer's specifications. The Licensee has indicated that in the event of power failure, there is no back-up generator on site. To avoid loss of air pressure, the licensee has installed a larger air receiver. In the event of failure of water cooling on adiabatic quench system, the licensee has additional pumps available that can be brought online immediately.

Risk Assessment: Normal Operations
*Consequence:* Minor
*Likelihood*: Possible
*Risk*: Moderate

Risk Assessment: Bypass
*Consequence:* Minor
*Likelihood*: Unlikely
*Risk*: Moderate

Emission Description – Volatile Organic Compounds

*Emission:* Organic compounds measured in the flue gas are an indicator of the level of combustion achieved in an incineration process.
For the purpose of modelling, VOCs have been modelled as Benzene only however in practice, due to heterogeneous nature of the feedstock, a number of different VOC species may be expected.

*Impact:* Modelled data indicates that during both normal and bypass conditions, predicted ground level concentrations of VOCs (as benzene) at receptors are likely to be significant. After taking into account the conservatism built into air emissions modelling, potential ground level of concentrations of VOCs during normal operation and bypass conditions are likely to be significant.

Other VOCs includes chemicals that are known air toxics are also likely. Some odour emissions may also be associated with VOC emissions.The Premises is located in an industrial area however residential development is less than 100 meters away.

Control: Regulating incineration process temperature, residence time and monitoring Carbon monoxide as a surrogate are primary process controls. The exhaust gases are passed through adiabatic cooling system, injected with activated carbon and lime and passed through the fabric filter prior to discharge into air. These end of pipe controls are targeted at minimising emissions of acid gases, dioxins, heavy metals, volatile organic compounds and particulates. Six monthly stack emissions monitoring is undertaken in accordance with conditions of current licence to demonstrate compliance with limits specified.

Risk Assessment: Normal Operations
*Consequence:* Moderate
*Likelihood*: Likely
*Risk*: High

Risk Assessment: Bypass
*Consequence:* Moderate
*Likelihood*: Possible
*Risk*: Moderate

Regulatory Controls

*(a) Regulatory controls to monitor and manage potential public health impacts –*

Air emissions modelling undertaken by the Licensee indicates potential for exceedance of ambient criteria for Cadmium and Arsenic at sensitive receptors.

Noting the conservative nature of the modelling, in order to verify the modelling predictions and to accurately determine whether exceedance of health criteria can occur at sensitive receptors, it is considered appropriate that ambient air monitoring is conducted at selected locations. DER has consulted with the licensee and recommends that a 12 month ambient monitoring programme be conducted to gather data representative of various operating conditions and seasonal and annual wind profiles. DER will review ambient air monitoring data to determine whether additional regulatory controls are warranted to safeguard public health. These may include, review of existing stack configuration or other measures to improve dispersion of contaminants.

Of significant concern is the predicted exceedance of ambient criteria for cadmium during bypass operations. Improvement requirement IR5 has been specified requiring the licensee to submit a proposal with details of actions proposed, and associated timeframes, to ensure that GLC for cadmium do not exceed the specified criteria. The Licensee is required to upgrade the existing baghouse to a multi-compartment baghouse, install emergency power provisions or review the existing stack configuration. IR 5 also requires the licensee to propose measures to prevent occurrence of bypass operations for the interim period. DER notes that the proponent has provided no further information in its application to address the high modelled impacts of metals and has provided conditions to address the risk. Should the proponent provide a secondary option, DER would consider that alternative approach on its merit as a licence amendment.

A conservative stack emission limit, in line with similar facilities, has been specified through condition 2.2.1. DER notes that this limit is lower than the modelled emissions, but can be consistently achieved by the proponent to achieve appropriate GLC's during normal operations.

Improvement requirement IR 6 has been specified requiring the licensee to submit to DER a proposal to undertake ambient air monitoring for at least 12 months to determine ground level concentration of heavy metals at those sensitive receptors that are most likely to be impacted as predicted in the air emissions modelling assessment. IR 6 specifies the requirement for the licensee to commence ambient monitoring, at locations determined in consultation with DER, within 3 months of submitting the proposal.

Other regulatory requirements which have been specified in the licence to minimise the likelihood of community exposure to unacceptable emission levels are as below:

- Condition 2.2.1 authorises point source emissions to air. Limits for point source emissions to air as specified in Condition 2.2.2 which have been reviewed in accordance with Benchmarked practice in the state.

Previous versions of the licence required the Licensee to comply with emissions limits that were set in accordance with Environmental Protection Authority's *Guidance Statement No 13 Management of Air Emissions from Biomedical Waste Incinerators, March 2000*. This Guidance Statement has now been rescinded. Condition 2.2.3 retains requirements of conditions 63 and 64 on previous licence for operation and maintenance of the baghouse.

Previous licence required the licensee to install an opacity meter on the outlet of baghouse. The opacity monitor needs to be correlated in order to get accurate measurements of particulate matter emitted from baghouse stack. A limit for TPM has been specified in condition 2.2.2 of this licence. A requirement IR 7 has been specified requiring the licensee to correlate opacity monitor for TPM measurements

- Condition 3.2.1 specifies point source emissions monitoring requirements. Frequency of monitoring as current six monthly stack monitoring regimen is not considered to provide representative data given heterogeneity of feedstock.

- Improvement requirement IR 1 has been specified requiring the Licensee to submit a CEMS implementation plan for monitoring temperature, flow rate, oxygen, TPM, CO, $CO_2$, TOC, HCl,HF,$SO_2$,NOx from incineration exhaust. Having an operational CEMS is expected to help the licensee in responding to any limit exceedances or upset conditions by taking appropriate process or management control measures. DER understands that through previous correspondence with the proponent, that it has progressed towards this requirement prior to the licence being issued.

- Conditions 3.2.2 and 3.2.3 require the licensee to undertake monitoring specified in accordance with AS 4323.1 and to ensure that sampling and analysis is undertaken by NATA accredited laboratory. Monitoring parameters specified have been reviewed in accordance with industry standards. Process monitoring requirements are specified in Condition 3.4.1.

Industry standards require that the incineration process should be able to achieve temperatures of at least 850$^{o}$C using burners and conventional fuels and that no waste should be charged into the primary chamber until desired temperature is achieved. The Licensee currently burns waste containing flammable components (including alcohol/ spirits and general waste- defined in the licence) to reach temperatures higher than 700$^{o}$C in primary combustion chamber and does not have auxiliary burners installed. Consultation undertaken with the Licensee has identified that upgrades to the primary combustion chamber will be capital intensive and require significant down time.

(b) *Regulatory controls to ensure combustion efficiency-*

Key operational consideration for incineration process is to thermally treat wastes in order to minimise the amount and harmfulness of the residues arising for further disposal. Optimum combustion conditions, appropriate combustion temperatures (depending on waste stream) and residence time of flue gases in the combustion zone are essential parameters.

Condition 1.3.4 specifies operational requirements regarding waste charging, incineration temperature over qualifying zone, incineration efficiency. These are key operational parameters to ensure optimum incineration process to thermally treat wastes and to minimise the amount and harmfulness of the residues arising for further disposal. Condition 1.3.7 requires investigation of any descriptive or numerical limit set in section 1.

Condition 1.3.4 retains the requirement specified in condition 22 of previous licence (location of thermocouples). Improvement requirement IR2 requires the licensee to submit a Process Monitoring Plan which details techniques or procedures which will be used to demonstrate ongoing compliance with combustion temperatures and gas residence time requirements specified in the licence.

Previous licence required the licensee to undertake six monthly analysis of ash for the total and leachable fractions of the heavy metals in accordance with Australian Standard Leaching Procedure AS 4439.2. This requirement has not been retained as it is not considered to be an indicator of incineration process efficiency.

Testing for leachability of ash and heavy metal content of ash are parameters relevant to the final disposal location as they can impact groundwater quality when disposed to landfills (unlined). The Licensee does not dispose of fly ash/ bottom ash onsite and has not proposed reuse or recycling of fly ash or bottom ash. Determining suitability of ash produced at the premises in accordance with Landfill Waste Classification Guidelines will be the responsibility of the disposal site.

(c) Regulatory controls to improve waste acceptance and waste characterisation processes at the premises:

Clinical waste is pre-sorted before arriving at the premises. This can lead to a great variation in calorific value of each batch received. A large batch with significantly different calorific input can upset the incinerator operating conditions. It is hence essential that the operator is able to identify the nature of the waste received without opening clinical waste bags/ containers. Condition 1.3.1 sets specifications for waste acceptance, limits on quantities of waste and minimum information which needs to be recorded for each batch of waste received at the premises. Waste categorization definitions and associated references in licence conditions have been reviewed in line with Department of Health's (DoH's) *Operational Directive: Clinical and Related Waste Management Policy OD0651/16*, Department of Health, 21 January 2016 to maintain consistency.

Condition 1.3.2 has been included to ensure waste streams that do not conform to the licence specifications are not treated on the premises and are disposed offsite at an authorised facility. Condition 1.3.3 specifies authorised processes and associated limits for approved waste streams. Condition 3.3.1 specifies inputs/ outputs monitoring requirements for each batch of waste accepted at the premises.

*Radiation Safety Act 1975* is considered to be the primary legislation to address potential radiation risks. Industry standards identify that monitoring devices such as scintillators may be used on incinerators to detect potential radioactive substances. At this stage, DER has not prescribed specific monitoring requirements in this regard as it is expected that having effective waste acceptance and pre-acceptance procedures are key to ensuring that incoming waste streams do not contain unacceptable levels of radioactivity. DER will reconsider this position in future if waste acceptance and feedstock management plan proposed by the licensee is considered deficient or if otherwise recommended by other regulatory authorities. This licence does not authorise incineration of radioactive waste.

*(d) Regulatory controls to manage abnormal operating conditions (bypass events)*

Events such as power failure can trigger a bypass event and currently the premises does not have a back-up power source to minimise the duration of bypass. Magnitude of exceedance of cadmium ambient health criteria, during bypass operations, as predicted in the air emissions model, is of significant concern to DER.

It is expected that the Licensee undertakes interim measures to prevent the bypass operations from occurring or to minimise the frequency / duration of bypass events. These measures could include installing a back-up power supply onsite to prevent bypass operations and reviewing existing emission point height to assess whether predicted ground leven concentrations could be minimised to acceptable ambient health criteria.

Improvement requirement IR 5 has been specified requiring the Licensee to submit a proposal with details of proposed actions and timeframes to ensure that ambient ground level concentrations during bypass scenarios do not exceed the recommended criteria.

Imrpovement requirement IR 6 has been specified requiring the licensee to submit a proposal to undertake ambient air monitoring for a period of minimum 12 months. This is expected to provide sufficient data to determine the risk to sensitive receptors during various meteorological conditions that may occur during the year.

Improvement requirement IR4 has been specified requiring the licensee to submit to the CEO an Abatement Plant Bypass Management Plan. Installation of continuous air emissions monitoring system is expected to provide profile of emissions during abnormal operating conditions.

Condition 1.3.5 and 1.3.6 specify management actions that must be undertaken during abnormal operating conditions. These include activation of interlock mode to prevent charging of waste into primary combustion chamber while the abatement plant is bypassed.

Condition 5.3.1 requires notification of any event associated with failure/ malfunction or bypass of pollution control equipment. Additional non-annual reporting requirements have been specified through condition 5.2.3. The Licensee is required to implement a complaints management system as specified in Condition 5.1.4.

DER will re-assess risk of emissions during these scenarios once data from continuous emissions monitoring becomes available. DER will review data obtained and may consider specifying limits during abnormal operations should ambient monitoring data support the conclusion that there is increased risk to public health.

***Residual Risk assessment - summary***

| | Risk assessment (with proponent controls) | | | Residual Risk | | | Risk (Bypass- current) | | | Residual risk (Bypass- subsequent to IR implementation) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Contaminant** | **consequence** | **likelihood** | **risk** | **consequence** | **likelihood** | **risk** | **consequence** | **likelihood** | **risk** | **consequence** | **likelihood** | **risk** |
| **NOx** | Minor | Likely | Moderate | Minor | Likely | Moderate | Minor | Likely | Moderate | Minor | Likely | Moderate |
| **CO** | Insignificant | Likely | Moderate | Insignificant | Likely | Moderate | Insignificant | Possible | Low | Insignificant | Likely | Moderate |
| **PM** | Minor | Likely | Moderate | Minor | Possible | Moderate | Minor | Possible | Moderate | Minor | Possible | Moderate |
| **Heavy metals** | Major | Likely | High | Major | Possible | Moderate | Severe | Unlikely | High | Major | Unlikely | Moderate |
| **Acid gases** | Minor | Likely | Moderate | Minor | Unlikely | Moderate | Minor | Unlikely | Moderate | Minor | Unlikely | Moderate |
| **Dioxins and Furans** | Minor | Possible | Moderate | Minor | Unlikely | Moderate | Minor | Unlikely | Moderate | Minor | Unlikely | Moderate |
| **VOCs** | Moderate | Likely | High | Moderate | Likely | High | Moderate | Possible | Moderate | Moderate | Possible | Moderate |

**Point source emissions to air (bio aerosols, pathogens)**

The Premises uses Matrix Waste Treatment System (alkaline oxidation) for treatment of specific clinical waste streams. The treatment process involves shredding of waste which is subsequently treated by addition of calcium oxide and water. Literature review shows that sterilisation efficiency of this alternative treatment of clinical waste depends on maintaining optimum pH, temperature (greater than 70$^{o}$C) and residence time. Treated waste is subsequently compacted for disposal offsite to a landfill.

*Emission:* Emissions to air resulting from shredding of untreated waste. Insufficient sterilisation of waste due to treatment at less than optimum pH, temperature and residence time may contribute to emissions. These emissions may release bio aerosols that contain unidentified pathogens.

*Impact:* Bio aerosols containing pathogens may impact public health. The Premises is located in an industrial area with other industrial receptors immediately adjacent. Nearest residential receptor is less than 100 meters away. There is potential for localised, public health impacts which may require medical treatment if emissions are not adequately controlled.

*Control:* The system is operated under negative pressure. Licensee has indicated that the process monitoring parameters are established however the operator ensures that excess quantity of calcium oxide is used in treatment process to achieve alkaline pH.

Risk Assessment

| | |
|---|---|
| *Consequence:* | Moderate |
| *Likelihood:* | Possible |
| *Risk*: | Moderate |

Regulatory Controls

Condition 1.3.3 specifies waste treatment criteria and process limits for the matrix waste treatment system. Types of wastes restricted from treatment and temperature requirement specified are consistent with Department of Health's *Operational Directive 0258/09: Clinical and Related Waste Management: General Requirements,* dated 31 December 2009.

Previous licence condition 16 required the licensee to undertake monthly testing of solid waste produced by the Matrix Waste Treatment System. This requirement has been retained through outputs monitoring condition 3.3.1.

Residual Risk

| | |
|---|---|
| *Consequence:* | Moderate |
| *Likelihood:* | Possible |
| *Risk*: | Moderate |