INCINERWASTE PTY LTD

Public Information Package

for a

Clinical and Related Waste Disposal Facility

serving the

Alice Springs Region

May 2017

1. Introduction

This public information package has been prepared as part of the community consultation plan for the establishment of a clinical and related waste incineration facility (the facility) in the Brewer Road Industrial Estate, approximately 20 kilometres south-west of Alice Springs.

The facility is being proposed by Incinerwaste Pty Ltd, which is currently seeking an environment approval through the Northern Territory Environmental Protection Authority (EPA) to establish the facility

The waste management facility proposed is "*a facility for storing, recycling, treating, or disposing of listed wastes on a commercial basis*", and therefore according to the *Waste Management and Pollution Control Act*, will require approval from the EPA before construction works can begin, and will require a licence to operate the facility.

It is expected that there will be a lead time of approximately four to six months following EPA approval to complete detailed design and construction. After commissioning, and licensing by EPA, it is expected that the facility will begin operations in late 2017.

2. Incinerwaste Pty Ltd

Incinerwaste Pty Ltd was established in 2017.

Incinerwaste is a locally owned waste management business that is seeking to establish and build a clinical and related waste incineration facility in the Brewer Road Industrial Estate approximately 20 kilometres south-west of Alice Springs, Northern Territory (NT). The business will provide a solution to the management of clinical and related waste from the greater Alice Springs region in an efficient and responsible manner being fully compliant with all EPA requirements.

The facility will establish a local waste management service for Alice Springs and the region using world leading technology for the treatment and disposal of clinical and related wastes.

The Managing Director of Incinerwaste, Mr Darren Burton, is a well-known Alice Springs businessman who has over 30 years' experience in the building, construction and retail industry sectors. He has a thorough knowledge of working with building codes and construction legislation, requirements and licenses, and has had direct experience in the handling of hazardous chemicals and substances.

Mr Burton has owned and operated a number of successful award winning businesses including Burton and Ball Builders, the Alice Springs Pool and Spa Centre, and was winner of the 2012 NT Telstra Micro Business Award, and the 1999 NT Telstra Small Business Award.

3. Project Details

The total cost of the project is expected to be over $2 million.

It will create up to 20 jobs during the construction phase and result in up to six full time jobs to operate the facility.

The history and expected timeframe for the project is given below.

Project History and Timeframe

Action	Timing
Completed contract negotiations to purchase the land for the facility	2015
Gained planning approval to construct the facility (NT Planning Authority)	2015
Environmental Assessment of proposed facility submitted to EPA for decision regarding whether an EIS or PER is required	August/September 2015
EPA decision that an EIS or PER is not required	October 2015
Investigation of traditional and emerging incineration and gasification technologies	2016
Environmental Approval Application submitted to EPA	April 2017
Stakeholder and Public Consultations	April 2017 - ongoing
Commence construction	Once environmental approval is granted
Issue of operating licence from NT EPA	On completion of successful construction and commissioning of facility
Official Opening and Open day of Facility	1 month after granted of NT EPA licensing and commissioning
Commencement of operations	late 2017

4. Frequently asked questions

The following information should answer most questions relating to the project.

What are clinical and related wastes?

Clinical and related wastes are generated by the health care sector.

This includes:

- local hospitals (public and private);
- hospital/medical laboratories (e.g. pathology);
- medical, dental and veterinarian clinics/surgeries;

- council immunisation programs, community health clinics, and sharps collections from public toilets;
- emergency services and police forensic crime and trauma situations, including illicit drugs confiscation/disposal;
- aged care facilities; and
- home health care (e.g. diabetes, dialysis).

All members of the community can generate clinical and related wastes.

The composition of clinical and related waste is highly variable. It is typically a heterogeneous mixture of mainly solid wastes generated from the facilities and activities described above.

Clinical and related wastes can consist of:

- Potentially infectious wastes, such as various wastes contaminated with body fluids, contaminated sharps, refuse associated with isolation or quarantine ward patients, cultures and stocks of infectious agents and associated biological products, human blood and blood products, pathological wastes, placentae, body parts and other tissue.
- Laboratory and pharmaceutical chemicals such as expired drugs, disinfectants, pathological samples (e.g. blood, urine, faeces, biopsies, etc.) and cytotoxic agents and wastes.
- Cytotoxic wastes and residues. Cytotoxic wastes consist of any items contaminated with cytotoxic drugs and their residues used mainly in the treatment of cancer.
- General refuse similar to generic wastes from residences, aged care facilities and health care institutions and includes disposable and soiled linens, paper, nappies and incontinence products.

Other wastes that are suitable for disposal in the facility and are proposed to be disposed in relatively small quantities consist of:

- Quarantine wastes, from international flights coming into Alice Springs and Uluru;
- Security related wastes, including confidential documents;
- Contraband arising from police activities that can include Illicit drugs and substances; and
- Animal carcasses from local Council and veterinarians.

How much waste will the facility treat and dispose of?

Approval is being sought to dispose of up to 90 tonnes per year of the wastes described above.

This is based on 45kg/hr x 8 hr/day x 5 days/week x 50 weeks/year = 90 tonnes/year.

What currently happens to clinical and related wastes in Alice Springs?

Currently the clinical and related wastes generated in the Alice Springs region are disposed of to landfill, burnt or transported to Adelaide for incineration in an SA EPA licensed facility.

Currently all jurisdictions in Australia require specialised disposal of clinical and related wastes by incineration, autoclaving, or maceration and disinfection, and direct disposal to landfill is generally prohibited due to the potential risks to the environmental and human health.

Where is the proposed facility to be located?

The proposed clinical and related waste management facility is to be located about 20km SW of Alice Springs in the Brewer Road Industrial Estate, just south of the Power Station in Hugh.

What approvals are required to establish such a facility?

Such a facility requires planning and environmental approval. Planning approval has been obtained for the facility to be established in a suitably zoned industrial area well removed from the local population.

An environmental assessment was submitted to EPA in late 2015 to determine whether a Public Environmental Report (PER) or an Environmental Impact Statement (EIS) was required to be prepared. Based on the information provided, EPA determined that this was not necessary given the nature and scale of operations proposed.

An application for environmental approval has now been lodged with EPA to obtain permission to install appropriate equipment and plant to manage and dispose of clinical and related wastes at the proposed site.

What will the proposed facility consist of?

The facility will consist of:

- Offices, Kitchen/staff room, Bathroom/toilets;
- Large Open Shed housing:
    - Waste unloading/storage area (refrigerated storage and separate security materials storage),
    - Bin cleaning and storage area,
    - MAGS* unit,
    - Hot water recovery system,
    - Char bin/storage, and
    - Rainwater collection system;
- Entry/Exit road and car park.
- Extensive landscaping and gardens.
- Facility within fenced compound with CCTV monitoring.

What technology is being used to dispose of the waste?*

The original environmental assessment and application to EPA in late 2015 was for a traditional twin chambered gas-fired incinerator. No air pollution control devices (APCs) or heat (energy) recovery were proposed due to the small scale of the facility.

However in late 2016 the proponent became aware of a suite of existing proven technologies that had been integrated into a small scale unit that provided both APCs and energy recovery. This is the MAGS waste disposal technology developed in Montreal, Canada.

What is MAGS technology?

MAGS is a Micro Automated Gasification System. This is the technology that has been selected for the proposed facility.

Terragon (refer http://terragon.net/resource-recovery-solutions/energy-from-waste/) has developed the Micro Auto Gasification System, or MAGS™, which is intended to be the world's most compact, efficient and environmentally safe technology for the conversion of waste into thermal energy for use by the site where the waste is processed (or generated).

MAGS can be used to process most combustible wastes produced by a community, while sterilizing the remaining residues of the waste. Waste streams that can be easily treated by MAGS include, but are not limited to, clinical and related wastes, paper/cardboard, plastics, food, oily rags, oils and organic sludges.

MAG uses Terragon's patented technology, *Auto Gasification*, to thermally break down waste and transform it into a residual solid carbon material (char) and a synthesis gas (syngas).

The syngas (mainly carbon monoxide and hydrogen) becomes the main fuel source for MAGS, which eliminates the need for external energy sources and renders the appliance virtually self-sustainable.

Put simply, MAGS gasifies - or "cooks" – the waste (it does not burn), reducing it in weight by more than 90 percent to produce char and a hot gas (syngas). The hot gas re-circulates through the appliance to maintain the elevated temperatures needed to continue the gasification process, hence *Auto* Gasification.

MAGS is an energy generating device that is fuelled by waste, and produces up to 120 kW of thermal energy for use by the site where it is located. This thermal energy can be used by the site for a variety of applications such as hot water generation, reducing these associated energy costs to the site.

The residual char generated sequesters carbon thereby reducing greenhouse gas emissions when compared to alternative methods for such waste disposal, such as landfilling and traditional incineration techniques. Moreover, char has excellent water and nutrient retention properties when combined with soil as an additive.

Because of the *Auto Gasification* process and the char's ability to sequester carbon, MAGS can prevent much of the carbon in the waste from becoming CO_2.

The integrated MAGS technology's design incorporates many beneficial features.

It is extremely compact (2 m x 2 m x 2.6 m), making it small enough to be transported and installed almost anywhere (e.g. utility room, city building, remote mining camp, or within a ship).

It is fully automated, uses minimal external resources because it generates its own fuel, and can be monitored remotely on-line via the internet by technicians, thus offering immediate assistance for troubleshooting if need be.

Additionally, it is exceptionally safe and can be operated by anyone with little technical background and minimal training.

How does Auto Gasification work?

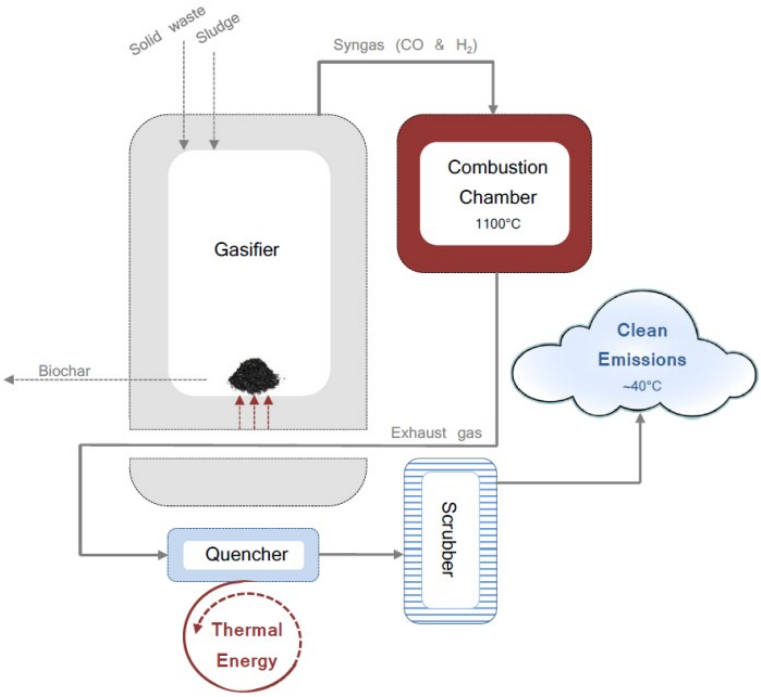
The proprietary *Auto Gasification* process used in MAGS has three basic elements:

(i) In the Gasifier, the organic materials are heated up to a temperature of 650°C in a low-oxygen environment, where they break down to a volatile combustible fraction and a carbon residue;

(ii) The volatile fraction is combusted at about 1,100°C in the Combustion Chamber and the hot gas is used to heat both the process air used in the Gasifier, as well as the Gasifier itself; and

(iii) The hot combustion exhaust gas leaves the heat transfer zone of the Gasifier at about 700°C and is quenched with water before being introduced to a caustic packed column scrubber for further cleaning, followed by the condensation of the excess moisture now contained within the exhaust gas prior to its final discharge into the atmosphere.

A schematic of the overall process is shown in below.



What does the MAGS unit consist of and how does it work?

The MAGS unit consists of two Gasifiers, each with its own loading port. Each Gasifier is constructed to allow for the indirect heating of the waste inside the drum by the exhaust gases from the adjacent combustion chamber. Waste is loaded into the Gasifiers and heated up to about 650˚C.

A controlled amount of pre-heated air is fed into the drum and brought in intimate contact with the waste. The heat and the oxygen in the air break down the hydrocarbons in the waste to form a syngas, composed primarily of CO and H_2, and as a consequence the residual char remains.

The syngas exiting the Gasifiers is fed into the Combustion Chamber where it is burned with excess air to form water, CO_2 and a hot combustion exhaust which is used to provide the thermal energy needed for the process.

The Combustion Chamber is a thermally insulated reactor maintained at 1,100°C through the combustion of natural gas during pre-heat, and by syngas once waste is introduced, and has an internal residence time of just over 1 second (measured at the end of the combustion chamber).

The natural gas burner allows for the heat-up of the Combustion Chamber during start-up and when the combustion chamber falls below 1,100°C, such as when waste is not being fed into the unit.

Excellent combustion is achieved because syngas is burnt in a mixing chamber located at the entrance of the combustion chamber (resulting in higher temperatures and better mixing at the start as compared to traditional technology); and the combustion chamber has three mixing zones to enhance and ensure good mixing.

The hot gases leave the combustion chamber above 1100^{o}C and leave the gasifier heat recovery at about 700^{o}C. This provides additional residence time for oxidation prior to reaching the quenching system (cooling exhaust gases using water).

The hot exhaust gases are instantly quenched with water in a Venturi scrubber to a temperature of less than 80°C. The water quench serves to stop any recombination reactions that may form toxic compounds such as dioxins and furans.

By bringing the hot exhaust in intimate contact with water, the Venturi also transfers particles that may be in the exhaust to the water where they can be recovered by the in-built water purification system.

The now cooler exhaust gas is fed into a caustic (alkaline) packed column scrubber to remove remaining particulates and acid gases. A condenser is used to further remove moisture and residual water borne pollutants from the exhaust gas prior to discharge to atmosphere via an 80 mm flue.

Additional waste heat, not recovered in heating the gasifiers and process air, is recovered from the rear of the unit using a hot water recovery system. Considerable amounts of water between 50-60^{o}C can be generated in this way during MAGS operations.

How would the unit be operated?

At the start of each day natural gas is used to heat up the Combustion Chamber to 1,100°C. When the Combustion Chamber is at the prescribed operating temperature its exhaust is directed towards a heat exchange zone located at the bottom of each Gasifier.

When waste is allowed to be introduced it heats up, dries and begins gasifying, i.e. producing syngas. When the concentration of syngas is sufficient, the natural gas burner switches off and the syngas serves as the main fuel for the Combustion Chamber.

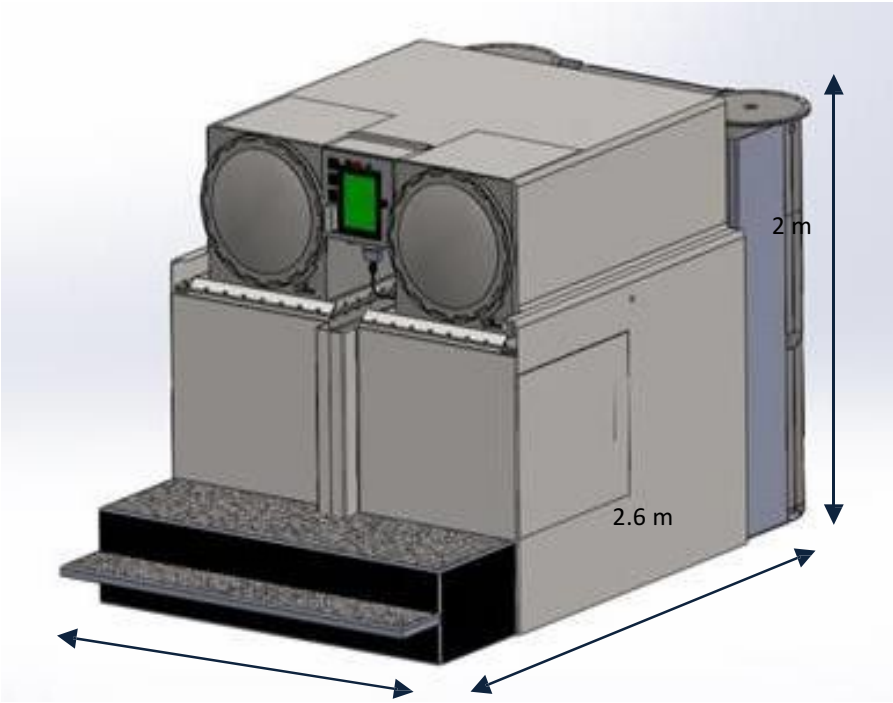
The process comes to completion when all the organic waste is fully gasified and the production of synthesis gas stops.

The system will not allow the user to physically open the loading doors at any time during the process due to mechanical interlocks enabled by the negative pressure within the system. The doors can only be opened when prompted by the system. In this case, and all cases where the door is opened, the operator is isolated from the hot gasifier chamber by a large insulated, water cooled sliding gate which forms an airtight seal in the loading chamber.

The throughput is ultimately managed by the MAGS microprocessor which notifies the operator when more waste may be added.

If the waste has a very high moisture content (>50%), or if the operator fails to feed waste into the system, the natural gas burner will automatically turn on to keep the temperature of the Combustion Chamber at its required operating temperature of 1100°C.

MAGS' internal operating programs have a number of automatic shutdown modes if critical components fail. They are all automatic. The operator is needed to turn the system back on again after an automatic shutdown.



Schematic of Micro Auto Gasification System (MAGS™)

What happens to the Char?

The char is automatically transferred from the gasifier to a char cooling zone at the base of the unit periodically, with the operator controlling the process. Then the char can be removed any time by simply momentarily shutting down the system.

The residue, which is mostly carbon in the form of char, may contain any incidental metal and glass found in the original waste. The char residue is recovered as a sterilized inert material.

After removal of any residual glass and metal present the char can be used as a carbon sequestration agent and soil improver (subject to appropriate testing and regulatory approvals).

How does a MAGS produce less carbon dioxide that a traditional incinerator?

Because much of the carbon contained in the waste is collected as char and less fuel is used to provide heat to the process the MAGS technology offers significantly reduced emissions of greenhouse gases, as compared to alternative practices, such as landfilling and conventional incineration.

Photo of Char Produced by MAGS™

What emissions are discharged to atmosphere?

The emissions proposed to be discharged to atmosphere are given below.

EMISSION	Original Incineration Proposal 2015	Current MAGS Proposal 2017	Percentage (%) Difference 2015 vs 2017	NSW 2010 Clean Air Emission Limits (Sch4)
NOx (as NO_2)	*350 mg/m^3*	250 mg/m^3	**-29%**	350 mg/m^3
SOx (as SO_3)	*100 mg/m^3*	50 mg/m^3	**-50%**	100 mg/m^3
HCl	*400 mg/m^3*	20 mg/m^3	**-87.5%**	100 mg/m^3
HF	*20 mg/m^3*	10 mg/m^3	**-50%**	50 mg/m^3
CO	*125 mg/m^3*	50 mg/m^3	**-60%**	125 mg/m^3
Particulates	*250 mg/m^3*	25 mg/m^3	**-90%**	50 mg/m^3
Heavy Metals	*10 mg/m^3*	5 mg/m^3	**-50%**	5 mg/m^3
Dioxins	*3 ng/m^3*	0.1 ng/m^3	**-97%**	0.1 ng/m^3
CO_2	*130.5 tCO_2-e/yr*	60.6 tCO_2-e/yr	**-54%**	N/A

The selection of the MAGS technology for the proposed clinical and related waste management facility significantly improves the quality of the expected emissions and the licence limits that can be applied.

Prospective licence limits will now be fully compliant with the emission limits required in the Northern Territory.

Also disposing of clinical and related wastes locally using the MAGS produces about 50% less greenhouse gases than sending wastes to Adelaide for incineration by conventional means, when the energy costs associated with storage, transport and refrigeration are included.

Monitoring?

The MAGS unit will have emission monitoring equipment fitted and configured to provide input into the MAGS Data Management System (DMS) which can be monitored directly at the unit and/or remotely via the internet or a smart phone application.

Internally the MAGS measures three key parameters to determine the loading frequency as well as to monitor the progress of the last batch loaded. All parameters monitored by the system are available in the data log files stored in the DMS.

The main components which the MAGS monitors for loading are:

- Gasifier Temperature
- Combustion Chamber Temperature
- Final Exhaust Residual Oxygen %

Based on algorithms developed for the gasification process utilising these three conditions as well as minimum duration times, the MAGS is able to determine if the system is still producing syngas and in that way determines if the system is ready to be loaded.

In addition, the system actively monitors and records values for all signals and sensors including pressures, temperatures and water flow rates to ensure that all are within specification and if not, an alarm is triggered to inform the operator.

All data monitored by the system can be retrieved via the data log stored on the DMS or via an internet interface. A few of the main parameters measured and actively monitored include:

- Combustion Chamber, Gasifier and Scrubber Pressure
- Combustion Chamber, Gasifier Temperature
- Final Exhaust Oxygen Concentration (%)
- Process Water Temperature, Flow Rate and pH
- Water Levels in Process Water Tanks
- Closed Loop Cooling Water Temperature and Flow Rate

The air emission monitoring proposed to be incorporated into the MAGS are:

- CO concentrations (ppm, in stack)
- CO_2 concentrations (ppm, in stack)
- NO_x concentrations (ppm, in stack)

The efficient combustion of syngas at 1100^{o}C and subsequent venturi quench, caustic packed column scrubber and condenser will ensure that emissions of particulates, SO_2, HCl, organic products of incomplete combustion, and dioxins are controlled to levels well below those limits currently prescribed in regulation.

How much water will the facility use?

Rainfall will be collected from the facility's roof (approx. 60 m x 18 m). The average annual rainfall (measured at Alice Springs Airport) is 284.5 mm per year (BoM 2015), so 307.26 kL of rainwater can be collected per year.

It is estimated that the total facility water consumption will be approximately 1500 L/d based on estimates for facility and bin cleaning. The MAGS unit itself consumes little water with the condenser returning water to the MAGS reticulation system.

Rainwater should therefore be sufficient for about 200 operational days per year. The facility is intended to operate for only 250 days per year, so rainwater will meet about 80% of water operational requirements

The sump serving the bunded areas will collect and store wash waters which can be reused in MAGS operations.

Potable water can be sourced from mains supply. The objective is to use as little mains supplied potable water as possible.

Are liquid wastes generated by the facility?

The scrubbers and bin/facility cleaning activities will generate waste water that can be recycled and reused to a significant extent.

Ultimately though some waste water will be produced that will require storage and transport to the local sewage authority to be disposed as a trade waste. Waste water from the kitchen and showers will be collected in a grey water system for use on the gardens, while toilet wastes will be discharged to an onsite septic sewage treatment system.

Is there a need for such a facility?

Currently, clinical and related wastes generated in the greater Alice Spring region are:

- disposed of to landfill (a practice that EPA discourages),
- burnt in the open or in simple incinerators that have no air pollution control equipment, with the residues buried locally (also practices that EPA discourages), or
- collected, stored and transported via road and rail to Adelaide to be incinerated in a SA EPA licensed facility.

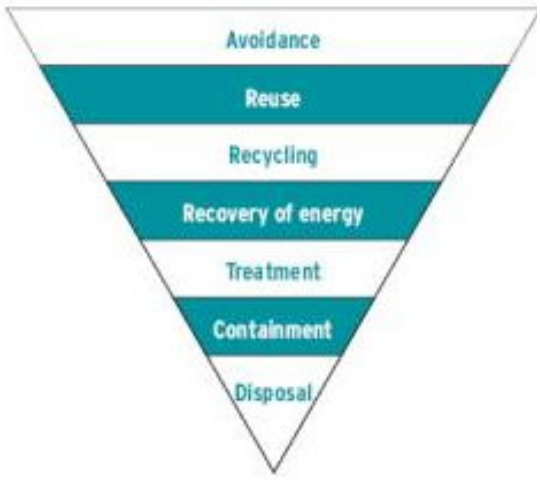
Incineration interstate involves multiple handling of the waste and both road and rail transport over considerable distances, incurring additional costs, time and energy use.

Management of clinical and related wastes in isolated communities is of particular concern given current practices.

The proposed facility will provide the capability to manage and dispose of such wastes locally and will enable the greater Alice Springs region to safely and appropriately manage the clinical and related wastes generated within the region in accordance with NT EPA requirements.

The proposed facility fulfils a long standing local community need.

The proposal is also consistent with the 'proximity principle' of waste management which favours appropriate management as close to the source of waste generation as possible, and the 'waste management hierarchy', with recovery of energy and treatment of the waste preferred to direct disposal to landfill.



Waste Management Hierarchy

What plans are there for community consultation?

Early and sustained community engagement often leads to better outcomes and is strongly encouraged by the NT EPA.

The land and its intended use were previously subject to:

- **Planning Development Application**: The application was subject to a Notification of Application and put on public exhibition, sent to Council, Service Authorities, and publicised in the local paper.

- **Environmental Assessment Report** on proposed facility reviewed by EPA to determine whether a Public Environmental Report (PER) or Environmental Impact Statement (EIS) was warranted. EPA decided that a PER/EIS was not required.

Stakeholder engagement to date has been with the:

- Development Consent Authority,
- Alice Springs Town Council,
- Environment Protection Authority,
- Power and Water Corporation,
- Alice Springs Business Association,
- Alice Springs News,
- Public (via development consent process and local media).

In order to demonstrate its commitment to community engagement and stakeholder consultation, a Community Consultation Plan has been developed. The Community Consultation Plan (CCP) details the stakeholder consultation to be undertaken during the approval process and construction stage and will include a summary of how the outcomes of consultation were incorporated into the facility's development and Environmental Management Plan (EMP).

The CCP will also cover procedures for the investigation, engagement and response to any community complaints once the facility is operational.

Engagement requires an open, active and voluntary approach to dialogue and participation that identifies the current positions of all parties, understands their expectations, and discusses and identifies the processes to best achieve them. The parties to engagement may change over time, but engagement is a continuous process.

Such engagement also requires the provision of information about the proposed facility to stakeholders to address the potential concerns that simply arise from 'not knowing'.

This information package has been prepared to provide stakeholders and interested parties with detailed information about the proposed facility in order for them to develop an informed opinion about the facility, its operations, and emissions.

Such public disclosure provides the necessary capacity building to allow communities and stakeholders to effectively engage on any potential issues of concern to them.

Stakeholders and interested parties can access this information from Incinerwaste's web site (www.incinerwaste.com.au) or by contacting the company and having the information package mailed to them. Comments and questions about the proposal may also be left on the company's web page.

What is the community consultation strategy?

The proposed community consultation strategy is as follows:

Action	Logistics	Timing
Establish web site for information and comment	Employ local consultant to develop web site	Within 30 days after application lodged with EPA
Local paper advertisements	Contact paper with copy	After application lodged with EPA
Presentation to local councillors	Contact council to get on meeting agenda	Prior to advertisement
Response to interested parties	Timely response after inquiry by email	Within 3 working days (on-going)
Local paper advertisements	Contact paper with copy	After/if environmental approval is granted
Official Opening and Open Day at Facility	Contact stakeholders (Minister for Health, Minister for Environment, Councillors, indigenous leaders/elders, clients, public, media, etc.)	1 month after commissioning and EPA licensing

Our commitment to the greater Alice Springs community

This proposal to establish a ***locally owned and operated*** clinical and related waste management facility to serve the greater Alice Springs region will allow the region to manage its clinical and related wastes in an ***efficient and responsible*** manner ***fully compliant*** with EPA requirements.

The decision to adopt MAGS as the preferred technology enables this small facility to be the first of its type in Australia that is capable of disposing of clinical and related wastes using less energy and producing less greenhouse gases compared than any other traditional conventional incinerator in Australia. ***"Think global. Act local".***

The Alice Springs facility ***will provide a model for other communities and regions*** in Australia of about 50,000 people or less that currently have to dispose of clinical and related wastes to landfill, or engage in open burning and burial, or have to collect and store such putrescible wastes until there is a sufficient quantity that can be transported over large distances to a capital city that has a suitable EPA licensed facility.

The construction of the facility will use local contractors and suppliers.

When completed the facility will provide employment for a number of transport contractors and up to six full and part time staff to manage and operate the facility, with some casual positions also expected.

This local initiative involves a ***considerable investment*** in the future of the region by making it ***self-sufficient*** with respect to responsible clinical and related waste management.

Our commitment to the Alice Springs region is successfully operate a modern fully compliant and efficient facility to manage and dispose of all locally generated clinical and related wastes for the benefit of the whole community.

CONTACT DETAILS FOR FURTHER INFORMATION

General Enquiries

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Environmental and Technical Enquiries

Mr Paul Clarey – Principal Environmental Scientist, Integral Alliance Pty Ltd.

Email: paul@integralalliance.com

Website (for general information and feedback/comments)

www.incinerwaste.com.au

Terragon http://terragon.net/mags.php

MAGS waste loading and operation https://youtu.be/3moVtPHWJXs