8. Storage Requirements

This Section outlines minimum requirements for any storage area containing clinical and related waste (ie. centralised storage areas where wastes are consolidated).

8.1 General Storage Requirements

The following are the minimum requirements for the storage of clinical and related waste at generator facilities, transport premises and treatment/disposal facilities:

(a) Provide adequate environmental protection;

(b) Hygienically managed;

(c) Suitably sited, easy to secure and have restricted access;

(d) Signposted with the bio-hazard symbol and other labelling appropriate to the types of waste stored in the area (eg. clinical, cytotoxic);

(e) Safe for staff (see Section 12 for more details);

(f) Adequately lit;

(g) Licenced by the relevant regulatory authorities where applicable;

(h) All containers which contain clinical and related waste are secured;

(i) Dedicated to a clinical and related waste storage area, so that there is no mixing of these wastes with any other stored materials (eg. supplies);

(j) Secure storage area so that access is limited to only authorised persons;

(k) Adequate containment measures (eg. container, bund and/or sump) to prevent off-site migration of spills and provision of the necessary cleanup equipment (spill kit); and

(l) All plastic liners shall be treated as temporary containers and shall be placed in, and remain in outer containers / bins pending transport, treatment or disposal. Plastic liners alone shall not be used for transport of the waste off-site.

8.2 Other Additional Storage Requirements

8.2.1 The site shall be designed and constructed so that:

(a) Its base is an impervious surface (eg. concrete) surrounded by a bund appropriate to contain any spill;

(b) All loading/ unloading takes place within the bunded area in such a manner to ensure any spills are appropriately managed;

(c) The base and walls of bunded areas are free of gaps or cracks;

(d) Where vehicular access to the bunded area is required, bunds are constructed to prevent them from being damaged by vehicles;

(e) Be signposted with the bio-hazard symbol and other labelling appropriate to the types of waste stored in the area (eg. clinical, cytotoxic);

(f) No liquid waste, wash down waters or stormwater contaminated with clinical and related waste are disposed of via the stormwater drainage system; and

(g) The bunded area drains to a sump or sewer to collect spills and wash waters. Cut-off drains, which drain to a sump, may be used instead of bunds if approved by the relevant authority.

Note: When a container (eg. 240 litre mobile garbage bin), is used as the temporary storage facility, then it should be secured in a manner to prevent unauthorised access to the contents.

Where cold storage units are hired from contractors, contractors shall be advised on what substances have been stored within the units, how, and whether or not they have been adequately cleaned

8.2.2 Storage conditions include the following:

(a) Any clinical and related waste not treated or destroyed upon arrival at a disposal premises shall be managed in a manner that meets relevant conditions and standards so as to prevent any obnoxious odours or offence.

(b) All refrigerator facilities shall be contained within a secure area.

(c) Treated waste shall be segregated from untreated waste in order to ensure that cross contamination does not occur.

8.2.3 Conditions related to security of clinical and related waste include the following:

(a) The operator shall ensure that loading/ unloading of waste is carried out in accordance with designated safe procedures, and relevant records are completed and maintained.

(b) Containers in which clinical and related waste are stored shall be secured when loading/unloading is not taking place.

8.2.4 Spill Kits

(a) Generator and treatment/disposal premises are required to have a spill kit located in all waste storage and/or loading/unloading areas.

(b) A spill kit shall contain all items necessary to clean up spills of clinical and related waste. Typical contents include absorbents, disinfectant, bucket, shovel, gloves, disposable overalls, facemask / shield, tongs for sharps, sharps container, torch, disposable containers and plastic waste liners.

(c) Records shall be maintained of all spills in regards to waste types, causes and corrective actions implemented.

9. Transportation

This Section outlines the requirements to ensure that transport and loading/unloading of clinical and related waste is conducted in a safe manner.

All waste liners shall be placed into an outer container for transport – this includes for shipping containers. Transport of loose waste liners poses occupational health and safety concerns in regards to manual handling and potential environmental issues should a spill occur.

Transport of clinical and related waste shall not occur with transport of other materials unless the wastes are separated from these materials in a purpose-designed enclosure that meets the conditions contained within this Section. Clinical and related waste shall only be transported to premises licenced to accept such waste.

9.1 Transport Vehicles/Containers

A vehicle used for the transport of clinical and related waste shall have the following features:

(a) Communication equipment;

(b) Sealed body with lockable doors (where time and temperature factors are of an extreme nature, refrigeration may be necessary);

(c) Lifting equipment (for either mobile bins or any other container used to collect waste) to adequately lift mobile bins from the ground to load area or there is provision of ancillary equipment for lifting;

(d) A lockable load compartment;

(e) The load compartment physically separated from the driver's cabin by a solid partition;

(f) Be equipped with a feature to secure bins during transport;

(g) Spill kit - equipment and materials to manage a spill (eg. absorbents, water, disinfectant, mop with disposable head, shovel, gloves, disposable overalls, face mask/shields (to prevent against splashes), tongs for sharps, sharps container, torch, disposal containers, plastic waste liners, labelling).

(h) Management of spills that include blood and body substances shall be undertaken in accord with the Communicable Diseases Network of Australia "Infection Control Guidelines for Prevention of Transmission of Infectious Diseases in the Health Care Setting", Commonwealth of Australia 2004.

(i) Appropriate hazard placarding;

(j) Detailed instructions prominently displayed in the cabin, for use in case of spills, accidents, fire or other emergencies (including records of waste types/quantities being transported and a list of contact personnel and phone numbers);

(k) Be easy to clean;

(l) Be rigid and leak proof;

(m) The walls and floor of the load compartment are smooth, impervious and have sealed seams and;

(n) The floor of the compartment shall be bunded or configured to contain spillages.

Note: Until a shipping container (or similar), has been deposited onto a transport vehicle, the container shall meet applicable storage requirements.

An effective cleaning disinfection program can be established and performed regularly (at least weekly).

Where an exemption from some transport requirements has been granted by the regulatory authority, the following should apply to those transporting small volume wastes in a non-dedicated vehicle:

- The load compartment should be lockable and separated from the driver's cabin.
- The waste material shall be contained in a manner that spillage cannot enter the load compartment, and that the container is labelled so that the type of waste material is readily identifiable.
- Equipment and material should be available to manage a spill (refer Section 9.1(h).
- The wastes shall be transported in such a manner that they are securely segregated from any other materials or product in accordance with the relevant Dangerous Goods code or regulation.
- Waste containers shall be secured in the load compartment during transport to prevent spillage.

9.2 Approvals

Relevant transport approval conditions vary for each jurisdiction in Australia and New Zealand. The relevant authorities should be contacted for a listing of their requirements.

9.3 Vehicle Operation

9.3.1 The driver of a vehicle transporting clinical and related waste has a duty of care for safe operation of the vehicle and shall be:

(a) In possession of a current relevant driver's licence and where required a dangerous goods licence and/or obtained a Hazardous Goods endorsement on their Drivers Licence;

(b) Neat, tidy and wearing the appropriate personal protective equipment; and

(c) Trained in spill procedures and use of spill kit equipment.

9.3.2 Drivers of vehicles used to transport clinical and related waste shall be responsible for:

(a) Ensuring the load compartment is locked at all times when left unattended and during transport;

(b) Safe operation of equipment;

(c) Reporting either verbally or in writing on equipment condition daily, service failures and accidents with either vehicle or waste; and

(d) The overall cleanliness and presentation of the vehicle under his/her control.

9.3.3 Owners of vehicles used to transport clinical and related waste shall be responsible for:

(a) Safe maintenance of equipment; and

(b) Providing appropriate facilities and training in procedures for decontaminating vehicles that have been contaminated with clinical and related waste following an incident such as a spill.

9.3.4 The vehicle shall be maintained in a clean and roadworthy condition; and

9.3.5 It is essential that for proper waste containment all waste containers be securely closed and stowed on the vehicle.

9.3.6 The approval/permit holder shall provide evidence that the driver of the vehicle has completed a course of instruction on the transport of such waste.

9.3.7 Appropriate vehicle and public liability insurance should be obtained in accordance with transport and dangerous goods codes in Australia and New Zealand if the vehicle is used to transport waste in packages. The insurance should include third party property clause with respect to loss or damage as a result of fire, explosion or spillage of waste. Clean-up costs incurred by, or on behalf of, a public authority should also be covered.

9.4 Vehicle Signage

9.4.1 Vehicles, which transport clinical and related waste that are also considered to be dangerous goods, shall do so in accordance to the relevant Australian or New Zealand code for the transport of dangerous goods by road and rail.

9.4.2 Signage of the vehicle is the responsibility of the waste transporter and shall be displayed while the vehicle is transporting waste.

9.4.3 For any quantity of:

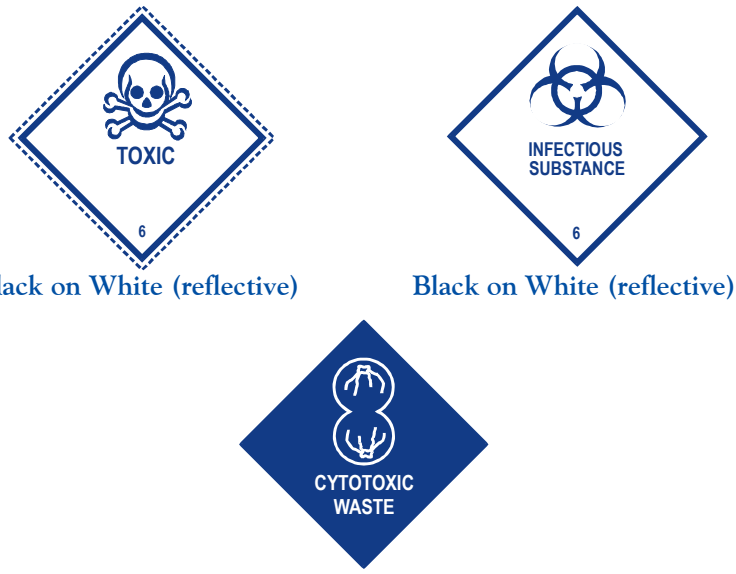
(a) Cytotoxic and clinical waste placards shall be displayed on the front and rear of the vehicle. This also applies to Pharmaceutical Waste in Australia.

(b) The type of placards to be used depends on the legislative requirements of the relevant agency within each jurisdiction. Transporters of the wastes referred to in 9.4.3 (a) shall consult the agency to ascertain what placard(s) are to be displayed and under any specific conditions.

(c) Examples of placards that are required to be used are illustrated in Figure 1.

(d) Examples of requirements are as follows:

- Cytotoxic Waste - use UN Hazard Class 6.1/TOXIC and recommended Cytotoxic Waste symbol;
- Clinical Waste - use UN Hazard Class 6.2/INFECTIOUS SUBSTANCE;
- Pharmaceutical Waste - use UN Hazard Class 6.1/TOXIC; and
- Clinical and Related Waste – use Infectious Waste placard in Victoria.



Black on White (reflective)

Black on White (reflective)

White on Purple (reflective)

Figure 1: Format for Vehicle Signage
(Source: United Nations Recommendations for Transport of Hazardous Goods)

9.5 Waste Transport Certificates

A certification system should be implemented to adequately identify source and transport path to disposal. Compliance with jurisdictional Transport Certificate systems shall occur. Note that currently, a "Waste Transport Certificate" registration system is not applicable in New Zealand.

9.5.1 The generator is responsible for ensuring that:

(a) Clinical and related waste is segregated, packaged, labelled, stored, transported, treated and disposed of in accordance with the requirements of the relevant authorities;

(b) In New Zealand, the provision of accurate transport of Dangerous Goods documentation;

(c) A transporter using vehicles that have relevant government approvals is chosen;

(d) The waste is being transported to a licenced facility capable of treating or disposing of the waste in an environmentally acceptable manner;

(e) All Sections of the transport certificate pertaining to generator information are accurately completed; and

9.5.2 The waste transporter is responsible for:

(a) The transport certificate if the transporter is registered as an accredited agent by the generator and the relevant authority;

(b) Ensuring the transport of clinical and related waste is done in accordance with approval/permit/licence conditions and Dangerous Goods requirements as applicable;

(c) Completing and using transport certificates when transporting waste, irrespective of vehicle type and carrying capacity; and

9.5.3 The waste treatment/disposal/storage facility is responsible for:

(a) Accepting only those wastes for which they have been approved to store, treat and/or dispose;

(b) Completing and signing original transport certificate;

(c) Noting any discrepancies between the waste described on certificates and that being received; and

(d) Not accepting any waste at the disposal facility, which is not accompanied by a full and accurately completed transport certificate.

9.6 Accredited Agency System

In some jurisdictions an Accredited Agency System may be in place. An accredited agent is a person/ company authorised in writing by the relevant authority to complete certain Sections of the waste transport certificate on behalf of the waste generator.

9.6.1 Accredited agency/contractor shall have an identification number and a document stipulating the conditions, limitations and requirements with which they shall comply.

9.7 Transboundary Transportation of Clinical and Related Waste

The transportation of Clinical and Related waste across borders in Australia shall now satisfy the requirements of national manifest systems as applicable. Waste generators, transporters and treatment/disposal/storage companies should consult the relevant authorities for details.

In Australia, transportation of clinical and related waste across State/Territory borders shall be undertaken in compliance with the National Environment Protection Measure "Movement of Controlled Waste Between States and

Territories", or jurisdictional legislation implementing the NEPM (where applicable).

9.8 Rail Transportation

Reference shall be made to the most recent edition of the Code of Practices and Conditions for the Carriage of Dangerous Goods or the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG) or the New Zealand Standard NZS 5433:1999 Transport of Dangerous Goods on Land and any amendments or enactments relating to the Transport of dangerous goods on land, in regards to the requirements for shipping poisonous and clinical and related waste/substances, and any requirements of the appropriate regulatory authority.

9.9 Air Transportation

Reference shall be made to the International Air Transportation Association (IATA) Dangerous Goods Regulations (2002), and any requirements of the appropriate regulatory authority.

9.10 Marine Transportation

Reference shall be made to the International Maritime Organisation (AIM)'s International Maritime Dangerous Goods Code (2002), and any requirements of the appropriate regulatory authority.

10. Treatment and Disposal Facilities

This Section describes the general requirements for treatment facilities. All treatment and disposal facilities shall meet the regulatory requirements as specified within each jurisdiction that the facility operates. For further information regulatory agencies and/or the operators of the treatment/disposal facility should be contacted.

The ANZCWMIG does not support the use of landfill disposal for untreated clinical and related waste. The ANZCWMIG recommends that the use of landfilling for disposal of untreated clinical and related waste should be progressively phased out, owing to the unknown risks to the environment, waste handlers and the wider community.

It is important to note that operators of treatment and disposal facilities should allow waste generators to inspect the facilities as part of due diligence programs.

10.1 Siting and Development of Treatment Facilities

10.1.1 All members shall complete an Environmental Impact Statement (EIS) prior to undertaking development of new facilities or major expansion and redevelopment of existing facilities. This will help ensure new sites are selected and developments undertaken with environmental and community concerns taken into account.

Any facility that will be undertaking research and development and because of this applies for an exemption under relevant legislation shall also undertake an EIS. Any application for conversion from a research and development facility to a full commercial facility shall be accompanied by an EIS.

10.1.2 The Environmental Impact Statement shall be issued for community consultation and advice irrespective of whether an EIS is required by relevant regulatory authorities.

10.1.3 Where existing facilities have not been the subject of an EIS; members shall conduct a comprehensive Environmental Review to ascertain the current environmental status of their facilities and operations. This review shall be conducted in accordance with the ISO 14004 or similar (eg. Enviromark) Environmental Management Standard.

10.1.4 Environmental Performance Criteria shall be developed on the basis of the findings of the EIS or Environmental Review. These shall be recorded and documented within the facility's Environmental Management System, Quality System or operational plans. At intervals following commissioning of the facility or ongoing operations, environmental reviews shall be undertaken and the results of audits and routine monitoring compared with the predetermined performance criteria to assess whether corrective actions are necessary to maintain continued improvement in environmental performance.

10.1.5 A State of Environment Report shall be provided to stakeholders annually after commencement of operations. This report should identify both positive and negative aspects of the facility's environmental performance.

10.2 Clinical and Related Waste Treatment and Disposal Methods

The two most important criteria for the selection of a suitable option for the treatment and disposal of clinical and related waste are:

(a) To ensure that the method of treatment and by-product disposal will meet acceptable biological standards; and

(b) To ensure that there is minimal adverse environmental impact with respect to water, soil, air and noise.

All clinical and related waste treatment technologies shall therefore be subject to regular monitoring within the system and periodic testing of their by-products by an independent, accredited organisation to ensure that these criteria are being achieved.

10.2.1. Any treatment option for clinical and related waste shall:

(a) Render the waste non-infectious;

(b) Render the waste unrecognisable;

(c) Achieve a significant volume reduction;

(d) Result in residues being suitable for approved reuse or disposal;

(e) Result in minimum levels of hazardous or toxic by-products as approved by the relevant authority;

(f) Be verifiable for the treated wastes;

(g) Have automatic controls and built-in failsafe mechanisms;

(h) Have continuous automatic monitoring and recording;

(i) Ensure that the waste cannot bypass the treatment process;

(j) Meet relevant occupational health and safety standards;

(k) Have failsafe alternative treatment and disposal in case of emergency; and

(l) Where feasible, implement materials and energy recovery strategies.

10.2.2 Clinical and related waste transporters and treatment/disposal companies are required to supply notification IN WRITING to existing or potential clinical and related waste generators of any segregation requirements for wastes that can be accepted for storage, transport, treatment or disposal; and for the exclusion of wastes which are not licenced to be stored, treated or disposed of at the intended disposal facility.

10.3 Waste Treatment and Disposal Methods

In nearly all jurisdictions, standards and environmental outcomes for treating clinical and related waste are prescribed rather than specific requirements for each of the different treatment technologies. Any technique for the treatment of clinical and related waste shall be processed through the relevant approvals process applicable in the jurisdiction where approval is sought.

For each technology process description and equipment, see Appendix One. Appendix Two provides a summary of the waste types that are generally allowed/prohibited from each treatment technology.

Facility operators shall state clearly to their clients the types of wastes their process is able to treat. Where a facility is unable to effectively treat specific wastes, then the facility operator shall advise the client as to how these wastes are to be managed by the facility operator.

10.4 Equipment and Facility Design and Construction

The design and construction of facility and equipment shall be such as to ensure effective treatment of clinical and related waste. All equipment shall be purpose designed and constructed in accordance with all applicable Standards and regulatory authority requirements.

10.5 Emission Standards

This Code does not set emission or effluent discharge standards for the Waste Mangement Industry. A minimum goal shall be compliance with requirements of regulatory authorities. However, this Code requires the Industry to strive

towards Best Practice through a commitment to continual improvement in environmental performance.

Progress towards achieving continual improvement shall be demonstrated by:

(a) Monitoring work place fugitive and stack/exhaust duct emission levels, and discharges to soil and water;

(b) Drawing up a plan of action to reduce emission levels;

(c) Issuing a State of the Environment report that discloses all emissions; and

(d) Charting progress achieved since last report.

The Australian/New Zealand Standard AS/NZS ISO 14004 Environmental Management System Guideline or equivalent document can serve as a basis for achieving continuous improvement in environmental performance.

Note: This does not in any way imply a requirement for ISO 14001 certification.

10.6 Operations Management

10.6.1 At treatment/disposal facilities loading of waste into treatment/disposal devices shall be performed mechanically to maintain the integrity of waste and minimise the risk to workers.

10.6.2 All equipment shall be loaded and operated according to manufacturers' specifications.

10.6.3 The treatment plant shall be maintained in such condition that design specifications are met and controls, instruments and interlocks are working when the process plant is in use.

10.6.4 The treatment plant shall be placed under the control and supervision of a suitably qualified and/or experienced person, thoroughly instructed by the manufacturer or equivalent in the operation of the process plant and approved by the relevant authority in each jurisdiction.

10.6.5 Company staff shall be given thorough training and instruction in the operational procedures of the treatment plant. This training should be competency based. When operating, an appropriately trained person shall supervise the plant.

10.6.6 A summary of operating instructions and conditions shall be prominently displayed in the control room. Contingency and emergency procedures shall also be prominently displayed.

10.6.7 A spill kit shall be provided to manage spills of all waste types accepted at the facility. The size and capability of the spill kit shall be directly related to the types and quantities of waste that may be on-site.

10.7 Washdown Effluents

10.7.1 Disinfection of bins shall be achieved. Bin washing may be a three-stage process, which includes:

(a) A cold wash;

(b) Hot detergent - disinfectant wash; and

(c) A hot wash; or

(d) Any alternative process which suitably sanitises/disinfects the bins.

10.7.2 The bin washing process shall minimise personnel exposure to aerosols.

10.7.3 Where odour is a problem it may be necessary to also use a deodoriser.

10.7.4 A program of random spot checks/swabs should be implemented to assess cleaning efficacy.

10.7.5 The bin washing process shall be located in a bunded area or an area bounded by cut-off drains.

10.7.6 Wash down liquids from the cleansing of waste bins and storage areas shall not be allowed to enter the stormwater system.

10.7.7 Checks of all bins shall be conducted to ascertain if any are damaged and require replacing or repairing.

10.8 Operational Records

10.8.1 It is recommended that an environmental management system based on the AS/NZS ISO 14000 or similar (eg. Enviromark) series of environment management standards be established to ensure auditable, verifiable documentation is available to demonstrate that operations are occurring as claimed. Such a system will also assist with provision of quality data and information on which a State of Environment report can be prepared.

The keeping of records shall comply with the regulatory control requirements enforced by the responsible jurisdictions.

10.8.2 Records shall be kept of all waste accepted at the premises and/or transferred to other premises and shall include the following:

(a) Date of acceptance;

(b) Identifying label and number or similar to identify the origin of the waste load;

(c) Weight of waste;

(d) Type of waste;

(e) Type of treatment;

(f) Time of treatment;

(g) Date of treatment;

(h) Date and the facility wastes forwarded to;

(i) Date of disposal of treatment residues to landfill; and

(j) Address of disposal landfill site.

10.9 Process Monitoring and Recording

10.9.1 In order to verify that original process conditions are maintained, and in the absence of any regulatory control, monitoring for these parameters shall occur every month for the first 6 months, every second month for the next 6 months and thereafter at 6-month intervals. Parameters to be monitored are process dependent. Copies of appropriate recording charts or equivalent recorded data shall be retained for a minimum of 12 months or as required by relevant statutory authorities.

10.9.2 All treatment processes shall be equipped for continuous automatic monitoring and recording of key operational and output parameters.

10.10 Process Instrumentation and Control

10.10.1 All process instruments shall be calibrated regularly to ensure accurate readings.

10.10.2 All relevant process management instruments eg. thermometers and timers, shall produce an audible and visual alarm. Such alarms shall be recorded automatically and manually if lesser or greater values are indicated than required for effective treatment of the waste.

10.11 Sampling

10.11.1 All process equipment, gas discharge stacks, exhaust ducts and liquid discharge pipes shall be fitted with appropriate ports and sampling facilities to enable valid samples to be obtained for subsequent chemical and/or microbiological analysis as required by the relevant regulatory authority.

10.11.2 A document be prepared outlining the timing, frequency and nature of sampling to be undertaken to validate effectiveness of treatment processes and monitor residues, discharges and emissions. This document should form part of an Environmental Management System.

Staff undertaking sampling and monitoring shall be trained and qualified to undertake the tasks.

10.12 Other Conditions

10.12.1 All instrumentation is to be maintained in accordance with the manufacturer's specifications

10.12.2 All records, log books and continuous monitoring data are to be kept on site for at least twelve months (or longer as required by regulatory authorities), and made available upon request to authorised officers under the relevant legislation.

10.12.3 All residues shall be stored and transported for disposal to an approved landfill site in enclosed/covered containers.

10.12.4 The following shall be kept on site:

(a) Specifications for the process treatment plant and pollution control equipment including all associated auxiliary equipment and instrumentation;

(b) Procedures and operational manuals;

(c) Maintenance manual;

(d) Training manual; and

(e) Emergency procedures manual.

Procedures in manuals shall be followed and any departures from procedures are to be confirmed in writing to the relevant licensing authority.

10.12.5 Any change or modification to the approved operating plant and equipment is to be approved by the appropriate regulatory authorities.

10.13 Microbial Testing

10.13.1 Processes for treating clinical and related waste shall ensure an acceptable level of microbial inactivation. Commissioning of plant shall include a demonstration of the efficacy of the treatment process by inclusion of appropriate test organisms in a typical waste feed. This efficacy testing shall be repeated at predetermined intervals and the results included in the facility's or organisation's Environment Performance Report.

10.13.2 Regular tests shall be conducted for all clinical and related waste treatment technologies to ensure microbial inactivation is achieved to meet the minimum requirements of:

(a) Safety; and

(b) Environmental protection.

A suitable test procedure shall be developed, implemented and maintained to ensure acceptable microbial inactivation is achieved.

10.14 Waste Control Documentation

This Section outlines the responsibilities of treatment/disposal facility operators in ensuring that documentation is correctly completed for both regulatory requirements and to assist waste generators in meeting due diligence requirements.

All waste pick-ups shall be individually identifiable and traceable back to the generator.

10.14.1 These waste control documentation requirements apply to:

(a) Treatment/disposal facilities where the waste is treated and/or destroyed;

(b) Intermediate handling facilities where the waste is treated prior to disposal;

(c) Treatment/disposal facilities where waste that does not meet the treated and destroyed criteria (outlined in Section 10.2) is disposed.

10.14.2 The generators shall maintain shipment logs for both the original generation point and central collection point.

10.14.3 Waste Tracking requirements include:

(a) Treatment/disposal facilities shall return signed copies of the tracking form to the generators acknowledging receipt of the waste;

(b) Intermediate handlers shall sign the tracking form to acknowledge receipt of the waste; after the waste is treated, they shall initiate a new tracking form if shipment of waste to a disposal facility is required;

(c) Copies of tracking forms shall be kept for incoming waste and for shipments of waste from intermediate handlers;

(d) Intermediate handlers shall maintain logbooks or record systems to match incoming and outgoing shipments; and

(e) Copies of discrepancy reports shall be retained and noted for future audits.

11. Disposal of Treatment Residues

This Section outlines the requirements for disposal of solid, liquid and air wastes/emissions from clinical and related waste treatment technologies commissioned for use. Management, which includes disposal of any residues and air emissions, shall meet all relevant authorities licensing and other requirements.

As outlined in Section 10, the ANZCWMIG does not support the use of landfill disposal for untreated clinical and related waste. The ANZCWMIG recommends that the use of landfilling for disposal of untreated clinical and related waste should be progressively phased out, owing to the unknown risks to the environment, waste handlers and the wider community.

The receiving environments for the disposal of residues are:

- Air - gases and particulates;
- Water - effluents and liquid residues; and
- Land - solid residues.

Before any residues from treatment technologies are released or disposed into air, water or land environments they shall satisfy all biological, chemical and physical standards set down by the relevant authorities.

Tests for both leachate and microbial inactivation shall be conducted by a relevant testing and accreditation authority approved laboratory on the solid residues intended to be disposed at a landfill site, which is approved, by the relevant authority. However, the microbial testing protocols to be used need to be congruent with the relevant treatment technology.

11.1 Residue Disposal

Consideration before disposal shall be given to:

(a) All available options for reuse or energy/resource recovery of residues;

(b) Whether the solid residue is toxic;

(c) Whether any of the residues are recognisable; and

(d) Potential chemical reactivity within the receiving environment (including landfill);

11.1.1 Process by-products can be disposed of in a landfill provided the landfill has been designed, engineered and licenced to accept, without environmental harm, such residues. The wastes need to meet the criteria as set out in the landfill operation licence or specified by the relevant regulatory authority.

11.1.2 In the event that residues are classified as hazardous, then they shall be disposed of in an appropriately licenced disposal facility, or at a facility approved by the relevant authority.

11.1.3 In the collection and disposal of process by-product residues, the following shall apply:

(a) Care shall be exercised in the removal and disposal of residue(s);

(b) The removal of process by-product residue shall be mechanised and designed to facilitate continuous or semi-continuous operation so that the disposal process operation can run efficiently;

(c) Dry residues may be wetted prior to handling to minimise risk of fire and the generation of airborne dust;

(d) The amount of water used in wetting shall be controlled to minimise the potential for leachate generation in the landfill;

(e) The process residue shall be stored in enclosed containers which are then appropriately secured and transported to an approved site; and

(f) Some treatment process residues may contain chemicals, which could interact with other materials in a landfill. Consideration shall be given to the stability and nature of such process residues and any potential impacts prior to disposal to landfill.

11.2 Stormwater Management

Stormwater shall be controlled to prevent contact with spillages, wash down effluents or other materials in operational areas. Such control shall be adequate to prevent the migration of contaminants off-site. Management options include:

(a) Diversion valves;

(b) Covered areas and bunds to prevent stormwater contact with operational areas; and

(c) Collection areas and/or settling tanks for holding water.

12. Occupational Health and Safety

This Section considers the types of occupational risks, relevant OH&S management issues and how they should be managed, and the achievement of compliance with statutory requirements. This Section refers to all employees who are involved in the generation, transport, treatment and/or disposal of clinical and related waste from the point of generation to final disposal. This Section also provides guidance as to the content and objectives of emergency/ contingency plans.

12.1 Occupational Risk and Management

There are two major types of occupational health and safety concerns associated with clinical and related waste management, the risk of disease and the risk of injury.

12.1.1 To minimise the risks associated with clinical and related waste, safeguards shall be employed against exposure to (or contact with) any agents, which can cause disease or injury. These include:

(a) Infectious agents;

(b) Bioaerosols

(c) Toxic and hazardous chemicals;

(d) Sharps; and

(e) Cytotoxics.

12.1.2 To reduce the risk of contracting a disease from waste handling it is necessary to:

(a) Assume that the nature of the potential causative agent present in the waste is of a high risk level ie. standard precaution procedures to be adopted requiring maximum care to be taken and all precautions adopted;

(b) Actively promote the correct segregation and labelling of all wastes at source;

(c) Identify the type and degree of possible exposure;

(d) Establish the health status of the 'at risk' personnel; and

(e) Minimise handling of the waste at all points (eg. reduce double handling).

12.1.3 In consultation with employees, risk assessments should be conducted into the management of all clinical and related waste handled by the organisation.

12.1.4 In order to manage the risks identified, the following steps are essential:

(a) Categorise the degree of risk;

(b) Develop strategies for control of risks (eg. segregate and label all waste at source and no manual handling of wastes);

(c) Implement the controls;

(d) Evaluate the controls (eg. regular risk assessments conducted); and

(e) Continue employee consultation.

12.1.5 The risk of chronic or acute exposure to clinical and related waste can be minimised through the use of correct waste management procedures for the handling, movement and storage of wastes and through emergency preparedness, education and awareness of staff.

12.1.6 The risk of exposure to radioactivity can be avoided by proper management procedures adopted by waste generators. Each waste storage, treatment and disposal facility in Australia shall have the means of detecting radioactive wastes brought on-site. In New Zealand, the National Radiation Laboratory (NRL) sets the criteria for the release of this waste for disposal.

12.1.7 Ensuring that there is proper ventilation controls in all areas where clinical and related waste are handled and stored to minimise airborne dispersion of dusts and micro-organisms.

12.1.8 To avoid accidents and to prevent injury to personnel, including waste generators, transporters and disposal facility personnel, it is essential that the following general practices be implemented along with the specific practices as detailed throughout this Code of Practice:

(a) Develop clear communication channels between all involved parties, to ensure safe and consistent practices are maintained;

(b) Train all personnel in safe work practices;

(c) Provision of appropriate amenities for hand washing/showers and lunchrooms;

(d) Train personnel in the correct use of personal protective equipment, such as:

- Safety boots;
- Safety helmet;
- Safety glasses/face shields;
- Respiratory protective equipment;
- Safety gloves; and
- Safety aprons;

(e) Ensure that all safety equipment is always available and in good working order and that routine checks of all equipment are carried out;

(f) Ensure adequate access and space for movement in secure storage areas and that bins are stored properly eg not stacked too high;

(g) Use appropriate bins or similar collection containers as specified in Section 7.2;

(h) Eliminate any handling involving direct physical contact of the contents of clinical and related waste containers, in particular sharps waste;

(i) Ensure that transport of waste is conducted in a safe manner and this includes the loading/unloading of any waste container from vehicles or storage areas;

(j) Eliminate the manual compression of all clinical and related waste; and

(k) Train all personnel in spill containment procedures, and ensure spill containment materials and equipment are always available and in good working order.

12.1.9 To reduce the risk to personnel it is essential that staff realise that individual's actions during waste transport, treatment and disposal affects those who subsequently handle or work with this waste. People who may be affected include:

(a) Waste generator staff;

(b) Maintenance workers;

(c) Operators of treatment equipment;

(d) Waste handlers and transport drivers;

(e) Landfill workers;

(f) Emergency services personnel; and

(g) Public.

12.2 Management Responsibility

Management has primary responsibilities under the various jurisdictions workplace health and safety (and other), legislation for employee health and safety. The following provides an overview of those responsibilities.

Areas of acknowledged managerial responsibility include:

(a) Effective and appropriate human resource management;

(b) Consultation with employees on health and safety issues;

(c) Establishment of standard operating policies and procedures with regular performance monitoring;

(d) Development of emergency/contingency plans; and

(e) Provision of appropriate and adequate staff training.

12.2.1 For issues pertaining to staff training refer to Section 13.2.

12.2.2 For management issues pertaining to emergency/contingency plans refer to Section 12.3.

12.2.3 Relevant immunisations (eg. hepatitis, tetanus) shall be made available to all personnel who handle, transport, treat and/or dispose of clinical and related waste. An immunisation record should be maintained for each staff member.

Note: It is management's responsibility to seek on-going advice from qualified medical personnel on appropriate vaccinations and protocols for testing the efficacy of those vaccinations.

All personnel shall:

(a) Be given a pre-placement and periodic medical examination following a protocol designed by a suitable qualified medical practitioner such as an occupational physician, at the expense of the employer;

(b) Be provided with access to appropriate immunisations against Hepatitis A and B, tetanus and any other precautions deemed necessary by an occupational physician at the expense of the employer. Note: it is important that documentation of the offer of immunisation be recorded in the event of the staff member refusing such immunisations;

(c) On induction, employees shall be given a comprehensive training program and be required to attend a regularly scheduled training program providing updated information relevant to their occupation.

12.2.4 A blood and body fluid exposure and/or needlestick injury policy shall be in place encompassing initial first aid treatment, medical follow up and confidential counselling.

12.2.5 A copy of the waste management plan, and any other policies and procedures relevant to waste management shall be made available to all employees.

12.3 Emergency/Contingency Plans

12.3.1 Contingency plans shall be established for all emergencies, which are likely to occur as a result of the handling, storage, transport, treatment and disposal of clinical and related waste.

12.3.2 The establishment of contingency plans shall be the responsibility of the principal operator of the particular service in consultation with other contracted operators and relevant authorities (eg. EPA, fire service, police etc.).

12.3.3 The plan shall address any incidents for which the facility is at most risk and shall serve as a reference for risk assessment and employee training. Risk management requires:

(a) A risk assessment of the hazards and potential hazards;

(b) Control of hazards;

(c) Induction and continual training;

(d) The use of approved collection and disposal bins;

(e) Approved technologies and methods to be used during the handling, storage, transport, treatment and disposal of waste;

(f) Development of a risk management plan; and

(g) An audit system to ensure compliance with procedures and to assist in review and revision of risk management systems.

12.3.4 The objective of planning for emergencies is to identify actions that need to take place in an emergency and prepare for them ahead of time leaving as many resources as possible available for emergency response. The following are the steps that shall be taken in planning for the management of potential accidents:

(a) Establish and maintain occupational health and safety procedures for all aspects of operations;

(b) Identify potential risks;

(c) Outline emergency scenarios;

(d) Establish command hierarchy;

(e) Organise lines of communication;

(f) Determine response actions;

(g) Delegate responsibilities; and

(h) Designate an evacuation signal, identify rendezvous points and mark these on an appropriate map/plan for each area. Area plans shall be displayed in their respective areas.

12.3.5 The plan shall also co-ordinate with the local fire service, police and ambulance emergency response plans.

12.3.6 Personnel requirements for emergency/contingency planning include:

(a) Treatment/disposal operators and drivers who are familiar with:

- Procedures for both small and large spillages;
- Types and use of emergency equipment; and
- Types and use of personal protective equipment.

(b) An emergency response team who are familiar with:

- Statutory requirements;
- Hazards of the waste;
- Labelling requirements;
- Transport documents;
- Construction and layout of containers and vehicles;
- Use of emergency equipment, protective clothing and equipment;
- Safe handling and containment procedures;
- Spill management requirements outlined in the Communicable Diseases Network of Australia "Infection Control Guidelines for Prevention of Transmission of Infectious Diseases in the; Health Care Setting", Commonwealth of Australia 2004;
- List of contacts ie. police, fire service, hazardous chemical response units, local authorities; and
- Environmental and public concerns.

12.4 Compliance

It is important that all aspects of clinical and related waste management (ie. handling, storage, transportation etc) comply with applicable legislation as well as relevant Standards, this Code and other codes of practice mentioned in this document.

While compliance with regulations should provide for relatively safe operation of a facility, such minimum activity yields minimum benefits. It will be more beneficial over time to operate at maximum safety levels.

12.4.1 Operation at maximum safety levels requires the establishment of an accident and risk reduction program, which includes:

(a) Prompt recording and reporting of all incidents;

(b) Investigation of cause;

(c) Identification of reasons for incident;

(d) Implementation of corrective actions including operator awareness and training where relevant; and

(e) Revision of standard operating procedures.

13. Education and Training

This Section provides guidance on the principles and requirements of an employee-training program, training methods, assessment procedures, training schedule and record keeping. This Section refers to all employees who are involved in the generation, transport, treatment and/or disposal of clinical and related waste from the point of generation to final disposal.

13.1 Employees

13.1.1 'Employees' in this Section refers to the following:

(a) Those who generate the waste;

(b) Those who handle and/or transport the waste on and off-site;

(c) Those who operate or maintain the treatment equipment;

(d) Those who handle waste at the disposal facility;

(e) Reception and Administrative staff; and

(f) Managers and Executive level positions.

13.2 Employee Training

13.2.1 Establishment of standard operational procedures is not sufficient. The employees shall be trained so that they can:

(a) Implement procedures quickly and easily;

(b) Understand the importance of good hygiene practices;

(c) Understand their role and how they contribute to the overall management of clinical and related waste; and

(d) Understand the importance of following standard operating practices.

13.2.2 All employee and contractor staff shall be trained on induction. In facilities where there is a large number of temporary, casual or relieving staff it is important that a training strategy be developed with these people in mind (eg. ensuring that they are identified by Human Resources for training).

13.3 The Training Program

13.3.1 Training programs shall be competency based. This ensures that staff achieve the necessary knowledge and skills to conduct all tasks safely and effectively.

13.3.1 The amount of detail and extent of training required will depend on the nature of the hazard associated with the type(s) of clinical and related waste, the role and responsibilities of the employees receiving training, and the complexity of the work procedures and control measures required to minimise the risk of exposure.

13.3.2 Drivers of transport vehicles shall, in addition, attend a hazardous goods transport-training course.

13.3.3 The training program should also reflect any new changes in legislation or contractual requirements and ensure all appropriate personnel receive required education/training.

13.3.4 Indicative topics that should be included in a training programs are:

(a) Relevant job duties which includes emergency procedures and use of personal protective equipment;

(b) Definitions;

(c) Hazards associated with clinical and related waste;

(d) Information on occupational risks to satisfy the employee's right to know such as safe sharps handling and the management of needlestick injuries;

(e) Procedures to ensure that job functions are conducted in a safe manner and in accord with organisational requirements methods (eg., not to manually compress waste and to not place hands into waste containers);

(f) The purpose and implementation of occupational health and safety;

(g) Legislative requirements relating to waste operations;

(h) Segregation, containerisation and transport;

(i) Treatment and disposal options;

(j) Management of spills; and

(k) Management of emergencies.

13.4 Training Methods

13.4.1 Different training methods should be used as appropriate. In most cases formal training sessions will be appropriate. However, training programs should be developed so that they include a mix of formal presentations and problem solving activities. Those providing training should

investigate the availability and appropriateness of audiovisual and other teaching aids to enhance the training sessions.

13.4.2 Where possible, hands-on training should be included in the training program when relevant. One-on-one or small groups with careful supervision is best for hands-on training, enabling trainees to practice the techniques until they feel comfortable performing them. The hands-on training section of the course should consist of:

(a) Demonstration as well as practice of correct techniques;

(b) Communication of the rationale for the established procedures (eg. environmental, human health, economic);

(c) Explanation of the reasons for doing something in a particular way; and

(d) Question and answer sessions.

13.4.3 Follow up training should be included in the training program as it increases the training effectiveness and provides data about retention of information, long term effectiveness and the need for refresher courses. Follow up training should include:

(a) Random testing of operational and emergency procedures;

(b) Written tests; and

(c) Drills of particular activities such as emergency response techniques.

13.5 Assessment

13.5.1 Testing of employees on material taught is essential to assess the effectiveness of training programs, however testing should not be extensive (ie. short quizzes or multiple choice would be sufficient). Testing should involve competency-based assessment (that is practical activities). Testing should:

(a) Identify employees who need additional training;

(b) Identify problem areas that need emphasis or a different type of presentation in subsequent courses; and

(c) Evaluate the effectiveness of the training program.

13.5.2 Test results should be used to evaluate the overall effectiveness of the training program as well as individual parts of the program.

13.6 Training Schedule

13.6.1 Repeat sessions and refresher courses are essential to promote and restore interest, awareness and concern.

13.6.2 A schedule is needed for the initial presentation of the course as well as for subsequent refresher courses. The schedule should be flexible with additional courses provided as the need arises.

13.7 Instructors and Instructions

Instructors shall be suitably trained in the relevant areas and capable of conveying instructions, which are easily understood by the trainees. Instructors shall be provided with adequate time and resources to prepare appropriate training aids.

13.8 Record Keeping

13.8.1 The following information shall be included in the records for the training program:

(a) A record of the courses given in the training program with schedules for initial and repeat presentations of each course;

(b) A detailed record for each course, including the contents of the course, the location and time of each course, a roster of the attendees with names and job title, the name and qualifications of the instructor, the schedule for hands-on training and the tests administered;

(c) A file for course evaluations and a record of all responses made to these evaluations; and

(d) A record in each employee's personnel file that includes courses attended, training received and test results.

13.9 Waste Treatment Operator Training

All operators at a treatment facility shall receive specific comprehensive training appropriate to the safe performance of their duties.

The training shall include:

(a) Operational features and functions of the waste treatment technology and control equipment;

(b) Knowledge of the waste and raw materials used at the facility;

(c) Handling guidelines for clinical and related waste and other commonly encountered wastes that may be received from time to time;

(d) Knowledge of applicable environmental, workplace and occupational health and safety regulations;

(e) Practical knowledge of the function and effective use of safety and emergency response equipment; and

(f) Knowledge of the emergency contingency plan for the facility, including emergency response measures for spills and fires and reporting procedures for emergencies.

APPENDIX ONE:

Clinical and Related Waste Treatment Processes in Use in Australia and New Zealand

The following outlines the specific operational parameters for each of the treatment technologies currently in use in Australia and New Zealand. The information in this Section has been provided by those organisations that operate those technologies.

Waste generators are advised to ensure that the treatment facility is licenced for the particular waste(s) to be treated. Generators may obtain specific environmental protection operating licences on request from each individual facility or from the relevant regulatory authority in each jurisdiction.

INCINERATION

Process description

Incineration involves the combustion of waste materials at high temperatures to produce an inert ash, carbon dioxide, water and minimal pollutants. A modern clinical waste incinerator equipped with Air Pollution Control Equipment (APCE) destroys infectious and other medical waste components, reduces the volume of the waste material by 90% and controls emissions to the atmosphere.

Incineration is a rapid oxidation process as opposed to landfilling, which involves slow oxidation. One of the major advantages is that all stages of the process are monitored and quantified unlike treatment/landfilling options.

Incineration is a mass conversion process - solid/liquid wastes are reduced to gaseous emission and heat energy. Through the application of heat energy waste solids/liquids are converted back to carbon dioxide and water. Clean and measurable gases with trace pollutants removed to below threshold levels through effective air pollution control equipment.

Clinical waste incinerators consist of a primary chamber and secondary chamber, which may also be referred to as an afterburner. A well-designed incinerator system utilises controlled feed rates, regulated combustion air, high temperatures, good mixing of gases under control for combustion, and sufficient burn time (retention time) to destroy the waste. During incineration process 90% of clinical waste volumes are volatilised off as products of combustion with residual 10% to landfill as ash (non-combustible fraction). Ash or non-combustible fraction consists of inert glass and metal.

Wastes able to be processed/treated

Licence conditions need to be checked in all jurisdictions, but generally all types of clinical and related wastes can be incinerated.

Specific operating conditions in relation to waste segregation

Licence conditions will outline those materials not permitted to be incinerated.

AUTOCLAVE

There are several types of autoclave process that are operating in the different jurisdictions. Advice should be sought from the operators of each type to ascertain specific process descriptions and any variations to what wastes are able, or excluded from the treatment process. In addition, some autoclave processes are combined with shredding/granulation.

Process description

Autoclaving is the process of steam sterilisation. Steam sterilisation effectively kills microbial flora and fauna through the moisture and heat of the saturated steam The steam sterilising process is controlled by time and temperature with the parameters set to ensure steam penetration into the most difficult part of the load.

Not all clinical and related waste can be treated by autoclave system.

Wastes able to be processed/treated

Clinical and related waste that can be treated by the autoclave system:

- Sharps
- Dressing and disposable linen
- Microbiological and pathological waste
- Human and animal tissue
- Body fluids

Specific operating conditions in relation to waste segregation

The following waste cannot be treated by the autoclave system and must be segregated and disposed of in a facility authorised to treat this waste:

- Radioactive material
- Cytotoxic drugs
- Chemicals
- Recognisable body parts
- Pharmaceutical's

GRINDING/SHREDDING & SODIUM HYPOCHLORITE

Process description

Waste is drawn through the machine via air pressure (no aerosols released to environment). Shredding is carried out in three stages using hammermills. Ground product is passed through on air separator that separates solid waste from the air. The air to be discharged from the system passes through a bank of pre filters, HEPA filters and carbon filters. The ground product is then mixed in a vat with a mist of 2000ppm (part per million) of sodium hypochlorite. The ground product is then transferred to a compactor that reduces the product by volume at the ratio of 14:1. The compacted ground waste is then sent to landfill as inert waste. Fluid extracted from the ground waste flows to a holding pit. Then in compliance with the Trade Waste Water Agreement, the fluid is sent to sewer.

Wastes able to be processed/treated

- Clinical waste
- Sharps

Specific operating conditions in relation to waste segregation

The following waste cannot be processed and must be segregated and sent to a facility licenced to process such waste

- Human and Animal tissue
- Microbiological and pathological waste (in Victoria)
- Cytotoxic
- Chemicals
- Pharmaceuticals
- Chemical

ELECTRO THERMAL DEACTIVATION (ETD)

Process description

The ETD treatment process uses low-frequency radio waves and an imposed high energy field to inactivate the medical waste and destroy pathogens, such as viruses, vegetative bacteria, fungi and yeast and spores, without combusting any of the materials.

The electric field created by ETD causes high molecular agitation and thus rapidly creates high temperatures within the microbial cell. This causes the microbial cell to rupture and die. All of the molecules exposed to the field are agitated simultaneously and, accordingly, heat is produced evenly throughout the waste instead of being imposed from the surface as in conventional heating.

Wastes able to be processed/treated

- Sharps
- Dressings and disposable linen
- Microbiological and pathological waste
- Body fluids
- Human and animal tissue

Specific operating conditions in relation to waste segregation

ETD cannot process:

- Cytotoxic drugs
- Body parts
- Pharmaceuticals
- Chemicals
- Radioactive materials

These waste streams must be segregated and sent to a facility authorised to treat such material.

MATRIX PROCESS (ALKALINE OXIDATION)

Process description

The Matrix treatment process relies, as its chief means of disinfection, on subjecting shredded bio medical waste to a high pH environment, generated by the addition of a metered quantity of Calcium Oxide (Quicklime fines) and water. The process of lime hydration and mixing with the shredded waste stream within a controlled residence time, elevates pH and temperature thereby disinfecting the waste prior to compaction and transport to landfill.

There are three basic process steps;

- Shredding waste to a size range of 20 to 30 mm to render waste inconspicuous and to increase the surface area for chemical reaction.
- Disinfecting waste by the addition of Calcium Oxide and water under controlled conditions thus elevating pH and via heat of reaction, increasing the temperature at times above 70^{o} C.
- Dewatering the admixture, compacting the waste residue and transporting to landfill.

The mechanical process is continuous, using shredders, screw conveyors , flow through mixing unit and dewatering screw, and compaction.

Wastes able to be processed/treated

- Sharps
- Dressing and disposable linen
- Microbiological and pathological waste
- Body fluids
- Human and Animal tissue
- Part used cytotoxic (as defined in Appendix 2)

Specific operating conditions in relation to waste segregation

The following waste cannot be processed through a matrix plant and must be segregated and sent to a facility licenced to process such waste

- Cytotoxic drugs
- Chemicals
- Recognizable body parts
- Pharmaceuticals
- Chemical

MICROWAVE DISINFECTION UNIT

Process description

The microwave disinfection unit is a disinfection process that originated in Europe, and is now in use in the Americas and Australia. Prior to receipt at the facility, wastes are segregated, with the microwave best suited to wastes not including anatomical, scheduled pharmaceutical, chemical or cytotoxic wastes. The microwave unit is designed to accept wastes from mobile garbage bins (MGBs), in sizes ranging from 120L to 1100L. Bins are mechanically tipped into an infeed chamber, where they are held and consolidated before being fed through a shredder.

Shredded wastes are then moved by an auger into a transfer chamber that is used as an intermediate storage area for shredded wastes. From the transfer chamber, wastes are then transferred to the process chamber, which is effectively a long auger. In this area, the wastes are exposed to saturated steam from a boiler at around 150°C. Microwave units produce heat energy. The heat produced coupled with the saturated steam ensure that high process temperatures are maintained, and ensure the avoidance of cold spots in the process chamber. At all times, the process chamber waste temperature is between 95°C and 105°C. The process will stop if temperatures fall below the minimum process temperature of 95°C.

After wastes have passed through the process chamber, an ejection auger transfers the wastes to a bin or compaction unit for terminal deposition at

an appropriate landfill. The system is continually monitored for temperature throughout the process, and treated waste samples are taken for microbial and virological testing. Periodic inspections are also carried out for any microwave leakage.

Wastes able to be processed/treated

- Sharps
- Clinical

Specific operating conditions in relation to waste segregation

- Anatomical
- Scheduled pharmaceutical
- Chemical
- Cytotoxic

THERMAL TREATMENT TECHNOLOGY

Process description

Clinical waste is loaded into the system via various sized MGB'S. It is automatically fed by a Hydraulic Dumper. The waste is shredded, enters the steam auger where low-pressure steam is injected through multiple ports immediately bringing all waste material to a sterile temperature. The waste then passes through a steam jacket, which raises the temperature still further and dehydrates the waste beyond the steam injection segment of the system. Following this a low-pressure flash off chamber converts moisture to sterile steam. Treated waste then exits the end of the conveyor into a compactor.

Wastes allowed to be processed/treated

- Sharps
- Clinical Waste
- Dressing and disposable linen
- Microbiological and pathology waste
- Human and animal tissue
- Body fluids

Specific operating conditions in relation to waste segregation

The following waste cannot be treated by the STI System:

- Radioactive waste
- Cytotoxic waste
- Chemicals
- Pharmaceuticals
- Recognisable body parts

APPENDIX TWO:

Licence Conditions for Clinical and Related Waste Treatment Techniques in Australia and New Zealand

A summary of current conditions of licences for treatment processes in Australia and New Zealand are provided in the following tables. These tables are based on information provided by individual treatment facility operators for their particular treatment technologies. Reference to local jurisdictions should be made in order to verify the information relevant to the waste types.

Table 1 Summary of Current Conditions of Licences for Treatment Processes in Australia – subject to local jurisdiction approvals

Waste Types	Inciner-ation	Autoclave	Rotating Autoclave	Hypo-chlorite & Shredding	ETD	Matrix Alkaline Oxidation	Microwave	Thermal Treatment
Sharps	Y	Y	Y	Y	Y	Y	Y	Y
Clinical	Y	Y	Y	Y	Y	Y	Y	Y
Human Tissue	Y	Y	Y	Y	Y	Y	Y	Y
Recognisable Anatomical Body Parts	Y	N	Y	N	N	Y	N	N
Cytotoxic	Y	N	N	N	N	Y (see 1 below)	N	N
Pharmaceutical	Y	N	Y	N	N	N	N	N
Chemical	N	N	N	N	N	N	N	N

Note: Y = Yes, N = No (Yes classification does not apply unless licence specifically lists the waste type as acceptable for treatment).

1. *This process has only been licenced by the Queensland EPA to treat dispensing equipment, (ie. cannulas/needles, all intravenous therapy equipment, containers such as vials and any used dressings-swabs gloves), that have been contaminated with cytotoxic materials.*

Table 2 New Zealand Healthcare waste pre-treatment and disposal methods subject to local jurisdiction approvals

Waste category		Waste sub-category	Pre-treatment	Acceptable disposal methods
Non-hazardous	General Recyclable	Solid	C	I, Lf, SLf
		Liquid		S
			C	R, Cm
Hazardous	Sharps		Nil	I
			St and G	Lf, SLf
	Infectious	Body part – Solid [1]	Nil	I, Cr
			M, G	S, I, Cr[1]
			St and G, M	I, SLf, Cr, S
		Body part – Liquid [1,2]	Dilute	S
			St	S
		Solid	Nil	I, Cr
			M	I, S, Cr
			St	I, SLf, Cr
		Liquid	Dilute	I, S
			St	S
	Cytotoxic		Nil	I, S[3]
	Radioactive	In accordance with NRL code.		
	Other hazardous			I, S[3], R[4], SLf[3]
Controlled			C[5], St, G, M	I, SLf

NOTE –

(1) Only minor, minute and non-recognizable body parts may be disposed of to the sewer. Body parts may be released to family/whânau. Refer to body parts policy.

(2) Diluted embalming and body fluids may be disposed of to sewer.

(3) As approved by local authority.

(4) Recycling may only be suitable for a limited range of other hazardous waste.

(5) May be compacted only if any liquid expresses if fully contained.

Pre-treatment:

C = Compaction
M = Maceration
St = Sterilization (various methods)
G = Grinding
R = Recycling
Cr = Cremation

Acceptable disposal methods:

I = Incineration
Lf = Landfill
SLf = Sanitary Landfill
S = Sewer
CM = Composting

APPENDIX THREE:

Sample Waste Management Plan

The following provides an example of the core elements of a clinical and related waste and Controlled waste in New Zealand management plan. The extent and content of the Plan will be dependant on the type and quantity of clinical waste generated and the services available to manage those wastes on/off-site. The waste management plan should be developed in consultation with all stakeholders and follows the conduct of the waste audit.

The following recommended contents have been adapted from:

- Queensland Environment Protection Agency - Environmental Protection (Waste Management) Regulation 2000.
- World Health Organization – Safe Management of Wastes from Health-Care Facilities, 1999.

Contents:

- Scope of the waste management plan.
- Waste avoidance and reduction targets and programs.
- Waste audit protocols and schedules.
- Waste generation/segregation procedures.
- Information on the types, quantities and sources of clinical and related waste and Controlled waste in New Zealand.
- Data collection procedures and requirements.
- Risk management strategies.
- Waste recycling, reusing procedures.
- Responsibilities.
- Waste storage requirements.
- Waste treatment and residue disposal options.
- Spill management and emergency procedures.
- Duties of key waste management staff.
- Duties of waste management officer.
- Education programs for all staff and other stakeholders.
- Community relations.
- Procedures for monitoring adherence to the waste management plan.
- Waste management plan review procedures.

APPENDIX FOUR:

Signatory Organisations to the Code as at March 2004

The following organisations are members and signatories to the Code and are Tier 1 members. These organisations have been actively involved in the development and reviews of the Code of Practice.

Ace Waste Group
491 Gooderham Road,
Willawong QLD 4110
PO Box 400, Acacia Ridge QLD 4110
Tel: (07) 3372 6666
Fax: (07) 3372 3777
Contact: John Homewood
Email: mail@acewaste.com.au
Web site: www.acewaste.com.au

Airducter
PO Box 39871, Winnellie NT 0821
Tel: (08) 8984 4885
Fax: (08) 8947 0372
Email: dominic_fracaro@airducter.com.au

AWS Clinical Waste
Suite 27, 120 Bloomfield Street,
Cleveland QLD 4163
Tel: (07) 3821 1500
Mobile: 0417 511 500
Fax: (07) 3821 1525
Contact: Peter Atherton
Email: peter@awsclinical.com
Web site: www.awsclinical.com

BD
4 Research Park Drive,
North Ryde NSW 2113
Tel: (02) 8875 7000
Fax: (02) 8875 7100
Contact: Maha Hardy
Email: maha_hardy@bd.com

Cleanaway Australia
22 Centenary Avenue,
Moorebank NSW 2170
Tel: (02) 9827 8888
Direct: (02) 9827 8807
Mobile: (0418) 426 897
Fax: (02) 9824 2406
Email: jason_blackmore@cleanaway.com.au
Web site: www.cleanaway.com.au

Collex Pty Ltd
166 Boundary Road, Rocklea QLD 4106
PO Box 933, Archerfield QLD 4108
Tel: (07) 3275 0116
Mobile: 0411 223
Fax: (07) 3275 0142
Contact: Paul Haslam
Email: phaslam@collex.com.au
Web site: www.collex.com.au

CWDS Pty Ltd
PO Box 396, St Mary's NSW 2760
Tel: (02) 9623 0888
Mobile: 0418 399 334
Fax: (02) 9623 0644
Contact: Peter Wong
Email: info@cwds.com.au
Web site: www.cwds.com.au

Deakin University
School of Ecology & Environment
221 Burwood Highway, Burwood VIC 3125
Tel: (03) 9251 7621
Mobile: 0412 036 781
Fax: (03) 9251 7626
Contact: Trevor Thornton
Email: trevort@deakin.edu.au
Website: http://deakin.edu.au/

Ellwaste
PO Box 480, Cohuna VIC 3568
Tel: (03) 5456 2500
Fax: (03) 5456 3300
Contact: David Elliott
Email: david@ellwaste.com.au

Matrix Technology Pty Ltd
PO Box 1455, Cairns QLD 4870
Tel: (07) 4051 2955
Fax: (07) 4051 8709
Contact: Michael Sumner-Potts
Email: msp@cairns.net.au

Medi-Collect
PO Box 213, Bentley WA 6982
Tel: (08) 9356 5737
Fax: (08) 9458 6174
Contact: John Stephenson
Email: john@medicollect.com.au
Web site: www.medicollect.com.au

Medico Waste Disposal
325 Raglan Street, Sale VIC 3850
PO Box 1455, Sale VIC 3850
Tel: (03) 5144 6059
Fax: (03) 5143 1923
Contact: Glen Stephenson
Email: glen@medicoservices.com.au
Web site: www.medicoservices.com.au

MediVac Technology Pty Ltd
PO Box 7721 Baulkham Hills B.C.
NSW 2153 Australia
Tel: (02) 9894 7011
Fax: (02) 9894 7558
Contact: Mark Butler
Email: mark.butler@medivac.com.au

Nuplex Medismart (NZ)
PO Box 16.593, Hornby, Christchurch New Zealand
Tel: +64 3 344 5590
Mobile: +64 21 344 420
Fax: +64 3 344 5545
Contact: Royce Rivers
Email: roycer@nuplex.co.nz

Redlam Waste Services Pty Ltd
PO Box 2056, East Woonona NSW 2517
Tel: (02) 4285 2555
Fax: (02) 4285 3652
Contact: Rick Jones
Email: rick@redlam.com.au

SITA Australia Pty Ltd
PO Box 6928, Wetherill Park NSW 2164
Tel: (02) 9757 5790
Fax: (02) 9756 6217
Contact: John Hassett
Email: John_Hassett@sita.com.au

SAN-I-PAK Ltd
PO Box 21043, Christchurch, New Zealand
Tel: +64 3 328 9430
Fax: +64 3 335 4495
Contact: Julie Whitehead

Specialised Waste Treatment Services
PO Box 47, New Lambton NSW 2305
Tel: (02) 4928 4499
Mobile: 0412 390 842
Fax: (02) 4928 4499
Contact: Gerard Fuge
Email: swts@iprimus.com.au

SteriCorp Limited
Level 8, 470 Collins Street,
Melbourne VIC 3000
Tel: (03) 9629 7733
Mobile: 0400 640 619
Fax: (03) 9629 7455
Contact: Jennifer Bensemann
Email: jennifer.bensemann@stericorp.com.au

STI Clinical Waste Victoria Pty Ltd
140 Broderick Road, Corio, Vic, 3214.
Tel: (03) 5278 2428
Mobile: 0429169025 – Hugh Parsons &
0433 113 997 – Hugh Gillies
Fax: (03) 5277 1640
Contact: Hugh Parsons and Hugh Gillies
Email: hughparsons@sweeneytodd.com.au
hdsgillies@hotmail.com

Surepak
PO Box 385, Braeside VIC 3195
Tel: (03) 9580 5400
Fax: (03) 9580 5496
Contact: Jim O'Brien
Email: job@surepak.com.au

Sweeney Todd Waste Disposal Pty Ltd
PO Box 102, Lara VIC 3212
Tel: (03) 5278 2428
Mobile: 0419 324 086
Fax: (03) 5277 1640
Contact: Judith & Hugh Parsons
Email: sweeney@pipeline.com.au
www.sweeneytodd.com.au

TREDI New Zealand
PO Box 62599, Central Park,
Auckland New Zealand
Tel: +64 9 256 8533
Mobile: +64 21 440 464
Fax: +64 9 525 3550
Contact: Janette Hodson
Email: jhodson@tredi.org

Waste Audit and Consultancy Services
PO Box 154, Forest Hill VIC 3131
Tel: (03) 9877 9960
Fax: (03) 9877 5534
Contact: Pam Keating
Email: pam@wasteaudit.com.au

Membership of ANZCWMIG

Tier 1 membership is available to those who supply clinical and related waste services or products to the generators of climical and related waste.

Tier 2 membership is available to those individuals or organisations that are directly involved in any aspect of the **generation** of clinical and related waste and/or have an interest in the management issues.

For information on the benefits of membership of ANZCWMIG and the procedures to apply for either Tier 1 or 2 membership, please contact the ANZCWMIG Network Manager at info@clinicalwaste.org
Telephone 1800 222 259, or from outside Australia +61 3 9877 9960.

AUSTRALIAN & NEW ZEALAND
CLINICAL WASTE MANAGEMENT INDUSTRY GROUP

A Division of

WASTE MANAGEMENT
ASSOCIATION
OF AUSTRALIA

Mission Statement

"To achieve consistency of industry practice through uniform guidelines on classification, handling, transportation, treatment and disposal of clinical and related waste in Australia and New Zealand. In achieving this, the waste generators, transporters, disposal and treatment facilities, along with the regulators of this industry, have a focused understanding of, and commitment to, the best practice required to ensure cost effective, safe and environmentally sound management of clinical and related wastes."