

INSPECTORS REPORT
WASTE LICENCE REGISTER NUMBER W038

(1) Summary:

Name of Applicant	Southern Health Board
Facility Address	Boiler House Complex, University Hospital, Ballinaspig Beg, Wilton, Cork
Description of Principal Activity	Clinical Waste Disinfection Unit
Quantity of waste (tpa)	1,000
Environmental Impact Statement Required	No
Number of Submissions Received	None
INSPECTOR'S RECOMMENDATION	The proposed decision as submitted to the Board be approved

Notices	Issue Date(s)	Reminder(s)	Response Date(s)
Article 14 (2) (b) (i)	Not Applicable		
Article 14 (2) (b) (ii)	22 May 1998		3 July 1998
Article 14 (2) (a)	27 July 1998		
Article 16	28 July 1998		27 August 1998 and 8 September 1998

Applicant Address	Boiler House Complex, University Hospital, Ballinaspig Beg, Wilton, Cork
Planning Permission status and date granted (if appropriate)	Cork Corporation Ref 2867 / 71 Date Granted 28th September 1971
Planning Authority	Cork Corporation
For Local Authority applicants, is the facility within its own functional area	Not Applicable
Is the facility an existing facility:	Yes - - Cork Corporation Permit (1442/98) to store and treat clinical waste under EC Waste Regulations 1979
Prescribed date for application:	Prior to May 1 1998
Date Application received:	30 th April 1998
For Certified Sites, have matters in the EIS relating to environmental pollution been considered as required by Article 21 of SI 133 of 1997	Not applicable
Location of Certificate in Application	Not applicable
Confidential Information Submitted	None
Location of Planning Documents in Application	Attachment B4 of information received on 4/8/98
Location of EIS in Application	Not applicable

SITE VISITS:

DATE	PURPOSE	PERSONNEL	OBSERVATIONS
15/5/98	Check Site Notice	Brian Donlon	Site Notice complies with Art. 8
1/9/98	Meeting on Site	Brian Donlon	Meeting with SHB & Gaelsafe Personnel in relation to monitoring proposals
21/9/98	Site Visit	Brian Donlon	Facility in operation

(2) Class/Classes of Activity

The class(es) of activities for which the applicant has applied are marked below. The principal activity is indicated by (P).

Waste Management Act, 1996			
THIRD SCHEDULE Waste Disposal Activities		FOURTH SCHEDULE Waste Recovery Activities	
1. Deposit on, in or under land.		1. Solvent reclamation or regeneration.	
2. Land treatment, including biodegradation of liquid or sludge discards in soils.		2. Recycling or reclamation of organic substances which are not used as solvents.	
3. Deep injection of the soil, including injection of pumpable discards into wells, salt domes or naturally occurring repositories.		3. Recycling or reclamation of metals and metal compounds.	
4. Surface impoundment, including placement of liquid or sludge discards into pits, ponds or lagoons.		4. Recycling or reclamation of other inorganic materials.	
5. Specially engineered landfill, including placement into lined discrete cells which are capped and isolated from one another and the environment.		5. Regeneration of acids or bases.	
6. Biological treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any activity referred to in this Schedule.		6. Recovery of components used for pollution abatement.	
7. Physico-chemical treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any activity referred to in this Schedule.	P	7. Recovery of components from catalysts.	
8. Incineration on land or at sea.		8. Oil re-refining or other re-uses of oil.	
9. Permanent storage, including emplacement of containers in a mine.		9. Use of any waste principally as a fuel or other means to generate energy.	
10. Release of waste into a water body (including a seabed insertion).		10. Spreading of any waste on land with a consequential benefit for an agricultural activity or ecological system, including composting and other biological transformation processes.	
11. Blending or mixture prior to submission to any activity referred to in this Schedule.		11. Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule.	
12. Repackaging prior to submission to any activity referred to in this Schedule.		12. Exchange of waste for submission to any activity referred to in a preceding paragraph of this Schedule.	
13. Storage prior to submission to any activity referred to in this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.		13. Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.	

Class description:

Class 7 of the Third Schedule is the principal activity and refers to the heat disinfection of Health Care Risk waste being carried out at the facility. The process treats Health Care Risk waste to produce disinfected solid waste suitable for landfill.

(3) Site Location

A location plan showing the outline of the site to which the application relates is provided in Appendix 1. The plan also shows the layout of the facility.

The location of the facility is in the former incinerator room within the boiler house complex at the Cork University Hospital. This location was used when the hospital opened, initially for the disposal of Health care waste by incineration. The incineration plant closed in October 1994 and a microwave Health Care Waste disinfecting unit was put in its place. This operated until May 1996 when it was replaced by the present Heat Disinfection System (HDS). Gaelsafe operate it under contract to the applicant Southern Health Board.

(4) Waste Types and Quantities

The total quantities and types of wastes accepted by the facility are shown below.

YEAR	NON-HAZARDOUS WASTE (tpa)	HAZARDOUS WASTE (tpa)	TOTAL QUANTITY OF WASTE (tpa)
1996	0	460	460
1997	0	990	990
1998	0	1000 (projected)	1000
1999	0	1000 (projected)	1000
2000	0	1000 (projected)	1000

The projected annual waste quantities are not expected to exceed 1,000 tpa.

(5) Facility Operation/Management

• Waste Acceptance Procedures

Waste arising from health-care activities in the Southern Health Board region is treated at the facility - (i.e. waste arising from acute hospitals, long term care facilities, community health facilities, general practitioners). In total, less than 1000 tonnes per annum of health care risk waste will be treated at the facility. The following wastes which are deemed to belong to Classes 1,2,5 and 9 as outlined in the SHB Waste Management plan are acceptable at the facility:

SHB Class Code	Waste Type	Example	Estimated Quantity (tonnes/annum)
1	Used Sharp instruments	syringes, needles and scalpel blades	100
2	Infectious or potentially hazardous health care risk waste	contaminated waste from patients with transmissible infectious diseases	625
5	Laboratory Waste	cultures and clinical samples	25
9	Potentially offensive material	incontinence pads and nappies	250

The following clinical wastes, not acceptable for treatment in the facility are: recognisable body parts, radioactive waste, chemotherapy/cytotoxic waste, pharmaceutical waste.

• Waste Handling

Incoming waste is contained in 400 gauge sealed plastic bags or in sealed UN approved bins in wheeled carts. The carts are weighed and the transport documentation is completed and then moved to the loading area. The waste containers are visually inspected prior to conveying to the shredder. Sharps waste will be removed manually using appropriate personal occupational safety procedures and placed in a dedicated sharps wheeled cart (Condition 5.6).

The bins are then raised by mechanical means and emptied into a fully enclosed shredder hood and subjected to shredding. The waste is shredded to a non identifiable material. The shredding process provides the additional benefits of improved handling,

better heat transfer, reduced volume and no pollutant air emissions as it is an enclosed automatic system. A negative air pressure flows through the enclosed shredder hood ensuring that any airborne particles are drawn into the filtration system.

From the shredder the waste is transferred in an enclosed conveyor to the main processing unit where it is subjected to heat treatment and disinfected. The heating unit provides a heat transfer surface for heating the shredded waste to $>106^{\circ}\text{C}$ (for a theoretical minimum of 19 minutes - in practice 27 minutes) thus removing moisture and ensuring disinfection and a means of conveying the waste through the heating process. Hot oil is a non-combustible heat transfer fluid that is never exposed to the waste material. The oil is indirectly heated by a 470kW gas fired heating unit. The operation of the process is monitored continuously by the recording of time and temperature of the material being treated. The conveying of waste through the unit stops when the temperature goes outside pre-set parameters ($<102^{\circ}\text{C}$ or $>130^{\circ}\text{C}$); an alarm sounds and the process does not re-start until the temperature levels required to achieve disinfection are achieved.

Vapour removed from the main processing unit is condensed in the shell and tube heat exchanger using mains cooling water and discharged without treatment to sewer.

Process air from the shredder hood and the condensate system is filtered via a three-stage filter configuration (i.e. coarse filter, HEPA filter, activated carbon). Condition 8.7 and Schedule E(ii) requires monitoring and maintenance of the filter system. Spent filters are to be treated as hazardous waste and (i) either treated in the disinfection system or (ii) sent for disposal off-site using an approved hazardous waste disposal contractor.

Once the waste has passed through the disinfecting unit it is conveyed in a series of enclosed screw conveyors to an enclosed compacting unit. Wastes which contain sharps are heat treated as normal and are then sent through a second shredder prior to despatch to the compactor. The waste is held in this unit pending results of the microbiological and physical testing.

At present, disinfection of health care risk waste is verified daily, by testing of treated materials for pathogens (salmonella/shigella) and by passing a spiked test sample of *Enterococcus faecalis* through the process. The testing for these is carried out by the Microbiology Laboratory Dept in Cork University Hospital under the direction of the Consultant Microbiologist.

Schedule E(vi) requires waste analysis on a daily basis for temperature, residence time, the testing of treated materials for pathogens. It is required that there shall be no pathogens (salmonella and shigella) present in the treated waste

Further, challenge tests against (i) an overnight culture of a vegetative organism (*Enterococcus faecalis*) and (ii) a spore former (*Bacillus subtilis*) are required daily

and monthly, respectively. These challenge tests involve the controlled introduction into the system, of known indicator microorganisms in small glass containers (c.30ml volume) which are held in a metal tube for protection. When the test sample has passed through the system it is tested for its microbial content. A test is deemed to have passed when there is a minimum of log 6 and log 4 reduction of *Enterococcus faecalis* and *Bacillus subtilis*, respectively.

This is in accordance with the microbiological testing proposed in the Joint Waste Management's Board report on behalf of the Department of Health, Republic of Ireland, the Department of Health and Social Services and the Central Supplies Agency, Northern Ireland.

The compacted residue is disposed of as solid waste at the Cork Corporation Landfill site, Kinsale Road, Cork. Waste is not acceptable at the landfill until these results are available.

The licensee is required to submit two other once-off reports dealing with proposals for reprocessing of waste which does not comply with microbiological or physical testing and examining processed waste size dimensions within three months of the date of licence (Conditions 5.24, 5.25).

The licensee is required to submit a report dealing with inactivation of other pathogenic organisms within three months of the date of grant of licence (Condition 5.26). In addition, a report on the microbiological emissions to air, sewer and surface water from the facility is required within nine months from the date of licence (Condition 8.11).

- **Nuisance Control**

All waste processed at the site is sealed in either 400 gauge sealed plastic bags or in sealed UN approved bins. These are in turn contained within closed waste carts. The treated material is contained within a dedicated enclosed compacting unit prior to disposal 10-12 times per month at landfill.

- **Hours of Operation**

The plant normally operates from Monday to Friday inclusive between the hours of 7a.m. and 10 p.m. To deal with emergencies the plant may be operated on Monday to Saturday inclusive between the hours of 7 a.m. and 10p.m. However, there is an hourly and daily maximum throughput on the facility set in Condition 5.6.

(6) Facility Design

- **Infrastructure;**

The area in which the plant is located is at the rear of the hospital in the hospital service yard area. The facility has a weigh station platform scales to weigh each cart of

waste up to 200kg within the process building. Bunding is provided within the process area so as to contain any spillages of the heat transfer oil should such occur. The volume of the banded area is 5,500litres which is over 200% the capacity of the maximum spillage possible.

A waste quarantine area is provided at the entrance to the treatment facility. This area is designed to hold any carts of waste of incorrect segregation which have been delivered to the plant.

- **Facility Operation**

The current operation between the Southern Health Board and Gaelsafe continues until January 1999 and may be continued thereafter. The Southern Health Board will be the licensee should a licence be granted.

(7) Decommissioning and Aftercare

It is expected that the site will be decommissioned in the next 2 years. In the Proposed Decision the licensee is requested to submit a decommissioning report to the Agency within three months.

(8) Emissions to Air

Atmospheric emissions from the site arise from the natural gas fired process oil heat exchange unit and from process exhaust emissions which are vented through the existing chimney (29m above ground) which was used formerly for incineration.

Flue gas emission from the natural gas fired (470kW) process oil heat exchange unit was analysed. The first results obtained indicated that the boiler was not operating efficiently due to the very high CO (849 mg/N/m³) and O₂ content (14%). After a complete overhaul, the second results indicated emissions of CO of 43 mg/m³, NO 33 mg/m³ with an oxygen content of 9.5% which indicates emissions below the accepted limits. The proposed decision requires a boiler combustion efficiency report every two years with the first of these within six months of the date of grant of licence.

The process exhaust emission after abatement has a TOC concentration of 120 mg/Nm³ at a mass flow rate of 0.083 kg/hr. The TOC comprises of ethanol, acetone, isopropanol, toluene and cyclohexene derivatives. Toluene is a TA Luft class II substance: the others are TA Luft Class III substances. This emission can be regarded as a minor emission as it is less than 20% of the threshold limit for TA Luft Class II organic compounds.

The process emissions after abatement also contain total amines (c. 25 mg/Nm³) at a mass flow threshold of 0.018kg/hr and ammonia at 2.9 x 10⁻³ kg/hr. Odour analysis and Screen 2 modelling thereafter indicate that the maximum concentration at 106m

from the emission to be 0.22 ou/m³ which is well below the maximum permitted ambient odour concentrations in Dutch and Danish standards. The results of modelling demonstrate that the impact of the waste treatment operation, from the point of view of odour nuisance, will be negligible.

The PD proposes to require biannual sampling of the process exhaust emission for total amines and TA Luft Class II and III organic substances.

Dust emissions will be controlled due to the operation of the dust extraction unit fitted on the feed hoppers to the baler. There are no proposals for sampling of dust emissions in the proposed decision due to the enclosed nature of the operation and the inspectors observations at the facility.

Air emissions are abated in a 3 stage filter unit (comprising of (i) coarse pre-filter, (ii) HEPA filter and (iii) activated carbon). The PD requires maintenance of the unit as per manufacturers instructions in addition to spare filters being held on site.

(9) Emissions to Groundwater

No emissions to groundwater should occur as all oil containers are fully banded and any liquid emissions from cart washing are directed to the foul sewer with the consent of the Sanitary Authority.

(10) Noise Emissions

The noise from the operation of the process is masked by existing background noise and traffic movements on the access road for the hospital that runs around the rear of the plant.

At location N5 the nearest noise sensitive location to the facility the daytime level recorded is 57 dB(A). However, the noise is not attributable to the operation of the waste treatment facility, but is associated with traffic movements along the access road as suggested by the L₁₀ parameter of the L_{eq} measured. Therefore the activity should have no noise impact on the area. The licensee is required to undertake an annual noise survey to facilitate compliance examination.

(11) Emissions to Sewer

There are currently no effluent treatment facilities on site. Process effluent is currently discharged directly to sewer. The process effluent is high in organic and inorganic content (i.e. COD 9020 mg/L, Ammonia 186 mg/L), but the discharge volume is low 1m³ per day.

Sanitary authority consent in accordance with Section 52 of the Waste Management Act 1996 has been received for the discharge and the PD has been drafted accordingly.

Continuous monitoring of flow will be required on the discharge within six months of the date of grant of licence.

Cooling water also discharges to the foul sewer and the licensee is requested to provide an assessment of this discharge with a view to diverting this discharge to surface water within six months of the date of grant of licence.

(12) Emissions to Surface Water

Analytical results on one sample of surface water run off was reported in the Waste Licence Application and indicated low level of nutrients and organic content. Surface water from the plant is piped to the Glasheen River. The licensee is required, under the proposed decision, to perform and report the chemical composition of the surface water run off on a biannual basis for BOD, COD and OFG. A daily visual inspection of the rain water gully is also required.

(13) Other Significant Environmental Impacts of the Development

None.

(14) Waste Management, Air Quality and Water Quality Plans

No relevant plans exist. The SHB Waste Management Plan is included in part in Appendix 3.8 to Attachment E2- Waste acceptance procedures.

(15) Submissions/Complaints

None received.

Signed _____

Dated:

Name Dr Brian Donlon

APPENDIX 1
LOCATION PLAN

APPENDIX 2

LIST OF PERSONS MAKING SUBMISSIONS