INSPECTORS REPORT
WASTE LICENCE REGISTER NUMBER W054

(1) Summary:

Name of Applicant	Eco-Safe Systems Ltd.
Facility Name(s)	Eco-Safe Systems Ltd.
Facility Address	Unit 1, Allied Industrial Estate, Kylemore Road, Ballyfermot, Dublin 10
Description of Principal Activity	Healthcare Risk Waste Treatment Facility
Quantity of waste (tpa)	16,000
Environmental Impact Statement (EIS) Required	No.
Number of Submissions Received	One.
INSPECTOR'S RECOMMENDATION	The proposed decision as submitted to the Board be approved

Notices	**Issue Date(s)**	**Reminder(s)**	**Response Date(s)**
Article 8	07/10/99	12/11/99	21/01/99
Article 14 (2) (b) (i)	Not Applicable		
Article 14 (2) (b) (ii)	05/03/99	-	26/03/99, 04/05/99 & 10/05/99
Article 14 (2) (a)	20/05/99		
Article 16	1. 02/06/99 2. 22/06/99	-	1. 10/06/99 2. 24/06/99 & 02/07/99

Applicant Address	Eco-Safe Systems Ltd., Unit 1, Allied Industrial Estate, Kylemore Road, Ballyfermot, Dublin 10.
Planning Permission Status and Date Granted (if appropriate)	Planning Permission being processed.
Planning Authority	Dublin Corporation
Date Application received	24 August 1998
Confidential Information Submitted	None
Location of Planning Documents in Application	Copy of Planning Application in information received 26/03/99.

SITE VISITS:

DATE	PURPOSE	PERSONNEL	OBSERVATIONS
18/02/99	To check site notice and site visit	Donal Howley	Site Notice complies with Article 8 of S.I. 133 of 1997 as amended by S.I. 162 of 1998

(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 refers to the sterilisation of those healthcare risk wastes specified by *Condition 5.1*, through use of "*Rotoclaves*" i.e. a steam autoclave with an internal rotating drum containing vanes/blades. Following this sterilisation process the waste is to be shredded and compacted into bales. This baled waste is then to be wrapped in polythene prior to transport for disposal at landfill or, subject to *Condition 5.22*, to an appropriate recovery facility.

Activities recommended for licensing:

It is recommended that the above activity, for which the applicant has applied for a waste licence, be licensed subject to the requirements of Conditions 1 to 11 of the proposed decision.

(3) Facility Location

A location plan showing the outline of the facility to which the application relates is provided in Appendix 1.

The location of the facility is in an existing building at the Allied Industrial Estate, Kylemore Road, Co. Dublin. The building, comprising of 23,000 ft^2 industrial block, has an adjoining 6,000 ft^2 office and administration building.

The immediate neighbour of the facility, to the south west, is an ESB electrical power station.

(4) Waste Types and Quantities

Total quantities and types of wastes proposed to be accepted by the facility are shown below.

YEAR	NON-HAZARDOUS WASTE (tpa)	HAZARDOUS WASTE (tpa)	TOTAL ANNUAL QUANTITY OF WASTE (tpa)
Year 1	-	approx. 5,000	approx. 5,000
Year 2	-	approx. 10,000	approx. 10,000
Year 3	-	approx. 16,000	approx. 16,000
Year 3 +	-	approx. 16,000	approx. 16,000

The quantity proposed to be accepted in year 3 above was given as an estimate of the maximum annual quantity that the facility will accept. *Condition 5.1* specifies acceptable wastes as the following healthcare risk wastes; (i) Infectious, and (ii) Sharps. Wastes included in the application for acceptance, but not to be accepted at the facility are

healthcare risk wastes categorised as Pharmaceuticals and comprising waste medicines and chemicals.

The quantity of waste to be treated at the facility is limited by the following factors; (i) the capacity of the two autoclave chambers which is controlled by *Condition 5.2*, (ii) the duration of an individual cycle, and (iii) the hours of operation (as per *Condition 5.3*).

(5) Activity Summary

It is intended to operate a healthcare risk waste treatment facility to safely treat, prior to disposal at landfill, such waste arising from the Irish health care system. The treatment uses a steam autoclave which incorporates an internal rotating drum with blades. The combination of high temperature steam and pressure and rotating blades within the chamber will sterilise all the waste over an intended duration of exposure.

Condition 5 controls the waste types, acceptance procedures and handling of healthcare risk waste at the facility.

Similar facilities are currently in operation and regulated in a number of states in the U.S. The efficacy of the process indicates that it can achieve in excess of 6 $\log_{10}$ reduction of microbial populations (sterilisation as required in *Condition 5.14*). Literature on this equipment states that tests carried out on the process show that the process: sterilises the material that leaves the autoclave vessel (both particulate and aqueous); sterilises cell/spore cultures; and does not produce any products of carcinogenic potential. As part of the commissioning test requirements (*Condition 5.13*), the licensee is instructed to monitor the emissions to sewer and to atmosphere, as well as testing samples of the waste and the use of test vials containing spore cultures. Emissions to sewer are subject to Dublin Corporation's consent (*Condition 7.7*). *Schedule G* sets emission limit values for emissions to sewer and to atmosphere.

(6) Facility Operation/Management

- **Waste Acceptance Procedures**

Condition 5.1 specifies the wastes acceptable at the facility. *Condition 5.4.2* requires that a proposal for the scanning of all bins for radioactivity be submitted to the Agency along with proposals for handling any waste indicating radioactivity. All bins accepted at the facility are to be supplied by Eco-Safe Systems Ltd., and collected by Eco-Safe Systems Ltd. personnel who check that the bins are correctly sealed.

Healthcare risk wastes categorised as Pharmaceuticals were proposed to be accepted by the applicant but has been excluded from those specified in *Condition 5.1*. This category comprising waste medicines and chemicals is not suitable for this process as the technology was not designed to treat this waste.

- **Waste Handling**

All waste is to be packaged at source in bags and containers provided by Eco-Safe Systems Ltd., and subsequently placed in containers also provided by Eco-Safe Systems Ltd. These containers are to have an internal lining which is to be sealed by the waste producer. *Condition 5.10* requires that each bin accepted at the facility be uniquely identifiable by visual and electronic means; such that its location can be determined at all times.

Conditions 4.7 & 4.8 require and specify bunding for all waste storage areas.

The wheeled bins which contain the healthcare risk waste are unloaded from the collection vehicle inside the facility building and in the Red Line Area (see section (7) *Facility Design* below). All bins are electronically logged and manually wheeled to a weigh station. A trolley or grip-device will be employed to avoid direct contact with the receptacles. After weighing, the bin is wheeled to a designated storage area for untreated waste. *Condition 5.7* requires that waste deemed unacceptable for processing at the facility be stored in a quarantined store (to be agreed with Agency) prior to its removal to an appropriate facility at the earliest possible time. *Condition 5.8* limits this storage time to 36 hours.

Wastes to be treated are wheeled from the storage area to the autoclave chamber. The bin is mechanically lifted such that its contents are emptied into the autoclave chamber. Once loaded, the chamber is closed and sealed and the treatment process begins.

Autoclave Process: The autoclave is patented as *Rotoclave* and consists of an autoclave chamber along with an internal rotating drum to which are attached vanes/blades. The premise of the *Rotoclave* is that the waste in the chamber is sterilised through the use of steam heat under pressure for a set period of time. The vanes/blades on the internal drum slice open boxes and bags and along with agitation from the rotation of the drum enable the surfaces to be exposed to the sterilising steam. The waste is therefore to be processed without any direct contact with the treated waste by personnel. *Condition 5.13* controls the commissioning procedures required to determine the operating parameters i.e. temperature, pressure and effective residence time. The applicant has identified the following parameters in commissioning proposals of 134°C at 20 psi for twenty minutes..

Once the chamber is closed and sealed, an initial vacuum is formed. The required operating parameters of temperature, pressure and effective residence time are then achieved with steam being injected into the chamber. The chamber is designed to remain sealed until the designated operating parameters of a full cycle - temperature, pressure and time - have been achieved.

Outflows from the process are: the treated waste (*Condition 5.14* controls the efficacy testing requirements); the initial air exhaust at vacuum formation; air exhaust following the treatment cycle; and water resulting from the condensation of the

sterilisation steam. This water is collected in a recovery tank from where it is pumped as boiler feed. Water emissions to sewer consists of boiler blowdown from the steam generating gas boiler which are subject to Dublin Corporations consent (*Condition 7.7*).

The vacuum/condensing system employed is intended to dry the waste although the waste coming from the autoclave chamber is expected to still be moist. Following the autoclave process the waste is placed onto a conveyor belt from where it is conveyed to a fully enclosed shredder. Upon shredding it is similarly conveyed to a second shredder, which is also fully enclosed. From this shredder it is conveyed to a compactor. Upon compaction the waste volume is reported to be reduced by up to 80%. *Condition 4.9* provides for the enclosure of the conveyor belt system, such that there shall be no air emissions from when the waste enters the conveyor system and reaches the compactor. *Condition 7.5* requires that there be no emissions from the compactor.

The waste is compacted into bales which are then wrapped in polythene. *Condition 5.16* requires that they be stored in fully enclosed containers, in the designated storage area, to await the results of verification testing. Upon verification of successful treatment, the waste is to be transported to an appropriate facility. *Condition 5.22* requires that the licensee submit a report identifying options for the recovery of processed healthcare risk waste to the Agency for its agreement.

Once emptied, the waste receptacles are introduced to a steam cleaning unit, prior to introduction to the green line area. The receptacles are then to be reintroduced to the waste collection points. This bin washing unit is designed such that it drains to the recovery tank mentioned above. *Condition 5.11* requires a report to be submitted to the Agency on the effectiveness of this cleaning process.

- **Nuisance Control**

Condition 6 deals with the nuisance control requirements of the facility.

Healthcare risk waste treatment facilities have the potential to cause odour problems. Consequently, *Condition 6.4* requires the applicant to submit a proposal to assess odours arising from the facility. *Condition 6.3* requires that odours generated at the facility do not become a nuisance.

- **Hours of Operation**

Monday to Friday 9.00 a.m. to 5.00 p.m. inclusive. Any changes in these hours are subject to the prior written agreement of the Agency.

(7) Facility Design

- **Infrastructure**

The facility is surrounded on all sides by 9 ft. high security fencing, and is monitored by CCTV. There is on site security 24 hours a day, 7 days a week. The facility is

located in the Allied Industrial Estate with it's entrance opening on to Kylemore Road which connects to the M50. The estate is designed in a manner to allow vehicular access to both the front and rear of the buildings.

The facility is to be designated into two areas - one a Red Line Area (RLA) and the other a Green Line Area (GRA). The RLA proposed consists of the areas into which unprocessed waste will be where maximum hygiene, health, safety and environmental management controls will be in operation. The area is controlled and enclosed from the external environment and segregated from the other operational areas of the facility. *Condition 5.4.4* requires that this area will have restricted access points and that all persons leaving the RLA will have to undergo appropriate disinfection procedures. *Condition 5.4.3* requires that the red line area (RLA) be increased to include all process equipment and the waste storage area for treated waste prior to verification of successful treatment.

Vehicles deliver waste into the facility building at the Reception bay, within the RLA, where it will undergo inspection procedures - weighing, logging, source identification**.** An adjustable ramp will facilitate the unloading of receptacles in a roll-on roll-off manner.

- **All other services**

No fuel will be stored on site. Both the treatment facility and the adjoining administrative building have a fire sprinkler system installed. This system has its own stored water supply housed in a containment tank at the rear of the premises. A water cooling tower is also located outside the rear of the building. Within the treatment building there is an equipment storage room and a worker's rest area, along with the following plant/machinery:

- Rotoclave Model 2500-D2 (a microprocessor controlled system consisting of; two Rotoclave vessels, a steam jet ejector vacuum system with condenser and condensate holding tank, two shredders, one compactor, conveyors connecting autoclave to shedders and from there to the compactor)
- water pumps
- one boiler/steam generator and a
- battery operated fork-lift truck.

The adjoining but separate two-storey administrative building also houses a canteen, toilets and showers.

(8) Decommissioning and Aftercare

Condition 8 specifies the decommissioning and aftercare of the facility which will involve the decontamination of all machinery, their dismantling and ultimate removal.

(9) Emissions to Air

Air and steam condensate are emitted by the Rotoclave cycle. Air emissions result from;

(i) the vacuum formation in the chamber prior to the introduction of high pressure steam. This initial exhaust is predominantly ambient air with the possible addition of any micro-organisms that may have been on the outside of autoclave bags/boxes/containers; and

(ii) a small amount of air exhaust occurs following a cycle, and after complete sterilisation of the chamber contents has occurred. [It is exhausted before the chamber is opened].

All this air is passed through a steam jet for approximately one minute and then passed through an activated charcoal filter to eliminate any potential release of micro-organisms to atmosphere. The sterilising steam is condensed and the water is collected in a recovery tank. *Condition 9.9* requires proposals for the monitoring of the effectiveness of the carbon filters. *Condition 5.24* controls the handling of used charcoal filters, which are to be introduced to the autoclave chamber for treatment. Along with air monitoring requirements of *Condition 9.1, Condition 7.4* requires the following: (i) a report investigating alternative VOC abatement technologies; (ii) a determination of emission values for total VOC and indicator micro-organisms at the process vent; and (iii) testing of the efficiency of the natural gas steam generating boiler.

(10) Emissions to Groundwater

There are to be no emissions to groundwater.

(11) Noise Emissions

Background noise levels at the perimeter of the facility have been assessed as being primarily caused by the continual passing traffic on the Kylemore Road. Some interference was noted from an adjacent industrial unit and nearby electricity pylons. The indoor operation of the facility machinery is a significant potential source of noise. *Condition 7.3* requires that noise does not result in significant impairment of the facility beyond the facility boundary. *Condition 9.1* controls noise monitoring requirements.

(12) Emissions to Sewer

There is one direct emission to a Dublin Corporation foul sewer. The discharge is composed mainly of boiler blowdown containing condensed process water. Consent for the discharge has been obtained from Dublin Corporation as per *Condition 7.7*. Monitoring requirements and emission limit values are set out in *Schedules F.1 & G.1* respectively.

Surface run-off discharges to a Dublin Corporation storm sewer.

(13) Emissions to Surface Waters

None.

(14) Other Significant Environmental Impacts of the Development

None.

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

A regional Waste Plan has been adopted by Dublin Corporation. This plan does not contain any specific proposals for healthcare risk waste, but refers to the adoption the National Hazardous Waste Management Plan when finalised.

(16) Submissions/Complaints

One submission from Dublin Corporation, Atmospheric Pollution & Noise Control Unit, Environmental Health Officers' Service (Ms. Anne Kellegher) Appendix 2 Date Received 04/08/99). A summary of all issues raised in the submission is provided.

The submission states that no complaints under the Air Pollution Act, 1987 and Noise Regulations 1994 have been received at the above offices in relation to activities being carried on by Eco Safe Systems Limited, Unit 1, Kylemore Road, Ballyfermot, Dublin 10. Any relevant information or complaints will be forwarded to the Agency in the future.

RESPONSE

Any complaints arising with regard to noise and air issues will be dealt with under the terms of the proposed decision.

Signed _____ Dated:

Name

APPENDIX 1

Location Plan
+
Facility Layout

APPENDIX 2

Submissions

APPENDIX 3

Sanitary Authority Consent
(Section 52)