ERAS ECO Ltd.

Annual Environmental Report 2010

ERAS ECO Limited

Foxhole, Youghal, Co. Cork
County Cork

Waste Licence Number:
W0211-01

Document Lead Sheet:

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1 Introduction

ERAS ECO Ltd. is a Sludge Drying and Waste Recovery/ Transfer facility located in, Foxhole, Youghal, Co. Cork. ERAS ECO Ltd. operates in accordance with the company's waste licence (Waste Licence number W0211-01). ERAS ECO Ltd. has prepared this Annual Environmental Report in accordance with the terms W0211-01, in particular Condition 11.9. This Annual Environmental Report covers the twelve month period from January 2010 to December 2010.

Since 2010 ERAS ECO Ltd. is solely owned by Ormonde Organics Holdings Limited, Killowen, Portlaw, Co. Waterford. In this AER the company is referred to as ERAS ECO Ltd.

A Certification of Incorporation for ERAS ECO Ltd is provided Appendix A of this report.

2 Company Description

2.1 Company Description and Site Activities

ERAS ECO Ltd is an innovative waste management company specialised in treatment of WWTP sludge's and recovery of Biomass. The company, which is now solely owned by Ormonde Organics was set up to compensate for the lack of facilities in Ireland capable of operating under the guidelines of recently published environmental legislation.

Ormonde Organics is a leading sludge management company with headquarters located at Killowen, Portlaw, Co. Waterford, Ireland. Ormonde Organics consists of specialist services in sludge management, sludge dewatering, composting, land restoration, industrial site services, specialist services, brown field excavation and remediation.

ERAS ECO Ltd consists of a Sludge Drying and Waste Recovery/Transfer Facility. The location of the Facility is on a 3.5 acre brown field site, close to the Youghal Landfill and Civic Amenity Centre (Waste Licence Reg. No. W0068-02). A maximum 70,000 tonnes per annum (tpa) of commercial and industrial non-hazardous waste will be managed in the Waste Recovery/Transfer Facility (hereinafter referred to as Building No.1). The Sludge Drying Facility (hereinafter referred to as Building No. 2) treats a maximum 30,000 tpa of non-hazardous treated sewage sludge and industrial sludge from municipal or industrial waste water treatment plants. In addition ERAS ECO Ltd is also licensed to accept 10,000 tpa of landfill leachate.

The Sludge Drying Facility treats sludge from industrial, pharmaceutical and municipal sources. Sludge accepted on-site will have a minimum dry solids content of 10%. Effluent from the sludge drying plant is treated in the on-site waste water treatment plant (WWTP) prior to discharge to the Sanitary Authority sewer. The licensee may accept leachate from the nearby Youghal Landfill to be treated in the on-site WWTP, subject to agreement in advance by the Agency and the Sanitary Authority.

Building No.1 is purpose built for the recovery and transfer of solid, non-hazardous commercial and industrial waste. Such waste consisted of cardboard, paper, plastic, metals, wood, glass, electrical and electronic equipment and wood. Operations included waste inspection, segregation, recovery, storage and transfer into vehicles for removal off-site. Other activities that were carried out include baling, compacting and shredding.

The licence and the Environmental Management System in place sets out in detail the conditions under which ERAS ECO Ltd. operates and manage the facility.

2.2 Environmental Policy (ERAS ECO Ltd.)

Figure 1 - ERAS ECO Ltd - Environmental Policy

ERAS ECO Ltd	Environmental Policy		Document Number; Eras-DS-003
			Page 1 of 1
Created by; J. Dee	Approved by; P. Wilson	Date; 19/02/2010	Revision 00

Eras Eco Ltd. operates a non hazardous waste transfer station for waste sludge, C&I waste and storage. The group recognises it's environmental and occupational health & safety responsibilities to its staff, shareholders, customers and the general public and is committed to the continual improvement of the operating environment of its facility.

To this end it shall maintain a documented Environmental Management System which is implemented in line with ISO 14001:2004 and complies with all regulatory and legislative requirements pertinent to its industry, local operating environment and customer requirements.

The organisation's objectives include the following:

- Communicating it's policies both internally and externally
- Ensuring that all employees are aware of their obligations
- Commitment to continual improvement in environmental, quality, occupational health & safety and performance.
- Using the input of staff, customers, shareholders, government, local authorities, interested third parties and the general public
- Awareness and training on quality, occupational health & safety and environmental issues
- Creating a better environment for all, through promotion of reducing, recycling and reuse of waste, the optimum usage of resources and the elimination of polluting releases to the environment
- Compliance with all pertinent applicable regulations and legislation
- Prevention of pollution
- Provision of a competitive, cost effective and on time service

The above policy is supported by the management of the organisation who shall commit the necessary resources in ensuring that the objectives and targets can be achieved. This policy shall be made available to the public.

Facility Manager

Date: 19/2/10

Environmental Management Rep.

Date: 19/2/10

2.3 Company Management and Organisational Chart

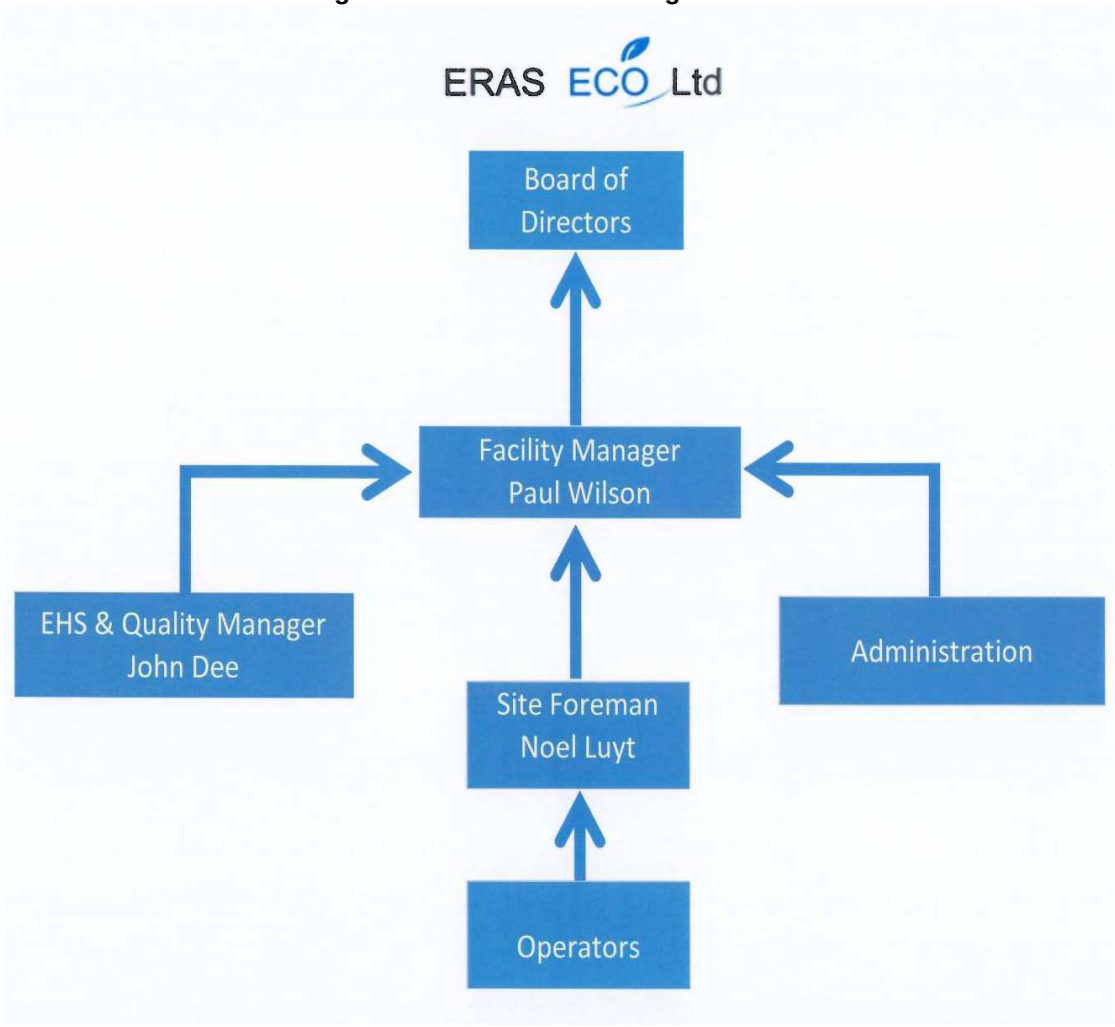
As part of the company's environmental policy, management is committed to continual improvement in environmental, quality, occupational health & safety and performance.

Management will ensure that necessary resources are available to comply with all objectives stated in our environmental policy.

Figure 2

~~Figure 2~~ below is an up-to-date organisational flow diagram of ERAS ECO Ltd.:

Figure 2 - ERAS ECO Ltd Organisational Chart



3 Summary Information

In accordance with Schedule E of ERAS ECO Ltd. Waste License (W0211-01) the following summary information is provided:

- Waste management
- Emissions to sewer
- Stormwater Emissions
- Emissions to air
- Noise monitoring
- Groundwater monitoring

3.1 Waste Management

As per condition 11.10 of Waste License W0211-01, a full record of all incoming /outgoing waste is kept and updated on a monthly basis.

The main on site waste activities are summarized as follows:

- Non hazardous industrial or municipal WWTP Sludge are inspected, accepted (or rejected if non-compliance with waste acceptance criteria), dried and exported as a fuel.
- Non-hazardous grade wood/ woodchip is accepted, stored and used onsite as a fuel for the onsite boiler. To improve our self-sufficiency capability some wood is delivered in a non-chipped form and this is shredded onsite when the quantities are sufficient.
- The facility is also licensed to accept non hazardous waste from Commercial and Industrial sources. Since 2008 – 2010 the acceptance of these waste streams has been curtailed.
- Waste storage

All incoming/ outgoing waste is recorded by means of an integrated weighbridge and software system.

ERAS ECO Ltd. operates with stringent waste acceptance criteria and in-house standard operational procedures for waste acceptance.

3.1.1 Incoming wastes

The total amount of sludge accepted during 2010 is provided in Table 3-1 below.

Table 3-1 Total sludge accepted in ERAS ECO Ltd. during 2010

EWC	Description	Total Weight (Tonnes) 2010 Note 1
02 03 99	Sludge	83.9
02 07 05	Sludge	340.18
05 01 10	Sludge	13.3
07 05 12	Sludge	6631.43
19 08 05	Sludge	674.19
19 09 02	Sludge	238.88

Note 1 The total weight figure for 2010 includes sludge waste accepted from January to December.

3.1.2 *Outgoing Waste*

Table 3-2 Provides a summary of all Outgoing wastes during 2010

EWC [1]	Description	Weight (tonnes)	Via (Haulier)	Waste Licence/ Collection Permit/ Waste Permit	Final Outlet	Waste Licence/ Waste Permit	Recovery [2]/ Disposal [3]
10 01 01	Ash boiler	187.98	O'Brien Skip Hire Ballyrussel, Midleton, Co Cork	CK WMC 104/02	Youghal Landfill Foxhole Youghal County Cork	EPA waste Licence W0068-02	D1
19 08 12	Dried Sludge	1422.06	Yawl Haulage Foxhole, Youghal, Co Cork	W 0050-02 CK WMC 07/01	Remondis, Luenen, Germany	21/Fo/Tho -G 61/93	R1
19 12 07	Woodchip	86.74	Ormonde Organics, Killowen, Portlaw, Co. Waterford	WCP-OY-08-0595-01	Ormonde Organics, Killowen, Portlaw, Co. Waterford	Exempt	R3
20 03 01	General Wastes	17.48	Greenstar Recycling, Glanmire, Co. Cork	CK WMC 323/05	Sarsfield Court Ind. Est., Glanmire, Co. Cork	W0136-02	R3, R4, R5

Note 1: European Waste Catalogue Code (asterisk denotes hazardous waste)
Note2: R1 Use as a fuel to generate energy; R3 Recycling/ Reclamation of organic substances which are not used as solvents (including Composting); R4 recycling/reclamation of metal and metals compounds; R5 recycling/reclamation of other inorganic materials.
Note 3: D1 deposit into landfill,

3.1.3 *Waste Monitoring 2010*

As per schedule C.4 Waste Monitoring, a sample of boiler ash and dried sludge was sent for analysis during 2010. A boiler ash sample was collected on the 06th April 2010 from an outgoing load and sent to ELS Environmental Laboratory for metals analysis. Samples from outgoing loads of dried sludge were collected and sent for analysis to BHP (17th June 2010) or ELS Environmental Laboratory (06th May 2010).

Table 3-3 below summarises the annual waste monitoring carried out, as per Schedule C.4 of the Waste License W0211-01.

Table 3-3 Annual Waste Monitoring 2010

Document No.	EWC Code	Description	Date of Sample	Date of Analysis	Laboratory	Analysis
Boiler Ash 01 10/ 16854	10 01 01	Ash	06/04/2010	12/04/2010	ELS Environmental Laboratory	Metals
Dried Sludge 10 02 / 93508.2	19 08 12	Dried Sludge	17/06/2010	22/06/2010	BHP Laboratory	N & P
Dried Sludge 10 02 / 17173			06/05/2010	10/05/2010	ELS Environmental Laboratory	Metals

3.2 Emissions to Sanitary Sewer (Emission point Reference SE1)

This section provides information relating to annual emissions to sewer (Ref: emission point SE1). Effluent from the sludge drying plant and Waste /Transfer Facility is treated in the on-site waste water treatment plant (WWTP) designed and installed by EPS Pumping and Treatment Systems Ltd. prior to discharge to the Sanitary Authority sewer (Youghal Town Council).

Washwater from the wheelwash is also treated in the on-site waste water treatment plant. The Sanitary effluent from the administration building is treated in a Puraflo peat filter sewage treatment system, which was installed by Bord Na Mona in 2007, prior to discharge to the Sanitary Authority Sewer.

The main source of the trade effluent originates from the sludge drying process, as the condensate water from the process is discharged and treated in the WWTP.

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Table 3-4 below outlines the monitoring requirements for emission point SE1 as stipulated by Schedule C3.1

Table 3-4 Monitoring Frequency and Analysis methodology SE1

Monitoring Frequency	Parameter	Analysis Method	Emission Limit Value Note 1
Continuous	Flow	On-line flow meter with recorded	Maximum in any one day: 170 m^3/day Max rate per hour 7m^3/hour
Weekly	Temperature	Temperature probe (on-line continuous daily readings available)	25^{0}C (max)
	pH	pH electrode/meter (on-line continuous daily readings available)	6.0-8.5 (ph units)
	COD	Standard Method	125 mg/l
	Suspended Solids	Gravimetric	35 mg/l
Monthly	BOD	Standard Method	20 mg/l
Quarterly	Total Nitrogen (as N)	Standard Method	10 mg/l
	Sulphate	Standard Method	100mg/l
	VOC	Standard Method	50ug/l
	Semi VOC	Standard Method	50ug/l
	Faecal Coliforms	Standard Method	<250FC/100mls
Biannually	Total Phosphorus (p)	Standard Method	1.0
	Cyanide	Standard Method	0.01mg/l
	Mercury	Standard Method	
Annually	Lead	Atomic Absorption/ ICP	5ug/l
	Zinc		100 ug/l
	Copper		30ug/l
	Cadmium (total)		5 ug/l
	Arsenic (total)		20 ug/l
	Chromium		15ug/l
	Nickel		25ug/l

Note 1 Source B.4 Emission to Sewer Waste Licence No: W0211-01

3.2.1 *Flow*

Volume flow is monitored hourly using an online probe. No daily flow during 2010 exceeded the 170 m^3 /day emission limit value. The average total daily flow for each month during 2010 is provided in **Table 3-5.**

Table 3-5 Average Total Daily Flow per month during 2010.

Month	Total Average Flow (m^3/day)	Emission Limit Value (m^3/day)
January	7.38	170
February	10.24	170
March	10.32	170
April	7.59	170
May	9.95	170
June	6.28	170
July	3.13	170
August	4.07	170
September	18.45	170
October	14.92	170
November	7.1 Note 1	170
December	0 Note 1	170

Note 1 Discharges from the WWTP ceased between Week 44 – 52 due to Improvement works to WWTP and Sludge Drying Downtime

At present, there is one sludge dryer in operation (15,000 tonnes sludge capacity). The Flow limits in Waste License W0211-01 are based on two sludge dryers (30,000 tonnes sludge capacity), however based on existing information, it appears that even with two dryers in operation the discharge volumes would continue to be significantly less than permitted in Schedule B4 of W0211-01.

3.2.2 *Weekly Monitoring*

COD, pH and Suspended Solids are monitored on a weekly basis by an external laboratory, Alcontrol, Laboratories, BHP and/or Environmental Laboratory Services.

Table 3-6 summarises the results of weekly monitoring during 2010.

Any resulting exceeding the emission limit values are highlighted in red. Temperature is monitored continuously using an online probe. The temperature from the online probe for the date the weekly sample was collection is reported.

Table 3-6 SE1 Weekly Results

	COD *Note 1		pH *Note 1			Temperature		TSS *Note 1	
Week 2010	ELV	Result	ELV (Low & High		Result	ELV		ELV	Result
Wk1	125	16	6	8.5	5.32	25	2	35	48
Wk2	125	72	6	8.5	4.72	25	6	35	32
Wk3	125	63	6	8.5	5.49	25	5	35	51
Wk4	125	21	6	8.5	6.29	25	6.1	35	155
Wk5	125	264	6	8.5	6.70	25	8.1	35	10
Wk6	125	400	6	8.5	6.40	25	6.2	35	15.6
Wk7 *Note 2	125	11	6	8.5	7.54	25	6.8	35	4.4
Wk8	125	27	6	8.5	7.29	25	5.1	35	8.4
Wk9	125	22	6	8.5	7.32	25	6.8	35	10.4
Wk10	125	198	6	8.5	7.55	25	8.9	35	14
Wk11	125	300	6	8.5	8.01	25	9.3	35	12
Wk12	125	240	6	8.5	8.00	25	5.9	35	16
Wk13	125	106	6	8.5	7.48	25	6.7	35	15.2
Wk14	125	320	6	8.5	7.68	25	8.4	35	14
Wk15	125	300	6	8.5	7.11	25	9.8	35	5
Wk16	125	160	6	8.5	5.80	25	10.8	35	5
Wk17	125	340	6	8.5	7.26	25	11.5	35	30.7
Wk18	125	380	6	8.5	6.13	25	13.1	35	19.2
Wk19	125	188	6	8.5	6.64	25	17	35	13.5
Wk20	125	350	6	8.5	6.97	25	14	35	10.6
Wk21	125	136	6	8.5	7.31	25	14	35	3.2
Wk22	125	141	6	8.5	7.58	25	20.2	35	1
Wk23	125	150	6	8.5	7.31	25	17.5	35	9
Wk24	125	182	6	8.5	7.54	25	22.4	35	1.3
Wk25	125	87	6	8.5	7.65	25	20.8	35	3
Wk26	125	31	6	8.5	7.79	25	20.4	35	4
Wk27	125	190	6	8.5	7.75	25	18	35	6.8
Wk28	125	80	6	8.5	7.83	25	18.7	35	1
Wk29	125	18	6	8.5	7.91	25	17.2	35	1
Wk30	125	1	6	8.5	7.80	25	17.9	35	8
Wk31	125	8	6	8.5	8.10	25	16.8	35	5
Wk32	125	8	6	8.5	8.10	25	18.7	35	5
Wk33	125	110	6	8.5	7.29	25	18.6	35	19
Wk34	125	29	6	8.5	8.77	25	17.9	35	5.2
Wk35	125	360	6	8.5	7.20	25	16.7	35	3.2
Wk36	125	280	6	8.5	5.97	25	18.9	35	22
Wk37	125	8	6	8.5	7.10	25	16.1	35	5
Wk38	125	10	6	8.5	8.05	25	16.1	35	2.8
Wk39	125	50	6	8.5	7.31	25	13.9	35	10
Wk40	125	90	6	8.5	7.33	25	14.1	35	2
Wk41	125	70	6	8.5	6.87	25	13.9	35	2.4
Wk42	125	124	6	8.5	6.94	25	8.9	35	5
Wk43	125	140	6	8.5	7.43	25	11.7	35	5
Wk44	125		6	8.5	6.36	25	11	35	

	COD *Note 1		pH *Note 1			Temperature		TSS *Note 1	
Week 2010	ELV	Result	ELV (Low & High		Result	ELV		ELV	Result
Wk45	125		6	8.5	6.98	25	11.5	35	
Wk46	125		6	8.5	6.38	25	2.7	35	
Wk47	No Discharge – Implement WWTP Works								
Wk48									
Wk49									
Wk50									
Wk51									
Wk52									

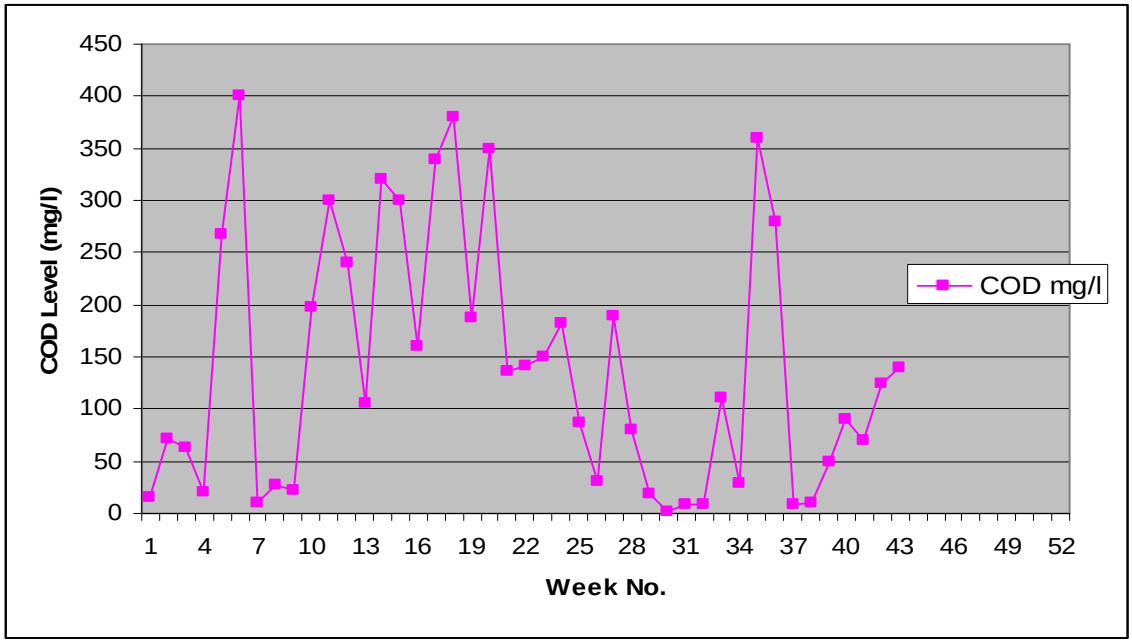
Note 1 Any result highlighted in red exceeds the emission limit value.
Note 2 An EPA split sample was taken at this date

As can be seen from the above table, ERAS ECO Ltd ceased discharging to sewer during week 47 to week 52 (inclusive). During the intervening period, ERAS ECO Ltd conducted significant maintenance measures including the installation of a program of works designed to reduce exceedances of Ammonia and COD (see Table 3-14).

3.2.3 Chemical Oxygen Demand

In 2010, COD continued to fall in line with the decreases that were initiated in the final quarter of 2008. Improvements within the onsite WWTP are an ongoing objective within ERAS ECO Ltd in order to meet emission limits values, hence these trials will continue until continuous compliance can be achieved.

Figure 3 - 2010 COD Level (mg/l) per Week

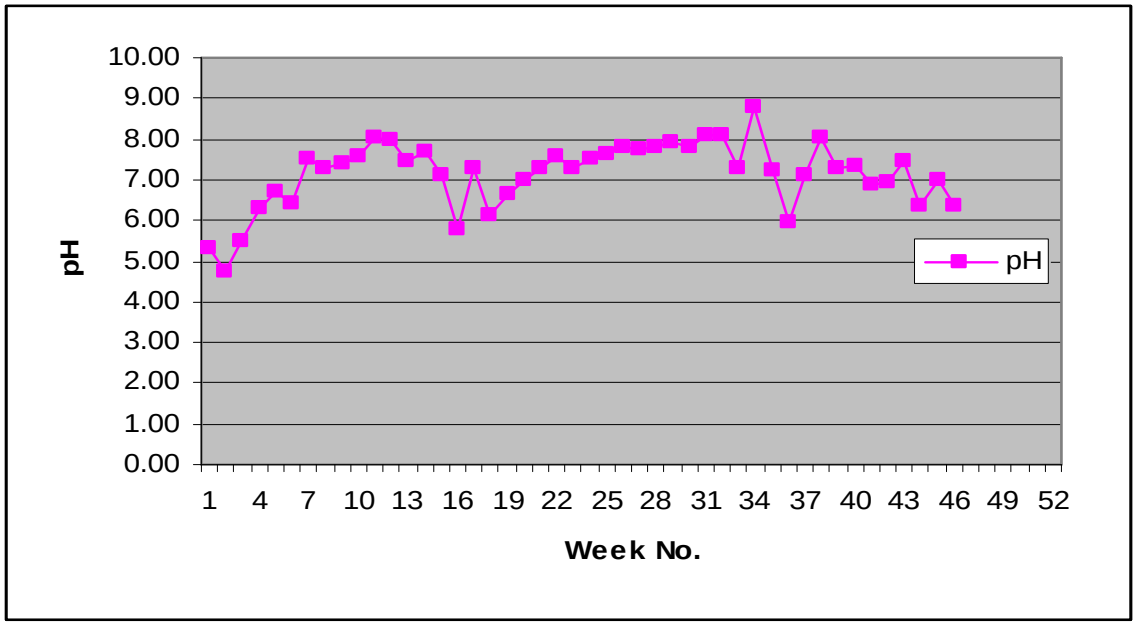


The average COD value in 2010 has fallen considerably from previous years (i.e. In 2008 the average COD was 304.3 mg/l, in 2009 the average COD was 220.0 mg/l and for 2010 the average COD had fallen to 141 mg/l).

3.2.4 pH

Six pH exceedances were observed in the weekly 24h composite samples during 2010 (Week 1 – 3, Week 16, Week 34 & Week 36). This trend is displayed in Figure 4 below. The average pH reading from the 2010 composites was 7.10.

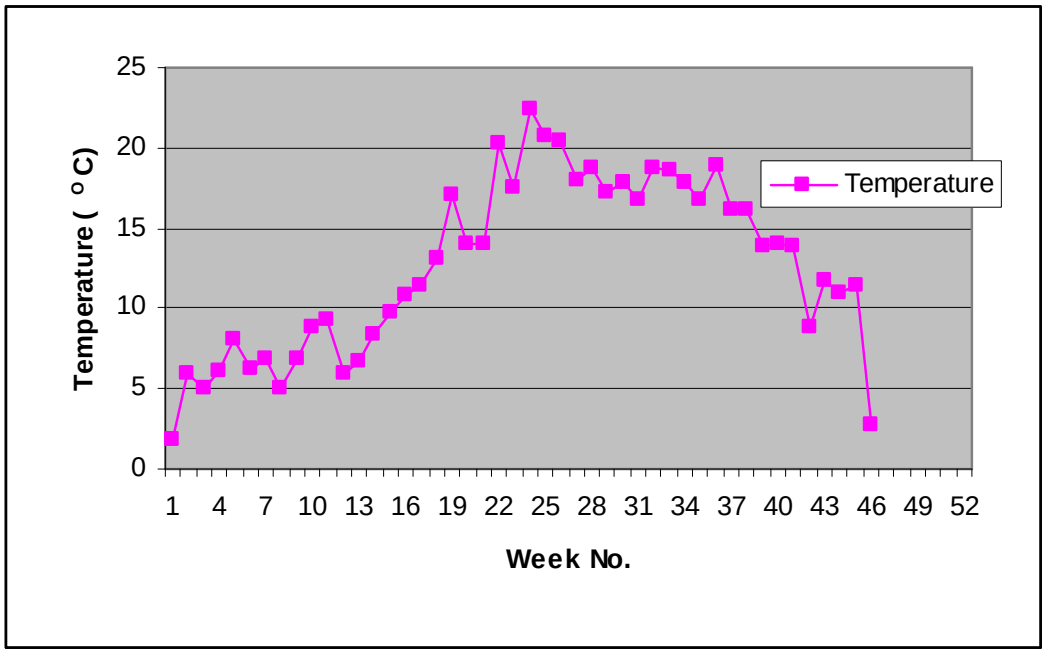
Figure 4 - 2010 pH levels per Week



3.2.5 Temperature

Temperature was found in compliance (see Figure 5) at all times with the waste license emission limit values during 2010. The average weekly temperature for SE1 discharge was 13 ^{O}C.

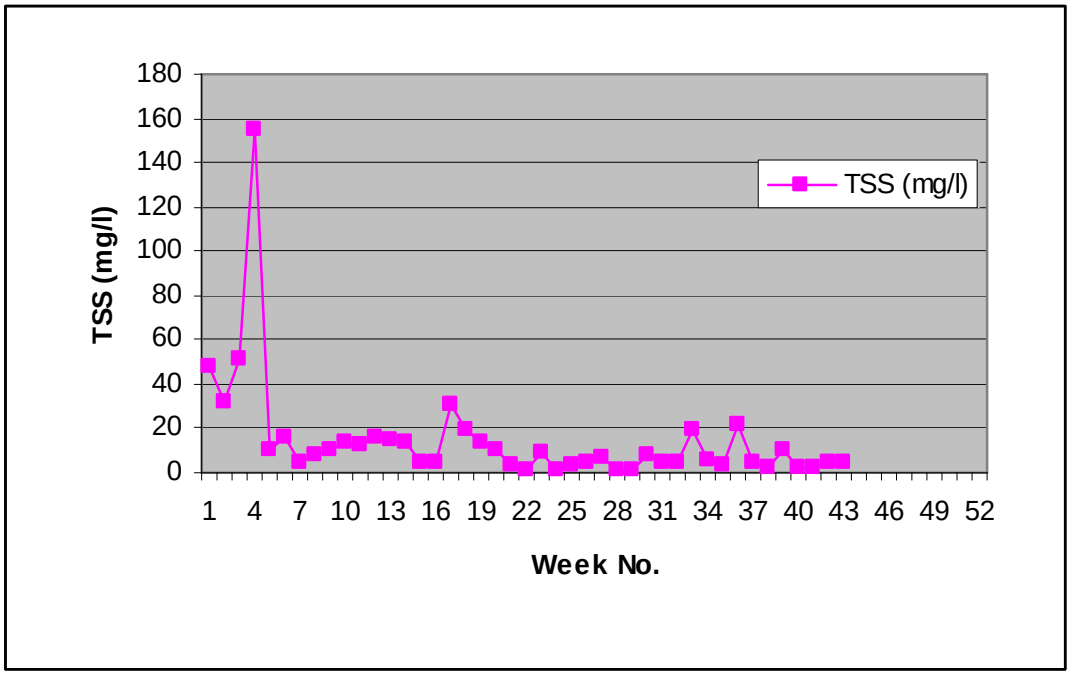
Figure 5 - SE1 Temperature 2010



3.2.6 Total Suspended Solids

Total Suspended Solids is monitored on weekly basis. In 2010, three weekly composite samples exceeded the ELV of 35 mg/l TSS, these exceedances occurred during Week 1, 3 and 4. ERAS ECO Ltd has undertaken the appropriate remedial actions to ensure that such discharges have since been with the 35 mg/l ELV. During week 1 – 4 the pH of the Discharge was low therefore not allowing the filtration systems to effectively capture solids. In addition to pH correction, ERAS ECO Ltd has installed a Dissolved Air Flotation (DAF) unit during Week 47 to Week 52. During laboratory trials the DAF unit was removing all TSS and it's therefore expected that such exceedances will not re-occur.

Figure 6 - 2010 TSS SE1 Emissions per Week



3.2.7 Biological Oxygen Demand

Biological Oxygen Demand (BOD) is monitored on a monthly basis in accordance with the requirements of the licence. Table 3-7 below summarises all results for BOD during 2010.

Table 3-7 - Monthly Monitoring Results 2010 – Biological Oxygen Demand

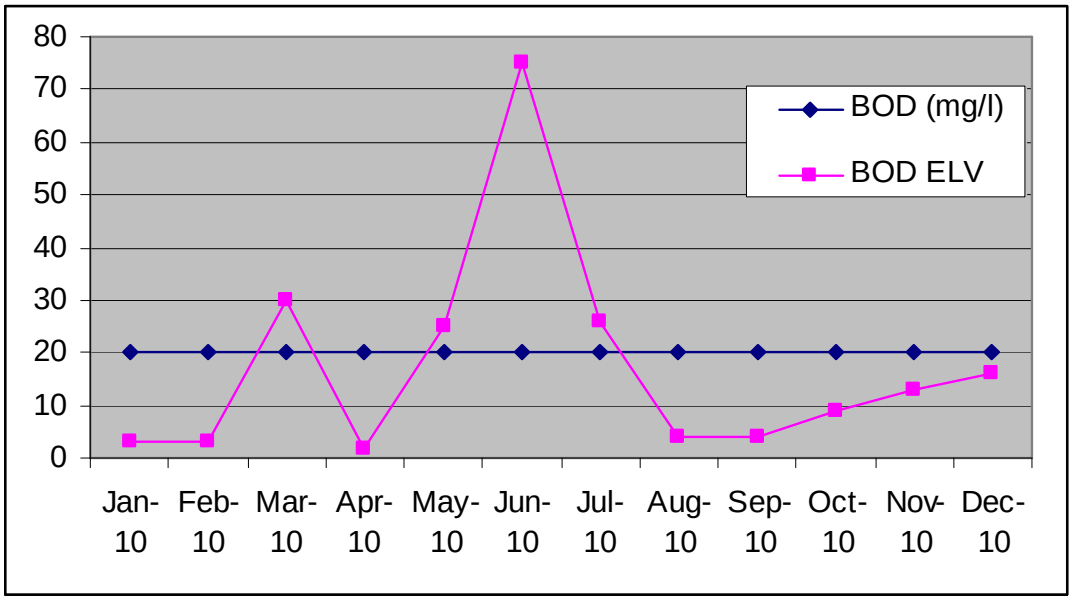
	BOD mg/l	
Month	***Emission Limit Value***	***Result***
Jan-10	20	3
Feb-10	20	3
Mar-10	20	30
Apr-10	20	2
May-10	20	**25**
Jun-10	20	75
Jul-10	20	**26**
Aug-10	20	4
Sep-10	20	**4**
Oct-10	20	9
Nov-10	20	13
Dec-10	20	16

Four BOD exceedances (outlined in bold text above) were observed during 2010, these are:

- March = 30 mg/l

- May = 25 mg/l
- June = 75 mg/l
- July = 26 mg/l

Figure 7 - 2010 Monthly BOD SE1 Levels



These exceedances have been studied and addressed by modifications to the plant and its flow. The improvement works undertaken (Week 44 to 52) have addressed the BOD exceedances, by allowing the treatment of the BOD fraction of the effluent in the balance tank and subsequent removal of solids in the dissolved air flotation (DAF) system. Testing has shown that discharges to sewer (SE1) are now consistently within the BOD ELV limit of 20 mg/l.

3.2.8 Quarterly Monitoring (Q1, Q2, Q3 and Q4):

Table 3-8 outlines monitoring results for parameters monitored on a quarterly basis.

Quarterly monitoring was carried out on following dates:

- Q1: 05/02/2010
- Q2: 21/05/2010
- Q4: 18/06/2010
- Q4: 10/12/2010

Table 3-8 - 2010 Quarterly Monitoring Results

Year/Quarter	Date	Parameter	Units	Emission Limit	Result
2010/Q1	05/02/2010	Total Nitrogen	mg/l	10	17
	05/02/2010	Sulphate	mg/l	100	87.6
	05/02/2010	VOC	ug/l	50	<10
	05/02/2010	Semi VOC	ug/l	50	<10
	05/02/2010	Faecal Coliforms	FC/100mls	<250	0
Year/Quarter	**Date**	**Parameter**	**Units**	**Emission Limit**	**Result**
2010/Q2	21/05/2010	Total Nitrogen	mg/l	10	7.5
	21/05/2010	Sulphate	mg/l	100	22.9
	21/05/2010	VOC	ug/l	50	**<10**
	21/05/2010	Semi VOC	ug/l	50	<10
	21/05/2010	Faecal Coliforms	FC/100mls	<250	<1
Year/Quarter	**Date**	**Parameter**	**Units**	**Emission Limit**	**Result**
2010/Q3	18/06/2010	Total Nitrogen	mg/l	10	5
	18/06/2010	Sulphate	mg/l	100	11.24
	18/06/2010	VOC	ug/l	50	<10
	18/06/2010	Semi VOC	ug/l	50	<10
	18/06/2010	Faecal Coliforms	FC/100mls	<250	0
Year/Quarter	**Date**	**Parameter**	**Units**	**Emission Limit**	**Result**
2010/Q4 **Note 1**	10/12/2010	Total Nitrogen	mg/l	10	14
	10/12/2010	Sulphate	mg/l	100	16.8
	10/12/2010	VOC	ug/l	50	<10
	10/12/2010	Semi VOC	ug/l	50	<10
	10/12/2010	Faecal Coliforms	FC/100mls	<250	0

ND: Not detected

Note 1 All results for Weeks 44 to 52 relate to final treated effluent which was stored onsite. During this time period ERAS ECO Ltd staggered sludge drying operations until the WWTP Improvement Plan was fully enacted.

- Total Nitrogen: In Q1 of 2010, a total Nitrogen emission limit level of 10mg/l was exceeded.
- Sulphate levels: All results were compliant with the Emission Limit Value of 100 mg/l.
- All VOC & SVOC's were within emission limit values during 2010.
- All Semi VOC results were within the license emission limit values.
- Faecal Coliforms results were within the emission limit values during 2010.

3.2.9 Ammonia Testing during 2010

Following an Agency request, ERAS ECO Ltd completed weekly analysis of Ammonia in discharges to Sewer (SE1). This analysis demonstrated that Ammonia levels vary enormously and further actions were necessary to reduce emissions. In Week 44 – 52 ERAS ECO Ltd engaged with relevant expertise to design a sustainable solution to Ammonia exceedances. A plan for the implementation of the recommendations was quickly implemented (see Table 3-14).

The ammonia limit value of 0.5mg/l was exceeded on many occasions from Week 21 – 43.

Table 3-9 - Ammonia Testing during 2010

Date	Result mg/l	Limit value mg/l
Wk21	23.19	0.5 mg/l
Wk22	52.2	0.5 mg/l
Wk23	41.4	0.5 mg/l
Wk24	25.1	0.5 mg/l
Wk25	16.2	0.5 mg/l
Wk26	26.6	0.5 mg/l
Wk27	38.3	0.5 mg/l
Wk28	44.6	0.5 mg/l
Wk29	50.9	0.5 mg/l
Wk30	42.3	0.5 mg/l
Wk31	39.8	0.5 mg/l
Wk32	49.5	0.5 mg/l
Wk33	78.4	0.5 mg/l
Wk34	0.14	0.5 mg/l
Wk35	42	0.5 mg/l
Wk36	92	0.5 mg/l
Wk37	0.399	0.5 mg/l
Wk38	0.37	0.5 mg/l
Wk39	0.6	0.5 mg/l
Wk40	6.9	0.5 mg/l
Wk41	28	0.5 mg/l
Wk42	8.1	0.5 mg/l
Wk43	0.469	0.5 mg/l

3.2.10 Biannual Monitoring (B1 and B2):

Biannual monitoring was carried out in May and December 2010. Parameters analysed include Total Phosphate, Cyanide and Mercury. Biannual analysis (i.e. both B1 and B2) were in compliance and less than Emission Limit Values as specified in Schedule B4 of W0211-01. Table 3-10 below summarises biannual monitoring results.

Table 3-10- Biannual Monitoring Results 2010

Parameter	Units	Limits	Sample ID	
			Sample B1: Composite 1020 (D)	Sample B2: Composite 1048 (C)
Total Phosphate	mg/l	1	<0.01	<0.1
Cyanide	mg/l	0.01	<0.0002	<0.005
Mercury	ug/l	Not Specified	0.029	0.06

3.2.11 *Annual Monitoring*

Annual monitoring of the Heavy Metals is required for the compliance of the waste licence. All parameters were found to be compliant with the emission limit values for a sample collected on the 10th December 2010.

Table 3-11 - Annual Monitoring Results 2010

Year	Date	Parameter	Units	Emission Limit	Result
2010	10/12/2010	Pb	ug/l	5	1.5
		Zn	ug/l	100	57.1
		Cu	ug/l	30	26
		Cd	ug/l	5	<0.1
		As	ug/l	20	<0.2
		Cr	ug/l	15	<1
		Ni	ug/l	25	1.6

3.2.12 *Toxicity Testing*

A sample of effluent was taken for toxicological analysis on the 18th December 2008. Analysis was carried out by Shannon Aquatic Toxicity Services. A summary of results are provided in Table 3-12.

Table 3-12 Summary of Toxicity report

Test Parameter	Toxic units
48 hLC 50 to Tisbe Battagliai (Marine Copepod)	<3.1
72 h IC50 to Skeletonema costatum (Marine Algae)	<3.01
5 min EC50 to Vibrio Fischeri (Marine Bacterium)	<2.2
15 min EC50 to Vibrio Fischeri (Marine Bacterium)	<.2.2

This reported indicates that the sample of effluent tested is not toxic for the range of species monitored.

3.2.13 Mass Emissions

Flows (See Table 3-1~~Table 3-1~~) and results were averaged to provide information on annual emission figures for the licensed parameters. Table 3-13~~Table 3-13~~ below summarises the 2010 mass emissions to sewer.

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Table 3-13 SE 1 Mass Emissions 2010

Parameter	ELV Emission Limit Value Note 1	2008 Note 2	2009 Note 2	2010 Note 2
COD	7756.25	3590.11	2532.571	427.398
BOD	1241.00	700.51	235.968	63.655
TSS	2171.75	193.49	260.025	42.437
Total Nitrogen	620.50	353.81	48.920	28.796
Sulphate	6205.00	9443.35	1237.106	42.497
VOC	3.10	0.07	0.115	0.030
Semi VOC	3.10	0.21	0.115	0.030
Total Phosphate	NA	0.21	2.647	0.167
Cyanide	0.62	0.19	5.986	0.038
Mercury	NA	0.00	2.878	0.044
Pb	0.31	0.03	0.012	0.055
Zn	6.21	0.47	0.046	0.173
Cu	1.86	0.30	0.012	0.079
Cd	0.31	0.01	0.012	0.000
As	1.24	0.02	0.012	0.001
Cr	0.93	0.10	0.012	0.003
Ni	1.55	0.05	0.012	0.005
Faecal Coliforms	250.00	<1	<1	<1

Note1: Calculations based on total days January 2010 -December 2010 (365 days) and maximum discharge limit: 170m3/day (Schedule B.4 of Waste License W0211-01)

Note2: Results based on average flow

Note 3: Calculations based on 280 drying days (including period Nov – Dec)

As can be seen from the above table, all parameters are well within mass emission limits. This is due to the discharge being considerably less than the license flow limit.

As reported to the Agency (in standardised facsimile) a number of exceedances were recorded in the effluent during 2010. These exceedances have been categorised as incidents and a summary table is provided in Table 3-27.

As part of onsite continual improvement and corrective action procedures, ERAS ECO Ltd. installed additional plant in latter stages of 2010; the benefits of this are expected to be realised in 2011.

Table 3-14 summarises the improvement works carried out in the WWTP in different stages during 2010, this table also includes some planned measures/infrastructural works which will contribute to achievement of ongoing compliance.

Table 3-14 – Summary of WWTP Improvement Measures

Description	Progress/ Timeframe	Purpose	Progress
Independent Review of WWTP	Completed by Parsons	Reduce Exceedances	Complete
Purchase DAF and locate after BT	Order Placed / Installation 1 week	Reduce COD and Solids loading on Carbon filters, thereby increasing absorption capacity of filters	Complete
Trial Coagulants and Flocculants on DAF	Completed		Complete
Empty & Replace Sand Media in Culligans	Completed	Increase Removal of Filtration	Complete
Stop raising pH to 11 & Divert the Biofilter Water to the DAF after the Balance Tank	In-Progress / 1 Week	Reduce Ammonia Recyling	Ongoing
Replace all Balance Tank Diffusers	Ordered	Increase DO within BT	Complete
Conduct Daily Analysis on Wastewater	In-Progress / 1 Week	Control especially Ammonia & Chlorine	Ongoing
Calibrate pH probes & Dosing Pumps	In-Progress	Create suitable conditions for optimal treatment	Complete
Empty & Replace Carbon Media. Add Carbon Filter and Replace Carbon when exhausted as demonstrated by BOD and COD testing	In-Progress	Reduce COD	Complete
Install Ammonia Probe and Link to NaOCL Dosage	Planned	Ammonia Compliance	Proposed for 2011
Biological influent test	In- Progress	Examine future possibilities	Planned
Harvest Rainwater for Re -Use in Backwashing Filters	Competed	Improve the Quality of Filter Backwashing Water and hence Filter Performance (COD Reduction)	Completed in Part. Option of harvesting all rainwater to be evaluated in 2011.
Install a DO probe	Pending Success of Trials	Optimise treatment within Balance Tank	Feasibility Assessment in 2011
Supplement DO (additional diffusers, compressors, link DO to compressors)			Feasibility Assessment in 2011
Install Aquacritox Plant	EIS Design/Planning	Destruction of Organics-COD Compliance	Planned

In the past year, ERAS ECO Ltd. has experienced a reduction in the overall/ total Mass Emissions. The above measures have positively improved the final effluent discharge at SE1. ERAS ECO Ltd. is committed to continual improvement works to ensure demonstration of compliance with emission limits.

To build upon ongoing improvements over the two years, ERAS ECO Ltd. has outlined further projects/works that will aid the company meet its discharge emission limits. To this end a programme for continual improvement is included in the site's Environmental Objectives and Targets indicating targets, timelines and works the company is committed to achieving.

3.3 Emissions to the Air

ERAS ECO Ltd. operates two licensed emission points to the atmosphere namely:

- A1-Boiler
- A2-Biofilter

3.3.1 Emission Point Reference No.: A1 Boiler

The sludge drying process (non-contact drying process) utilises 12 bar steam generated by the onsite biomass boiler. The start-up procedure for the boiler uses light fuel oil which raises the furnace temperature to approximately 400ºC. Upon reaching this temperature the system is manually switched to woodchip. This results in the furnace reaching temperatures above 600 ºC. The flue gas generated is treated through a cyclone and a bag filter, prior to emission at reference point A1 (boiler stack).

As per Schedule C.1.2 Monitoring of Emissions to Air, quarterly monitoring was carried out during 2010 and results are summarised in Table 3-15. Any results highlighted in bold exceeded emission limit value. Monitoring of Emissions to Air Reports (Emission Point A1-Boiler) is provided in Appendix B

Table 3-15 Air Results 2010: Emission Point A1 Boiler

			Monitoring period	Q1 2010	Q2 2010	Q3 2010	Q4 2010
Parameter	License Emission Limit	UNITS	Date of monitoring	29/03/2010	20/05/2010	10/09/2010	25/11/2010
NOx	250	mg/Nm^3		190	202	205	182
CO	150	mg/Nm^3		1.5	1	8	6
Particulates	20	mg/Nm^3		0.5	0.176	1.5	1.1
SOx	--	mg/Nm^3		1.2	1	5	5
Airflow	11,600	Nm^3/hr		3480	4109	9585	9766

Note 1: Normalised to 273K, 101.3 kPa and 11% O2 reference.

Note 2: in 2010, there was no exceedances to Schedule B1, thus suggesting that the levels are under control.

Table 3-16
~~Table 3-16~~ below summarises the annual mass emissions (Emission Point ref. A1-Boiler) to the air 2010. These figures are based on average values (Q1-Q4) of the parameters monitored and the actual number of sludge drying days in 2010 (280 days).

Table 3-16 Mass Emissions to the Air (A1-Boiler) 2008 & 2010.

Parameter	Units	License Emission Limit Mass emissions[1,2]	Mass Emissions 2007[1,2,6]	Mass Emissions 2008[1,3,6]	Mass Emissions 2009[1,4,6]	Mass Emissions 2010[1,5,6]
NOx	Kg/year	25,404	1,499.19	7,501	9842.41	8667.65
CO	Kg/year	15,242.4	106.81	697.27	287.18	166.90
Particulates	Kg/year	2032.32	64.32	84.13	55.06	35.60
SOx	Kg/year	Not Specified	415.04	185.65	157.98	137.97

Note 1: Normalised to 273K, 101.3 kPa and 11% O2 reference.

Note 2: ELV - Calculations based on boiler running 24 hours per day 365 days per annum emission limits and airflow emission limit (as per schedule B.1 of Waste license W0211-01)

Note 2: 2007 - Calculations based on boiler running 24 hours per day 214 days per annum - January- December 2007

Note 3: 2008 - Calculations based on drying hours January- December 2008 (3973 drying hours)

Note 4: 2009 - Calculations based on boiler running 24 hours per day 260 days per annum - January- December 2010

Note 5: 2010 - Calculations based on boiler running 24 hours per day 280 days per annum - January- December 2010

Note 6: Calculations based on average of Quarterly results

3.3.2 Emission Point Reference No.: A2 Biofilter

As per condition 6.8.3 of Waste License W0211-01, the sludge storage bin (Ref: HST2) is vented to the onsite biofilter for odour abatement.

As per condition 6.8.4 and 6.8.5 of Waste License W0211-01, gaseous emissions from the condensate (cooling) tower and from the WWTP are treated in the onsite biofilter.

The odour abatement system (A2-Biofilter) was installed and commissioned in May 2008 by Bord na Mona.

Controls are also carried out regularly by ERAS ECO Ltd. personnel. Monthly biofilter pH water return results summarised in Table 3-17 and Table 3-18.

Table 3-17 – Biofilter Sump 1 pH & TVC (2010)

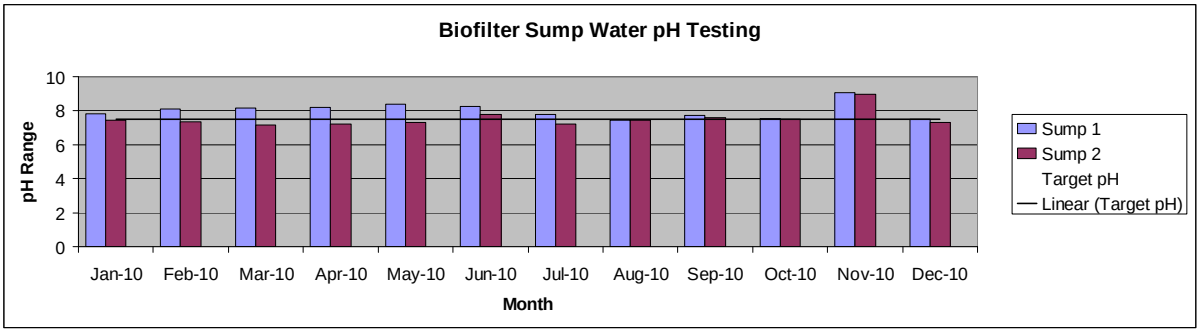
Sump 1			
Total Viable Count 22^{O}C	Total Viable Count 37^{O}C	pH result	monthly
24000	1400	8.04	Jan-10
580	253	8.58	Feb-10
1150	600	7.56	Mar-10
2200	1010	8.99	Apr-10
68	39	8.72	May-10
46700	44000	9.04	Jun-10
762	106	6.96	Jul-10
22500	20300	9.08	Aug-10
9700	46400	8.84	Sep-10
203	340	8.96	Oct-10
1100	410	8.19	Nov-10
277550	65700	8.54	Dec-10

Table 3-18 - Biofilter Sump 2 pH & TVC (2010)

Sump 2			
Total Viable Count 22^{O}C	Total Viable Count 37^{O}C	pH result	monthly
19500	2600	8.11	Jan-10
326	107	8.6	Feb-10
1600	780	7.84	Mar-10
4100	1600	8.98	Apr-10
74	930	7.67	May-10
45600	44000	9.22	Jun-10
258	167	6.71	Jul-10
21400	28300	8.96	Aug-10
43700	42600	8.37	Sep-10
360	120	8.54	Oct-10
120	205	8.06	Nov-10
99100	94300	8.25	Dec-10

The above tables are the results of Biofilter sump water testing conducted by an external laboratory. The pH values are critical to the Biofilter's performance and hence the abatement of odours. As a general rule, the target pH range is 7 – 8. A trend that has come to light is that the pH is generally greater in sump 1; this can be observed in the Figure 8 below.

Figure 8 - Biofilter pH Comparison - Sump 1 V Sump 2



As part of odour management strategy developed in 2009, ERAS ECO Ltd samples the Biofilter sump water once monthly; these samples are sent to an external laboratory for Total Viable Count (TVC) testing. The purpose of this test is to gauge an understanding of the bacteria levels in each of the sumps and consequently realising when it is time to replenish the sumps with new bacteria/innoculum. This testing was recommended by the Biofilter manufacturer and has been communicated to the Agency. In reality TVC testing does not appear to provide any meaningful data, the TVC levels are fluctuating enormously and this instability cannot be linked to innoculum boosts.

As per Schedule C.1.2 Monitoring of Emissions to Air, Biannual and weekly monitoring was carried out during 2010. Biannual biofilter stack monitoring was carried out twice during 2010. A summary of the biannual and weekly monitoring are provided in Table 3-19~~Table 3-19~~ and Table 3-20~~Table 3-20~~ respectively. A copy of the biannual reports is provided in **Appendix B** of this report.

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Table 3-19 Biannual Emissions to the Air Results 2010. Emission Point Ref. A2

Parameter	Units	Emission Limit	Result B1 20/05/2010	Result B2 25/11/2010
Airflow	Nm^3/hr	No Limit Specified	1193	790
Ammonia	mg/Nm^3		<0.19	<0.2
Organics (VOC)	mg/Nm^3		<0.18	1.6
Hydrogen Sulphide	mg/Nm^3		<0.18	0.2
Amines	mg/Nm^3		<0.18	<0.4
Mercaptans	mg/Nm^3		<0.04	<0.05

ERAS ECO Ltd conducts weekly analysis of other parameters including Ammonia, Mercaptans and Hydrogen Sulphide, these results are displayed in Table 3-20 below.

Table 3-20 Weekly Biofilter Air Results. Emission Point Ref. A2

Date	Ammonia (PPM)	Mercaptans (PPM)	Hydrogen Sulphide (PPM)
05/01/2010	10	0.5	1

08/01/2010	10	0.5	1
11/01/2010	10	0.5	1
15/01/2010	10	0.5	1
25/01/2010	10	0.5	1
28/01/2010	5	0.5	1
03/02/2010	12	0.5	1
05/02/2010	10	0.5	1
10/02/2010	10	0.5	1
12/02/2010	10	0.5	1
16/02/2010	15	0.5	1
18/02/2010	10	0.5	1
24/02/2010	10	0.5	1
26/02/2010	10	0.5	1
02/03/2010	10	0.5	1
05/03/2010	15	0.5	1
09/03/2010	10	0.5	1
12/03/2010	10	0.5	1
16/03/2010	10	0.5	1
18/03/2010	20	0.5	1
23/03/2010	10	0.5	1
26/03/2010	10	0.5	1
30/03/2010	10	0.5	1
01/04/2010	10	0.5	1
06/04/2010	10	0.5	1
08/04/2010	10	0.5	1
13/04/2010	10	0.5	1
15/04/2010	10	0.5	1
20/04/2010	10	0.5	1
23/04/2010	30	0.5	1
27/04/2010	10	0.5	1
29/04/2010	10	0.5	1
05/05/2010	5	0.5	1
07/05/2010	15	0.5	1
10/05/2010	5	0.5	1
14/05/2010	5	0.5	1
19/05/2010	5	0.5	1
20/05/2010	10	0.5	1
25/05/2010	5	0.5	1
31/05/2010	10	0.5	1
04/06/2010	10	0.5	1
09/06/2010	15	0.5	1
10/06/2010	10	0.5	1
15/06/2010	10	0.5	1
18/06/2010	25	0.5	1
22/06/2010	10	0.5	1
25/06/2010	15	0.5	1
28/06/2010	10	0.5	1
29/06/2010	10	0.5	1
05/07/2010	10	0.5	1

08/07/2010	20	0.5	1
20/07/2010	20	1	1
22/07/2010	10	0.5	1
26/07/2010	10	0.5	1
28/07/2010	20	0.5	1
04/08/2010	10	0.5	1
06/08/2010	20	1	1
10/08/2010	10	0.5	1
13/08/2010	10	0.5	1
17/08/2010	25	0.5	1
19/08/2010	10	0.5	1
25/08/2010	20	2	1
27/08/2010	50	2	1
31/08/2010	10	0.5	1
03/09/2010	20	0.5	1
07/09/2010	15	0.5	2
09/09/2010	20	0.5	1
13/09/2010	20	0.5	1
16/09/2010	10	0.5	1
21/09/2010	10	0.5	1
23/09/2010	15	0.5	1
28/09/2010	5	0.5	1
30/09/2010	5	0.5	1
05/10/2010	10	0.5	1
08/10/2010	5	0.5	1
13/10/2010	5	0.5	1
15/10/2010	5	0.5	1
19/10/2010	5	0.5	1
22/10/2010	15	0.5	1
26/10/2010	10	0.5	1
28/10/2010	5	0.5	1
05/11/2010	5	0.5	1
06/11/2010	5	0.5	1
12/11/2010	5	0.5	1
14/11/2010	5	0.5	1
30/11/2010	20	0.5	2
03/12/2010	15	0.5	1
06/12/2010	15	0.5	1
09/12/2010	10	0.5	1
20/12/2010	5	0.5	1
23/12/2010	10	0.5	1
Average	**11.67**	**0.54**	**1.02**

In accordance with C1.1.Bord Na Mona personnel have also carried out periodic maintenance visits during 2010 to set up airflows and check the Biofilter performance and media. A brief summary of the results is included in Table 3-21 below.

Table 3-21 Inlet and Outlet Concentrations at A2 Biofilter

	INLET	OUTLET	% REMOVAL
Hydrogen Sulphide	0.31ppm	0.039ppm	87.42%
Ammonia	~60ppm	8 ppm	86.67%
Mercaptans	~0.6 ppm	ND	>99%

* ND = None Detected

As can be seen from the results, in Table 3-21, on the date of testing (04/03/2010) the Biofilter unit was removing >99% of Mercaptans, 86 % of Ammonia and 87 % of Hydrogen Sulphide from the inlet air. These efficiencies are high, but a number of recommendations were made by Bord Na Mona to further increase the unit's performance. These recommendations were evaluated and corrective actions were implemented.

Table 3-22 below summarises the annual mass emissions (Emission Point ref. A2- Biofilter) to the air during 2010. These figures are based on the values obtained in the biannual monitoring, the average values of the weekly parameters monitored and the average of flows recorded during 2010. The Biofilter calculations are based on total of number drying days from Jan 2010 to December 2010 (i.e. 280 drying days).

Table 3-22 Mass Emissions to the Air Results 2010. Emission Ref. Point A2

Parameter	Units	Mass Emissions 2010[1,2]
Ammonia	Kg/year	68.77
Organics (VOC)	Kg/year	7.56
Hydrogen Sulphide	Kg/year	12.76
Amines	Kg/year	2.46
Mercaptans	Kg/year	9.01

Note 1: Based on average airflow recorded during Biannual 2010 (1264.35 Nm3/h) and 280 Drying Days

Note 2: Calculations based on: H2S molecular weight (34.082 g/mol) / 1ppm NH3= 19.03 mg NH3/m3 / 1ppm methylmercaptan = 48.11 mg methylmercaptan/ m3

3.4 Stormwater Emissions SW1

ERAS ECO Ltd. stormwater is discharged into the Blackwater estuary via a non-return valve. Two silt / oil interceptors (Class 1 and designed in accordance I.S. EN 858) together with a pH controlled storm water tank are installed on site before the final storm/surface water outlet pipe to retain any potential spillages that could occur onsite.

As per Schedule C.2.2 Monitoring of Stormwater Emissions, quarterly monitoring and daily visual inspections were carried out during 2010.

Quarterly Storm/ surface water monitoring in Emission Point Ref SW1 was carried out twice during 2010.

All Conductivity, pH, Temperature and Total Suspended Solids results (Q3 and Q4 surface/ storm water monitoring, Emission point Reference SW1) are outlined in the Table 3-23 below:

Table 3-23 Quarterly Stormwater Results 2010- Emission Reference Point SW1

Parameters	Units	SW1 Q1 (12/03/2010)	SW1 Q2 (30/07/2010)	SW1 Q3 (01/10/2010)	SW1 Q4 (22/10/2010)	W211-01 License Limits
Sample ID	-	SW1-Q1-2010	SW1-Q2-2010	SW1-Q3-2010	SW1-Q4-2010	N/A
Lab. Report No	-	ELS: 16583	BHP: 93922.2	BHP: 94988.2	ELS: 19432	N/A
Temperature	ºC					-
pH	pH units	7.8	7.06	7.97	7.5	-
Conductivity	uS/cm	325	1015	951	437	-
Total Suspended Solids	mg/l	<5	13	4	5	-
Visual Inspection	-	Clear	Clear	Clear	Clear	-

All parameters analysed during the first, second, third & fourth quarterly monitoring rounds were within acceptable levels for storm/surface water.

No storm water was sent off-site for treatment during 2010. No contamination was found in outlet surface/ stormwater discharge during 2010 (Emission Point Reference SW1).

3.5 Noise Emissions

As per condition 4.5 of Waste License W0211-01, "Noise from the facility shall not give rise to sound pressure levels (Leq,T) measured at the boundary of the facility or at the noise sensitive locations which exceed the limit values".

As per Schedule B.5 of Waste License W0211-01, Noise Daytime limit values $L_{eq\ (30\ min)}$ are 55 dB(A) and Noise Night-time limit values are 45dB(A)

As per Schedule B.5 of Waste License W0211-01, "No clearly audible tonal component or impulsive component in the noise emission from the activity at any noise sensitive location"

As per condition 6.19 and Schedule C.5 of Waste License W0211-01, daytime annual environmental noise monitoring was carried out on 26/07/2010. As there is no requirement for night-time monitoring, no noise monitoring took place at night. The complete noise monitoring report is enclosed in Appendix C.

A summary of the 2010 annual noise report is included below.

3.5.1 Summary of Noise Measurement Comments:

Observation: ''Monitoring on the 26th July was carried out on ideal conditions with no rain and low winds. Noise characteristics of the area are influenced by local traffic and noise from light industry.''

NM1: ''Noise measurements at this location were recorded at the northern corner of the site. Noise from the biofilter, together with traffic noise, comprising that from the landfill and the local roads contributed to the ambient levels. The average noise level was recorded at 54.3dB(A).''

NM2: ''Noise measurements at N2 were recorded at the south-eastern corner of the site. Local industrial noise influenced the average levels, while the contribution from the facility was not significant. The average noise level was recorded at 50.2dB(A).''

NM3: ''The daytime noise measurements at N3 recorded an average noise level of 52.6dB(A), influenced mainly by passing traffic, with the background level at 48.7dB(A). There was minimal contribution from the facility while industrial noise from buildings to the north also contributed to the ambient levels.''

NSR1: ''Average noise levels were influenced by intermittent traffic volumes passing close to the monitoring location close to the dwelling. There was no contribution from the operation of the Eras Eco facility. The average noise level was recorded at 62.5dB(A).''

3.5.2 Conclusions of Noise Report:

''It is considered that the noise emanating from the facility is not a source of nuisance at local sensitive dwelling NSR1 and local traffic is the main noise source in the region. This is supported by the low L90 levels recorded. Noise levels on-site are within the EPA licence limit of 55dB(A).''

Table 3-24 below outlines noise emissions results during the ERAS ECO Ltd. annual noise survey 2010.

Table 3-24 Annual Noise Monitoring Results 2010

Monitoring Points	Units	L_{Aeq} Result	L_{90} Result	L_{10} Result
NM01	dB(A)	54.3	42.2	55.6
NM02	dB(A)	50.2	47.1	52.2
NM03	dB(A)	52.6	48.7	54.1
NSL1	dB(A)	62.5	50.9	64.4

(Daytime Leq (30min) Emission Limit Value: 55 dB(A); Night-time Leq (30min) Emission Limit Value: 45 dB(A))

As stated in 2010 Annual noise survey in ERAS ECO Ltd. report (Appendix C): "noise emanating from the facility is not a source of nuisance."

3.6 Groundwater Monitoring

As per condition 3.23 of Waste License W0211-01, three groundwater monitoring points were installed in 2007. Minerex installed and monitored the boreholes on 19/02/07, 08/03/07, 14/03/07 and 15/03/07.

The locations for the groundwater monitoring points are specified in schedule C.6 Ambient Monitoring (Groundwater monitoring) in the waste licence as follows:

- MW1 at E209704, N079731 (along the south-eastern boundary of site).
- MW2 at E209589, N079778 (along the western boundary of site).
- MW3 at E209641, N79805 (in the area which housed the diesel storage unit).

In accordance with condition 6.18.1 and Schedule C.6 Groundwater Monitoring, Groundwater monitoring was carried out biannually during 2010.

Table 3-25 below outlines groundwater monitoring results obtained during the site investigation and biannual groundwater monitoring 2010.

Table 3-25 Groundwater Monitoring Results

Parameter	Units	Results MW1BI (05/03/2010)	Results MW2 B1 (05/03/2010)	Results MW3 B1 (05/03/2010)	Results MW1 B2 (30/07/2010)	Results MW2 B2 (30/07/2010)	Results MW3 B2 (30/07/2010)
Diesel Range Organics	mg/l	0.01	0.01	0.01	0.01	0.01	0.01
Petrol Range Organics	mg/l	0.005	0.005	0.05	0.01	0.01	0.01
Cd	mg/l	0.001	0.001	0.001	0.016	0.001	0.001
Co	mg/l	0.001	0.001	0.001	0.001	0.001	0.001
Iron	mg/l	0.1	0.49	0.25	0.08	0.11	0.11
Maganesse	mg/l	0.016	0.002	0.001	0.01	0.02	0.05
Arsenic	mg/l	0.001	0.001	0.001	0.002	0.001	0.001
Chloride	mg/l	36.1	24.9	33.9	11.54	15.29	18.77
Nitrate (as NO_3)	mg/l	16.3	16.2	12.2	2.44	2.67	4.09
Conductivity (at 25℃)	µS/cm	953	639	656	1,877	598	677
pH	pH units	6.78	7.39	7.36	6.6	7.57	7.38
Ammonia (as N)	mg/l	2.06	0.02	0.01	35.09	0.02	0.01
COD	mg/l	620	5	1	212	12	1
Organohalogens	mg/l	0.01	0.01	0.01	0.01	0.01	0.01

The results not only vary between boreholes, but also demonstrate variances between each monitoring round. This analysis shows there to be no recorded hydrocarbon contamination present in the groundwater. It's likely that the levels of chloride may relate to the mineral salts.

The results of levelling and of recording water levels at the monitoring points suggested that groundwater flow is towards the south-eastern corner of the site under low tide conditions. However the direction of flow may change under high tide conditions.

3.7 Ambient Air Monitoring

3.7.1 Dust Deposition

In accordance with Schedule C.6 of Waste License W0211-01, ERAS ECO Ltd. carried out dust deposition monitoring during 2010. Dust Deposition monitoring was carried out three times during 2010.

As per condition 4.6 of the Waste License, dust and particulate matter from the activity shall not give rise to deposition levels which exceed the limit value. Table 3-26 below outlines dust deposition monitoring carried out during 2010.

Table 3-26 Dust Deposition Results 2010. Jan 2010- December 2010

Date	Location	Dust Deposition[1] mg/m2/day	ELV[1,2] mg/m2/day	Visual Comments
1st Dust Deposition Monitoring 25th Feb to 01st April 2010	D1	148	350	In Compliance. Northern corner close to landfill entrance.
	D2	87.7	350	In Compliance. South West corner of the site. Next to a marshland and approx 300m from landfill site.
	D3	289.2	350	In Compliance. Next to adjacent Rd and NCT Centre trucks.
2nd Dust Deposition Monitoring 30th June to 12th August 2010	D1	329.5	350	In Compliance.
	D2	289.5	350	In Compliance.
	D3	291.1	350	In Compliance.
3rd Dust Deposition Monitoring 16 Nov to 16 Dec 2010	D1	112.8	350	In Compliance.
	D2	148.2	350	In Compliance.
	D3	200	350	In Compliance.

Note1: ~30 day composite sample (Bergerhoff Gauges)
Note 2: As per schedule B.2 of Waste License W0211-01, Dust Deposition Emission Limit Values: 350 mg/m2/day.

Dust deposition results during 2010 were found IN COMPLIANCE with the Waste license W211-01 (Schedule B.2 Dust Deposition Limits).

3.7.2 Odour monitoring

In accordance with condition 6.8.3 of Waste License W0211-01, the sludge storage bin (Ref: HST2) is vented to the onsite biofilter for odour abatement.

In accordance with 6.8.4 and 6.8.5 of Waste License W0211-01, gaseous emissions from the condensate (cooling) tower and from the WWTP are treated in the onsite biofilter.

The odour abatement system (A2-Biofilter) was installed and commissioned in May 2008 by Bord na Mona. Refer to previous section 3.2.10 of the AER 2007 document for biofilter summary of emissions to the air.

Sludge arriving onsite is stored in enclosed storage bins (HST1 and HST2) inside the sludge drying building. Doors are kept closed in the sludge reception area except when sludge deliveries arrive onsite.

All waste is stored within the buildings. The plant presently accepts sludge between 7am and 6pm; doors are only opened for deliveries and immediately closed after tipping. Sludge is dried 24 hours per day Monday to Friday, also depending on levels of sludge in stock, sludge may also be dried on weekends. All doors remain closed throughout the night. There is no acceptance of sludge on Sundays.

In accordance with schedule C.6 Ambient Air Monitoring, ERAS ECO Ltd. personnel carry out daily sniff test in the site boundaries and site entrance.

3.8 Nuisance Monitoring

In accordance with condition 6.11 Nuisance Monitoring of Waste License W0211-01, vermin controls were put in place and the site is subject to regular inspection by an external contractor.

ERAS ECO Ltd has contracted a pest control company to carryout routine inspection of vermin at points located throughout the facility. In addition, should this same contractor detect any activity, they will also conduct follow-up visits, as necessary. There is no indication of significant Pest/vermin activity onsite. Records of inspection reports conducted by the Pest Contractor are maintained onsite.

In accordance with condition 6.11, the site is inspected daily for litter and odour in accordance with in-house standard and operational procedures and site operators are trained in corrective actions in the event of litter and control odour measures. Please refer to previous section 3.7.2 for odour monitoring.

3.9 Trade effluent / Contaminated Stormwater

There was no trade effluent sent off site for treatment during 2010.

There was no recorded contamination in the stormwater outlet during 2010 and therefore no requirement for off-site treatment.

3.10 Resources Consumption

In accordance with Schedule E of Waste License W0211-01, ERAS ECO Ltd. must submit a summary of the resources consumed during 2010 in the Annual Environmental Report.

The following resources are used on site:

- Water consumption
- Light fuel oil
- Diesel
- Electricity
- Wood chip

3.10.1 Water Consumption

The operation of facility utilises water in two main areas which are outlined below:

- Process Water (Sludge Dryer Plant Boiler, Cooling Screw for dry product, wheel wash and admin building sanitary water/potable water).
- Fire Water (Fire fighting equipment for entire site).

ERAS ECO Ltd records water consumption at least once weekly. These readings are taken from onsite Youghal Town Council water meter located outside the entrance gates to the facility.

The approximate 2010 municipal water consumption in ERAS ECO Ltd. was 5537 m^3. This reduction represents a continuation in reduction efforts from previous years i.e in 2009 water consumption was 10,279 m^3 and in 2008 17,759 m^3.

3.10.2 *Electricity Consumption*

Electricity is supplied to ERAS ECO Ltd. by Electricity Supply Board (ESB).

The total electricity consumed during 2010 was 586,309 kWh (January 2010 to December 2010)

3.10.3 *Light Fuel Oil Consumption*

Light Fuel Oil is mainly consumed for the boiler start-up procedure to raise the furnace temperature to approximately 400ºC. Light Fuel Oil is also consumed for the onsite teleporter and forklift.

The approximate total 2010 light fuel oil consumption in ERAS ECO Ltd. was 13,537 Litres.

3.10.4 *Woodchip consumption*

The sludge drying process (non-contact drying process) utilises 12 bar steam generated by the onsite biomass boiler. This biomass system utilises woodchip as fuel. In 2010, ERAS ECO Ltd accepted 2,933.18 tonnes of woodchip.

Virgin and recycled woodchip are both used as a fuel in the onsite boiler.

3.11 Environmental Incidents

All environmental incidents during 2010 are summarised in Table 3-27. In each case corrective actions were taken as soon as practicable to prevent and correct the incident and reports relayed to the EPA.

Table 3-27 Summary of 2010 Environmental Incidents recorded.

Date/Week	Reference no.	Nature of Incident	Cause	Environmental impact	Corrective Action
WK 1 – 7 2010	WK 1 – 7 2010	SE 1 – ELV Exceedance's	Ongoing COD problem	Negligible	Test different approaches
WK 10 - 13 2010	WK 10 - 13 2010	SE 1 – ELV Exceedance's	Ongoing COD problem	Negligible	Laboratory Trials
WK 14 -16 2010	WK 14 -16 2010	SE 1 – ELV Exceedance's	Ongoing COD problem	Negligible	RO & Electro Coagulation Trials
WK 17 - 21 2010	WK 17 - 21 2010	SE 1 – ELV Exceedance's	Ongoing COD problem	Negligible	Ordered Trial DAF Unit
WK 22 - 25 2010	WK 22 - 25 2010	SE 1 – ELV Exceedance's	Ongoing COD problem	Negligible	Waiting on DAF
WK 26 - 28 2010	WK 26 - 28 2010	SE 1 – ELV Exceedance's	Ongoing COD & Ammonia problem	Negligible – as mass emissions are less than originally conceived for site.	Waiting on DAF
WK 29 – 33 2010	WK 29 – 33 2010	SE 1 – ELV Exceedance's	Ongoing COD & Ammonia problem	Negligible – as mass emissions are less than originally conceived for site.	Installation of DAF. DAF on Trial.
WK 34 – 43 2010	WK 34 – 43 2010 Reported via Improvement Plan	SE 1 – ELV Exceedance's	Ongoing COD & Ammonia problem	Negligible – as mass emissions are less than originally conceived for site.	Discharged Stopped. Implementing Improvement Plan

3.12 Environmental Complaints

Five environmental Complaints were recorded during 2010. However it should be noted that on the dates of these complaints, odours were detected from neighbouring facilities and therefore these complaints are not directly attributable to ERAS ECO Ltd. These complaints are listed in Table 3-28 below.

Table 3-28 below summarises all complaints recorded during 2010 and investigations and corrective actions, where applicable, carried out for all complaints recorded.

Table 3-28 Environmental Complaints during 2010

Date	Reference no.	Name of Complainant	Nature of Complaint	Corrective Action
03/06/2010	W0211-01/cc 21noc.doc	Billy Ellis	Odours	Visit Complainant. Sniff Check. Biofilter Check.
10/06/2010	W0211-01/cc 22 noc.doc	Teresa Collins	Odours	Sniff Check - Odours relate neighbouring source.
15/06/2010	W0211-01/cc 23noc.doc	Michael Farrell	Odours	Sniff Check – Odours not consistent with character of onsite odours.
16/06/2010	W0211-01/cc 24noc.doc	Seamus Curran	Odours	Following sniff check, odours did not relate to ERAS ECO Ltd
08/09/2010	W0211-01/cc25noc.doc	Diarmuid Keogh	Odours	Following sniff check, odours did not relate to ERAS ECO Ltd

3.13 Summary of Non - Compliances - 2010

Table 3-29 below summarises non-compliances recorded during 2010:

Table 3-29 Non-Compliance Summary 2010

Non-compliance	Report No	Description	Corrective Action
Condition 5.4	AR02SMcD	Exceedance of Emissions to SE1	WWTP Improvement Program
Condition 9.3, 11.2 and 11.3	AR02SMcD	Delay in Reporting Results	Extend in-house analysis & hence faster reporting
Condition 8.11.1, 8.14.2, 8.14.4 & 8.14.5	AR02SMcD	Wood waste	Procedure for Accepting Wood wastes
Condition 8.11.1 and 11.10	AR02SMcD	Waste acceptance	Standardisation of waste acceptance procedure
Condition 3.19.3	AR02SMcD	Storage of sludge in Building No.1	Draft plan forwarded and agreed with Agency
Condition 11.10	AR02SMcD	Boiler Ash	Full records available
Condition 3.6.5	AR02SMcD	Labelling	Labelling is up to date

With respect to each of these non-compliances ERAS ECO Ltd. put in place corrective actions to address the same.

A programme for continual improvement is included in site's Environmental Objectives and Targets (see section 5.1) of the Annual Environmental report) indicating timelines and plan of action the company is committed to ensure that emissions to sewer are in compliance and to prevent any odour nuisance.

4 Waste License Specific Reports

As per schedule E of Waste License W0211-01, the following reports must also be submitted in the Annual Environmental Report:

- Tank and pipeline testing report.
- Closure, restoration management plan.
- Environmental Liabilities Risk Assessment.
- Energy efficiency audit report summary.
- Development / Infrastructural work summary

4.1 Tank and Pipeline Testing & Inspection Report

In accordance with condition 6.14 of Waste License W0211-01, "all tanks and pipelines shall be maintained impervious to materials carried by stored therein. The integrity and water tightness of all underground pipes, tanks, bunding structures or containers and their resistance to penetration by water or other materials carried or stored therein shall be tested and demonstrated by the license prior to use. This testing shall be carried out by the license at least once every three years thereafter and reported to the Agency on each occasion. A written record of all integrity tests and any maintenance or remedial works arising from them shall be maintained by the license"

All underground pipework was completed and tested in accordance to the relevant standards during 2006, 2007 and 2010. A pipeline testing report is submitted in Appendix D.

An integrity assessment of all bunds report was carried out on 2010. All bunds and sumps have been designed and tested in accordance with the requirements of BS8007 – Standard Code Practice for the Design Liquid Retaining Concrete Structures and in accordance with Chapter 6 of Environmental Protection Agency IPPC Guidance Notes, June 2004. The bund integrity assessment report and certificates of all onsite bunds are enclosed in Appendix D**.**

Table 4-1 List of bunds on site

Name	Description	Bund Test	Due for Bund test
The Diesel Fuel Oil Tank Bund – purchased unit	The Fuel Oil Bund is an above ground structure. The unit is a Kingspan Ecosafe ES2600 Double skinned tank measuring 2585mm x 1570mm x 1465mm high. The maximum capacity of the vessel is 2600lts. The vessel is designed and constructed in accordance with OFS T- 100 (OFCERT No. 0641099913).	10/03/2010	10/03/2013
The Main Chemical Store Area – purchased units	Main Chemical Store is an enclosed covered 4 IBC Bunded Chemical Store –purchased from Chemstore (Model 4IBC-P)	10/03/2010	10/03/2013
Spill Trays	IBC-22B	10/03/2010	10/03/2013
Sludge reception bin	Reinforced Mass Concrete	03/03/2010	03/03/2013

The re-testing of all bunds is scheduled for the first quarter of 2013.

4.2 Closure, Restoration & Aftercare Management Plan

In accordance with Condition 10.2, "the license shall prepare, to the satisfaction of the agency, a fully detailed and costed plan for the decommissioning or closure of the site or part thereof. This plan shall be submitted to the Agency for agreement in advance of the commencement of the licensed activities"

A Closure, Restoration and Aftercare Management Plan, which was carried out in January 2008

> 10.2.2 The plan shall be reviewed annually and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the agreement of the Agency.

The closure bond was agreed and submitted to the Agency in 2008. This Closure, Restoration and Aftercare Management Plan has been reviewed by Management and no modifications are deemed necessary for 2010. This plan is located in Appendix E of this report.

4.3 Environmental Liabilities Risk Assessment

In accordance with condition 12.3.2 of Waste license W0211-01, "the license shall arrange for the completion, by an independent and appropriately qualified consultant, of a comprehensive and fully costed Environmental Liabilities Risk Assessment (ELRA) which addresses the liabilities from past and present activities. The assessment shall include those liabilities and cost identified in Condition 10 for the execution of RMP/CRAMP".

The site Environmental Risk Liability Assessment, which was carried out in 2007, is enclosed in Appendix F~~Appendix H~~.

A detailed Environmental Liabilities Risk Assessment was conducted for ERAS ECO Ltd., which is a Risk Category 3 facility (based on the EPA guidance on Liability Risk Assessment, Residuals Management Plans and Financial Provision). The ELRA considers the risk of unplanned events occurring during the operation of the facility that could result in unknown liabilities materialising.

The ELRA covers environmental risks leading to a potential or anticipated liability. Environmental Risks will be deemed to cover all risks to surface water, groundwater, atmosphere, land and human health.

> ''12.3.2 The licensee shall arrange for the completion, by an independent and appropriately qualified consultant, of a comprehensive and fully costed Environmental Liabilities Risk Assessment (ELRA), which addresses the liabilities from past and present activities. The assessment shall include those liabilities and costs identified in Condition 10 for execution of the RMP/CRAMP. A report on this assessment shall be submitted to the Agency for agreement in advance of the commencement of the licensed activities. The ELRA shall be reviewed as necessary to reflect any significant change on site, and in any case every three years following initial agreement: review results are to be notified as part of the AER. ''

Environmental Liabilities Risk Assessment was agreed and submitted to the Agency in 2008. The financial bond is in place. The contents of the Assessment have been reviewed by Management and no modifications are deemed necessary for 2010. This plan is located in Appendix F of this report.

4.4 Energy Efficiency Audit Report

As per condition 7.1 of Waste License W0211-01, "the license shall carry out an audit of the energy efficiency of the site within a year of the commencement of the licensed activities. The audit shall be carried out in accordance with the guidance published by the Agency: "Guidance Note on Energy Efficiency Auditing". The energy efficiency audit shall be repeated at intervals as required by the Agency".

The site Energy Efficiency Audit was carried out during 2008 and an energy efficiency audit report summary was submitted to the EPA. In 2009, ERAS ECO Ltd subscribed to the Sustainable Energy Ireland (SEI) mentoring and advice service.

4.4.1 Findings of Energy Audit

''ERAS ECO Ltd's commitment to sustainable and green initiatives is evidenced by its installation of a 4MW steam-generating biomass boiler. However, alternative options are available which may make further financial as well as sustainable business sense. A front end study is recommended:

Explore the potential benefits in using the dried waste sludge as a fuel source for the existing boiler. The energy content of this end product is sufficiently high as to justify examining mixing this fuel with the woodchips and feeding this to the boiler's burner assembly. Such a project would significantly reduce operating costs onsite (e.g. fuel costs, disposal costs for end product).''

4.4.2 Conclusion of Report

'' Energy efficiency and 'green' initiatives are taken very seriously by management at ERAS ECO Ltd. As can be seen from the EPI charts, efficiency levels onsite have improved dramatically in recent months.''

''ERAS ECO Ltd should review this report and in particular the opportunities for energy savings.''

4.5 Development / Infrastructural Works summary 2010

4.5.1 Specified Engineering Works

Engineering Works Completed in 2010:

- Safely remove plant from C&I building
- Install Weather Station
- Install Rainwater Harvesting System
- The Waste Water treatment plant had a number of alterations and/or additions in its infrastructure in order to improve/streamline the treatment process. These alterations/additions are outlined in Table 3-14

Engineering planned for 2011:

- Install dedicated sludge storage bays in Building No. 1
- Odour Abatement System for Building 1

5 MANAGEMENT OF THE FACILITY

5.1 Environmental Management Programme (Environmental Objectives and Targets)

In accordance with condition 2.2.2.3 of W0211-01, ERAS ECO Ltd. have established, implemented and maintained an Environmental Management System during 2010. The EMS was implemented in line with ISO 14001:2004 and complies with all regulatory and legislative requirements pertinent to industry, local operating environment and customer requirements.

The Environmental Management System is reviewed annually together with the company's Environmental Objectives and Targets. In section 5.2 a progress report details the significant achievements and developments attained at ERAS ECO Ltd. during 2010. These objectives and targets form part of a longer term Environmental Management Programme. When setting targets for 2011, consideration was taken of both the Environmental Management Programme and developments to date. Thus the 2010 targets will help build upon developments/improvements in 2011 and also realise longer term goals. The achievement of the environmental targets will be evaluated throughout 2011.

The Board of Management, Facility Manager, EHSQ Manager and the operational staff are responsible for achieving these objectives and targets within a set time frame.

The environmental objectives and targets which are established at relevant functions and levels within the company are consistent with the company's environmental policy and legislative requirements. Objectives and targets must also be consistent with BATNEEC (Best Available Technology Not Entailing Excessive Cost) and the financial, operational and business requirements of the organisation.

ERAS ECO Ltd. will invest funds for both internal and external works to be carried out as appropriate, as may be defined as part of the objectives and target programme and any follow-up actions required.

For each objective the following information is detailed in the schedule for the Environmental Objectives and Targets:

- Objectives.
- Target.
- Plan of Action / Methodology.
- Timeframe for implementation (Targets timeframes are arranged according to the Quarter in which they are scheduled to be completed).
- Responsibility.

A schedule for the Environmental objectives and targets is included below:

- **Objective 1** - Compliance with Schedule B4. Emission to Sewer of Waste License W0211-01
- **Objective 2 -** Nuisance Prevention (Ambient Monitoring)
- **Objective 3 -** Energy efficiency
- **Objective 4** - Prevention of noise nuisance
- **Objective 5** - Waste recycling efficiency
- **Objective 6** - Administration Waste Management
- **Objective 7 -** Environmental Health & Safety Awareness

5.2 Progress on 2010 Objectives and Targets

5.2.1 OBJECTIVE 1: Emission to Sewer

Reference: SE1

Title: Compliance with Schedule B4. Emission to Sewer of Waste License W0211-01

Objectives: To ensure that emission to the sewers are in compliance with the Emission Limit Values of the waste license W211-01

Targets:

- To continuously monitor emissions to sewer
- Reduce emissions and where possible increase compliance
- Propose modifications & optimise the WWTP's performance
- Increase speed of emissions reporting

Plan of Action/ Methodology Vs Timescale:

Compliance with Schedule B4. Emission to Sewer of Waste License W0211-01		
No.	**Plan of Action (methodology)**	**2010 Progress/ Status in 2010**
1	Reduce the lag time between monitoring and reporting of results to the Agency and Sanitary Authority	Ongoing
2	Continue to conduct trials on WWTP and Liaise with external WWTP Consultant(s)	Ongoing
3	Trial WWTP technologies as per recommendations by external consultant	Complete
4	Liaise with the Agency and Sanitary Authority on recommendations from consultant	Ongoing
5	Increase the range of parameters and quantity of analysis conducted internally. This will assist WWTP operators with understanding of the WWTP and allow swift responses to fluctuating loads. Also it will ensure faster reporting of exceedances to the Agency & Sanitary Authority	Ongoing
6	If necessary, seek an increase from the Sanitary Authority on the Ammonia/ COD emission limit values	Postponed
7	Conduct Integrity Test on Bunds	Complete
8	Conduct Integrity Test on Pipelines	2011
9	Calibrate flowmeters, probes & other instrumentation	Complete
10	Replace media beds of filter tanks (where required)	Ongoing
11	Complete a report on the requirements for extending the internal laboratory analysis and sampling onsite	Postponed
12	Install new plant where agreeable/necessary	Complete

5.2.2 OBJECTIVE 2: Ambient Emissions

Reference: Ambient Emissions

Title: Nuisance Prevention.

Objectives: To ensure that air/ odour emissions do not produce any significant environmental impact/nuisance

Targets:

- To ensure regular inspections and monitoring are sufficient to control nuisance(s)
- To maintain and check the odour abatement system regularly to ensure its correct performance
- Understand and where possible reduce potential of onsite odours

Plan of Action/ Methodology Vs Timescale:

Ambient Emissions		
No.	**Plan of Action (methodology)**	**2010 Progress/ Status in 2010**
1	Reduce no. of Complaints	Ongoing
2	Improve Biofilter Performance – increase the range and frequency of Biofilter monitoring, and hence reduce the risk of odours	Ongoing
3	Increase the frequency of Innoculum top-ups to the Biofilter sump water	Ongoing
4	Install weather station, therefore aiding the review and identification of odours	Complete
5	Install odour suppressing/misting system – on biofilter stack??	Postponed
6	Compile a spreadsheet of customer sludge analysis, identifying what parameter(s) are likely to be given-off from each sludge. This will allow operators to gauge the likely load at the abatement system.	Completed in part

5.2.3 OBJECTIVE 3: Use of Resources

Reference: To minimise the use of resources on site.

Title: Energy Efficiency

Objectives: Energy (woodchip, oil, electricity), water and raw materials use are a significant cost factor in addition to having a potential adverse environmental impact. Consequently ERAS ECO Ltd. proposes to minimise the use of resources on site as far as is practicably possible.

Targets:

- Increase efficiency & minimise the use of resources
- Minimise emissions and footprint of activities onsite
- Conduct a detailed energy audit (including energy map) and implement finding(s)
- Increase energy efficiency awareness among all staff
- Establish/ Increase us of performance indications

Plan of Action/ Methodology Vs Timescale:

Minimise the Use of Resources		
No.	**Plan of Action (methodology)**	**2010 Progress/ Status in 2010**
1	Reduce oil consumption by 10% per kg of Sludge Dried	Complete
2	Reduce water consumption by 10% per kg of Sludge Dried	Complete
3	Improve the efficiency of chemical dosing in the WWTP and consequently reduce the dosing by 5% per M^3 of flow through the plant	WWTP Operational Practices have been significantly altered. Chemicals usage has changed accordingly.
4	Contrast the Carbon Footprint of exporting the Dried Biomass Sludge to the existing recovery facility and using the dried sludge directly as a fuel the onsite Biomass Boiler	Complete
5	Examine the potential energy savings by utilising the dried sludge produced onsite in the Biomass Boiler	Not permitted by the Agency
6	Conduct an Energy audit identifying the major electricity consumers per each segregated area of the facility	Complete
7	Investigate the possibility of harvesting rainwater onsite e.g. estimated rainfall, ease of capture and reuse, costs, savings, etc.	Complete
8	Identify a energy and cost saving opportunity list – as part of the energy audit	Postponed
9	Install sensors on lights, therefore reducing electricity consumption	Sensors not appropriate for existing lighting
10	Provide energy training on the above targets and results to all ERAS ECO Staff	Postponed to 2011
11	Maximise steam use (Examine valves for steam/heat losses and repair or replace as necessary). This measure is expected to reduce woodchip consumption by 10% per kg of sludge dried	Ongoing

5.2.4 *OBJECTIVE 4: Prevention of Noise*

Reference: N1, N2, N3 (boundary points)/ NSR-1 (Nearest Noise Sensitive Location)

Title: Prevention of Noise Nuisance.

Objectives: To ensure that noise emissions are in compliance with the waste license noise emission limits.

Targets:

- To ensure that existing and new equipment do not produce noise nuisance.
- To ensure that ERAS ECO Ltd. noise emissions are in compliance with Schedule B.5- Noise Emissions of Waste License W0211-01.

Daytime dB(A) L_{Aeq}(30 minutes)	Night-time dB(A) L_{Aeq}(30 minutes)
55 Note 1	45 Note 1

Note 1: There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise sensitive location.

Plan of Action / Methodology Vs Timescale:

Prevention of Noise		
	WWTP Plan of Action (methodology)	**2010 Progress/ Status in 2010**
1	Minimise truck running times in open yard, where delays are expected direct loads to be tipped within the material recovery building	Ongoing
2	Complete noise survey as per Condition C5 of W0211-01	Ongoing
3	Continue to ensure plant is well maintained	Ongoing

5.2.5 OBJECTIVE 5: Waste Recycling Efficiency

Reference: Waste & Recycling

Title: Waste recycling efficiency.

Objectives: Increase waste and awareness levels with respect to acceptable materials, segregation procedure. Identify and reduce carbon footprint of operations.

Targets:

- To increase throughput, viability and sustainability of operations.

Plan of Action / Methodology V's Timescale:

Waste Recycling Efficiency		
	WWTP Plan of Action (methodology)	**2010 Progress/ Status in 2010**
1	Increase the hourly sludge throughput through the drier. Communicate the plant performance to all staff (e.g. graph)	Ongoing
2	Extend the scope of the Sludge Drying SCADA system to include other area(s) of the plant e.g. the Boiler	Investigated – Feasibility being examined
3	Management to explore options for increasing the waste intake and viability of the facility	Ongoing
4	Remove any superfluous plant and equipment from the material recovery facility	Complete
5	Explore local sustainable options for the Biomass produced onsite i.e. Dried Sludge e.g. onsite in the Biomass boiler.	Ongoing
6	Submit sample(s) of the onsite Biomass (i.e. Dried sludge) for testing, to demonstrate the absence of any Active Pharmaceutical Ingredients (API's), and hence its suitability as a Boiler Fuel.	Complete
7	Revise/Retrain staff on load acceptance and rejection procedures for sludges, wood waste and any other permitted waste materials	Ongoing
8	Review/Update customer profiling data	Ongoing
9	Ensure the metals content of the Boiler Ash is reduced in 2010. To this end, only use/purchase woodchip were it has undergone screening for metals e.g. magnet	Complete
10	Document and train relevant staff on the procedure for segregating, removing and subsequent disposal of non suitable materials within loads of wood waste	Ongoing
11	Increase load weight of outgoing dried sludge trucks/ Reduce transport emissions (e.g. modify ducting and access to filling hatches)	Ongoing

5.2.6 *OBJECTIVE 6: Administration Waste*

Reference: Administration waste.

Title: Administration Waste Management

Objectives: To improve waste segregation and consequently reducing waste to landfill

Targets:

- To manage properly all waste generated in the administration building
- To reduce material consumption and increase source segregate of waste

Plan of Action/ Methodology V's Timescale

Administration Waste		
	WWTP Plan of Action (methodology)	**2010 Progress/ Status in 2010**
1	Provide suitable recycling in addition to the existing waste bins	Complete
2	Provide training for all staff on segregation of waste	Ongoing
3	Arrange for a licensed waste contractor to provide and maintain a separate recyclables and general waste collection service	Ongoing
4	Source a licensed outlet and dispose of used laboratory vials	Postponed to 2011
5	Reduce administration consumption of paper and printer inkjets/cartridges by 10%	Ongoing

5.2.7 *OBJECTIVE 7: EHS Awareness*

Reference: Environmental Health & Safety.

Title: Environmental Health & Safety Awareness.

Objective: To increase the awareness of all on-site personnel of the provisions and requirements of Health and Safety in the work place.

Targets:

- To continually improve Environmental, Health & Safety and Waste License awareness issues among staff
- To review, and improve the signage/labeling onsite
- To continually improve the working environment for persons onsite

Plan of Action/ Methodology V's Timescale:

Environmental, Health & Safety Awareness		
	WWTP Plan of Action (methodology)	**2010 Progress/ Status in 2010**
1	Install steps at weighbridge to aid drivers access and egress from their vehicles	Complete
2	Calibrate the portable Confined Space entry gas analyser	Complete
3	Elect a new Safety Representative	Offered
4	Document a formal SOP for vendor control i.e. identifying and approving Contractors/Vendors	Ongoing
5	Review Training matrix & update training where needed (e.g. Chemical Spill, Confined Space, Fire Extinguisher, Forklift, Manual Handling, Telescopic Handler, Waste License, etc.)	Ongoing
6	Chart Biofilter & WWTP performance and make these available to all staff	Ongoing
7	Review and revise lockout & tagout procedures	Ongoing
8	Ensure all storage areas including bins, bunds, bunkers, FIBC, IBC, skips, and other containers are labeled correctly	Ongoing
9	Review the procedure for carrying out colorimetric tests on A2 Biofilter and in particular specify any P.P.E. for carrying out these tests	Ongoing
10	Review signage onsite, in particular its conformity with the Safety Health and Welfare at Work (General Application) Regulations 2007 (Chapter 1 of Part 7: Safety Signs at Places of Work)	Ongoing

5.2.8 *OBJECTIVE 8: Environmental Management System*

Reference: Environmental Management System

Title: Environmental Health & System Update

Objective: To ensure ERAS ECO Ltd operates to the highest level of performance

Targets:

- Review Environmental Management System
- Achieve standard accreditation

Plan of Action/ Methodology V's Timescale:

Environmental Management System		
No.	**Plan of Action (methodology)**	**2010 Progress/ Status in 2010**
1	Review, revise and develop the management systems in line with formal standards e.g. ISO 9000; ISO 14000 & OHSAS 18000	Complete
2	Achieve ISO 9001 & ISO 14001 Certification	Complete
3	Achieve OHSAS 18001 Certification	Complete

5.3 2011 Objectives & Targets

5.3.1 OBJECTIVE 1: Emission to Sewer

Reference: SE1

Title: Compliance with Schedule B4. Emission to Sewer of Waste License W0211-01

Objectives: To ensure that emission to the sewers are in compliance with the Emission Limit Values of the waste license W211-01

Targets:

- Reduce emissions to sewer/ maintain continued compliance

Plan of Action/ Methodology Vs Timescale:

Compliance with Schedule B4. Emission to Sewer of Waste License W0211-01		
No.	**Plan of Action (methodology)**	**Timescale**
1	Install & Commission DAF Unit	Completed in Q1 2011
2	Install & Maintain Additional Carbon Filter(s)	Completed in Q1 2011
3	Upgrade & Maintain Air Diffusion System	Completed in Q1 2011
4	Monitor DO levels in Balance Tank	Q2 – Q4 2011
5	Monitor WWTP at each stage of Process	Ongoing Q1 – Q4 2011
6	Monitor & Maintain Balance Tank Solids	Ongoing Q1 – Q4 2011
7	Maintain Balance Tank pH at ~ 7.5	Ongoing Q1 – Q4 2011
8	Conduct analysis internally (where possible) and monthly verification of results by sending samples to external laboratories	Ongoing Q1 – Q4 2011
9	Add Alkalinity to Balance Tank (as required by testing)	Ongoing Q1 – Q4 2011
10	Install Filter Skip to Dewater DAF Solids	Q2 2011
11	Calibrate pH probes at least once per month	Q1 – Q4 2011
12	Document a procedure for Operation of DAF & WWTP	Q2 – Q3 2011
13	Document a Procedure for regular backwashing of Filters	Q3 - 2011
14	Investigate the feasibility of installing Ammonia probes in the Sodium Hypochlorite mixing tanks, hence interlinking Ammonia levels to its control	Q3 – Q4 2011

Responsibility:

- Allocation of Resources: Board of Management & Facility Manager
- Installation of DAF – External Contractors
- Install Additional Carbon Filter(s) – Contractors
- Upgrade Air Diffusion System – Contractors
- Monitor DO – EHSQ and/or Operators
- Procedures & Training – EHSQ

5.3.2 OBJECTIVE 2: Ambient Emissions

Reference: Ambient Emissions

Title: Nuisance Prevention.

Objectives: To ensure that air/ odour emissions do not produce any significant environmental impact/nuisance

Targets:

- To ensure regular inspections and monitoring are sufficient to control nuisance(s)
- To maintain and check the odour abatement system regularly to ensure its correct performance
- Understand and where possible reduce potential of onsite odours

Plan of Action/ Methodology Vs Timescale:

Ambient Emissions		
No.	**Plan of Action (methodology)**	**Timescale**
1	Reduce no. of Complaints	Ongoing
2	Replace the Biofilter Media as per the advise of odour consultant. Its advised to replace the Monashells with Leka	Q3 - 2011
3	Conduct a Health Check Assessment on the Biofilter	Q2 - 2011
4	Conduct Daily Logging of VOC's entering the Biofilter	Q1 - 2011
5	Install odour suppressing/misting system in Biofilter	Q1 - 2011
6	Install appropriate odour abatement system in Building No.1	Q2 – Q4 2011

Responsibility:

- Allocation of Resources – Board of Management & Facility Manager
- Replacement of Media – Ormonde Organics/ ERAS ECO Ltd
- Monitoring & Assessment – Odour Monitoring Ireland
- Install Odour Abatement Systems – External Contractors

5.3.3 OBJECTIVE 3: Use of Resources

Reference: To minimise the use of resources on site.

Title: Energy Efficiency

Objectives: Energy (woodchip, oil, electricity), water and raw materials use are a significant cost factor in addition to having a potential adverse environmental impact. Consequently ERAS ECO Ltd. proposes to minimise the use of resources on site as far as is practicably possible.

Targets:

- Increase efficiency & minimise the use of resources
- Minimise emissions and footprint of activities onsite
- Increase energy efficiency awareness among all staff

Plan of Action/ Methodology Vs Timescale:

Minimise the Use of Resources		
No.	**Plan of Action (methodology)**	**Timescale**
1	Discontinue the heating of the administration building with heat from the boiler, as the net value of this is negative. Replace with electrical space heaters.	Q1 2011
2	Reduce woodchip consumption by 10% per kg of sludge dried	Q1 – Q4 2011

Responsibility:

- Allocation of Resources – Board of Management & Facility Manager

5.3.4 *OBJECTIVE 4: Prevention of Noise*

Reference: N1, N2, N3 (boundary points)/ NSR-1 (Nearest Noise Sensitive Location)

Title: Prevention of Noise Nuisance.

Objectives: To ensure that noise emissions are in compliance with the waste license noise emission limits.

Targets:

- To ensure that existing and new equipment do not produce noise nuisance.
- To ensure that ERAS ECO Ltd. noise emissions are in compliance with Schedule B.5- Noise Emissions of Waste License W0211-01.

Daytime dB(A) L_{Aeq}(30 minutes)	Night-time dB(A) L_{Aeq}(30 minutes)
55 Note 1	45 Note 1

Note 1: There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise sensitive location.

Plan of Action / Methodology Vs Timescale:

Prevention of Noise		
	Plan of Action (methodology)	**Timescale**
1	Complete noise survey as per Condition C5 of W0211-01	Ongoing
2	Continue to ensure plant is well maintained including the replacement parts on dryer system, thereby reducing noise and vibration	Ongoing

Responsibility:

- Allocation of Resources – Board of Management & Facility Manager
- Replacement of Parts – Contractor
- Monitoring & Assessment – Monitoring Contractor

5.3.5 OBJECTIVE 5: Waste Recycling Efficiency

Reference: Waste & Recycling

Title: Waste recycling efficiency.

Objectives: Increase waste and awareness levels with respect to acceptable materials, segregation procedure. Identify and reduce carbon footprint of operations.

Targets:

- To increase throughput, viability and sustainability of operations.

Plan of Action / Methodology V's Timescale:

Waste Recycling Efficiency		
	Plan of Action (methodology)	**Timescale**
1	Operators to receive training on best sludge drying practices	Q1 2011
2	Maintain weekly logs of Dry Solids Content of Dried Product	Q2 – Q4 2011
3	Examine the availability of other local produced biomasses/wood fuels	Q2 – Q4 2011
4	Re-initiate activities in Building No. 1.	Q2 – Q4 2011
5	Create suitable divisions between different storage areas of Building No.1	Q2 – Q4 2011
6	Investigate the efficiency value of introducing small amounts of dried sludge to increase the size of the granular dried product	Q2 – Q4 2011
7	Revise and Document procedures for the acceptance of wastes (including acceptance of sludges and non-sludges)	Q3 – Q4 2011

Responsibility:

- Allocation of Resources – Board of Management & Facility Manager
- New Activities – Board of Management & Facility Manager
- Procedures – Board of Management & Facility Manager
- Monitoring & Assessment – EHSQ & Operators

5.3.6 OBJECTIVE 6: Administration Waste

Reference: Administration waste.

Title: Administration Waste Management

Objectives: To improve waste segregation and consequently reducing waste to landfill

Targets:

- To manage properly all waste generated in the administration building
- To reduce material consumption and increase source segregate of waste

Plan of Action/ Methodology V's Timescale

Administration Waste		
	Plan of Action (methodology)	**Timescale**
1	Reduce Consumption of Office Paper	Q1 – Q4 2011
2	Re-train staff on waste segregation and labelling	Q2 – Q4 2011

Responsibility:

- Allocation of Resources – Board of Management & Facility Manager
- Training – Facility Manager, EHSQ & All Operators

5.3.7 OBJECTIVE 7: EHS Awareness

Reference: Environmental Health & Safety.

Title: Environmental Health & Safety Awareness.

Objective: To increase the awareness of all on-site personnel of the provisions and requirements of Health and Safety in the work place.

Targets:

- To continually improve Environmental, Health & Safety and Waste License awareness issues among staff
- To review, and improve the signage/labeling onsite
- To continually improve the working environment for persons onsite

Plan of Action/ Methodology V's Timescale:

Environmental, Health & Safety Awareness		
	Plan of Action (methodology)	**Timescale**
1	Erect signs on both sides of doors to dryer/boiler room noting door must be kept shut at all times of operation	Q1 2011
2	Maintain Compliance with 14001, 18001 & 9001	Q1 – Q4 2011
3	Communicate/Re-communicate the key EHS awareness issues on-site	Q2
4	Complete/Re-complete driver training program for Telescopic Handler	Q4 2011
5	Conduct Testing on all Fire Extinguishers and Alarm System and provide relevant training where necessary	Q1 – Q4 2011
6	Revise Risk Assessment for new activities in consultation with other relevant parties	Q2 – Q4 2011
7	Train staff on new waste activities and works including the environmental and health and safety risks	Q2 – Q4 2011

Responsibility:

- Allocation of Resources – Board of Management & Facility Manager
- Maintain Compliance - Board of Management, Facility Manager & All Staff
- Driver Training – Facility Manager, EHSQ & Relevant Staff
- Risk Assessment & Training – EHSQ, All Staff and other Relevant Parties

5.3.8 OBJECTIVE 8: Environmental Management System

Reference: Environmental Management System

Title: Environmental Health & System Update

Objective: To ensure ERAS ECO Ltd operates to the highest level of performance

Targets:

- Review Environmental Management System
- Maintain standard accreditation
- Document standardised approaches to operation of facility

Plan of Action/ Methodology V's Timescale:

Environmental Management System		
No.	**Plan of Action (methodology)**	**Timescale**
1	Maintain Compliance with 14001, 18001 & 9001.	Q1 2011
2	Review and revise the management systems where gaps are identified	Q1 – Q4 2011
3	Draft a complete manual on the operation of the facility including Boiler, Dryer, WWTP, Utilities, etc.	Q2 – Q4 2011

Responsibility:

- Allocation of Resources – Board of Management & Facility Manager
- Identification of Gaps – Internal & External Auditors
- Draft Manual – EHSQ in consultation with all Staff

5.2 Resources Consumption and 2010 Planned Efficiency Improvements

5.2.1 Municipal Water /Trade Effluent

ERAS ECO Ltd. consumed approximately 5,538 m^3 of municipal water for the calendar year 2010 based on Youghal town council water meter. This represents a significant reduction in water consumption and far exceeds the 10% target posed in the 2009 EMP (i.e. Objective 3; Target 2).

The consumption of water is related to the onsite operations, in particular sludge drying. The operation of facility utilizes water in three main areas these are outlined below:

a) Process Water (Sludge Dryer Plant, Boiler, Cooling water for dry product, wheel wash and admin building sanitary water/potable water)
b) Biofilter (Sump flushing)
c) Fire Water (Fire fighting equipment for entire site)

In accordance with our waste licence W0211-01 the volume of trade effluent will not exceed our maximum limit of 7m^3 per hour or 170m^3 within a 24 hour period.

The main raw materials utilized on site by ERAS ECO Ltd. are detailed below:

5.2.2 Boiler Woodchip Fuel

The total consumption of virgin and recycling woodchip for the calendar year 2010 was **2,993.18 tonnes**. This woodchip is imported from a number of outlets and is used for generating the 12 bar steam required for the sludge drying process.

It is difficult to ascertain efficiencies for woodchip due to the intermittent start-up/shut-down of plant.

Furthermore, it should be noted that limitations in respect of sludge supply, necessitated frequent boiler shut down (e.g. weekends). This reduces the woodchip requirement, as the boiler is not operating 24 hours a day/365 days per year.

5.2.3 Light Fuel Oil

The total consumption of light fuel oil for the calendar year 2010 is approximately 13,045 litres. The light fuel oil is used for the start up procedure for Boiler to raise the temperature of furnace to 400 degrees Celsius and for the continual operation of the on-site vehicles.

It is difficult to ascertain efficiencies for light fuel oil due to the intermittent start-up/shut-down of plant. If and when possible, it is planned to have the boiler running continually at low temperature (depending on the boiler pressure) during shutdown periods to reduce the significant consumption of light diesel oil in boiler re-start mode.

5.2.4 Reduction in Waste Generated

The waste volumes generated at the facility are low and this is due to a number of factors, including:

- Lower than expected intake levels. The facility is licensed to accept a total of 110,000 tpa and in reality the tonnage is <10,000 tpa.
- The Waste Transfer Facility ceased accepting dry mixed recyclables in 2009, however management are investigating potential other uses of this waste transfer

building. At the moment its used to store wood (in both the shredded and non shredded form) and also some overflow sludge. These are stored in designated and labelled areas.

All recyclable waste generated in the administration building is sent to dedicated skips located in the yard areas of the facility. As detailed in Objective 6 of the 2010 EMP, ERAS ECO Ltd will arrange and maintain separate bins/skips for boiler ash, dry mixed recycling and general waste. These bins/skips will be serviced periodically by licensed contractors.

5.4 Facility Operational Procedures

As per Objective 8 in the 2009 EMP, ERAS ECO Ltd has been accredited to formal management system accreditation including ISO 9001, ISO 14001 and OHSAS 18001. In 2010, ERAS ECO Ltd will review its management systems and maintain its management system accreditations.

6 E-PRTR / AER SUMMARY TABLE

In accordance with the requirements of the S.I. No. 123 of 2008, European Communities (European Pollutant Release and Transfer Register) Regulations 2008, ERAS ECO Ltd. has separately submitted **Error! Reference source not found.**~~Appendix C~~, that is the information in relation to releases of pollutants and off-site transfers of pollutants and waste occurred during 2008. This information was also submitted to the EPA via electronic format.

APPENDIXES

Appendix A Certification of Incorporation
Appendix B A1 Boiler & Biofilter Monitoring Reports Q1-Q4
Appendix C Noise Monitoring Report 2010
Appendix D Pipeline & Bund Testing Reports
Appendix E Closure Restoration and Aftercare Management Plan v2.00
Appendix F ELRA v2.00

Number 388559

Certificate of Incorporation on change of name

I hereby certify that

AVR-ENVIRONMENTAL SOLUTIONS LIMITED

having, by a Special Resolution of the Company,
and with the approval of the Registrar of Companies,
changed its name, is now incorporated
as a limited company under the name

ERAS ECO LIMITED

and I have entered such name on the Register accordingly.

Given under my hand at Dublin, this

Monday, the 11th day of August, 2008

for Registrar of Companies

Confidential Report

Customer: Eras Eco Ltd
Foxhole
Youghal
Co Cork

F.T.A.O. Mr. John Dee **Glenside Ref**: 010-023

Order No.	Commencement Date: 29/03/2010	Completion Date: 29/03/2010

Report title: Boiler emissions survey at Eras Eco, Youghal, Co. Cork

Report by:

Patrick Power

Approved by:

Patrick Power

1.0 Scope

This report deals with a survey of emissions to atmosphere from the main boiler stack at the ERAS ECO plant in Foxhole, Youghal.

2.0 Methodology

2.1 Boiler

Glenside Environmental personnel conducted the survey on 29th March 2010. Temperature and velocity were measured *in situ* using a thermocouple and a pitot tube and manometer respectively. Combustion Gases were monitored *in situ* using a Lancom III electrochemical analyser fitted with a gas-drying unit. Particulates were determined by isokinetic filtration and analysis was undertaken by gravimetry. The results are reported relative to dry gas, 273.15K, 101.325 kPa, and 11% oxygen.

3.0 Results

The results are presented in Tables 4.1 below.

4.0 Evaluation of Results

Emissions to atmosphere from the boiler are in compliance with Limits stated in Schedule B of the Licence.

Table 4.1 Boiler Emissions to atmosphere at Eras Eco, Youghal

Emission Source	**Main Stack**
Measured Emissions	
Temperature, ^{o}C	179
Efflux Volume, Nm^3/hr	3480
Parameter	**Concentration mg/Nm^3 @ 11% O_2**
Particulates	< 0.5
Nitrogen oxides (as NO_2)	190
Carbon monoxide	<1.5
Sulphur dioxide (as SO_2)	<1.2
Carbon dioxide %	5.1
Oxygen %	12.7
EPA Licence Limit	
Parameter	**Concentration mg/m^3**
Particulate	20
Nitrogen Oxides (as NO_2)	250
Carbon Monoxide	150

Note:

[1] Reference conditions: 101.325kPa, 273.15K, 11% oxygen for combustion gases

Confidential Report

Customer: Eras Eco Ltd
Foxhole
Youghal
Co Cork

F.T.A.O. Mr. John Dee **Glenside Ref: 010-037**

Order No.	Commencement Date: 20/05/2010	Completion Date: 20/05/2010

Report title: Boiler & biofilter emissions survey at Eras Eco, Youghal, Co. Cork

Report by:

Patrick Power

Approved by:

Patrick Power

1.0 Scope

This report deals with a survey of emissions to atmosphere from the main boiler stack and biofilter at the ERAS ECO plant in Foxhole, Youghal.

2.0 Methodology

2.1 Boiler

Glenside Environmental personnel conducted the survey on 20th May 2010. Temperature and velocity were measured in situ using a thermocouple and a pitot tube and manometer respectively. Combustion Gases were monitored *in situ* using a Lancom III electrochemical analyser fitted with a gas-drying unit. Particulates were determined by isokinetic filtration and analysis was undertaken by gravimetry. The results are reported relative to dry gas, 273.15K, 101.325 kPa, and 11% oxygen.

2.2 Biofilter

Ammonia, hydrogen sulphides and mercaptans were determined by colorimetric tubes. Organics and amines were determined by adsorption onto silica gel tubes and subsequent analysis by GCMS. Samples were collected over 30-minute sampling intervals.

3.0 Results

The results are presented in Tables 4.1 and 4.2 below.

4.0 Evaluation of Results

Emissions to atmosphere from the boiler and biofilter are in compliance with Limits stated in Schedule B of the Licence.

Table 4.1 Boiler Emissions to atmosphere at Eras Eco, Youghal

Emission Source	**Main Stack**
Measured Emissions	
Temperature, ^{o}C	155
Efflux Volume, Nm^3/hr	4109
Parameter	**Concentration mg/Nm^3 @ 11% O_2**
Particulates	0.176
Nitrogen oxides (as NO_2)	202
Carbon monoxide	<1.0
Sulphur dioxide (as SO_2)	<1.0
Carbon dioxide %	4.9
Oxygen %	12.8
EPA Licence Limit	
Parameter	**Concentration mg/m^3**
Particulate	20
Nitrogen Oxides (as NO_2)	250
Carbon Monoxide	150

Note:

[1] Reference conditions: 101.325kPa, 273.15K, 11% oxygen for combustion gases

Table 4.2 Emissions to atmosphere from biofilter at Eras Eco, Youghal

EMISSION SOURCE	Biofilter	
MEASURED EMISSIONS		
TEMPERATURE, ^{o}C	20.2	
VELOCITY, m/sec	5.16	
FLOW RATE, Nm^3/hr	705	
PARAMETER	CONCENTRATION, mg/Nm^3	MASS EMISSION RATE, kg/hr
Ammonia	< 0.18	$< 2.0 \times 10^{-4}$
Amines and Amides	< 0.35	$< 2.5 \times 10^{-4}$
Total Hydrogen Sulphides	< 0.17	$< 1.0 \times 10^{-4}$
Mercaptans	< 0.03	$< 3.0 \times 10^{-5}$
IPPC Licence Limits		
Parameter	**Concentration, mg/Nm^3**	**Mass Emission Rate, kg/hr**
Ammonia	30	0.15
Amines and Amides	5	NS
Total Hydrogen Sulphide, Sulphides, Mercaptans expressed as S	3	0.015
Flow Rate, Nm^3/hr	1,730	

Note:
NS not specified

BHP/CEM/23/A

Analysing
Testing
Consulting
Calibrating

TEST REPORT

Client:
Eras Eco Ltd.
Foxhole,
Youghal,
Co. Cork.

FAO: Mr. John Dee

BHP Ref No.: 95889-95891
Order No.:
Date Received: 10th August 2010
Date Tested: 10th August 2010
Test Specification: Nil

BHP
New Road
Thomondgate
Limerick
Ireland
Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

Item: Boiler and Biofilter Emissions Survey at Eras Eco, Youghal, Co.Cork for Quarter 3, 2010

For and on behalf of BHP Ltd.

Pat O'Sullivan
Date Issued: 16th December 2010
Supplement to report No. N/A

1.0 SCOPE OF SURVEY

At the request of Mr. John Dee of Eras Eco, BHP undertook a sampling and analysis programme to monitor air emissions from the main boiler stack and biofilter at the Eras Eco plant in Foxhole, Youghal, Co.Cork. The purpose of the analysis was to determine whether the air emissions at the plant were compliant with the licence issued by Environmental Protection Agency.

The boiler stack and biofilter analysis was carried out on 10th August 2010.

2.0 SURVEY PROTOCOLS

2.1 Sampling Protocols (Boiler Stack)

- Temperature and velocity profiles of the emission sources were determined before and after sampling.
- Velocity was measured in accordance with BS 1042 using a pitot tube.
- Particulates were measured by Isokinetic Filtration/Gravimetry in accordance with BS 3405.
- Carbon Monoxide, Sulphur Oxides and Nitrogen Oxides were measured using a flue gas analyser (Lancom III Portable Flue Gas Analyser)

Table 2.1 Techniques used in sampling program.

Parameter	Sampling Method
Temperature	Thermocouple
Velocity	Pitot Tube
Particulates	Isokinetic filtration / Gravimetry
Flue Gases	Flue Gas Analyser

2.2 Sampling Protocols (Biofilter)

- Ammonia, Hydrogen Sulphide and Mercaptans were determined using Drager colourimetric tubes.
- Organics and amines were determined by adsorption onto silica gel tubes with subsequent analysis by GC-MS. These samples were collected over a 30 minute sampling period.

2.2 Reporting

Velocity and Temperature are presented as averages of the sum of all the measurements taken from source. All other results are reported in terms of concentration and mass flow rates per unit time.

The reference conditions for concentrations of substances in emissions to air from non-combustion sources are 273K; 101.3kPa, with no correction for water vapour content.

The result of a test gives an average value for the emission during the period of sampling, and is representative of the conditions during that period.

3.0 RESULTS

Table 3.1 Boiler Stack Sampled from 0800hrs - 0855hrs

Emission Parameter	Units	Measured	Licence Limit
Diameter	m	0.8	-
Temperature	°C	187	-
Velocity	m/s	5.3	-
Carbon Monoxide	mg/Nm^3	8	150
Nitrogen Oxides (as NO_2)	mg/Nm^3	205	250
Sulphur Dioxide (as SO_2)	mg/Nm^3	<5	-
Particulates	mg/Nm^3	1.5	20

Table 3.2 Biofilter Sampled from 0930hrs - 1000hrs

Emission Parameter	Units	Measured	Licence Limit
Stack Flow Rate	Nm^3/hr	810	1500
Temperature	°C	19.5	-
Velocity	m/s	4.9	-
Ammonia	mg/Nm^3	<0.2	30
Amines/Amides	mg/Nm^3	<0.4	5
Hydrogen Sulphide	mg/Nm^3	<0.2	3
Mercaptans	mg/Nm^3	<0.05	3
VOC's	mg/Nm^3	3.2	-

4.0 CONCLUSIONS

Emissions to the atmosphere from the main stack boiler and the biofilter are in compliance with the limits as stated in Schedule B of the IPPC Licence.

BHP/CEM/23/A

Analysing
Testing
Consulting
Calibrating

TEST REPORT

Client:
Eras Eco Ltd.
Foxhole,
Youghal,
Co. Cork.

FAO: Mr. John Dee

BHP Ref No.: 95890-95892
Order No.:
Date Received: 25th November 2010
Date Tested: 25th November 2010
Test Specification: Nil

BHP
New Road
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Tel +353 61 455399
Fax + 353 61 455447
E Mail bhpcem2@bhp.ie

Item: Boiler and Biofilter Emissions Survey at Eras Eco, Youghal, Co.Cork for Quarter 4, 2010

For and on behalf of BHP Ltd.

P. o Sul

Pat O'Sullivan
Date Issued: 16th December 2010
Supplement to report No. N/A

1.0 SCOPE OF SURVEY

At the request of Mr. John Dee of Eras Eco, BHP undertook a sampling and analysis programme to monitor air emissions from the main boiler stack and biofilter at the Eras Eco plant in Foxhole, Youghal, Co.Cork. The purpose of the analysis was to determine whether the air emissions at the plant were compliant with the licence issued by Environmental Protection Agency.

The boiler stack and biofilter analysis was carried out on 25th November 2010.

2.0 SURVEY PROTOCOLS

2.1 Sampling Protocols (Boiler Stack)

- Temperature and velocity profiles of the emission sources were determined before and after sampling.
- Velocity was measured in accordance with BS 1042 using a pitot tube.
- Particulates were measured by Isokinetic Filtration/Gravimetry in accordance with BS 3405.
- Carbon Monoxide, Sulphur Oxides and Nitrogen Oxides were measured using a flue gas analyser (Lancom III Portable Flue Gas Analyser)

Table 2.1 Techniques used in sampling program.

Parameter	Sampling Method
Temperature	Thermocouple
Velocity	Pitot Tube
Particulates	Isokinetic filtration / Gravimetry
Flue Gases	Flue Gas Analyser

2.2 Sampling Protocols (Biofilter)

- Ammonia, Hydrogen Sulphide and Mercaptans were determined using Drager colourimetric tubes.
- Organics and amines were determined by adsorption onto silica gel tubes with subsequent analysis by GC-MS. These samples were collected over a 30 minute sampling period.

2.2 Reporting

Velocity and Temperature are presented as averages of the sum of all the measurements taken from source. All other results are reported in terms of concentration and mass flow rates per unit time.

The reference conditions for concentrations of substances in emissions to air from non-combustion sources are 273K; 101.3kPa, with no correction for water vapour content.

The result of a test gives an average value for the emission during the period of sampling, and is representative of the conditions during that period.

3.0 RESULTS

Table 3.1 Boiler Stack Sampled from 0915hrs - 01015hrs

Emission Parameter	Units	Measured	Licence Limit
Diameter	m	0.8	-
Temperature	°C	195	-
Velocity	m/s	5.4	-
Carbon Monoxide	mg/Nm^3	6	150
Nitrogen Oxides (as NO_2)	mg/Nm^3	182	250
Sulphur Dioxide (as SO_2)	mg/Nm^3	<5	-
Particulates	mg/Nm^3	1.1	20

Table 3.2 Biofilter Sampled from 1045hrs - 1115hrs

Emission Parameter	Units	Measured	Licence Limit
Stack Flow Rate	Nm^3/hr	790	1500
Temperature	°C	20.4	-
Velocity	m/s	4.8	-
Ammonia	mg/Nm^3	<0.2	30
Amines/Amides	mg/Nm^3	<0.4	5
Hydrogen Sulphide	mg/Nm^3	<0.2	3
Mercaptans	mg/Nm^3	<0.05	3
VOC's	mg/Nm^3	1.6	-

4.0 CONCLUSIONS

Emissions to the atmosphere from the main stack boiler and the biofilter are in compliance with the limits as stated in Schedule B of the IPPC Licence.

REPORT ON NOISE MONITORING

FOR

ERAS ECO LTD.

FOXHOLE, YOUGHAL, CO. CORK.

Prepared By:
Glenside Environmental
24 The Heathers
Classes Lake
Ballincollig
Cork

2010 Annual Monitoring

Date of Survey: 26th July 2010

CONTENTS

1.0 INTRODUCTION

Glenside Environmental Services was commissioned by Eras Eco Ltd. to conduct a noise survey at their premises at Foxhole, Youghal, Co. Cork in accordance with conditions of Waste Licence W0211-01.

This report presents details of the noise levels recorded during the daytime period at 4 locations listed in the waste licence.

2.0 SURVEY DETAILS

The following are the details of the survey as carried out at the premises on 26th July 2010.

2.1 EXISTING ENVIRONMENT

The site is located approximately 2 miles from Youghal town centre on the old Waterford Road and approximately 500m from the Youghal by-pass. The site is accessed by a laneway off the local road. The Cork County Council operated Youghal Landfill is located at the end of the lane while the local NCT Test Centre is located at the south of the Eras Eco facility. Industrial units located close to the facility contributed to the local noise environment.

There is one single dwelling located to the south of the site and these shown in the location map.

2.2 Measurements

Patrick Power B.Sc MIOA carried out measurements at 4 no. selected locations as described in the waste licence. All measurements were carried out in accordance with *ISO 1996: Description and Measurement of Environmental Noise* and *EPA Noise Survey Guidance Document 2006*. Measurements recorded during daytime periods for 30-minute durations.

2.2.1 Noise Monitoring Instrumentation

The following details describe the equipment used in the survey:

- Details: Bruel and Kjaer Type 2250 sound level meter
- Serial Number: 2234498
- Microphone type: 4169
- Calibrator type: 4231

2.2.2 Weather Conditions

On the 26th July 2010 winds speed was noted <1m/s and temperature 15 degrees.

2.3 Permitted Noise Limits

The commonly permitted noise levels and monitoring frequency for licensed facilities in Ireland are detailed below.

Table 2.1 Noise Monitoring Frequency and Technique

Parameter	Monitoring Frequency	Analysis Method/Technique
$L(A)_{EQ}$ [30 minutes]	Annually	Standard[Note 1]
$L(A)_{10}$ [30 minutes]	Annually	Standard[Note 1]
$L(A)_{90}$ [30 minutes]	Annually	Standard[Note 1]
Frequency Analysis(1/3 Octave band analysis)	Annually	Standard[Note 1]

Note 1: "International Standards Organisation. ISO 1996. Acoustics - description and Measurement of Environmental noise. Parts 1, 2 and 3."

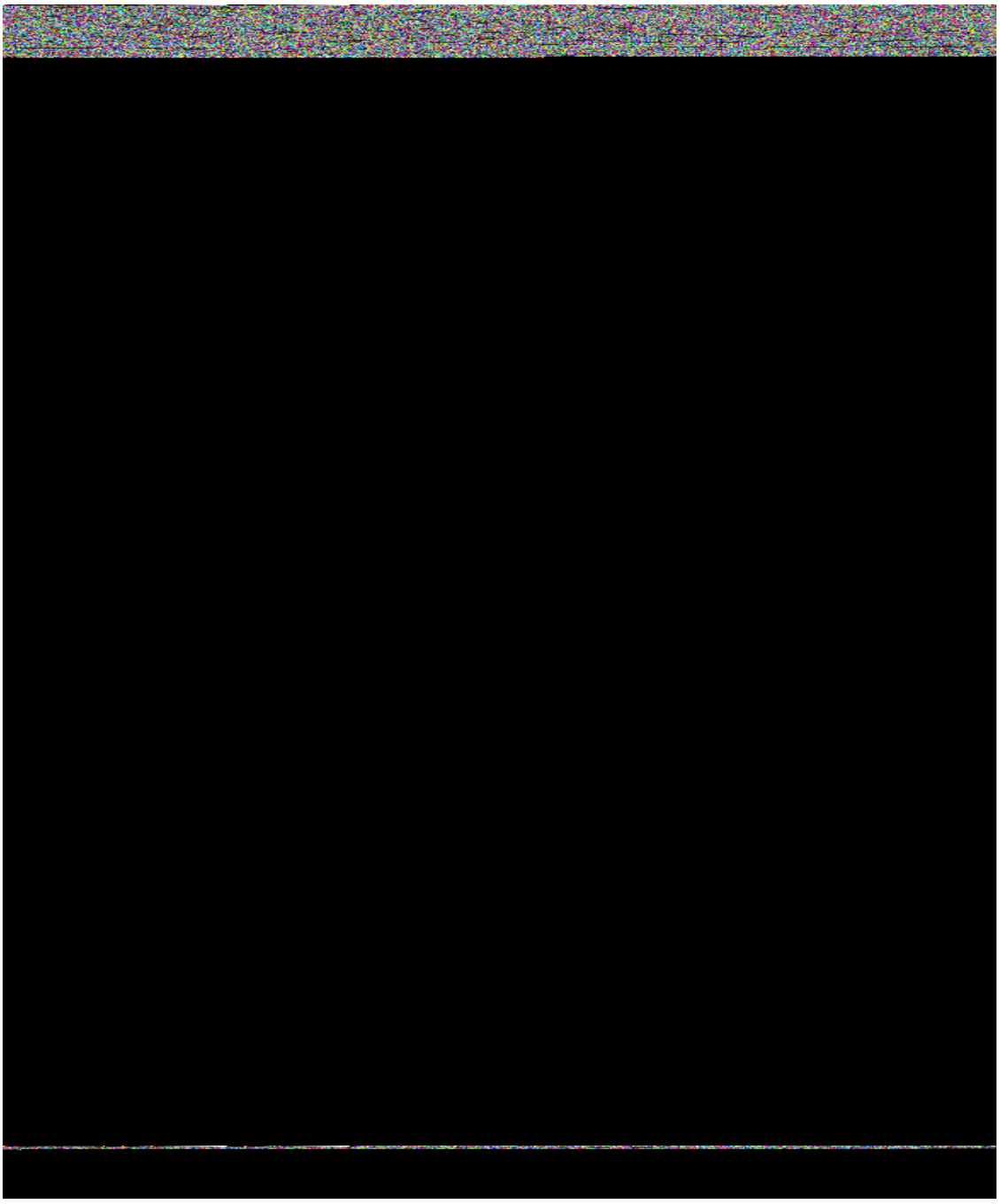
The typical noise emission limits for waste facilities in Ireland are tabulated below.

Table 2.2: Noise Emission Limits

Day dB(A) L_{Aeq} [30 minutes]	Night dB(A) L_{Aeq} [15 minutes]
55	45

Furthermore the EPA requires that there be no audible tones or impulsive components at any noise-sensitive location.

2.4 Noise Monitoring Locations



3.0 RESULTS

Table 3.1 Survey results

The measurement results for the day and night-time noise surveys are reported in Table 3.1 below. The measurement results for each 1/3-octave band frequency analysis survey are presented in Appendix 1.

Table 3.1: Results of noise survey carried out on 26th July 2010.

Monitoring Location	Time and Date	L_{Aeq} dB(A)	L_{A90} dB(A)	L_{A10} dB(A)	Comments
N1	26/07/10 11:23-11:53	54.3	42.2	55.6	Noise from landfill flare, landfill traffic, low level noise form biofilter
N2	26/07/10 11:59-12:29	50.2	47.1	52.2	Site noise, aDistant traffic.
N3	26/07/10 12:32-13:02	52.6	48.7	54.1	Local traffic, industrial noise from adjacent facility, no site noise.
NSR1	26/07/10 13:11-13:41	62.5	50.9	64.4	Local traffic, no site noise.

4.0 Observations

Monitoring on the 26th July was carried out on ideal conditions with no rain and low winds. Noise characteristics of the area are influenced by local traffic and noise from light industry.

4.1.1 Location N1

Noise measurements at this location were recorded at the northern corner of the site. Noise from the biofilter, together with traffic noise, comprising that from the landfill and the local roads contributed to the ambient levels. The average noise level was recorded at 54.3dB(A).

4.1.2 Location N2

Noise measurements at N2 were recorded at the south-eastern corner of the site. Local industrial noise influenced the average levels, while the contribution from the facility was not significant. The average noise level was recorded at 50.2dB(A).

4.1.3 Location N3

The daytime noise measurements at N3 recorded an average noise level of 52.6dB(A), influenced mainly by passing traffic, with the background level at 48.7dB(A). There was minimal contribution from the facility while industrial noise from buildings to the north also contributed to the ambient levels.

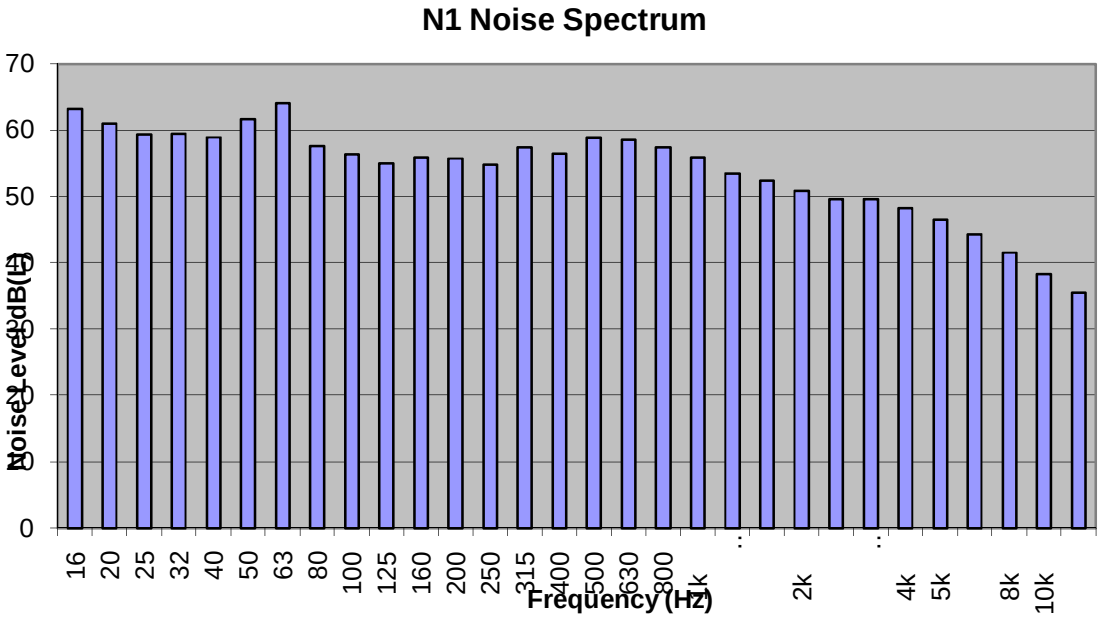
4.1.4 Location NSR1

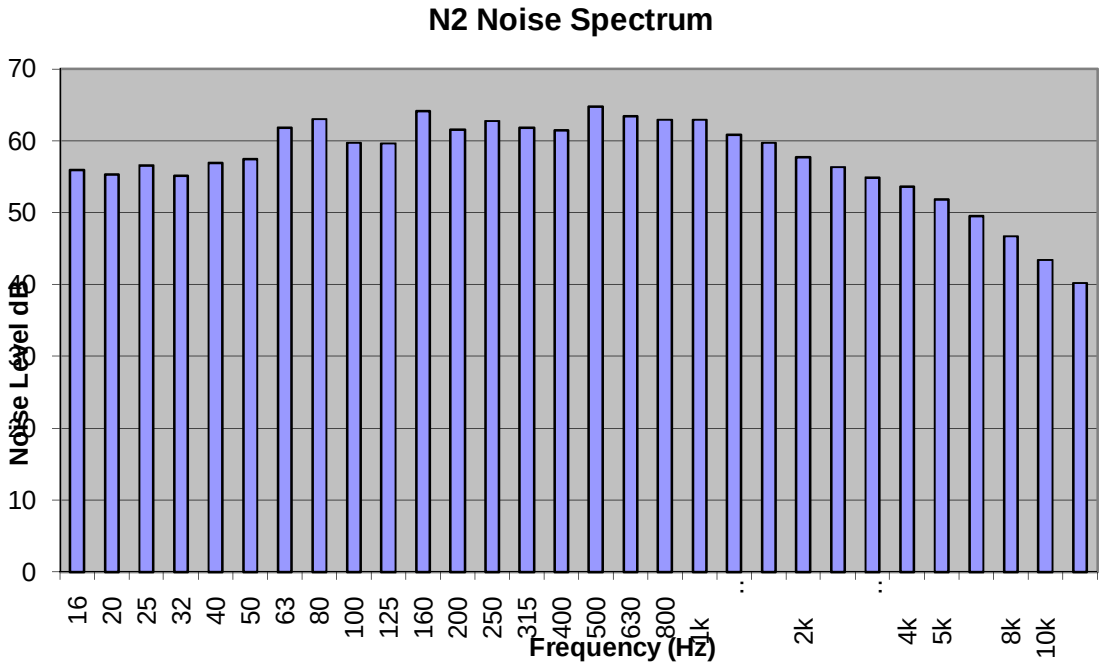
Average noise levels were influenced by intermittent traffic volumes passing close to the monitoring location close to the dwelling. There was no contribution from the operation of the Eras Eco facility. The average noise level was recorded at 62.5dB(A).

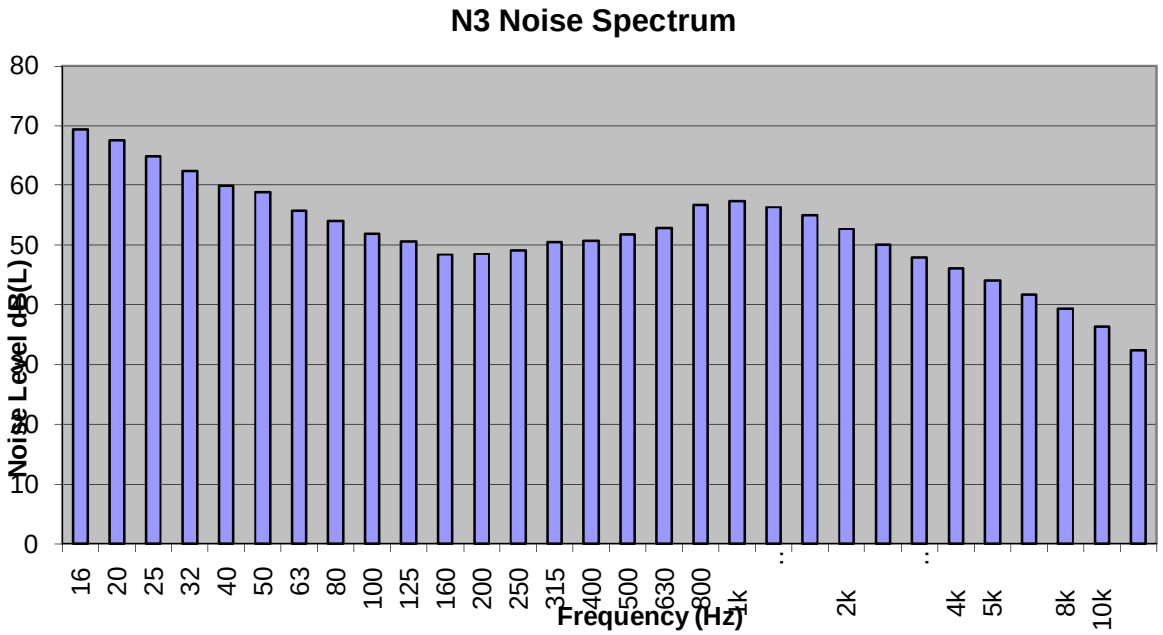
5.0 CONCLUSIONS

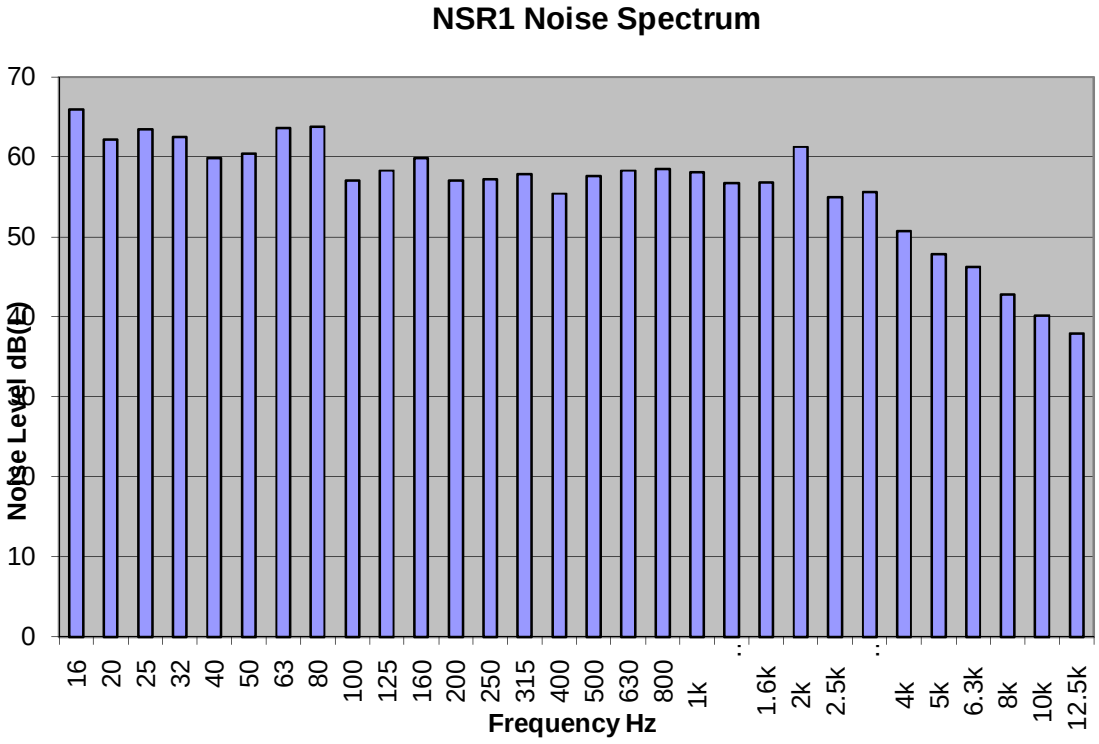
It is considered that the noise emanating from the facility is not a source of nuisance at local sensitive dwelling NSR1 and local traffic is the main noise source in the region. This is supported by the low L90 levels recorded. Noise levels on-site are within the EPA licence limit of 55dB(A).

APPENDIX 1: NOISE FREQUNCY SPECTRUM DATA


N1 Noise Spectrum
70
60
50
40
30
20
10
0
Noise Level dB(A)
16
20
25
32
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1k
2k
4k
5k
8k
10k
Frequency (Hz)


N2 Noise Spectrum
70
60
50
40
30
20
10
0
Noise Level dB
16
20
25
32
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1k
2k
4k
5k
8k
10k
Frequency (Hz)


N3 Noise Spectrum
Noise Level dB(L)
80
70
60
50
40
30
20
10
0
16
20
25
32
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1k
2k
4k
5k
8k
10k
Frequency (Hz)


NSR1 Noise Spectrum
Noise Level dB(L)
70
60
50
40
30
20
10
0
16
20
25
32
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1k
1.6k
2k
2.5k
4k
5k
6.3k
8k
10k
12.5k
Frequency Hz

B AND C SERVICES

Unit 5c, Marlhill Court, Foxhole Industrial Estate, Youghal, Co. Cork.
Tel / Fax : (024) 85960

10/03/2010

Method Statement for Bund Testing

1. Carry out visual inspection on bunds.

2. Note: (i) State of existing bunds
   (ii) Content of bunds
   (iii) Any obvious leaks/cracks

3. If the elements of No. 2 are not satisfactory then remedial works should be carried out prior to testing.

4. If the elements of No. 2 are satisfactory or the remedial works have been carried out, then the sump of the bund should be tested using a water test to BS8007.

5. If the sump does not pass this test then the remedial works should be carried out before re-testing.

6. If the sump passes the test (with or without remedial works to BS8007) then the bund as a whole should be tested.

7. If it fails the test then remedial works should be carried out and the bund should be re-tested

8. If and when the bund passes the requirements of BS8007 then a certificate of integrity will be issued.

Company Registered Number: 370885
VAT No. 9659268A

B AND C SERVICES

Unit 5c, Marlhill Court, Foxhole Industrial Estate, Youghal, Co. Cork.
Tel / Fax : (024) 85960

Bund Integrity Test Certificate

Bund Description: Single IBC Spill Pallet

Bund Dimensions: 1865L x 1600W x 770H mm

Bund Reference No: 001

Hydrostatic Test Results

Bund Materials of Construction: MDPE

Total Bund Volume: 1130L

Volume of Largest Vessel: 1000L

Date of Test: 03/03/2010 **Pass:** YES

Date of Re-Test: 04/03/2013

Level of Rainfall/Evaporation: 10mm Evaporation

Readings:

Readings	Time	Level (mm)
1	15:30PM	500
2	11:30AM	490

Comments:

Duration of test = 7 days

Test Engineer: Declan Coughlan (B_{Eng} Civil Eng) **Signed:**

Client: ERAS ECO Ltd, Foxhole, Youghal, Co. Cork

Client Contact: John Dee **Signed:**

Date: 10/03/2010

Company Registered Number: 370885
VAT No. 9659268A

B AND C SERVICES

Unit 5c, Marlhill Court, Foxhole Industrial Estate, Youghal, Co. Cork.
Tel / Fax : (024) 85960

Bund Integrity Test Certificate

Bund Description: Single IBC Spill Pallet

Bund Dimensions: 1865L x 1600W x 770H mm

Bund Reference No: 002

Hydrostatic Test Results

Bund Materials of Construction: MDPE

Total Bund Volume: 1130L

Volume of Largest Vessel: 1000L

Date of Test: 03/03/2010 **Pass:** YES

Date of Re-Test: 04/03/2013

Level of Rainfall/Evaporation: 10mm Evaporation

Readings:

Readings	Time	Level (mm)
1	15:33PM	500
2	11:32AM	490

Comments:

Duration of test = 7 days

Test Engineer: Declan Coughlan (B_{Eng} Civil Eng) **Signed:** Declan Coughlan

Client: ERAS ECO Ltd, Foxhole, Youghal, Co. Cork

Client Contact: John Dee **Signed:** John Dee

Date: 10/03/2010

Company Registered Number: 370885
VAT No. 9659268A

B AND C SERVICES

Unit 5c, Marlhill Court, Foxhole Industrial Estate, Youghal, Co. Cork.
Tel / Fax : (024) 85960

Bund Integrity Test Certificate

Bund Description: Single IBC Spill Pallet

Bund Dimensions: 1865L x 1600W x 770H mm

Bund Reference No: 003

Hydrostatic Test Results

Bund Materials of Construction: MDPE

Total Bund Volume: 1130L

Volume of Largest Vessel: 1000L

Date of Test: 03/03/2010 **Pass:** YES

Date of Re-Test: 04/03/2013

Level of Rainfall/Evaporation: 10mm Evaporation

Readings:

Readings	Time	Level (mm)
1	15:36PM	500
2	11:34AM	490

Comments:

Duration of test = 7 days

Test Engineer: Declan Coughlan (B_{Eng} Civil Eng) **Signed:**

Client: ERAS ECO Ltd, Foxhole, Youghal, Co. Cork

Client Contact: John Dee **Signed:**

Date: 10/03/2010

Company Registered Number: 370885
VAT No. 9659268A

B AND C SERVICES

Unit 5c, Marlhill Court, Foxhole Industrial Estate, Youghal, Co. Cork.
Tel / Fax : (024) 85960

Bund Integrity Test Certificate

Bund Description: Single IBC Spill Pallet

Bund Dimensions: 1865L x 1600W x 770H mm

Bund Reference No: 004

Hydrostatic Test Results

Bund Materials of Construction: MDPE

Total Bund Volume: 1130L

Volume of Largest Vessel: 1000L

Date of Test: 03/03/2010 **Pass:** YES

Date of Re-Test: 04/03/2013

Level of Rainfall/Evaporation: 10mm Evaporation

Readings:

Readings	Time	Level (mm)
1	15:39PM	500
2	11:36AM	490

Comments:

Duration of test = 7 days

Test Engineer: Declan Coughlan (B_{Eng} Civil Eng) **Signed:** _____

Client: ERAS ECO Ltd, Foxhole, Youghal, Co. Cork

Client Contact: John Dee **Signed:** _____

Date: 10/03/2010

Company Registered Number: 370885
VAT No. 9659268A

B AND C SERVICES

Unit 5c, Marlhill Court, Foxhole Industrial Estate, Youghal, Co. Cork.
Tel / Fax : (024) 85960

Bund Integrity Test Certificate

Bund Description: Single IBC Spill Pallet

Bund Dimensions: 1865L x 1600W x 770H mm

Bund Reference No: 005

Hydrostatic Test Results

Bund Materials of Construction: MDPE

Total Bund Volume: 1130L

Volume of Largest Vessel: 1000L

Date of Test: 03/03/2010 **Pass:** YES

Date of Re-Test: 04/03/2013

Level of Rainfall/Evaporation: 10mm Evaporation

Readings:

Readings	Time	Level (mm)
1	15:41PM	500
2	11:38AM	490

Comments:

Duration of test = 7 days

Test Engineer: Declan Coughlan (B_{Eng} Civil Eng) **Signed:**

Client: ERAS ECO Ltd, Foxhole, Youghal, Co. Cork

Client Contact: John Dee **Signed:**

Date: 10/03/2010

Company Registered Number: 370885
VAT No. 9659268A

B AND C SERVICES

Unit 5c, Marlhill Court, Foxhole Industrial Estate, Youghal, Co. Cork.
Tel / Fax : (024) 85960

Bund Integrity Test Certificate

Bund Description: Single IBC Spill Pallet

Bund Dimensions: 1865L x 1600W x 770H mm

Bund Reference No: 006

Hydrostatic Test Results

Bund Materials of Construction: MDPE

Total Bund Volume: 1130L

Volume of Largest Vessel: 1000L

Date of Test: 03/03/2010 **Pass: YES**

Date of Re-Test: 04/03/2013

Level of Rainfall/Evaporation: 10mm Evaporation

Readings:

Readings	Time	Level (mm)
1	15:45PM	500
2	11:41AM	490

Comments:

Duration of test = 7 days

Test Engineer: Declan Coughlan (B_{Eng} Civil Eng) **Signed:**

Client: ERAS ECO Ltd, Foxhole, Youghal, Co. Cork

Client Contact: John Dee **Signed:**

Date: 10/03/2010

Company Registered Number: 370885
VAT No. 9659268A

B AND C SERVICES

Unit 5c, Marlhill Court, Foxhole Industrial Estate, Youghal, Co. Cork.
Tel / Fax : (024) 85960

Bund Integrity Test Certificate

Bund Description:	**Quarantine Area Concrete Bund**
Bund Dimensions:	**N/A**
Bund Reference No:	**007**

Test Results

Bund Materials of Construction:	**Reinforced Mass Concrete**	
Total Bund Volume:	**N/A**	
Volume of Largest Vessel:	**N/A**	
Date of Test:	**03/03/2010**	**Pass: YES**

Test Procedure

Concrete bund was visually inspected for suitability of use at ERAS ECO ltd. No apparent damage, defects or cause for concern regarding the bunds integrity were noticed upon test inspection.

Test Engineer:	**Declan Coughlan**	**Signed:**
Client:	**ERAS ECO Ltd, Foxhole, Youghal, Co. Cork**	
Client Contact:	**John Dee**	**Signed:**
Date:	**10/03/2010**	

Company Registered Number: 370885
VAT No. 9659268A

Ormonde Organics International s.r.o.
Na Rovince 879.
720 00 Ostrava-Hrabová
Tel: 552 302 306
Fax: 552 302 310
E-mail: mail@ormondeorganicsint.eu
IČO: 284 32 444
DIČ: CZ 284 32 444

Paul Wilson
General Manager
Eras Eco Ltd.
Foxhole
Youghal
Co. Cork

To whom it concerned,

We made fully service of controls, cleaning and monitoring of the following for Eras Eco Ltd.:

- Foul Water System
- Process System
- Storm Water System

All systems are fully working, without any problems. Lines were preventive flushed.

Note:
All cleaning pipe service was done on the base of ČSN EN 752-7 (75 6110) standard and all monitoring work on the base on ČSN EN 13508 standards.

This letter is certification that Drainage System is working correct.

Ormonde Organics International s.r.o.
AXIS Office Park, Na Rovince 879,
720 00 Ostrava - Hrabová
IČ: 284 32 444 DIČ: CZ28432444
Email: mail@ormondeorganicsint.eu
www.ormondeorganicsint.eu

Regards

Michael O´Reilly
Managing Director
Ormonde Organics International, s.r.o.

In Ostrava, 10.9.2010

Closure, Restoration and Aftercare Management Plan (CRAMP)

for

ERAS ECO Ltd

Foxhole
Youghal
Co. Cork

Waste Licence No. W0211-01

by

Q.E.D. Engineering Ltd
11 Market Street
Monaghan
tel: 047-72060
fax: 047-72061

October 2010

Table of Contents

1. Introduction

ERAS ECO Ltd has constructed a new Waste Recovery/Transfer and Sludge Drying Facility at Foxhole, Youghal, Co. Cork. The company obtained their Waste Licence No. W0211-01 on the 9th November 2006. Condition 10.2 of the licence states that;

"The licensee shall prepare, to the satisfaction of the agency, a fully detailed and costed plan for the decommissioning or closure of the site or part thereof. This plan shall be submitted to the Agency for agreement in advance of the commencement of the licensed activities."

An initial screening and operational risk assessment of ERAS ECO Ltd site deems that it is classified as a Risk Category 3, based on the EPA guidance on Environmental Liability Risk Assessment, Residuals Management Plans and Financial Provision. Based on this risk category, the site requires a

- Closure plan and a
- Restoration, Aftercare Management Plan.

Sections 2 - 8 of this report details the Closure Plan for the site, which includes a site evaluation, closure considerations, criteria for successful closure, costing, update and review, implementation and validation.

Sections 9 – 11 of the report details the Restoration and Aftercare Management Plan for the site, which details the restoration and remediation proposals, aftercare management and site restoration/aftercare management costs.

The original report was been carried out by Patricia Murtagh, BSc, MSc, AIEMA of Q.E.D. Engineering Ltd and is based on available information supplied by SWS Environmental Services, Cork, who compiled the Environmental Impact Statement and the Waste Licence Application for the development. The report was also carried out in line with the EPA *Guidance on Environmental Liability Risk Assessment, Residuals Management Plans and Financial Provision,* 2006. In October of 2010, ERAS ECO Ltd completed a review of this report.

2. Site Evaluation

Site Location and General Context

ERAS ECO Ltd new Waste Recovery/Transfer and Sludge Drying Facility has been constructed on a 3.54 acre Brownfield site at Foxhole, Youghal, Co. Cork. The site is located on land reclaimed from the Blackwater Estuary, in a low lying area referred to as Youghal Mudlands. The site is located adjacent to Youghal Landfill and Civic Amenity Centre

Site Environmental Sensitivity Evaluation

The site is not within an environmentally sensitive area. However, it is located adjacent to the Blackwater River / Blackwater Estuary, which has a number of designations;

- Blackwater River is a candidate Special Area of Conservations
- Blackwater River and Estuary is a proposed Natural Heritage Area
- Blackwater Estuary is a Special Protected Area
- Blackwater Estuary is a Ramsar Site

Therefore, although the site is not within an environmentally sensitive area, all discharges from the site (surface water, foul sewer and process water) discharge to the Youghal Sanitary Authority Public sewer lines, which currently discharge directly to the Blackwater Estuary, pending construction of a wastewater treatment plant in the area. All foul sewer effluent and process water discharges from the site undergo treatment prior to discharge, are strictly regulated by conditions set in the Waste Licence and there are measures in place to regulate and retain discharges that are not satisfactory.

Site history and operational history, including full details of site processes

The land on which the site is located is owned by Youghal UDC and is leased to SWS Natural Resources (35 year lease). The previous leaseholders (Youghal Waste Disposal & Recycling, t/a Yellow Bin), used the site for skip storage.

Site investigations and information available regarding the environmental performance of the site

During the Waste Licence Application stage / EIS geotechnical investigations of the site found that a considerable area of the site has been used historically for stockpiling/landfilling. There is also evidence of more recent disposal of mounds of building waste materials. Trial pits dug extensively across the site showed that the waste types are typically degraded domestic and builders' type waste with plastic and ferrous objects, bricks and metal. The waste is generally confined to localised pockets, to a depth of 0.5 to 1.6m. It was estimated that between 7,000 and 11,000m^3 of waste material is present on the site. As per condition 6.18.3 of the licence, the site has extracted this waste material and it is currently stockpiled on the site. This waste will be removed to a permitted landfill and full records of disposal will be kept.

Geotechnical investigations at the site also discovered a hydrocarbon-type smell at one location, where a diesel storage tank was previously located. As per condition 6.18.2 of the licence, the site has submitted a proposal for the remediation of soil and groundwater contamination (via Minerex Environmental Ltd) for EPA approval. A low concentration of Diesel Range Organics (DRO) was found in the area (41mg/kg), no hydrocarbons were observed and no volatising hydrocarbons (measured by PID) above background were recorded. Because of this, the site proposes to leave the suspect soil in situ and cover with low permeability asphalt. In addition, they will install a monitoring well at this location and sample the water for hydrocarbons and remediate if necessary. All proposals and work regarding soil/groundwater contamination will be agreed with the EPA during the course of the Waste Licence compliance.

The ERAS ECO Ltd site has a negligible impact on soil/groundwater will be because;

- No hazardous or putrescible wastes will be accepted at the site and if waste of this type arrives at the site it will be temporarily stored in a bunded quarantine area.
- The entire operational area of the site will be hard-surfaced
- All fuels will be stored in bunded areas to prevent loss to soil and/or groundwater

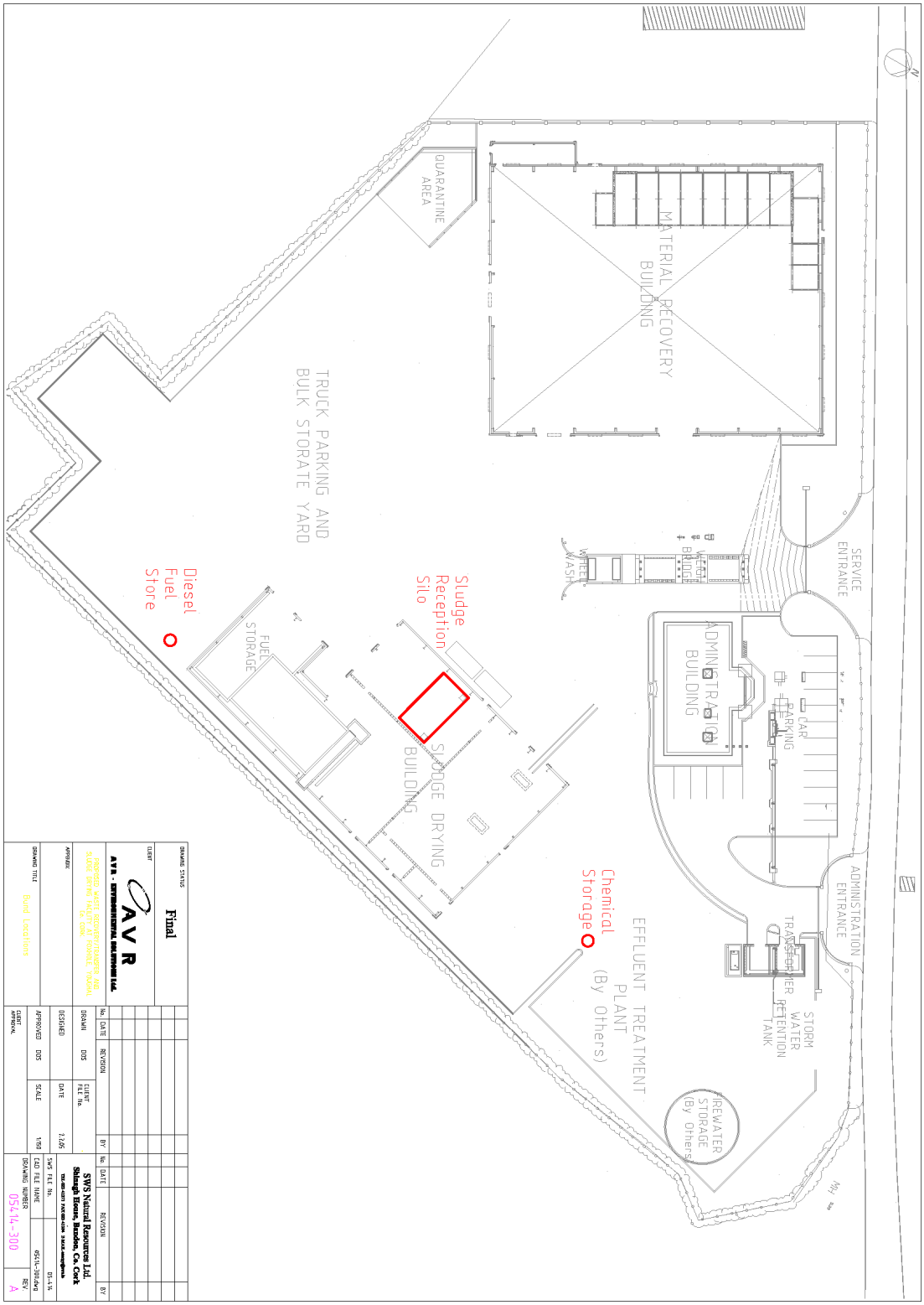
Details of the layout and contents/construction of all site buildings

The site once constructed will comprise the following buildings and structures (see Figure 1).

1. Materials recovery and transfer building
2. Sludge reception and drying building
3. Boiler and wood chip storage building
4. Administration building and car-park
5. Transformer building
6. Wastewater Treatment Plant (WWTP) including balancing tank
7. Firewater storage tank
8. Stormwater retention tank
9. Wheelwash and Weighbridge
10. Waste Quarantine Area
11. Oil Storage

The administration building will be constructed of block. The materials recovery and sludge drying building will be constructed or steel supports with insulated metal cladding.

Figure 1. ERAS ECO Ltd Site Plan



Site assets register & details of the type and value of process equipment and tanks

A site assets register of equipment / plant to be installed at the site is provided in Table 1.

Table 1. ERAS ECO Ltd Site Assets Register

PLANT & EQUIPMENT	€
Dryer	
Dryer	1,650,000
Dryer Auxiliaries	50,000
Spare parts - Dryer	58,200
Panel and cable to SCADA	74,900
Boiler (3.4MW Woodchip with LDO Back-up)	950,500
Odour Abatement e.g. Biofilter	60,000
Water Treatment	
WWTP	250,000
Spare parts - Others incl. WWTP	50,000
C&I Waste	
Sorting Equipment, including compactor	300,000
Loader	50,000
Fork Truck	20,000
Grab	60,000
General Site	
Weigh bridge (part of total project & wheel wash)	40,000
Civils (part of total project)	2,200,000
Office Building	500,000
Foundations for Dryer	
Building - Dryer	500,000
Building - C&I	825,000
Fire water tank + fittings	30,000
Fire water	
Transformer and switchgear	100,000
Oil storage	30,000
Total	7,798,600

Stock inventory, raw materials information and details of all hazardous materials

The volume of raw materials, including all hazardous materials expected to be typically held at the site during operation is provided in Table 2.

Table 2. ERAS ECO Ltd Stock Inventory

Material/Substance	Volume stored
Sludge (for drying)	500 tonnes
Dried Sludge	200 tonnes
Materials for recovery	1000 tonnes (approx)
Landfill leachate (for WWTP)	25 tonnes
Washings (for WWTP)	500 tonnes
Diesel (for boiler)	4000 litres
Woodchips (for boiler)	850 tonnes
Hydraulic fluid	300 litres
Engine oil	100 litres
Liquid Alum (for WWTP)	1 tonne
Flopam FO 4107 (for WWTP)	0.8 tonnes
Hydrochloric Acid (for WWTP)	1 tonne
Soda Ash (for WWTP)	1 tonne
Sodium Hydroxide Solution (for WWTP)	1 tonne
D-10 (Detergent/Disinfectant)	60 litres

Details of storage arrangements and that bunds and underground services have been tested as required.

The main storage areas on the site once constructed will be;

1. Sludge stored in sludge reception silo
2. Diesel stored in bund with 110% containment
3. Chemicals at WWTP stored in Chemstore bunded area
4. Wastewater treatment plant
5. Stormwater retention tank

Underground services to the site include stormwater drains, process water drains, foul water drains and mains water pipelines.

All structures are to be tested for integrity and water tightness prior to use, as per condition 6.14 of the licence and ever three years thereafter. Full reports of all tests carried out will be provided to the EPA as part of the Waste Licence requirements.

3. Closure Considerations

Clean closure is expected at this facility, whereby upon cessation of operations and subsequent decommissioning at the facility there are no remaining environmental liabilities.

This section of the report details the plant, buildings, equipment and other materials which require consideration as part of the closure process.

Closure of Materials Recovery & Transfer Building

1. Once it is determined that the Materials Recovery and Transfer Building will cease operations, no further waste materials will be accepted at the building.
2. All waste materials within the building will be processed in the normal way and transferred off site until there are no further raw materials / wastes requiring disposal.
3. The next stage of closure would be to clean all plant and equipment within the materials recovery building, including the shredder, compactor, bailer, grab machine, loading shovels, forklifts, conveyors etc. Cleaning will be done by power hosing predominantly and all wastewater will be directed and treated in the on-site wastewater treatment system.
4. The next stage would be to sell off all plant and equipment within the materials recovery building. Items that could not be sold would be dismantled and sold as scrap.
5. It is envisaged that the Materials Recovery building will be left intact on completion of decommissioning for re-sale.
6. If the building is required to be removed, it will be dismantled by specialist contractors and all parts that can be reused or recycled will be, otherwise wastes can be disposed of to licensed facilities.

Closure of Sludge Drying & Transfer Building

1. Deliveries of wet sludge will cease. Arrangements will be made to buy out of long term contracts.
2. All sludge on site would be dried to empty out the holding and storage bins.
3. The dried sludge would be sold as usual and the dried product hopper emptied.
4. All equipment will be washed down by site personnel and maintenance contractors and the washings sent to the waste water treatment plant.
5. All floors and other surfaces will be swept and washed by site personnel. The washings will be sent to the waste water treatment plant.
6. The site will then sell off all plant and equipment within the sludge drying facility. Items that could not be sold would be dismantled and sold as scrap.
7. It is envisaged that the Sludge Drying Facility will be left intact on completion of decommissioning for re-sale.

8. If the building is required to be removed, it will be dismantled by specialist contractors and all parts that can be reused or recycled will be, otherwise wastes can be disposed of to licensed facilities.

Closure of Boiler

1. Excess fuel remaining on closure will be removed and sold as is or sent for disposal to appropriate facilities.
2. The boiler will be cleaned by an outside contractor. Residual ash and soot will be removed and disposed of in accordance with site procedures.
3. The site will then sell off the boiler. If it cannot be sold it will be dismantled and sold as scrap.
4. It is envisaged that the boiler building will be left intact on completion of decommissioning for re-sale.
5. If the building is required to be removed, it will be dismantled by specialist contractors and all parts that can be reused or recycled will be, otherwise wastes can be disposed of to licensed facilities.

Closure of Waste Water Treatment Plant (WWTP)

1. The WWTP will be shut down and cleaned by an outside contractor. The liquor will be tested and, if non-hazardous, discharged to the sewer after filtration. The sludge will be disposed of as non-hazardous waste.
2. The wastewater treatment plant tanks will be left intact on completion of decommissioning for re-sale.

Waste Disposal & Recovery

1. All hazardous materials will be removed and either returned to the supplier, (unused chemicals, oils and fuels) or sent for disposal by an approved contractor. The contractor will pack and ship the waste to suitable, approved disposal facilities.
2. All non-hazardous waste will be sent for appropriate disposal.

Diesel Tank

1. Once the site decides to close, all required diesel will be utilised by the boiler until the tank is empty.
2. The boiler will be drained of diesel by a specialist contractor and any hazardous waste disposed of appropriately. The bund contents will be disposed of in the same manner.
3. The tank will be either sold as is or left in place and sold on with the site.

Chemicals

1. All chemicals used throughout the site; wastewater treatment plant chemicals, detergents, lubricants etc will be collected up and disposed of as hazardous waste.

Oil/Sludge Interceptors

1. Two oil/sludge interceptors will be cleaned out (oil and all hazardous waste will be disposed of appropriately).
2. Once clean, the interceptors will be left intact (as they are located underground)
3. If required, they will be removed and sold as a complete unit if they are in good condition or dismantled and disposed of to licensed contractors.

Quarantine Area

1. All waste in the quarantine area will be disposed of in the normal way until no waste remains.
2. The quarantine area will be cleaned and wastewater will discharge to the wastewater treatment plant.

Administration Building

1. The contents of the administration building would be sold.
2. The building would be cleaned out.
3. All general waste will be segregated and recycled.
4. All non-recyclable waste will be sent to landfill
5. All hazardous waste will be sent for hazardous waste disposal.
6. It is envisaged that the administration building will be left intact on completion of decommissioning for re-sale.
7. If the building is required to be removed, it will be dismantled by specialist contractors and all parts that can be reused or recycled will be, otherwise wastes can be disposed of to licensed facilities.

Transformer Building

1. An electrical contractor would be engaged to disconnect the transformer, if required and to remove/dispose of it if necessary.
2. It is envisaged that the transformer building will be left intact on completion of decommissioning for re-sale.
3. If the building is required to be removed, it will be dismantled by specialist contractors and all parts that can be reused or recycled will be, otherwise wastes can be disposed of to licensed facilities.

Firewater Storage Tank

1. The firewater storage tank would be left intact and sold on as is.
2. However it the tank is to be removed, it will be dismantled by specialist contractors and all parts that can be reused or recycled will be, otherwise wastes can be disposed of to licensed facilities.

Stormwater Retention Tanks

1. The stormwater retention tank would be cleaned out and washwater sent to the wastewater treatment plant.
2. If required, the tank will be removed and sold as a complete unit if it is in good condition or dismantled and disposed of to licensed contractors.

Soil or Spoil Removal

1. Historical stockpiling/landfilling at the site, identified at planning stages is being removed during the construction of the site, as per Condition 6.18.3 of the licence. Therefore the site was cleaned up of any residual waste/contamination, prior to use by ERAS ECO Ltd..
2. Soil contaminated with a low concentration of diesel range organics in front of the administration building is to be left in place and covered with asphalt as no further excavation or development is planned for this area.
3. Any groundwater contamination identified on the site will be remediated during the lifetime of the waste licence, as per condition 6.18.2.
4. The entire site area will be concreted, so it is not envisaged that soil or spoil removal will be required on decommissioning of the site.

4. Criteria for Successful Closure

Successful clean closure will be expected to be achieved when it can be demonstrated that there are no remaining environmental liabilities at the site. In practice this will require demonstration that the following criteria have been met:

- All plant safely decontaminated using standard procedures and authorised contractors.
- All wastes handled, packaged and temporarily stored and disposed or recovered in a manner which complies with regulatory requirements.
- All relevant records relating to waste and materials movement and transfer or disposal were managed and retained throughout the closure process.
- There was no soil or groundwater contamination at the site. This was verified using monitoring data and a soil/groundwater assessment at the time of closure (if required)
- The Environmental Management System remained in place and was actively implemented during the closure period.

5. Closure Plan Costings

The expected costs associated with site closure are outlined in this section;

Table 3. ERAS ECO Ltd Site Closure Costs

Details	**Expected Cost €**
Cleaning Equipment	20,000
Decommissioning Plant	50,000
Hazardous Waste Disposal	50,000
Non-Hazardous Waste Disposal	50,000
Aftercare Monitoring/Reporting	30,000
Subtotal	200,000
Contingency (25%)	50,000
Total (excl VAT)	**250,000**

6. Closure Plan Update & Review

The Closure Plan will be reviewed and updated annually as part of the Annual Environmental Report submission to the EPA.

The updated and reviewed Closure Plan will take account of any site or process changes, technology changes and costing changes.

7. Closure Plan Implementation

The site has only recently been developed (2007) and the company have a 35 year lease on the site. Closure of the site is not envisaged in the near future. However, in this event, the EPA will be given 3 months notice of any partial or any full closure. The form of notice will be in writing and in accordance with prevailing guidance and it is also expected that there will be discussions with the EPA as part of the process.

8. Closure Plan Validation

An Environmental Exit Audit of the site will be carried out following the announcement of closure and prior to actual decommissioning and closure operations taking place. The audit will devise an accurate inventory of all

plant, equipment and wastes on the site. This inventor will be used as a benchmark against which successful decommissioning will be assessed.

All Waste Licence monitoring with respect to air emissions, surface water, wastewater, groundwater, waste management and noise will remain in effect over the course of the decommissioning phase.

9. Restoration and Remediation Proposal

ERAS ECO Ltd operates under their waste licence from the outset, therefore the environmental performance of the site will be well known, documented and managed from commencement of operations at this site.

However as the ERAS ECO Ltd site is classified as a Risk Category 3, (based on site activities), on closure there is a requirement for some level of soil and groundwater investigation and risk assessment. If contamination is detected, there will be site remediation requirements.

The restoration/remediation proposal will entail the following steps;

1. Audit of site to identify potential sources of contamination and likelihood of occurrence
2. Soil investigations. (Groundwater investigations will be conducted at the site at 3 wells, biannually as part of the waste licence requirements, so there will be adequate data to assess groundwater quality).
3. Qualitative contaminated land risk assessment and conceptual site model
4. Quantitative contaminated land risk assessment.
5. Proposals for the restoration of the site through remediation (if deemed necessary)
6. Agreement of the proposal with the EPA.

10. Aftercare Management Plan

When the site ceases operations and all required decommissioning is carried out, along with restoration and remediation (if required), the majority of monitoring requirements from the waste licence will become un-necessary i.e. Air monitoring (boiler and biofilter), dust deposition, stormwater emissions, emissions to sewer, noise and odour.

If required for a period, groundwater can be monitored for the parameters listed in the licence to ensure that its quality does not deteriorate due to site decommissioning.

11. Site Restoration and Aftercare Management Costs

The proposed site restoration and aftercare management costs for ERAS ECO Ltd are provided in Table 4. Limited site investigation works are proposed on decommissioning. It is not envisaged that a detailed hydrogeological site investigation will be required at this site following closure as detailed studies have been conducted as part of the EIS and Waste Licence Application. In addition, during the operation of the site, as part of the waste licence requirements, site investigation/monitoring will be on-going. Therefore there will be a large volume of information available to the site on decommissioning to ascertain risks.

Table 4. ERAS ECO Ltd Site Restoration and Aftercare Management Costs

Item	**Cost € (1-5 years)**
Site Investigation works	10,000
Environmental risk assessment and devising remediation strategy	5,000
Implementation of remediation programme	5,000
Maintenance and monitoring costs	10,000
	30,000
Contingency 25%	7500
TOTAL	37,500

Environmental Liabilities Risk Assessment

(ELRA)

for

ERAS ECO Ltd.

Foxhole
Youghal
Co. Cork

Waste Licence No. W0211-01

by

Q.E.D. Engineering Ltd
11 Market Street
Monaghan
tel: 047-72060
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November 2010

Table of Contents

1. Introduction

ERAS ECO Ltd operates a Waste Recovery/Transfer and Sludge Drying Facility at Foxhole, Youghal, Co. Cork. The company obtained their Waste Licence No. W0211-01 on the 9th November 2006. Condition 12.3.2 of the licence states that;

"The licensee shall arrange for the completion, by an independent and appropriately qualified consultant, of a comprehensive and fully costed Environmental Liabilities Risk Assessment (ELRA) which addresses the liabilities from past and present activities. The assessment shall include those liabilities and costs identified in Condition 10 for the execution of the RMP/CRAMP".

Environmental liability risk assessment (ELRA) considers the risk of unplanned events occurring during the operation of a facility that could result in unknown liabilities materialising. For ERAS ECO Ltd, which is a Risk Category 3 facility (based on the EPA guidance on Environmental Liability Risk Assessment, Residuals Management Plans and Financial Provision), a detailed site specific ELRA has been conducted. The objectives of this ELRA is

- To identify and quantify environmental liabilities at the facility focussing on: unplanned, but possible and plausible events occurring during the operational phase.
- To calculate the value of financial provisions required to cover unknown liabilities
- To identify suitable financial instruments to cover each of the financial provisions
- To provide a mechanism to encourage continuous environmental improvement through the management of potential environmental risks.

This ELRA covers environmental risks leading to a potential or anticipated liability. Environmental risks will be deemed to cover all risks to: surface water, groundwater, atmosphere, land and human health.

The report has been carried out by Patricia Murtagh, BSc, MSc, AIEMA of Q.E.D. Engineering Ltd and is based on available information supplied by SWS Environmental Services, Cork, who compiled the Environmental Impact Statement and the Waste Licence Application for the development. The report was also carried out in line with the EPA *Guidance on Environmental Liability Risk Assessment, Residuals Management Plans and Financial Provision,* 2006.

Section 2 of the report looks at Risk Identification at ERAS ECO Ltd and a Risk Assessment is undertaken in Section 3. The identification of Risk Mitigation measures is examined in Section 4. The final sections of the report examine potential environmental liabilities and financial provisions.

2. Risk Classification and Identification

The original identification of Environmental risks were undertaken between Patricia Murtagh, Q.E.D. Engineering Ltd. (Independent Environmental Consultant), Sinead Hickey of SWS Environmental Services and Denis O'Sullivan Project Manager of SWS Natural Resources Ltd. in November 2010, ERAS ECO Ltd completed a review of this assessment and were satisfied that its content is accurate.

The two main outputs from discussions were;

a) The establishment of Risk Classification Tables
b) The identification of risks using risk identification tools and brainstorming exercises.

a) Risk Classification Tables

Risk Classification Tables are required in order to evaluate and rank the risks compared with each other. They form the basis for assigning a rate of 'occurrence' (the probability of an event occurring) and 'severity' (the magnitude of impact if the event occurs) to every risk. There are two required Risk Classification Tables; one for 'Occurrence' and one for 'Severity'.

Table 1. Risk Classification Table – Occurrence

Rating	Occurrence		
	Category	**Description**	**Likelihood of Occurrence (%)**
1	Very Low	Very low chance (0-5%) of hazard occurring in 30 yr period *	0-5
2	Low	Low chance (5-10%) of hazard occurring in 30 yr period	5-10
3	Medium	Medium chance (10-20%) of hazard occurring in 30 yr period	10-20
4	High	High chance (20-50%) of hazard occurring in 30 yr period	20-50
5	Very High	Greater than 50% chance of hazard occurring in 30 yr period.	>50

* The assessment of the environmental liabilities has been limited to a 30-year period in accordance with Article 10 of the *Council Directive 1999/31/EC of 26th April 1999 on the Landfill of Waste.*

Table 2. Risk Classification Table – Severity

Rating	Occurrence		
	Category	**Description**	**Cost of Remediation €**
1	Trivial	No damage or negligible change to the environment	€0- 1,000
2	Minor	Minor impact/localised or nuisance	€1,000-10,000
3	Moderate	Moderate damage to environment	€10,000 – 50,000
4	Major	Severe damage to local environment	€50,000 – 100,000
5	Massive	Massive damage to a large area, irreversible in medium term	€100,000 – 1,000,000

b) Identification of Risks from the Processes on Site

Each process proposed for the ERAS ECO Ltd site was considered separately and all risks associated with each were examined. A list of risks was developed and these were entered into a Risk Register, as detailed in Table 3.

Table 3. ERAS ECO Ltd Risk Register

Risk	Potential Failure Mode / Risk
1	Poor installation of impermeable yard, drains and storage tanks, leading to cracks, permitting process effluent and spills to reach soil and groundwater causing contamination
2	Fire causing contaminated fire water to be generated and cause pollution of Blackwater
3	Inadequate treatment of wastewater at wastewater treatment plant and failure of automatic monitoring controls, leading to pollution of Blackwater.
4	Failure of sluice valves at preventing contaminated water to divert to stormwater retention tank, resulting in contamination
5	Failure of oil interceptors in retaining oil spills
6	Loss of integrity of diesel storage tank and chemical drums.
7	Loss of integrity of bunds leading to spills.
8	Mobile fuel tanker accident
9	Uncontrolled release of dust and air emissions
10	Uncontrolled odour release / failure of Biofilter
11	Uncontrolled release of litter from premises
12	Excessive noise from machinery and processes
13	Excessive scavenging birds, animals and pests (flies)
14	Boiler explosion

3. Assessment of Risk

A number of risks were identified for the new ERAS ECO Ltd site that could result environmental contamination of surface water, groundwater, atmosphere, land and human health. These risks were assessed against the Risk Classification Tables for likelihood of occurrence and severity of impact, to provide an overall risk score for each risk.

Table 4 provides the risk ratings for each identified risk.

Table 4. ERAS ECO Ltd Project Risk Register with Risk Scores

Risk	Potential Failure Mode/Risk	Probability of Occurrence	Severity	Risk Score (severity x occurrence)
1	Poor installation of impermeable yard, drains and storage tanks, leading to cracks, permitting process effluent and spills to reach soil and groundwater causing contamination	1	5	10
2	Fire causing contaminated fire water to be generated and cause pollution of Blackwater	2	5	10
3	Inadequate treatment of wastewater at wastewater treatment plant and failure of automatic monitoring controls	2	5	10
4	Failure of sluice valves at preventing contaminated water to divert to stormwater retention tank, resulting in contamination	2	5	10
5	Failure of oil interceptors in retaining oil spills	2	5	10
6	Loss of integrity of diesel storage tank and chemical drums.	2	4	8
7	Loss of integrity of bunds leading to spills.	2	4	8
8	Mobile fuel tanker accident	2	4	8
9	Uncontrolled release of dust and air emissions	2	4	8
10	Uncontrolled odour release / failure of biofilter	2	4	8
11	Uncontrolled release of litter from premises	3	2	6
12	Excessive noise from machinery and processes	3	2	6
13	Excessive scavenging birds, animals and pests (flies)	3	2	6
14	Boiler explosion	2	4	8

Because this site is new and has been recently built, the likelihood of occurrence of the majority of identified risks is low as measures are being put in place at the outset to ensure that all plant, machinery and processes pose

minimal environmental risk. The severity of occurrence of identified risks is major/massive in most cases as they pose severe/massive damage to the local Blackwater Estuary, which is a highly sensitive/protected area. Risk mitigation measures are inbuilt into design of site.

A Risk Matrix has been devised to allow the risks to be easily displayed and prioritised. Minor risks (risk score <2) are excluded at this stage. The severity and occurrence ratings are used in the matrix; with the level of occurrence forming the x-axis and the likelihood of occurrence forming the y-axis. The colour code is as follows;

- Red - These are considered to be high-level risks requiring priority attention. These risks have the potential to be catastrophic and as such should be addressed quickly.
- Amber/yellow – These are medium-level risks requiring action but are not as critical as a red coded risk.
- Green (light and dark green) – These are lowest level risks and indicate a need for continuing awareness and monitoring on a regular basis. Whilst they are low or minor risks, some have the potential to increase to medium or even high-level risks and must therefore be regularly monitored and if cost effective mitigation can be carried out to reduce the risk even further this should be pursued.

Table 5. ERAS ECO LTD - Risk Matrix

V. High	5					
High	4					
Medium	3		**11, 12, 13**			
Low	2				6, 7, 8, 9, 10, 14	2, 3, 4, 5
V. Low	1					1
		Trivial	Minor	Moderate	Major	Massive
		1	2	3	4	5

Occurrence

Severity

It can be seen in the above risk Matrix that there are no risks in the red zone requiring priority attention. In addition, there are no risks in the yellow section that require mitigation or management action. All risks are located in the dark and light green zone, indicating the need for continuing awareness and monitoring on a regular basis. As these risks may have the potential to increase to yellow or red zone risks, risk management measures should be

put in place to manage them at their current levels, or preferably to reduce them further.

4. Identification and Assessment of Mitigation Actions

The recommended risk mitigation measures applicable to the ERAS ECO Ltd site are provided in Table 6. The table provides the proposed controls for each identified risk and recommended mitigation measures.

Table 6. ERAS ECO Ltd Proposed Risk Mitigation Measures

Risk	Potential Failure Mode/Risk	Proposed Controls / Mitigation Measures
1	Poor installation of impermeable yard, drains and storage tanks, leading to cracks, permitting process effluent and spills to reach soil and groundwater causing contamination	Ensure that all appointed contractors are complying with contract. As per Condition 6.14 of Licence, all underground pipes and tanks will be tested for integrity and water tightness prior to use and every 3 years thereafter. Monitoring of three groundwater wells biannually as per Schedule C.6. will provide details of groundwater quality.
2	Fire causing contaminated fire water to be generated and cause pollution of Blackwater	As per condition 3.9 of Licence, a Risk Assessment for Firewater Retention facility has been conducted for the site outlining measures for firewater retention.
3	Inadequate treatment of wastewater at wastewater treatment plant and failure of automatic monitoring controls	As per condition 6.21 of Licence, a Test Programme for the operation of the WWTP must submitted prior to use. Continuous and periodic monitoring conducted on WWTP as per schedule C.3.2 of Licence.
4	Failure of sluice valves at preventing contaminated water to divert to stormwater retention tank, resulting in contamination	Sluice valves are controlled automatically and as per condition 6.15 will be visually checked weekly.
5	Failure of oil interceptors in retaining oil spills	As per condition 6.15, Oil interceptors will be inspected weekly and cleaned out as required.
6	Loss of integrity of diesel storage tank and chemical drums.	All tanks and drums used on site will be new so low risk of spillage from them. Tanks and drums will be visually inspected on a regular basis.
7	Loss of integrity of bunds leading to spills.	As per Condition 6.14, Bunds integrity tested prior to use and every 3 years thereafter. As per condition 6.15, bunds visual inspected

		weekly.
Risk	**Potential Failure Mode/Risk**	**Proposed Controls / Mitigation Measures**
8	Mobile fuel tanker accident	Good traffic management, supervision by site staff. Enforcement of speed limits and traffic control measures
9	Uncontrolled release of dust and air emissions	Dust will be controlled within buildings and yard will be cleaned regularly. Boiler will be monitored quarterly, Biofilter biannually and dust deposition three times a year. Daily visual inspection of dust and air emissions will highlight potential problems and allow quick remedial action.
10	Uncontrolled odour release / failure of biofilter	Daily olfactory assessment (sniff test) to be carried out as per Schedule C.6 of licence
11	Uncontrolled release of litter from premises	Daily visual assessment of premises will ensure litter is controlled / managed.
12	Excessive noise from machinery and processes	Daily assessment of noise levels from machines will highlight areas for concern.
13	Excessive scavenging birds, animals and pests (flies)	Daily visual assessment of premises for pests will highlight potential problems and allow quick remedial action.
14	Boiler explosion	Boiler will be maintained on a regular basis by site maintenance staff and will undergo an annual safety check for insurance purposes.

The risk score for each of the above risks will not change significantly due to the risk mitigation measures highlighted above, as these were taken into consideration in assessing the risk score in the first place. Therefore as discussed previously, the likelihood of occurrence of the majority of identified risks is low as measures are being put in place at the outset to ensure that all plant, machinery and processes pose minimal environmental risk. In addition, the severity of occurrence of identified risks is major/massive (and will always be so) in most cases as they could pose severe/massive damage to the local Blackwater Estuary.

5. Risk Management Programme

A risk management programme at the ERAS ECO Ltd site will provide a mechanism for continuous and ongoing environmental risk management and mitigation such that the unknown environmental risks will reduce at the facility. As the site will operate under a Waste Licence, the stipulations of the licence provide a mechanism for risk management. In addition to licence requirement, the site will provide its own internal procedures for environmental management, where relevant.

The proposed controls / mitigation measures highlighted in Table 6 will be coodinated by the Site Facility Manager who has overall responsibility for managing and controlling all site operations, the EHSQ Manager and the site foreman. This person is deemed to be competent enough to understand the risks, the suggested mitigation proposals for the risk and they have the authority to implement the mitigation measures. They will also be held ultimately responsible for the risk.

The proposed timescales for the implementation of the mitigation measures are almost all set by the Waste licence requirements i.e. some have to be done before commencement of operations and others involve continuous/ daily/monthly assessment etc.

6. Assessment of Potential Environmental Liabilities

The known environmental liabilities (e.g. closure and aftercare costs) for the ERAS ECO LTD site have been calculated in the preparation and costing of a Closure, Restoration and Aftercare Management Plan (CRAMP). The costs for this eventuality are summarised in Table 7.

Table 7. ERAS ECO Ltd CRAMP Costs

Details	**Cost €**
Closure Costs	€250,000
Restoration and Aftercare Management Costs	€37,500
TOTAL	**€287,500**

Unknown liabilities have been assessed as part of this Environmental Liabilities Risk Assessment (ELRA). For these unknown liabilities, a financial model is necessary to estimate the environmental liability associated with these risks.

Each risk has two characteristics that are derived from the Risk Classification Tables (Tables 1 & 2) that are used in the financial models;

- The range of probability of the risk occurring
- The range in cost implications in the risk occurring

The financial model defines the worst, most likely or best case scenarios, by multiplying the maximum / median / minimum value of each range for each risk and totalling the values.

A summary of the potential cost of unknown liabilities is provided in Table 8.

Table 8. Summary of Potential "Unknown" Environmental Liabilities

Description	**Estimate of "Unknown" Environmental Liabilities**	**Assumptions**
Highest Cost Scenario	€536,000	Assumes all risks occur at their maximum cost
Lowest Cost Scenario	€0	Assumes none of the risks occur
Most Likely Scenario	€272,475	Based on median probability and severity for each risk after implementation of Risk Management Programme

A breakdown of the worst case scenario and the most likely scenario are provided in Tables 9 & 10.

Table 9. Maximum Scenario Financial Model

Risk	Probability of Occurrence	Likelihood of occurrence range	Severity Rating	Cost Score	Max. Prob.	Max. Sev.	Max. Scenario Cost
1	1	0-5%	5	€100,000-1,000,000	5.00%	€1,000,000	€50,000
2	2	5-10%	5	€100,000-1,000,000	10.00%	€1,000,000	€100,000
3	2	5-10%	5	€100,000-1,000,000	10.00%	€1,000,000	€100,000
4	2	5-10%	5	€100,000-1,000,000	10.00%	€1,000,000	€100,000
5	2	5-10%	5	€100,000-1,000,000	10.00%	€1,000,000	€100,000
6	2	5-10%	4	€50,000-100,000	10.00%	€100,000	€10,000
7	4	20-50%	4	€50,000-100,000	50%	€100,000	€50,000
10	2	5-10%	4	€50,000-100,000	10.00%	€100,000	€10,000
11	3	10-20%	2	€1,000-10,000	20.00%	€10,000	€2,000
12	3	10-20%	2	€1,000-10,000	20%	€10,000	€2,000
13	3	10-20%	2	€1,000-10,000	20%	€10,000	€2,000
14	2	5-10%	4	€50,000-100,000	10.00%	€100,000	€10,000
						TOTAL	**€536,000**

Table 10. Most Likely Scenario Financial Model

Risk	Probability of Occurrence	Likelihood of occurrence range	Severity Rating	Cost Score	Med. Prob.	Med. Sev.	Median Scenario Cost
1	1	0-5%	5	€100,000-1,000,000	5.00%	€550,000	€27,500
2	2	5-10%	5	€100,000-1,000,000	10.00%	€550,000	€55,000
3	2	5-10%	5	€100,000-1,000,000	10.00%	€550,000	€55,000
4	2	5-10%	5	€100,000-1,000,000	10.00%	€550,000	€55,000
5	2	5-10%	5	€100,000-1,000,000	10.00%	€550,000	€55,000
6	2	5-10%	4	€50,000-100,000	7.50%	€75,000	€5,625
7	4	20-50%	4	€50,000-100,000	7.50%	€75,000	€5,625
10	2	5-10%	4	€50,000-100,000	7.50%	€75,000	€5,625
11	3	10-20%	2	€1,000-10,000	15.00%	€5,500	€825
12	3	10-20%	2	€1,000-10,000	15%	€5,500	€825
13	3	10-20%	2	€1,000-10,000	15%	€5,500	€825
14	2	5-10%	4	€50,000-100,000	7.50%	€75,000	€5,625
						TOTAL	**€272,475**

7. ELRA Review

The ELRA will be reviewed as necessary to reflect any significant changes on site, and in any case every three years following initial agreement. Reviews of the ELRA will update the risks register through the addition of new risks or the omission of redundant risks. It will also verify the implementation of the risk management plan. The review will also ensure that the financial provision continues to cover the environmental liabilities at the facility. Reviews to the ELRA shall be notified as part of the Annual Environmental Report for the site.

8. Financial Provision

The main objective of Financial Provision is to ensure that sufficient financial resources are available to cover;

- Known environmental liabilities that will arise at the time of facility closure.
- Known environmental liabilities that are associated with the aftercare and maintenance of the facility until such time as the facility is considered to no longer pose a risk to the environment.
- Unknown environmental liabilities that may occur during the operating life of the facility.

Table 11 provides the Financial Provisions available to the site

Table 11. ERAS ECO Ltd Financial Provisions

Liability Type	Description	Method of Quantification	Amount of Provision	Total Amount (€)	Financial Instrument
Known Liability – Closure	Site closure and decommissioning	Closure Restoration and Aftercare Management Plan (CRAMP)	€250,000		
Known Liability – Restoration and Aftercare Management	Restoration and aftercare management	Closure Restoration and Aftercare Management Plan (CRAMP)	€37,500	**Known = €287,500**	a Bank bond will be implemented
Unknown Liability	Risk of unplanned events occurring on site, (posing risk to surface water, groundwater, atmosphere, land and human health).	Environmental Liabilities Risk Assessment (ELRA) Report	€536,000	**Unknown = €536,000**	Insurance policy covering environmental liability will be implemented with the agreement of the Agency

ERAS ECO Ltd. ELRA Reviews / Updates
Review 02: November 2010

Reviewed by EHSQ Manager **Approved by** Facility Manager