Environmental Protection Agency
Office of Environmental Enforcement
McCumiskey House, Richview
Clonskeagh Road
Dublin 14

28th March 2013

Your Ref: Indaver Ireland Limited, Carranstown, Duleek, Co-Meath.
Licence number: W0167-02
Our Ref: 102/ 2012 AER

Dear Sir/Madam,

Please find attached Indaver Ireland Limited's Annual Environmental Report for the reporting period January 2012 to December 2012 for the licence W0167-02.

I trust this is to the satisfaction of the Agency but should there be any further queries please do not hesitate to contact me.

Kind Regards,

Grace McCormack
Quality & Environmental Manager MSW
Indaver Ireland Limited
Carranstown |Duleek |Co-Meath
Web: www.indaver.ie

ANNUAL ENVIRONMENTAL REPORT

Waste Licence Registration No.:	W0167-02
Licensee:	Indaver Ireland Limited
Location of Activity:	Carranstown, Duleek, Co-Meath
Attention:	Environmental Protection Agency Office of Environmental Enforcement McCumiskey House, Richview Clonskeagh Road Dublin 14

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1.0 Introduction

1.1 Reporting Period

The following is the Annual Environmental Report (AER) for the period 1st January 2012 to the 31st December 2012 for the Waste to Energy Facility located at Carranstown, Duleek, Co-Meath, operated by Indaver Ireland Limited. Waste activities commenced at the site on the 15th August 2011.

This report has been prepared as per schedule D of Indaver's waste licence (Register No. W0167-02)

1.2 Description of On-Site Waste Activities

Indaver commenced operations in 1977 and is one of Ireland's leading companies in the recovery, treatment and disposal of hazardous and non hazardous waste.

Indaver has offices in Dun Laoghaire, Dublin Port, Cork and Meath and operates:

- A custom-built hazardous waste transfer station and solvent recovery facility in Dublin Port
- A Waste to Energy Facility in Duleek, Co Meath
- Civic amenity sites in Newcastle West, Killmallock and Mungret on behalf of Limerick County Council

The development in Meath is valued at €130 million and represents the largest ever single investment in solid waste management infrastructure in Ireland. Indaver's Meath facility uses the most advanced technology, to process 200,000 tonnes of waste annually, generating enough energy to meet the needs of 20,000 homes. The development of a thermal treatment plant with energy recovery is in line with the North East Regional Waste Management Plan.

Construction of the facility began in September 2008. This state of the art WTE facility provides the Northeast region and surrounding areas with an alternative recovery treatment solution to landfill. It offers municipal waste collectors and Local Authorities a treatment solution for their residual waste.

Indaver currently employs 180 people with 39 of these working at the Meath facility

Meath Waste to Energy Facility:

The primary operation on the Meath Waste-to-Energy Facility is the incineration of non hazardous wastes with associated energy recovery in the form of steam which is used to generate electricity.

In general terms, the Meath WtE Facility is designed to incinerate and recover energy from the residual fraction of non-hazardous household, commercial and industrial waste and non-hazardous wastewater sludge. It consists of an incineration plant with energy recovery and ancillary services, and the throughput of the facility for incineration is 200,000tpa.

The facility comprises of the following main elements:

- The main process building (comprising of tipping hall, waste bunker, furnace boiler, steam turbine, flue gas treatment and ash storage) including the control room, labs and administration offices
- The building housing the air cooled condenser
- A contractors' compound / building with workshop
- A transformer compound and ESB substation with emergency generator
- A security building with weighbridge at facility entrance
- A water storage tank and pump house

The main process building is approximately 160 m long, 40 m wide at the widest point and 40 m above ground at the highest point. The stack is 65 m tall and vents the treated combustion gases to atmosphere. The plant is based on conventional grate furnace technology with a horizontal steam boiler and an advanced flue gas treatment system designed to meet the current emissions regulations. The plant will produce up to 17.2 MW electricity of which approximately 15.1MW is exported to the national grid.

Waste is transported to the site by waste contractors in accordance with the site's licensed opening hours. On entering the site, waste contractors follow a well marked two-way route to the tipping hall where inspections on the waste are conducted by Indaver on a routine basis. There is a large turning area outside the tipping hall to allow the waste delivery vehicles turn safely before entering the hall and a maximum speed limit of 15 km/h. In the tipping hall, waste is deposited into the waste bunker where it is mixed by the crane before being placed in the hopper for the furnace. In the furnace, the waste is incinerated at temperatures exceeding 850ºC. The ash collected from the bottom of the furnace passes through a wet bath before being stored for collection and removal from the site. The combustion gases from the process pass through a number of treatment stages. This includes two stages of dosing (lime milk and lime) for acid removal and two stages of dosing (expanded clay and activated carbon) for dioxin removal, before passing through filter bags and being discharged to atmosphere via the emissions stack. The emissions to air is continuously monitored automatically and fed back to the control room for the facility where the levels of dosing can be adjusted if required.

Overview of status of commissioning:

The commissioning of the plant is almost finalised. Reports must be sent to the Agency before getting the final approval from the EPA under Condition 3.18.4. There are some packages that still need to be finalised e.g. economising on the use of consumables to ensure efficiency and good resource use. It is anticipated that this will be finalised by April 2013. Reports will be issued to the Agency at this time.

1.3 Summary of quantity and composition of waste received, recovered and disposed of in reporting period

1.3.1 Waste received on site for recovery

For a full breakdown of the waste accepted on site please see Appendix 1.

All waste accepted to site was accepted from within the State.

1.3.2 Waste moved off site for recovery/disposal

For a full breakdown of the waste removed from site please see Appendix 2.

1.4 Summary Report on emissions

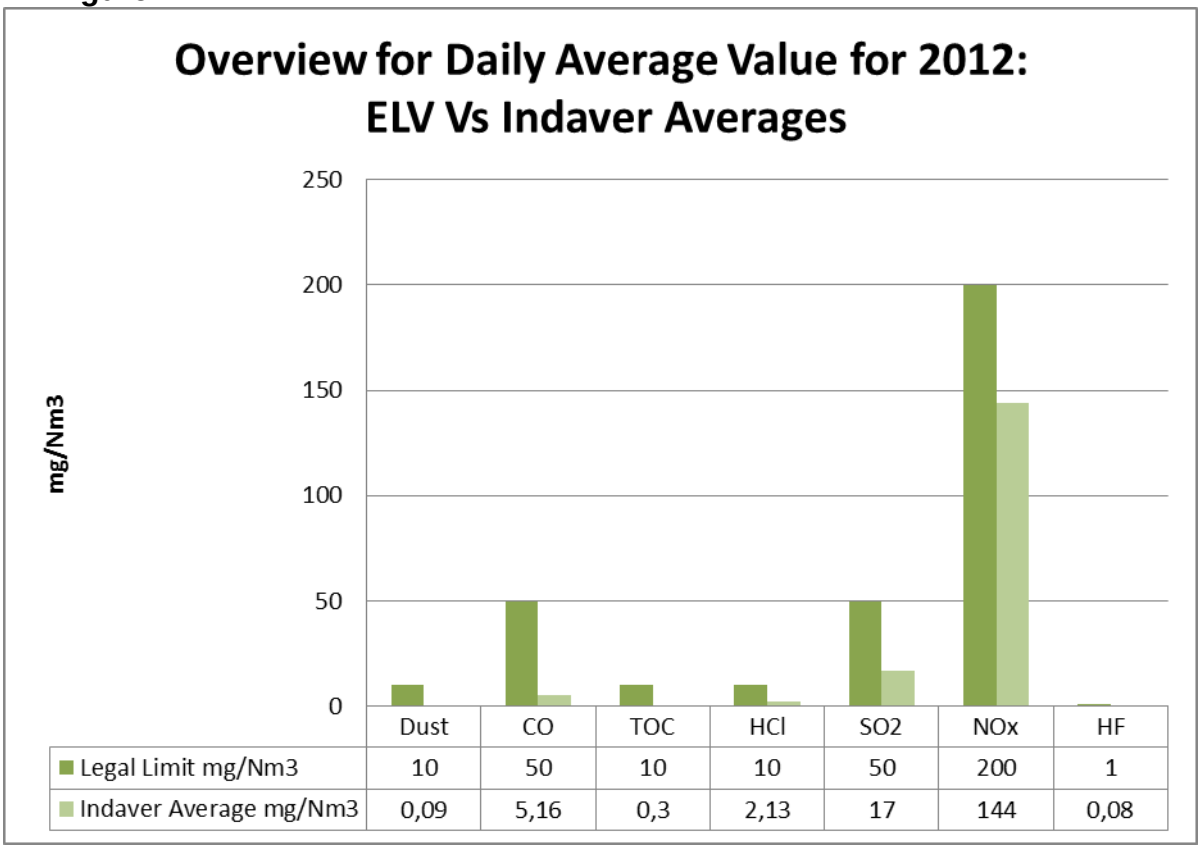
1.4.1 Air Emission Reports

1.4.1.1 Continuous Monitoring

Please see below the summary report on the continuous air monitoring emissions.

Please see below *figure 1.4.1.1.1,* in graphical format which shows the average value for each parameter as listed in Schedule B of the licence. As can be seen below the results for the average result for each parameter for 2012 is below the ELV.

Figure 1.4.1.1.1



Please see below *figure 1.4.1.1.2*, a graphical representation of the dioxin result for a one year period. Dioxins are sampled continuously and tested every 2 weeks. All results were below the threshold value of 0.1ng/Nm^3.

Figure 1.4.1.1.2

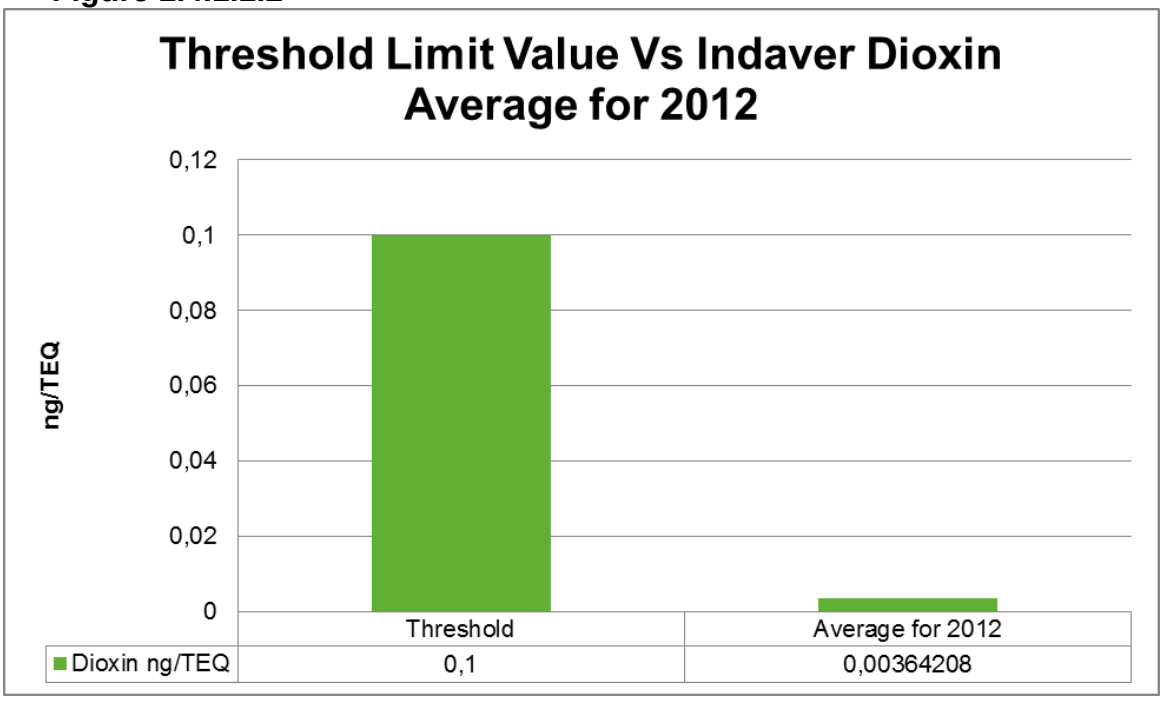


Figure 1.4.1.1.3 below gives an overview of compliance against the A and B norm. All results are given without taking into account the confidence interval but standardised to standard temperature and pressure and 11% oxygen and dry gas.

Figure 1.4.1.1.3

A norm Compliance

Installation	Parameter	# half hours year to date	# of half hours lower than ELV	# half-hours above A norm ELV
ME1	Dust	15711	15711	0
	CO	15647	15578	69
	TOC	15542	15538	4
	HCl	15548	15548	0
	HF	15548	15548	0
	SO2	15548	15547	1
	NOx	15647	15646	1
	Temp of oven	15657	15629	28

B norm Compliance

Installation	Parameter	# Half-hours	97% B-norm	Ok/NOK
ME1	Dust	15711	100	Ok
	CO	15647	No B norm	Ok
	TOC	15542	99.87	Ok
	HCl	15548	99.85	Ok
	HF	15548	100	Ok
	SO2	15548	98.30	Ok
	NOx	15647	98.52	Ok
	Temp of oven	15657	No B norm	Ok

For 2012 all daily results for all parameters achieved 100% compliance with the exception of SO_2 where there was one day where the result was 51.23 mg/Nm^3 compared to the limit of 50

mg/Nm^3. This was reported as an incident to the Agency and forms part of the summary report on incidents in Chapter 1.11.1.

Figure 1.4.1.1.4 Overview of compliance with the daily emission limit value excluding confidence intervals (measured to standard conditions including 11% O_2, dry gas)

Installation	Parameter	# of Days	% Day Norm Compliance	# of Compliant days
ME1	Dust	328	100	328
	CO	327	99.7*	326
	TOC	325	100	325
	HCl	325	100	325
	HF	325	100	325
	SO2	327	99.7	326
	NOx	327	100	327
	T oven	328	100	328

'* This demonstrates 100% compliance with the daily average as Note 6 of Schedule B of the licence states '97% of the daily average value over the year does not exceed the emission limit value'.

1.4.1.1.2 Non Continuous Monitoring

Each quarter Indaver Ireland Limited organises for an external contractor to take measurements of the non continuous monitoring parameters as listed in Schedule C.1.2 of W0167-02. These are sent in quarterly to the Agency as per the licence requirement. Please see below the average results with legal limit where applicable and the measurement uncertainty shown for the reporting period 2012.

PM10	Year 2012 Average mg/Nm3	Measurement Uncertainty mg/Nm3
Average for 2012	0.555	0.495

PM2.5	Year 2012 Average mg/Nm3	Measurement Uncertainty mg/Nm3
Average for 2012	0.3675	0.365

Cadmium & Thallium	ELV mg/Nm^3	Year 2012 Average	Measurement Uncertainty mg/Nm3
Average for 2012	0.05	0.02575	0.0065

Mercury	ELV mg/Nm^3	Year 2012 Average	Measurement Uncertainty mg/Nm3
Average for 2012	0.05	0.00053	0.00005

Heavy Metals	ELV mg/Nm^3	Year 2012 Average	Measurement Uncertainty mg/Nm3
Average for 2012	0.5	0.075	0.012

Arsenic	ELV mg/Nm^3	Year 2012 Average	Measurement Uncertainty mg/Nm3
Average for 2012	0.2	0.0033	0.00025

Dioxins	ELV ng/TEQ	Year 2012 Average	Measurement Uncertainty mg/Nm3
Average for 2012	0.1	0.0043	0.00135

1.4.2 Surface Water Emissions

Surface Water/Pond
The system is monitored continuously at the DCS by the operators. The discharge is checked daily in accordance with the licence. There has been no unusual discharges in 2012. Also, no water can be discharged when the readings are over the trigger levels.

Surface Water Agreed Trigger Levels:

pH	TOC	Conductivity
6-9	Warning Level 15 mg/L Action Level 20mg/L	Warning Level 650µScm^{-1} Action Level 800µScm^{-1}

Average Results for 2012 at the inlet to the pond:

pH	TOC	Conductivity
7.6	16.1	528.9

Average Results for 2012 at the outlet to the pond:

pH	TOC	Conductivity
7.4	18.1	391.3

As can be seen the values for TOC are higher than the warning levels. Indaver have requested for higher limits after the initial testing phase. This request was made in March 2012 (reference 64/Follow up from site inspection W0167-02/SI09MG) and Indaver are awaiting correspondence from the Agency on the request.

1.5 Summary of Noise Survey

Noise monitoring was performed on the 3rd and 4th of October 2012 by KD Environmental. Noise levels were outside the permitted day time noise limit of 55 dB(A) and night time noise limit of 45 dB(A) at monitoring locations AN1-1, AN1-2 and AN1-3. This is due to road traffic on the busy R152 which runs adjacent to the front of the Indaver facility. Noise levels were within the permitted day noise levels at monitoring location AN1-4 to the rear of the site. The noise level at AN1-4 exceeded the night time level but interference noise from cattle calling beside the noise meter caused an elevation in noise level recorded. No tonal or impulsive noise from site activities were recorded during either day or night time monitoring.
In conclusion, noise emissions from the site have a minimal impact on the local environment.

1.5.1 Noise Level Results

Monitoring Point	Date/Time	Sampling Interval minutes	L(A) eq	L(A) 10	L(A) 90	Audible Noise Source
AN1-1	03/10/2012					
	14:50	30	59.5	63.3	49.4	Low level audible noise from site activities during daytime hours. Road traffic noise from R152 main audible noise source. Some site traffic noise entering and exiting main gate approx. 60m away.
	22:23	30	55	59	45.8	Little if any noise from site activities. Road traffic noise from R152 main audible noise source. Low level noise from incinerator just audible.
AN1-2	03/10/2012					
	16:57	30	70.4	74.3	56.6	Little if any noise from site activities. Road traffic noise from R152 main audible noise source.
	23:20	30	61.3	63.2	40.7	Little if any noise from site activities. Road traffic noise from R152 main audible noise source. Low level noise from incinerator just audible.
AN1-3	03/10/2012					
	18:20	30	70.9	74.1	61.2	Little if any noise from site activities. Some site traffic noise entering and exiting main gate approx. 60m away. Road traffic noise from R152 main audible noise source.
	04/10/2012					
	00:11	30	59.3	60.1	39	Little if any noise from site activities. Road traffic noise from R152 main audible noise source. Low level noise from incinerator just audible.
AN1-4	03/10/2012					
	13:39	30	52.6	54	48.1	Forklift operating approx 70m away and waste truck unloading approx. 80m away main source of site noise during daytime hours.
	04/10/2012					
	01:05	30	46.2	47.1	44	Some noise audible from incinerator. Cattle calling in neighbouring field caused interference noise.

1.5.2 Tonal or Impulsive Noise

Monitoring Point	Time	Tonal or Impulsive Noise from site activity	Comments
AN1-1	Day 16:22	No	No significant tonal and impulsive noise from site activities. Recorded at 50Hz due to road traffic increase.
	Night 22:53	No	No significant tonal and impulsive noise from site activities. Recorded at 1Hz and 1.25Hz due to road traffic.
AN1-2	Day 17:29	No	No significant tonal and impulsive noise from site activities. Recorded at 50Hz due to road traffic increase.
	Night 23:50	No	No significant tonal and impulsive noise from site activities. Recorded at 63Hz and 2.5Hz due to road traffic.
AN1-3	Day 18:51	No	No significant tonal and impulsive noise from site activities. Off site HGV idling at meter caused meter overload.
	Night 00:41	No	No significant tonal and impulsive noise from site activities. Recorded at 200Hz, 800Hz and 1.25Hz due to road traffic.
AN1-4	Day 14:10	No	No significant tonal and impulsive noise from site activities. Cattle calling beside meter caused some impulsive noise at 125Hz.
	Night 01:35	No	No significant tonal and impulsive noise from site activities. Cattle calling beside meter caused some impulsive noise at 50Hz.

1.6 Summary of all Environmental Monitoring

1.6.1 Groundwater Monitoring

It is a requirement of Schedule C.6.1 of W0167-02 that monthly groundwater monitoring and biannual monitoring of the groundwater monitoring boreholes takes place. Please see below a summary of the results for the same.

AGW1-1 Upgradient Monitoring Point

Monitoring Frequency	TOC(mg/L)	Ammonia (NH4) Ug/L as N	Conductivity uscm-1@25C
Jan-12	1.78	10	1012
Feb-12	7.14	10	1002
Mar-12	1.39	10	977
Apr-12	2.36	10	859
May-12	3.2	10	843
Jun-12	2.4	13	938
Jul-12	0.52	39	963
Aug-12	2.03	10	891
Sep-12	0.84	47	876
Oct-12	1.34	10	836
Nov-12	3.28	38	854
Dec-12	2.14	20	863

AGW1-2 Downgradient Monitoring Point

Monitoring Frequency	TOC(mg/L)	Ammonia (NH4) Ug/L as N	Conductivity uscm-1@25C
Jan-12	2.44	10	714
Feb-12	1.68	10	728
Mar-12	1.27	10	782
Apr-12	2.54	10	974
May-12	2.49	10	797
Jun-12	1.27	10	679
Jul-12	1.04	10	644
Aug-12	7.18	10	683
Sep-12	1.1	41	688
Oct-12	2.34	10	679
Nov-12	2.18	19	644
Dec-12	2.17	10	621

AGW1-3 Downgradient Monitoring Point

Monitoring Frequency	TOC(mg/L)	Ammonia (NH4) Ug/L as N	Conductivity uscm-1@25C
Jan-12	0.84	10	719
Feb-12	2.18	10	714
Mar-12	1.26	10	720
Apr-12	2.59	10	695
May-12	1.15	10	628
Jun-12	1.12	10	618
Jul-12	1.86	10	632
Aug-12	1.4	10	615
Sep-12	0.91	59	616
Oct-12	3	22	615
Nov-12	3.59	22	607
Dec-12	2.14	10	603

Biannual Results

	AGW1-1	AGW1-2	AGW1-3	AGW1-1	AGW1-2	AGW1-3
Date	**27.04.2012**	**27.04.2012**	**27.04.2012**	**18.09.2013**	**18.09.2013**	**18.09.2013**
pH	7.2	7.3	7.2	7	7.2	7.3
Nitrate(mg/L as N)	3.42	14.07	8.87	3.58	10.87	11.07
Nitrite(mg/L as N)	0.009	0.007	0.01	<0.002	<0.002	<0.002
Chloride (mg/L)	70.58	129.09	35.99	102.64	36.38	59
Fluoride (mg/L)	0.13	0.11	0.13	<0.02	<0.02	<0.02
Metals-Cd (ug/L)	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Metals Tl (ug/L)	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Metals Hg (ug/L)	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Metals Pb (ug/L)	1.749	6.211	4.547	0.05	0.071	0.053
Metals Cr (ug/L)	<2.14	<2.14	<2.14	<2.14	<2.14	<2.14
Metals Cu (ug/L)	0.183	<0.11	<0.11	0.251	0.306	0.249
Metals Mn (ug/L)	0.435	0.293	2.913	2.828	2.153	1.504
Metals Ni (ug/L)	0.447	0.259	2.412	0.441	0.811	0.3
Metals As (ug/L)	0.271	0.241	0.234	0.365	0.211	0.28
Metals CO (ug/L)	0.03	0.143	0.172	0.066	0.153	0.171
Metals V (ug/L)	0.295	0.266	0.575	0.693	0.898	0.466
Metals Sn (ug/L)	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8
Organohalogens	<1	<1	<1	<1	<1	<1
Total coliforms(no/100ml)	20	0	0	66	6	1
Faecal Coliforms(no/100ml)	0	0	0	0	0	0

Overall it can be stated the activities on the site at W0167-02 has no significant impact on the groundwater quality as can be shown by the above results.

1.7 Summary record of the use of the emergency generator

The emergency generator was used a total of 27 hours in 2012. The majority of these hours were for testing purposes. It is tested weekly and these records are stored at the facility. Any plant trips would trigger the generator to start and these hours are all included within the 27 hours for 2012.

1.8 Resource and Energy Consumption Summary

1.8.1 Diesel Usage

For the year 2012 Indaver Ireland Limited used 827064L of Diesel fuel oil. This is a greater than 50% reduction in diesel fuel usage compared to the previous year 2011. In 2011 the plant was still at the start of the commissioning period and there was a lot of diesel used in the start up and shut downs. During 2012 the plant was running under general operating conditions and so this amount of diesel is more normal for a plant of this type. This is used in the auxiliary burners of the plant. The majority of this fuel usage was during the start up and shut down periods for planned maintenance. Fuel oil is also used whenever the temperature goes below 850°C .

1.8.2 Water Usage

1.8.2.1 Groundwater:

For the year 2012, Indaver Ireland Limited used 50043m^3 of groundwater for use in the process. This is used for the process to mix with lime which creates lime milk for use in the flue abatement system. Water would also be used inside the plant for clean down purposes. All the clean down washings are reused in the process again. Indaver also has a demineralisation plant to ensure water is of a sufficient quality for use in the boiler.
It is anticipated that the volumes will be similar for the year 2013 also.

1.8.2.2 Public Supply: The public water supply is only used on site for general office purposes and welfare facilities (Showers/toilets/drinking water etc) in the administration block. It is not envisaged to monitor or reduce the amount of water used here.

1.8.3 Consumable Usage

The following consumables are used in the process to ensure compliance with the emission limits of W0167-02.

Consumable	Usage during 2012
Quicklime	2209 Ton
Hydrated Lime	1318 Ton
Expanded Clay	150 Ton
Activated Carbon	88 Ton
Ammonia	606 Ton

Resource efficiency and consumable usage is a key performance indicator and is monitored daily and reported on a monthly basis.

1.8.4 Energy Consumption

An energy audit was completed at the facility on the 14th August 2012 as required by Condition 7.3 of W0167-02. The full copy of the report as required by Condition 7.3.3 is attached in

Appendix 5. Actions arising out of this audit report have been included in our schedule of objectives and targets (Indaver Improvement Plan).

For the reporting year 2012 Indaver exported 101,755MWH of electricity to the national grid and imported 841MWH. Indaver produce electricity to run the facility and only import electricity when in shutdown or constrained by the national grid.

1.9 Waste Recovery Report

The End of Life Vehicles Directive sets a minimum reuse and recovery target of 85% from 2006 increasing to 95% reuse and recovery by 2015. Up to 10% of this target may be met through energy recovery. The Meath waste-to-energy facility is positioned to accept End of Life Vehicle residue in the form of car shred and contribute to this recovery target from 2011 onwards.
In the reporting year 2012, a figure of 5,731.66 Ton of automotive shredder waste was accepted and recovered.

As a recovery option, the waste-to-energy facility can contribute to packaging recovery targets set out under the Packaging Directive (currently 60% recovery). It is estimated that up to 48,000t residual packaging waste in the MSW accepted will be recovered at the facility.

The facility contributed to the national target of diverting 50% household waste from landfill. Approximately 196,763.26 tonnes of municipal type waste was treated at the facility in 2012, compared with 750,066 tonnes[1] household waste disposed of to landfill in the country. Therefore, the facility contributed 26.23% towards this diversion target.

Flue Gas Residue and Boiler ash are removed from site and where possible sent to an underground salt mine in Germany. This is considered a recovery operation, R5, as the mine is being filled up with this material in order to remediate the ground above.

Ferrous metals are recovered from the bottom ash on site using a magnet and sent to metal brokers within Ireland.

Residue	Tonnage	Recovery Option
Ferrous Metal	3014	R4
Flue Gas Residue	6134	R5
Boiler Ash	1192	R5
Bottom Ash	764	R10

Bottom ash is currently being landfilled. An alternative landfill to Whiteriver has been used and the bottom ash is being used for cover which allows the recovery code R10 to be assigned.

[1] *Figures from 2011, From the National Waste Report 2011, EPA*

1.10 Tank, drum, pipeline and bund testing and inspection report

There was no testing required during the 2012 period as the plant is relatively new. Inspections are due in 2013 and 2014.

1.11 Summary of reported incidents and complaints

1.11.1 Summary of Incidents

All Environmental Incidents are dealt with as per the Environmental Incident Investigation and Reporting Procedure Operations 6.4.

There were 47 reported environmental incidents in 2012. Please see breakdown of the incidents below. All incidents have been closed out.

Rank of Incident	Incident Type	# of Reported Incidents for 2012
1	ELV Elevated Value: CO	33
1	Parameter: Low Temp	9
1	Breakdown: CEMS equipment	2
1	ELV Elevated Value: SO2	2
1	ELV Elevated Value: NOx	1
1	Trigger level exceendance: Surface Water	1
1	ELV Elevated Value: Cd/Tl	1

1.11.2 Summary of complaints

All Environmental Complaints are dealt with as per the Environmental Complaints Procedure Operations 6.2.

There were 27 environmental complaints registered in 2012. There were a number of complaints registered at the facility which upon investigation were not linked to any of our activities e.g. slurry spreading on neighbouring land. This is shown in the table below. All 2012 complaints have been closed out.

Detail	Complaints Registered Total	Complaints actually related to our activities Total
Ash cloud/rain	2	0
Coloured Mist	1	1
Litter	3	3
Noise	3	3
Noise and Odour	3	3
Odour	10	1
Plume	2	2
Traffic/Planning Conditions	3	3

1.12 Summary of audits of waste disposal, treatment and recovery sites for the residues from facility

During 2011, Indaver Group audited K&S, the facility for the recovery of our flue gas residues and boiler ash. There two minor observations raised at this audit. The facility was approved for use and continued use.
For 2012 there were planned audits of the bottom ash outlet. Unfortunately a suitable time was not agreed and this is scheduled for 2013 along with the outlet for the ferrous metals.

1.13 Environmental Management System

1.13.1 Environmental Management Programme – Report for previous year

Indaver Ireland Limited commenced waste activities on the 15th August 2011. Condition 2.3.2.3 of W0167-02 requires that an Environmental Management Programme be submitted to the Agency not later than six months from the date of commencement of waste activities. The EMP was submitted in February 2012. Correspondence (W0167-02/ap02mg) was received from the Agency stating that the EMP was largely to the Agency's agreement and any changes that were required to the schedule of objectives and targets were updated in accordance to the letter that was received by the Agency.

1.13.2 Environmental Management Programme – Proposal for current year- Indaver Improvement Plan - Schedule of QESH Objectives and Targets

The Indaver Improvement Plan details the company's objectives and targets for the improvement and maintenance of the quality, environmental and safety & health management systems. It is used to comply with Condition 2.3.2.3 in relation to the implementation and management of objectives and targets.

Version 67 of the Indaver Improvement Plan was issued on the 22nd March 2013. A number of new actions were added to this Version.

The following are our 9 core Objectives:

OBJECTIVE 1: LEGISLATIVE COMPLIANCE INCLUDING WASTE LICENCES AND PERMITS
OBJECTIVE 2: CUSTOMER FOCUS
OBJECTIVE 3: OPERATIONAL EFFICIENCY & BUSINESS PERFORMANCE
OBJECTIVE 4: EMPLOYEE DEVELOPMENT AND INVOLVEMENT
OBJECTIVE 5: ENERGY AND RESOURCE USE
OBJECTIVE 6: HEALTH AND SAFETY
OBJECTIVE 7: QESH SYSTEMS
OBJECTIVE 8: CONTROL AND MANAGEMENT OF SUPPLIERS & CONTRACTORS
OBJECTIVE 9: WASTE HANDLING AND TRANSPORT

Under each of these Objectives the Indaver Improvement Plan specifies the following information:

1. Specific objective and associated targets
2. The specific actions outlined for achieving targets
3. Where the action arose from
4. Target date for completion of the action
5. Person responsible for completion of the action
6. Manager of person responsible for completion of the action
7. Department of the person responsible for completion of the action
8. Current status of objective/target

Actions are added and closed on an ongoing basis.

See Appendix 6 for a list of actions closed.

See Appendix 7 for a list of planned actions.

1.13.3 Overview of Environmental Management System

It is the policy of Indaver to conduct its activities in such a manner as to minimise or eliminate any potential adverse effects on the environment

This commitment is expressed in the company's QESH (Quality, Environmental and Safety & Health) Policy and by the installation of an Environmental Management System to control and minimise the environmental impact that the activities on site may pose.

1.13.4 Structure of Environmental Management System

Indaver have an integrated Quality, Environmental and Safety & Health (QESH) management system. The Quality, Environmental or the Health & Safety Management Systems for the Facility are not yet certified to the ISO 9001, ISO 14001 and OHSAS 18001 standards respectively but the systems are progressing towards certification to these standards and is scheduled for 2013.

Figure 1.13.4.1 shows the basic structure of the QESH Management System.

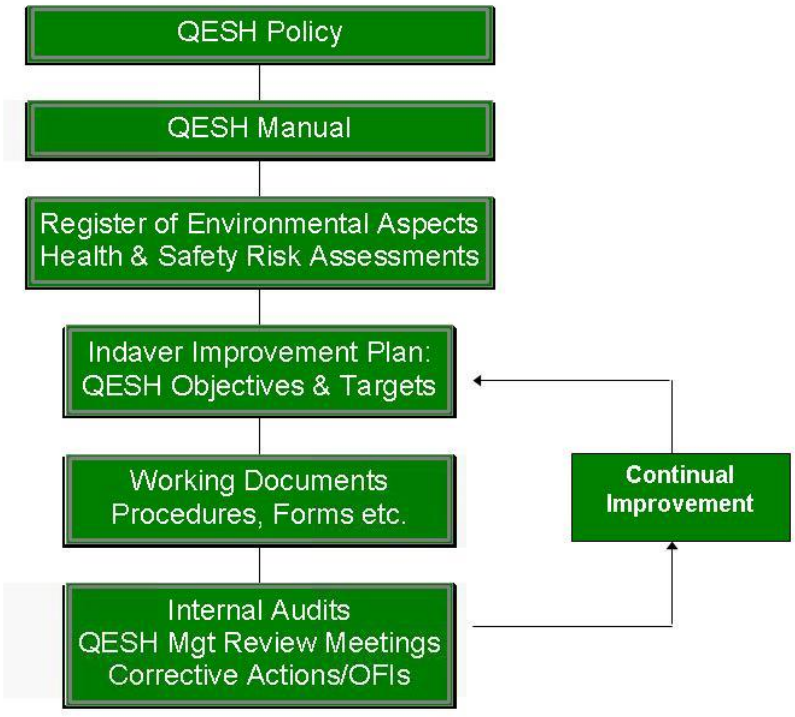


Figure 1.13.4.1 Structure of QESH Management System

1.13.5 Register of Environmental Aspects

The Register of Environmental Aspects identifies any significant environmental aspects of Indaver's activities. An environmental aspect is an element of Indaver's activities that can interact with the environment. The Register of Environmental Aspects for the Meath facility was drawn up in 2012 after consultation with the management and staff at the facility.

The following 9 aspects are currently in place:

1. Vehicle Movements
2. Tipping Hall
3. Storage & mixing of wastes
4. Incineration of wastes
5. Ash and metal handling & storage
6. Air emissions treatment process
7. Fire & Firewater
8. Ancillary Services
9. Resource, Consumable usage and generation of waste

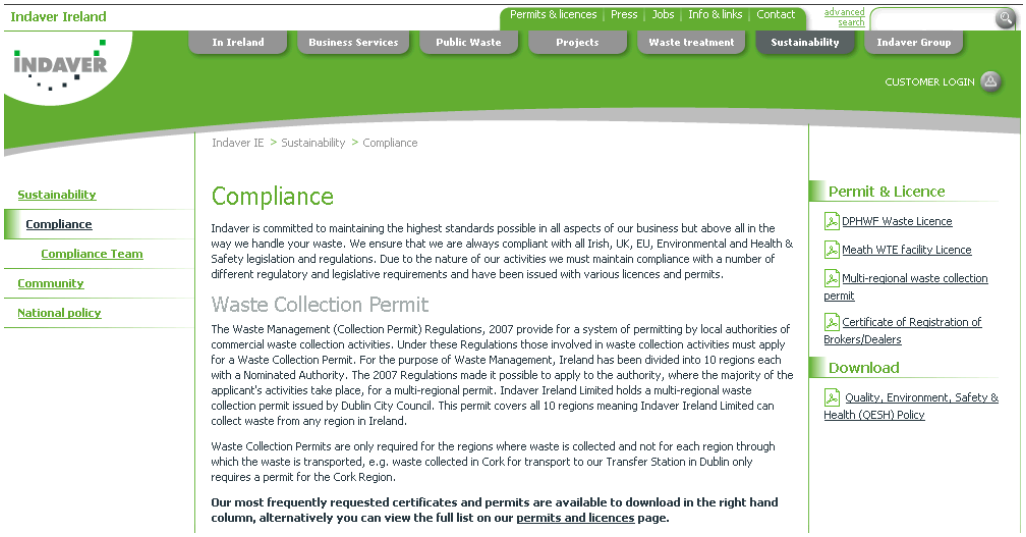
Each aspect is assigned a Significance Rating. All of these aspects were deemed significant and are controlled via the objectives and targets or through operational procedures.

1.13.6 Communication/Public Information

All communications with interested parties is dealt with as per Operations 6.1 Internal & External Communications Procedure. Indaver had 2 audits from customers during 2012 and over 30 visits from interested parties e.g. schools, universities etc

Environmental information is made available to interested parties upon request and Indaver aims to facilitate all requests by customers to conduct audits and by interested partied to conduct visits of the facility.

Indaver's website, www.indaver.ie, is a valuable source of information for customers and interested parties.



The “Compliance” Page provides access to downloads of the following:

- All of Indaver’s waste licences, waste permits and waste collections permit
- Indaver’s ISO 9001, ISO 14001 and OHSAS 18001 certificates
- Indaver’s Quality, Environmental and Health & Safety Policy
- Certificate of Registration of Brokers and Dealers

Indaver is also an active member of the Indaver Community Liaison Committee which consists of Slane Area Councillors, Carranstown Residents Committee and Indaver personnel and is chaired by Meath County Council.

1.14 Pollutant Release and Transfer Register-report for previous year

As per the PRTR regulations, S.I. No 123 of 2007, require that Indaver report releases of pollutants and off site transfers of waste. Indaver submitted their E-PRTR on 27th March 2012 and is attached in Appendix 4.

1.15 Pollutant Release and Transfer Register-proposal for current year

It is anticipated that Indaver will continue to monitor the same pollutants in our air emissions as in 2012. These are TOC, HCl, HF, SO_2, NO_x, CO, dust and dioxins.

1.16 Particulates Monitoring

Dust is monitored continuously using as per Schedule B of W0167-02. The quarterly reports contain the results for each months results for dust measurements. Here is the summary of dust figures for 2012.

The dust produced and emitted through A1-1 for the year 2012 is the following:

Dust ELV mg/Nm3	Average Result for 2012 mg/Nm3	Mass of dust emitted in 2012
10	0.09	68Kg

Quarterly testing took place in 2012 as per the licence schedule and the following is the results of the particulate monitoring from this campaign. The full reports have been sent to the Agency as part of the quarterly reports.

PM10	**Year 2012 Average mg/Nm3**	**Measurement Uncertainty mg/Nm3**
Average for 2012	0.555	±0.495

PM2.5	**Year 2012 Average mg/Nm3**	**Measurement Uncertainty mg/Nm3**
Average for 2012	0.3675	±0.365

1.17 Review of Decommissioning Management Plan

The Closure, Restoration, Aftercare management plan was completed and sent to the EPA for review in 2011. This was approved by the Agency on the 22nd August 2011. This was reviewed during 2012 and there have been no amendments or adjustments required. This will be reviewed again in 2013.

1.18 Statement of measures in relation to prevention of environmental damage and remedial actions (Environmental Liabilities)

Condition 12.2.1 of waste licence W0167-02 requires Indaver to submit an annual statement as to the measures taken or adopted at the site in relation to the prevention of environmental damage.

The statement of measures is outlined in Appendix 5 of the Environmental Liabilities Risk Assessment that was submitted to the Agency and agreed by the Agency on 22nd August 2011. A copy of this is attached in Appendix 3.

1.19 Environmental Liabilities Risk Assessment Review (every 3 years or more frequently as dictated by relevant on site change including financial provisions)

Condition 12.2.2 requires that the ELRA shall be reviewed as necessary to reflect any significant changes on site and in any case within three years following initial agreement. The ELRA was submitted to the Agency and received agreement on the 22nd August 2011. The financial provisions which were in place were also agreed with the Agency on the same date. This will be reviewed in light of any significant changes which occur and in any case within the three years i.e. by August 2014. There were no significant changes during 2012.

Appendix 1: Overview of waste accepted at W0167-02 during the reporting period 1st January 2012 to 31st December 2012

ID No.	EWC CODE WASTE DESCRIPTION	EWC	WASTE DESCRIPTION	QUANTITY ACCEPTED			ACTIVITIES CARRIED OUT AT YOUR SITE	Quantity of waste accepted in previous reporting year 2011 (tonnes)
				Licence Limit per Year from Schedule A (Tonnes)	Generated in RoI (tonnes)	Generated abroad (tonnes)		
WASTE FROM MUNICIPAL SOURCES (CHAPTER 20 CODES)								
1	Mixed residual waste (typically black bin)	20 03 01	This is split, there is 1637.76T of Category 1 waste which is waste from ports/airports so international caterial/msw waste. The rest is MSW waste. The figure in cell G15 is the combined figures	200000	160,064.04	0.00	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	31170.88
2	Plastic from municipal sources	20 01 39	This is material which is supplied from a collector of waste, the waste is primaily plastic but it is contaminated with MSW waste and therefore cannot be recycled.	50000	13.26	0.00	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	0
3	Metals from municipal waste e.g. light iron	20 01 40	Foil tubes from industry(foil tubes from denture cream)	50000	4.58	0.00	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	0
4	Street-cleaning residues	20 03 03	Street cleaning residues	200000	60.70	0.00	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	0
5	Bulky waste from municipal sources (skips or otherwise)	20 03 07	Described from the suppliers as only bulky waste	200000	985.22	0.00	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	0
6	Other municipal waste - please specify	20 03 99	One particular customer uses this EWC for the waste that they deliver to site. Material does appear to be like MSW waste	200000	1,575.16	0.00	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	267.62
SOURCE-SEGREGATED PACKAGING WASTE (CHAPTER 15 CODES)								
7	Segregated cardboard & paper packaging (e.g. corrugated cardboards, paper wrapping & bags)	15 01 01	This is microfiche product, no suitable EWC code so went with 15 01 01 as there was paper in the microfiche.	50000	0.02	0.00	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	0
WASTE FROM OTHER INDUSTRIES (CHAPTERS 01, 03–15, 18)								
8	Wastes from the MFSU of pharmaceuticals-sludges from on-site effluent treatment other than those mentioned in 07 05 11	07 05 12	Waste water treatment sludge from pharmaceutical industries	20000	3237.88	0	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	3.98
9	Solid wastes other than those mentioned in 07 05 13*	07 05 14	This is a mix of autoclaved biohardous material, vials, off spec raw material powders	20000	70.72	0	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	0
103	wastes from the MFSU of printing inks-waste printing toner other than those mentioned in 08 03 17	08 03 18	Toner waste from a manufacturer of toner products	50000	84.02	0	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	0
11	wastes from the photograpic industry-photographic film and paper free of silver or silver compounds	09 01 08	Photographic waste without silver	50000	7.1	0	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	0
PROCESSED WASTE FROM WASTE MANAGEMENT FACILITIES (CHAPTER 19 CODES)								
12	Combustible waste (refuse derived fuel)	19 12 10	Customers/Supplier state for this Refuse derived fuel	50000	5,157.50	0.00	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	492.82
13	Organic fines from mechanical treatment	19 12 12	One supplier only for this material-waste from mechanical treatment-organic fines and other oversize residues)	50000	5,000.00	0.00	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	0
14	Mixed residual waste from mechanical treatment	19 12 12	Mixed residual waste originating from domestic and commercial sources coming from a waste management facility which has been sorted by a grab machine and manual picking to removed recyclable items. Residual content contained in the loads delivered.	50000	22,659.78	0.00	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	10087.92

OTHER - Materials not listed specifically above								
15	materials unsuitable for consumption or processing	02 02 03	Food not fit for consumption(out of date pet food, cereals)	50000	38.76	0.00	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	0
16	materials unsuitable for consumption or processing	02 06 01	Out of date cereals	50000	8.90	0.00	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	0
17	waste from processed textile fibres	04 02 22	Clunker waste-this is fibrous material from industry, contains absorbant material used for absorbing products e.g. nappies	50000	16.84	0.00	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	0
18	Off specification batches and unused products-Organic wastes other than those mentioned in 16 03 05	16 03 06	Mix of saline solution, baby food and shredded lancing devices	50000	138.00	0.00	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	2.04
19	wastes whose collection and disposal is not subject to special requirements in order to prevent infection(for example dressings, plaster casts, linen, disposable clothing, diapers)	18 01 04	Sensitive waste e.g. wastes from retirment homes e.g incontinence pads, nappies, items from sanitary bins etc	50000	28.96	0.00	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	0
20	premixed wastes composed only of non-hazardous wastes	19 02 03	Sterlised shredded waste(from clinical collections)that used to go to landfill/use in a cement plant as an alternative fuel	50000	1,222.44	0.00	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	39.5
21	non composted fraction of municipal and similar wastes	19 05 01	Organic fines	50000	20.58	0.00	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	40.22
22	fluff-light fraction and dust other than those mentioned in 19 10 03	19 10 04	Automotive Shredder waste	50000	5,455.72	0.00	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	24.22
23	other fractions other than those mentioned in 19 10 05	19 10 06	Automotive Shredder waste-this customer uses this code for their automotive shredder waste	50000	275.94	0.00	R1. This waste is put into the bunker(pit), mixed with cranes,fed to a hopper before entering the furnace where it is incinerated at >850°C. Energy is produced, turned into electricity and supplied to the National Grid.	0

Appendix 2: Overview of waste removed from site W0167-02 during the reporting period 1st January 2012 to 31st December 2012

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
Within the Country	13 05 07	Yes	21.64	oily water from oil/water separators	D9	Offsite in Ireland	Enva Ireland Ltd,196-1	MacAnulty Clear Drains,John F Kennedy Industrial Estate John F Kennedy Road,Naas Road,Dublin 12,Ireland	Enva Ireland Ltd,196-1,MacAnulty Clear Drains,John F Kennedy Industrial Estate John F Kennedy Road,Naas Road,Dublin 12,Ireland	MacAnulty Clear Drains,John F Kennedy Industrial Estate John F Kennedy Road,Naas Road,Dublin 12,Ireland
Within the Country	16 10 01	Yes	0.0	aqueous liquid wastes containing dangerous substances	D9	Offsite in Ireland	Rilta Environmental,W0192-03	Block 402,Greenogue Business Park,Rathcoole,Dublin, Ireland	Rilta Environmental,W0192-03,Block 402,Greenogue Business Park,Rathcoole,Dublin,Ireland	Block 402,Greenogue Business Park,Rathcoole,Dublin,Ireland
Within the Country	16 10 02	No	1150.16	aqueous liquid wastes other than those mentioned in 16 10 01	D9	Offsite in Ireland	EPS Dundalk and Drogheda WWTW,EPS Pumping & Treatment Systems	Dundalk WWTW,Lower point road,Co-Louth,Co-Louth,Ireland		
Within the Country	16 10 02	No	0.0	aqueous liquid wastes other than those mentioned in 16 10 01	D9	Offsite in Ireland	Rilta Environmental,W0192-03	Block 402,Greenogue Business Park,Rathcoole,Dublin, Ireland		
Within the Country	17 02 01	No	17.42	wood	R13	Offsite in Ireland	Nurendale Limited trading as Panda Waste Services Limited,W0140 - 03	Rathdrinagh,Beauparc, Navan ,Co Meath ,Ireland		
Within the Country	17 04 05	No	3.68	iron and steel	R13	Offsite in Ireland	Nurendale Limited trading as Panda Waste Services Limited,W0140 - 03	Rathdrinagh,Beauparc, Navan ,Co Meath ,Ireland		
Within the Country	17 05 04	No	0.0	soil and stones other than those mentioned in 17 05 03	D15	Offsite in Ireland	Nurendale Limited trading as Panda Waste Services Limited,W0140 - 03	Rathdrinagh,Beauparc, Navan ,Co Meath ,Ireland		
Within the Country	17 06 04	No	0.0	insulation materials other than those mentioned in 17 06 01 and 17 06 03	D15	Offsite in Ireland	Nurendale Limited trading as Panda Waste Services Limited,W0140 - 03	Rathdrinagh,Beauparc, Navan ,Co Meath ,Ireland		
Within the Country	17 09 04	No	82.94	mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	D15	Offsite in Ireland	Nurendale Limited trading as Panda Waste Services Limited,W0140 - 03	Rathdrinagh,Beauparc, Navan ,Co Meath ,Ireland		
Within the Country	19 01 02	No	2745.72	ferrous materials removed from bottom ash	R4	Offsite in Ireland	Hammond Lane Metal Company Limited,WFP-DC-0013-01	Pigeon House Road,Ringsend,Dublin 4,Ringsend,Ireland		
Within the Country	19 01 02	No	169.58	ferrous materials removed from bottom ash	R4	Offsite in Ireland	Hegarty Metal Processors (International) limited,WFP-LKC-11-001-01	Ballysimon road,.,Limerick City,Limerick City,Ireland		
To Other Countries	19 01 07	Yes	6047.29	solid wastes from gas treatment	R5	Abroad	K&S Kali GmBH,LicenceM76D310/57	Reutilisation Salt Mines(Phillippstaal),Nipper StraBe 33,36269 Philippsthal,36269,Germany	K&S Kali GmBH,LicenceM76D310/57,Reutilisation Salt Mines(Phillippstaal),Nipper StraBe 33,36269 Philippsthal,36269 Philippsthal,Germany	Reutilisation Salt Mines(Phillippstaal),Nipper StraBe 33,36269 Philippsthal,36269 Philippsthal,Germany
Within the Country	19 01 12	No	39744.18	bottom ash and slag other than those mentioned in 19 01 11	D1	Offsite in Ireland	Whiteriver Landfill[Louth County Council] ,W0060-03	Whiteriver and Gunstown Townland ,Dunleer,Co-Louth,Co-Louth,Ireland		
To Other Countries	19 01 13	Yes	1170.18	fly ash containing dangerous substances	R5	Abroad	K&S Kali GmBH,LicenceM76D310/57	Reutilisation Salt Mines(Phillippstaal),Nipper StraBe 33,36269 Philippsthal,36269,Germany	K&S Kali GmBH,LicenceM76D310/57,Reutilisation Salt Mines(Phillippstaal),Nipper StraBe 33,36269 Philippsthal,36269 Philippsthal,Germany	Reutilisation Salt Mines(Phillippstaal),Nipper StraBe 33,36269 Philippsthal,36269 Philippsthal,Germany
Within the Country	20 03 01	No	2.24	mixed municipal waste	R13	Offsite in Ireland	Nurendale Limited trading as Panda Waste Services Limited,W0140 - 03	Rathdrinagh,Beauparc, Navan ,Co Meath ,Ireland		
Within the Country	20 03 01	No	7.54	mixed municipal waste	D15	Offsite in Ireland	Nurendale Limited trading as Panda Waste Services Limited,W0140 - 03	Rathdrinagh,Beauparc, Navan ,Co Meath ,Ireland		
Within the Country	20 03 01	No	15.6	mixed municipal waste	R1	Onsite of generation	Indaver Ireland Limited,W0167-02	Carranstown,Duleek,Co-Meath,N/A,Ireland		
Within the Country	20 03 03	No		street-cleaning residues	R1	Onsite of generation	Indaver Ireland Limited,W0167-02	Carranstown,Duleek,Co-Meath,N/A,Ireland		
Within the Country	20 03 04	No	565.76	septic tank sludge	D9	Offsite in Ireland	EPS Dundalk and Drogheda WWTW,EPS Pumping & Treatment Systems	Dundalk WWTW,Lower point road,Co-Louth,Co-Louth,Ireland		
Within the Country	20 03 04	No	0.0	septic tank sludge	D9	Offsite in Ireland	Meath County Council-Navan,D0059-01	County Hall,Railway Street,Navan,Co-Meath,Ireland		
Within the Country	20 03 07	No	4.36	bulky waste	D1	Offsite in Ireland	Whiteriver Landfill[Louth County Council] ,W0060-03	Whiteriver and Gunstown Townland ,Dunleer,Co-Louth,Co-Louth,Ireland		
Within the Country	20 01 39	No	1.88	plastics	R13	Offsite in Ireland	Nurendale Limited trading as Panda Waste Services Limited,W0140 - 03	Rathdrinagh,Beauparc, Navan ,Co Meath ,Ireland		
Within the Country	19 01 12	No	763.54	bottom ash and slag other than those mentioned in 19 01 11	R10	Offsite in Ireland	Greenstar Knockharley,W0146-01	Knockharley,Navan,Co-Meath,.,Ireland		
Within the Country	19 01 02	No	99.04	ferrous materials removed from bottom ash	R12	Offsite in Ireland	AES t/A Midland Waste Disposal Company Limited,W0131-02	Clonmagadden,Proudstown,Navan,Co-Meath,Ireland		

Within the Country	13 08 99	Yes	1.1	wastes not otherwise specified	R9	Offsite in Ireland	Rilta Environmental,W0192-03	Block 402,Greenogue Business Park,Rathcoole,Dublin, Ireland		
Within the Country	06 01 05	Yes	0.148	nitric acid and nitrous acid	D10	Offsite in Ireland	Indaver Ireland Limited,W0036-02	Tolka Quay Road,Dublin Port,D1,D1,Ireland	Abfall Verwertungs Gesellschaft Gmb (AVG),IB2234/AVG-GENB-2,Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany	Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany
Within the Country	06 01 06	Yes	0.128	other acids	D10	Offsite in Ireland	Indaver Ireland Limited,W0036-02	Tolka Quay Road,Dublin Port,D1,D1,Ireland	Abfall Verwertungs Gesellschaft Gmb (AVG),IB2234/AVG-GENB-2,Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany	Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany
Within the Country	06 02 03	Yes	0.033	ammonium hydroxide	D10	Offsite in Ireland	Indaver Ireland Limited,W0036-02	Tolka Quay Road,Dublin Port,D1,D1,Ireland	Abfall Verwertungs Gesellschaft Gmb (AVG),IB2234/AVG-GENB-2,Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany	Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany
Within the Country	06 02 04	Yes	0.045	sodium and potassium hydroxide	D10	Offsite in Ireland	Indaver Ireland Limited,W0036-02	Tolka Quay Road,Dublin Port,D1,D1,Ireland	Abfall Verwertungs Gesellschaft Gmb (AVG),IB2234/AVG-GENB-2,Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany	Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany
Within the Country	13 02 08	Yes	0.158	other engine, gear and lubricating oils	D10	Offsite in Ireland	Indaver Ireland Limited,W0036-02	Tolka Quay Road,Dublin Port,D1,D1,Ireland	Abfall Verwertungs Gesellschaft Gmb (AVG),IB2234/AVG-GENB-2,Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany	Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany
Within the Country	13 07 01	Yes	2.434	fuel oil and diesel	D10	Offsite in Ireland	Indaver Ireland Limited,W0036-02	Tolka Quay Road,Dublin Port,D1,D1,Ireland	Abfall Verwertungs Gesellschaft Gmb (AVG),IB2234/AVG-GENB-2,Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany	Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany
Within the Country	15 02 02	Yes	0.146	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	D10	Offsite in Ireland	Indaver Ireland Limited,W0036-02	Tolka Quay Road,Dublin Port,D1,D1,Ireland	Abfall Verwertungs Gesellschaft Gmb (AVG),IB2234/AVG-GENB-2,Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany	Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany
Within the Country	16 05 04	Yes	0.011	gases in pressure containers (including halons) containing dangerous substances	D10	Offsite in Ireland	Indaver Ireland Limited,W0036-02	Tolka Quay Road,Dublin Port,D1,D1,Ireland	Abfall Verwertungs Gesellschaft Gmb (AVG),IB2234/AVG-GENB-2,Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany	Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany
To Other Countries	19 01 13	Yes	463.12	fly ash containing dangerous substances	D9	Abroad	Indaver NV,MLAV1/9800000485/MV/bd	Industriele Afvalverwerking,Poldervlietweg,B-2030 Antwerpen 3,B-2030 Antwerpen 3,Belgium	Indaver NV,MLAV1/9800000485/MV/bd,Industriele Afvalverwerking,Poldervlietweg,B-2030 Antwerpen 3,B-2030 Antwerpen 3,Belgium	Indaver NV,MLAV1/9800000485/MV/bd,Industriele Afvalverwerking,Poldervlietweg,B-2030 Antwerpen 3,B-2030 Antwerpen 3,Belgium
To Other Countries	19 01 13	Yes	22.06	fly ash containing dangerous substances	R5	Abroad	K&S,34/Hef-79 n 330-51/153	Werk Werra,Standort Wintershall Herfagrund,36266 Herfa ,36266 Herfa ,Germany	K & S,34/Hef-79 n 330-51/153,Werk Werra,Standort Wintershall Herfagrund,36266 Herfa ,36266 Herfa ,Germany	Werk Werra,Standort Wintershall Herfagrund,36266 Herfa ,36266 Herfa ,Germany
To Other Countries	19 01 13	Yes	100.0	fly ash containing dangerous substances	D12	Abroad	K & S ,34/Hef-79n330-51/153	Werra Plant Underground Waste Disposal Plant,Herfa-Neurode,36266 Heringen ,36266 Heringen ,Germany	K & S ,34/Hef-79n330-51/153,Werra Plant Underground Waste Disposal Plant,Herfa-Neurode,36266 Heringen ,36266 Heringen ,Germany	Werra Plant Underground Waste Disposal Plant,Herfa-Neurode,36266 Heringen ,36266 Heringen ,Germany
To Other Countries	19 01 07	Yes	1194.26	solid wastes from gas treatment	D9	Abroad	Indaver NV,MLAV1/9800000485/MV/bd	Industriele Afvalverwerking,Poldervlietweg,B-2030 Antwerpen 3,B-2030 Antwerpen 3,Belgium	Indaver NV,MLAV1/9800000485/MV/bd,Industriele Afvalverwerking,Poldervlietweg,B-2030 Antwerpen 3,B-2030 Antwerpen 3,Belgium	Indaver NV,MLAV1/9800000485/MV/bd,Industriele Afvalverwerking,Poldervlietweg,B-2030 Antwerpen 3,B-2030 Antwerpen 3,Belgium
To Other Countries	19 01 07	Yes	86.8	solid wastes from gas treatment	R5	Abroad	K&S,34/Hef-79 n 330-51/153	Werk Werra,Standort Wintershall Herfagrund,36266 Herfa ,36266 Herfa ,Germany	K & S,34/Hef-79 n 330-51/153,Werk Werra,Standort Wintershall Herfagrund,36266 Herfa ,36266 Herfa ,Germany	Werk Werra,Standort Wintershall Herfagrund,36266 Herfa ,36266 Herfa ,Germany

Appendix 3: Statement of Measures

Master List of Risk Reduction and Consequence Mitigation Measures

Ref	Process / Area	Measure
01	Vehicle movements	Vehicles only travel over hardstanding areas with drainage to surface water drainage system
		Vendor selection procedures to eliminate high risk waste contractors
		Well marked two-way system for waste deliveries on site with a large turning area at tipping hall
		Outdoor lighting in vehicle movement areas
		Security gate at weigh bridge entrance to site
		15 km/h speed limit to be set on site
		All trucks carrying waste must present paperwork prior to gaining entry to site
		Visitor pass system
02	Tipping Hall	All waste depositing operations are manned activities
		Random waste inspections carried out to identify any unsuitable wastes in contractors loads
		SOP to be developed for waste loading / unloading
		Waste quarantine area designated at delivery area for diesel storage
03	Storage & mixing of wastes	Concrete specification is impervious to liquids that could enter the waste bunker
		Automatic foam / water cannons system in waste bunker
		All waste mixing activities in waste bunker are manned activities
		All waste mixed in waste bunker by grab to achieve consistency in waste to furnace and dilute any spot contamination loads
04	Heat treatment of wastes	Furnace designed to withstand minor explosions
05	Ash handling & storage	Ash loading operations are manned activities

Ref	Process / Area		Measure
			High level alarms on all ash holding silos
			Low level alarms on all ash holding silos
			Fill detectors on road tankers used for unloading ash from silos
			Bottom ash holding area graded to contain wet ash
			Spill kits (including absorbent materials)
			Spill procedures for containing and disposing of ash spills
			Bottom ash storage capacity of 1,600 m^3, over one weeks estimated storage capacity
			Approved vendor supplier vetting process
			Leak detection system on waste bunker to prevent any leachate entering groundwater
			Boiler ash and bottom ash to be collected in sealed container or sealed IBCs for disposal
06	Air emissions treatment process		Ammonia solution area is kerbed & graded towards a dedicated isolated underground 10,000 litre forecourt separator with closure valve to the south west of the tank
			Ammonia solution tank filling operations are manned activities
			Double skinned tank with leak detection and overfill protection used for ammonia solution
			Tank inspection regime as part of preventative maintenance procedures
			All ammonia solution pipework above ground
			High level alarms on all air emission treatment silos
			Low level alarms on all air emission treatment silos
			All drains in process building drain to recovered water tanks beside NaOH delivery area
			Spill kits (including absorbent materials)

Ref	Process / Area		Measure
			Emergency overpressure vent on activated carbon silo - if overpressure a vent system relieves overpressure to atmosphere
			Approved vendor supplier vetting process
			All NaOH and Nitric acid will be contained in IBCs
			Activated carbon quantities will be minimised once the process has been established
			Duty standby motors for suction fan for process
			Automatic process shutdown for fan failure
07	Fires & Firewater		Fire detection across site with smoke detectors in buildings (connected to fire alarm)
			UV / IR combined fire detectors used in waste bunker are better and more effective than smoke detectors due to height of bunker and dust levels expected
			Four directable water cannons in waste bunker for extinguishing spot fires
			Firewater retention tank with diversion valve linked to control room
			Waste bunker is impermeable and can contain firewater. Manual system for pumping out bunker after a fire event if required
			Fire main & hydrants across process building (hose reels inside, hydrants outside)
			Hand held fire extinguishers across site
			Foam supplies
			TOC, pH and conductivity of runoff monitored twice before leaving outfall
			All surface water runoff must be pumped to hydrobreak before release to drainage ditch
08	Ancillary services		Routine inspections of piping and tanks as per maintenance programme
			Diesel storage area is kerbed & graded towards a dedicated isolated underground 10,000 litre forecourt separator to the south west of the tank

Ref	Process / Area		Measure
			Diesel tank filling operations are manned activities
			Double skinned tank with leak detection used for diesel
			Engine shutoff during diesel unloading
			All diesel pipework above ground
			Spill kits (including absorbent materials)
			Concrete specification is impervious to liquids that could enter the septic tank
			Tank inspection regime as part of preventative maintenance procedures
			Automatic foam / water deluge system in Turbine area for turbine lube oil tank and pipework
			Spill procedure for containment and removal of material/chemical spills
			Break Glass Units across site
			All electrics to ETCI Rules
			Elevated pipe tracks, all process pipes are above ground (apart from drain pipes)
			Planned / preventative maintenance
			Operator training
			Safety briefing for contractors
			Use of qualified vendors
			Chemstore units with spill trays to be used in the contractors' compound for small quantities of hazardous materials stored there
			Inspection / monitoring chamber on puraflo system for domestic type waste effluent
			Bunding around transformers on site

Ref	Process / Area		Measure
			Eye washes and safety showers will be placed in the required locations across the site
			Emergency response and spill response drills will be carried out quarterly as part of the annual training regime for the site

Appendix 4: E-PRTR

Grace McCormack

From: aerreturns@epa.ie
Sent: 28 March 2013 08:07
To: Grace McCormack
Subject: AER / PRTR Emissions Data VERIFICATION OF ACCEPTANCE (w0167_2012.xml)

Thank you,

Your AER / PRTR Emissions Data submission has been accepted by our data system.

You may now proceed to print your submitted emissions and waste transfers information for insertion into your Full AER report. The Full AER Report must be submitted in BOTH hardcopy (paper) form (Only Applicable to Urban Waste Water Treatment Plants) and electronic (PDF) form.

Please retain the receipt / tracking number below in case of future queries about this submission and in case a request is made by an authorised person in this regard.

e61d9b30a3fc7376b4c08d5633d8a8f3

Environmental Protection Agency

Guidance to completing the PRTR workbook

AER Returns Workbook

Version 1.1.15

REFERENCE YEAR	2012

1. FACILITY IDENTIFICATION

Parent Company Name	Indaver Ireland Limited
Facility Name	Indaver Ireland Limited
PRTR Identification Number	W0167
Licence Number	W0167-02

Waste or IPPC Classes of Activity

No.	class_name
3.8	Incineration on land or at sea.
3.12	Repackaging prior to submission to any activity referred to in a preceding paragraph of this Schedule.
3.13	Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.
3.7	##
4.13	Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.
4.2	Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes).
4.3	Recycling or reclamation of metals and metal compounds.
4.4	Recycling or reclamation of other inorganic materials.
4.6	Recovery of components used for pollution abatement.
4.9	Use of any waste principally as a fuel or other means to generate energy.

Address 1	Carranstown
Address 2	Duleek
Address 3	Meath
Address 4	
	Meath
Country	Ireland
Coordinates of Location	-6.39215 53.6765
River Basin District	IEEA
NACE Code	3821
Main Economic Activity	Treatment and disposal of non-hazardous waste
AER Returns Contact Name	Grace McCormack
AER Returns Contact Email Address	grace.mccormack@indaver.ie
AER Returns Contact Position	Quality and Environmental Manager
AER Returns Contact Telephone Number	041 213 4005
AER Returns Contact Mobile Phone Number	086 046 4224
AER Returns Contact Fax Number	n/a
Production Volume	0.0
Production Volume Units	
Number of Installations	1
Number of Operating Hours in Year	7759
Number of Employees	39
User Feedback/Comments	
Web Address	www.indaver.ie

2. PRTR CLASS ACTIVITIES

Activity Number	Activity Name
5(b)	Installations for the incineration of non-hazardous waste in the scope of Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste
5(c)	Installations for the disposal of non-hazardous waste
50.1	General

3. SOLVENTS REGULATIONS (S.I. No. 543 of 2002)

Is it applicable?	No
Have you been granted an exemption ?	
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

4. WASTE IMPORTED/ACCEPTED ONTO SITE Guidance on waste imported/accepted onto site

Do you import/accept waste onto your site for on-site treatment (either recovery or disposal activities) ?	Yes

This question is only applicable if you are an IPPC or Quarry site

4.1 RELEASES TO AIR

Link to previous years emissions data

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD				QUANTITY		
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
02	Carbon monoxide (CO)	M	OTH	EN 14181 (Continuous Monitoring using FTIR)	3874.0	3874.0	0.0	0.0
80	Chlorine and inorganic compounds (as HCl)	M	OTH	EN 14181 (Continuous Monitoring using FTIR)	1599.0	1599.0	0.0	0.0
84	Fluorine and inorganic compounds (as HF)	M	OTH	EN 14181 (Continuous Monitoring using FTIR)	60.0	60.0	0.0	0.0
21	Mercury and compounds (as Hg)	M	EN 13211:2001		0.484	0.484	0.0	0.0
08	Nitrogen oxides (NOx/NO2)	M	OTH	EN 14181 (Continuous Monitoring using FTIR)	108113.0	108113.0	0.0	0.0
11	Sulphur oxides (SOx/SO2)	M	OTH	EN 14181 (Continuous Monitoring using FTIR)	12763.0	12763.0	0.0	0.0
03	Carbon dioxide (CO2)	M	OTH	EN 14181 (Continuous Monitoring using FTIR)	173645555.0	173645555.0	0.0	0.0
05	Nitrous oxide (N2O)	M	OTH	TGN M22	3958.509	3958.509	0.0	0.0
47	PCDD + PCDF (dioxins + furans)(as Teq)	M	EN 1948-1 to3:2003		0.0032	0.0032	0.0	0.0
86	**Particulate matter (PM10)**	M	CRM	BS EN ISO 23210	416.685	416.685	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD				QUANTITY		
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (As required in your Licence)

RELEASES TO AIR					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD				QUANTITY		
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
351	Total Organic Carbon (as C)	M	OTH	EN 14181 (Continuous Monitoring using FID)	225.0	225.0	0.0	0.0
210	Dust	M	OTH	EN 14181 (Continuous Monitoring)	68.0	68.0	0.0	0.0
347	Total heavy metals	M	EN 14385:2004	This is inclusive of Cd/Tl figures.	75.0	75.0	0.0	0.0
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

Additional Data Requested from Landfill operators

For the purposes of the National Inventory on Greenhouse Gases, landfill operators are requested to provide summary data on landfill gas (Methane) flared or utilised on their facilities to accompany the figures for total methane generated. Operators should only report their Net methane (CH4) emission to the environment under T(total) KG/yr for Section A: Sector specific PRTR pollutants above. Please complete the table below:

Landfill: Indaver Ireland Limited

Please enter summary data on the quantities of methane flared and / or utilised	T (Total) kg/Year	M/C/E	Method Used: Method Code	Method Used: Designation or Description	Facility Total Capacity m3 per hour	
Total estimated methane generation (as per site model)	0.0				N/A	
Methane flared	0.0				0.0	(Total Flaring Capacity)
Methane utilised in engine/s	0.0				0.0	(Total Utilising Capacity)
Net methane emission (as reported in Section A above)	0.0				N/A	

4.2 RELEASES TO WATERS

Link to previous years emissions data

SECTION A : SECTOR SPECIFIC PRTR POLLUTANTS

Data on ambient monitoring of storm/surface water or groundwater, conducted as part of your licence requirements, should NOT be submitted under AER / PRTR Reporting as this only concerns Releases from your facility

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING PRTR POLLUTANTS

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION C : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO WATERS					Please enter all quantities in this section in KGs			
POLLUTANT					QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

4.3 RELEASES TO WASTEWATER OR SEWER

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

OFFSITE TRANSFER OF POLLUTANTS DESTINED FOR WASTE-WATER TREATMENT OR SEWER					Please enter all quantities in this section in KGs			
POLLUTANT		METHOD			QUANTITY			
			Method Used					
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year	F (Fugitive) KG/Year
					0.0	0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

4.4 RELEASES TO LAND

Link to previous years emissions data

SECTION A : PRTR POLLUTANTS

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
No. Annex II	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

SECTION B : REMAINING POLLUTANT EMISSIONS (as required in your Licence)

RELEASES TO LAND					Please enter all quantities in this section in KGs		
POLLUTANT		METHOD			QUANTITY		
			Method Used				
Pollutant No.	Name	M/C/E	Method Code	Designation or Description	Emission Point 1	T (Total) KG/Year	A (Accidental) KG/Year
					0.0	0.0	0.0

* Select a row by double-clicking on the Pollutant Name (Column B) then click the delete button

Please enter all quantities on this sheet in Tonnes

Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	Method Used: M/C/E	Method Used: Method Used	Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
Within the Country	13 05 07	Yes	21.64	oily water from oil/water separators	D9	M	Weighed	Offsite in Ireland	Enva Ireland Ltd,196-1	MacAnulty Clear Drains,John F Kennedy Industrial Estate John F Kennedy Road,Naas Road,Dublin 12,Ireland	Enva Ireland Ltd,196-1,MacAnulty Clear Drains,John F Kennedy Industrial Estate John F Kennedy Road,Naas Road,Dublin 12,Ireland	MacAnulty Clear Drains,John F Kennedy Industrial Estate John F Kennedy Road,Naas Road,Dublin 12,Ireland
Within the Country	16 10 01	Yes	0.0	aqueous liquid wastes containing dangerous substances	D9	M	Weighed	Offsite in Ireland	Rilta Environmental,W0192-03	Block 402,Greenogue Business Park,Rathcoole,Dublin,Ireland	Rilta Environmental,W0192-03,Block 402,Greenogue Business Park,Rathcoole,Dublin,Ireland	Block 402,Greenogue Business Park,Rathcoole,Dublin,Ireland
Within the Country	16 10 02	No	1150.16	aqueous liquid wastes other than those mentioned in 16 10 01	D9	M	Weighed	Offsite in Ireland	EPS Dundalk and Drogheda WWTW,EPS Pumping & Treatment Systems	Dundalk WWTW,Lower point road,Co-Louth,Co-Louth,Ireland		
Within the Country	16 10 02	No	0.0	aqueous liquid wastes other than those mentioned in 16 10 01	D9	M	Weighed	Offsite in Ireland	Rilta Environmental,W0192-03	Block 402,Greenogue Business Park,Rathcoole,Dublin,Ireland		
Within the Country	17 02 01	No	17.42	wood	R13	M	Weighed	Offsite in Ireland	Nurendale Limited trading as Panda Waste Services Limited,W0140 - 03	Rathdrinagh,Beauparc,Navan ,Co Meath,Ireland		
Within the Country	17 04 05	No	3.68	iron and steel	R13	M	Weighed	Offsite in Ireland	Nurendale Limited trading as Panda Waste Services Limited,W0140 - 03	Rathdrinagh,Beauparc,Navan ,Co Meath,Ireland		
Within the Country	17 05 04	No	0.0	soil and stones other than those mentioned in 17 05 03	D15	M	Weighed	Offsite in Ireland	Nurendale Limited trading as Panda Waste Services Limited,W0140 - 03	Rathdrinagh,Beauparc,Navan ,Co Meath,Ireland		
Within the Country	17 06 04	No	0.0	insulation materials other than those mentioned in 17 06 01 and 17 06 03	D15	M	Weighed	Offsite in Ireland	Nurendale Limited trading as Panda Waste Services Limited,W0140 - 03	Rathdrinagh,Beauparc,Navan ,Co Meath,Ireland		
Within the Country	17 09 04	No	82.94	mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	D15	M	Weighed	Offsite in Ireland	Hammond Lane Metal Company Limited,WFP-DC-0013-01	Pigeon House Road,Ringsend,Dublin 4,Ringsend,Ireland		
Within the Country	19 01 02	No	2745.72	ferrous materials removed from bottom ash	R4	M	Weighed	Offsite in Ireland	Hegarty Metal Processors (International) limited,WFP-LKC-11-001-01	Ballysimon road,,,Limerick City,Limerick City,Ireland		
To Other Countries	19 01 07	Yes	6047.29	solid wastes from gas treatment	R5	M	Weighed	Abroad	K&S Kali GmBH,LicenceM76D310/57 Whiterver Landfill[Louth County Council]	Reutilisation Salt Mines(Philippstaal),Nipper Straße 33,36269 Philippsthal,36269,Germany	K&S Kali GmBH,LicenceM76D310/57, Reutilisation Salt Mines(Philippstaal),Nipper Straße 33,36269 Philippsthal,36269 Philippsthal,Germany	Reutilisation Salt Mines(Philippstaal),Nipper Straße 33,36269 Philippsthal,36269 Philippsthal,Germany
Within the Country	19 01 12	No	39744.18	bottom ash and slag other than those mentioned in 19 01 11	D1	M	Weighed	Offsite in Ireland	,W0060-03	Whiterver and Gunstown Townland ,Dunleer,Co-Louth,Co-Louth,Ireland		
To Other Countries	19 01 13	Yes	1170.18	fly ash containing dangerous substances	R5	M	Weighed	Abroad	K&S Kali GmBH,LicenceM76D310/57 Nurendale Limited trading as Panda Waste Services Limited,W0140 - 03	Reutilisation Salt Mines(Philippstaal),Nipper Straße 33,36269 Philippsthal,36269,Germany	K&S Kali GmBH,LicenceM76D310/57, Reutilisation Salt Mines(Philippstaal),Nipper Straße 33,36269 Philippsthal,36269 Philippsthal,Germany	Reutilisation Salt Mines(Philippstaal),Nipper Straße 33,36269 Philippsthal,36269 Philippsthal,Germany
Within the Country	20 03 01	No	2.24	mixed municipal waste	R13	M	Weighed	Offsite in Ireland	Nurendale Limited trading as Panda Waste Services Limited,W0140 - 03	Rathdrinagh,Beauparc,Navan ,Co Meath,Ireland		
Within the Country	20 03 01	No	7.54	mixed municipal waste	D15	M	Weighed	Offsite in Ireland	Nurendale Limited trading as Panda Waste Services Limited,W0140 - 03	Rathdrinagh,Beauparc,Navan ,Co Meath,Ireland		
Within the Country	20 03 01	No	15.6	mixed municipal waste	R1	E	Volume Calculation	Onsite of generatio	Indaver Ireland Limited,W0167-02	Carranstown,Duleek,Co-Meath,N/A,Ireland		
Within the Country	20 03 03	No	0.0	street-cleaning residues	R1	M	Weighed	Onsite of generatio	Indaver Ireland Limited,W0167-02	Carranstown,Duleek,Co-Meath,N/A,Ireland		
Within the Country	20 03 04	No	565.76	septic tank sludge	D9	M	Weighed	Offsite in Ireland	EPS Dundalk and Drogheda WWTW,EPS Pumping & Treatment Systems	Dundalk WWTW,Lower point road,Co-Louth,Co-Louth,Ireland		
Within the Country	20 03 04	No	0.0	septic tank sludge	D9	M	Weighed	Offsite in Ireland	Meath County Council-Navan,D0059-01 Whiterver Landfill[Louth County Council]	County Hall,Railway Street,Navan,Co-Meath,Ireland Whiterver and Gunstown Townland ,Dunleer,Co-Louth,Co-Louth,Ireland		
Within the Country	20 03 07	No	4.36	bulky waste	D1	M	Weighed	Offsite in Ireland	,W0060-03			
Within the Country	20 01 39	No	1.88	plastics	R13	M	Weighed	Offsite in Ireland	Nurendale Limited trading as Panda Waste Services Limited,W0140 - 03	Rathdrinagh,Beauparc,Navan ,Co Meath,Ireland		
Within the Country	19 01 12	No	763.54	bottom ash and slag other than those mentioned in 19 01 11	R10	M	Weighed	Offsite in Ireland	Greenstar Knockharley,W0145-01	Knockharley,Navan,Co-Meath,,Ireland		
Within the Country	19 01 02	No	99.04	ferrous materials removed from bottom ash	R12	M	Weighed	Offsite in Ireland	AES t/A Midland Waste Disposal Company Limited,W0131-02	Clonmagadden,Proudstown,Navan,Co-Meath,Ireland		
Within the Country	13 08 99	Yes	1.1	wastes not otherwise specified	R9	M	Weighed	Offsite in Ireland	Rilta Environmental,W0192-03	Block 402,Greenogue Business Park,Rathcoole,Dublin,Ireland	Rilta Environmental,W0192-03,Block 402,Greenogue Business Park,Rathcoole,Dublin,Ireland	Block 402,Greenogue Business Park,Rathcoole,Dublin,Ireland
Within the Country	06 01 05	Yes	0.148	nitric acid and nitrous acid	D10	M	Weighed	Offsite in Ireland	Indaver Ireland Limited,W0036-02	Tolka Quay Road,Dublin Port,D1,D1,Ireland	Abfall Verwertungs Gesellschaft Gmb (AVG),B2234/AVG-GENB-2,Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany	Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany
Within the Country	06 01 06	Yes	0.128	other acids	D10	M	Weighed	Offsite in Ireland	Indaver Ireland Limited,W0036-02	Tolka Quay Road,Dublin Port,D1,D1,Ireland	Abfall Verwertungs Gesellschaft Gmb (AVG),B2234/AVG-GENB-2,Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany	Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany
Within the Country	06 02 03	Yes	0.033	ammonium hydroxide	D10	M	Weighed	Offsite in Ireland	Indaver Ireland Limited,W0036-02	Tolka Quay Road,Dublin Port,D1,D1,Ireland	Abfall Verwertungs Gesellschaft Gmb (AVG),B2234/AVG-GENB-2,Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany	Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany
Within the Country	06 02 04	Yes	0.045	sodium and potassium hydroxide	D10	M	Weighed	Offsite in Ireland	Indaver Ireland Limited,W0036-02	Tolka Quay Road,Dublin Port,D1,D1,Ireland	Abfall Verwertungs Gesellschaft Gmb (AVG),B2234/AVG-GENB-2,Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany	Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany
Within the Country	13 02 08	Yes	0.158	other engine, gear and lubricating oils	D10	M	Weighed	Offsite in Ireland	Indaver Ireland Limited,W0036-02	Tolka Quay Road,Dublin Port,D1,D1,Ireland	Abfall Verwertungs Gesellschaft Gmb (AVG),B2234/AVG-GENB-2,Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany	Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany
Within the Country	13 07 01	Yes	2.434	fuel oil and diesel	D10	M	Weighed	Offsite in Ireland	Indaver Ireland Limited,W0036-02	Tolka Quay Road,Dublin Port,D1,D1,Ireland	Abfall Verwertungs Gesellschaft Gmb (AVG),B2234/AVG-GENB-2,Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany	Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany
Within the Country	15 02 02	Yes	0.146	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	D10	M	Weighed	Offsite in Ireland	Indaver Ireland Limited,W0036-02	Tolka Quay Road,Dublin Port,D1,D1,Ireland	Abfall Verwertungs Gesellschaft Gmb (AVG),B2234/AVG-GENB-2,Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany	Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany
Within the Country	16 05 04	Yes	0.011	gases in pressure containers (including halons) containing dangerous substances	D10	M	Weighed	Offsite in Ireland	Indaver Ireland Limited,W0036-02	Tolka Quay Road,Dublin Port,D1,D1,Ireland	Abfall Verwertungs Gesellschaft Gmb (AVG),B2234/AVG-GENB-2,Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany	Borsigstr. 2,D-22113 Hamburg,Hamburg,D-22113 Hamburg,Germany
To Other Countries	19 01 13	Yes	463.12	fly ash containing dangerous substances	D9	M	Weighed	Abroad	Indaver NV,MLAV1/98000004l85/MV/bd	Industriele Afvalverwerking,Poldervlietweg,B-2030 Antwerpen 3,B-2030 Antwerpen 3,Belgium	Indaver NV,MLAV1/98000004l85/MV/bd,Industriele Afvalverwerking,Poldervlietweg,B-2030 Antwerpen 3,B-2030 Antwerpen 3,Belgium	____Belgium
To Other Countries	19 01 13	Yes	22.06	fly ash containing dangerous substances	R5	M	Weighed	Abroad	K&S,34/Hef-79 n 330-51/153	Werk Werra,Standort Wintershall Herfagrund,36266 Herfa ,36266 Herfa ,Germany	K & S,34/Hef-79 n 330-51/153,Werk Werra,Standort Wintershall Herfagrund,36266 Herfa ,36266 Herfa ,Germany	Werk Werra,Standort Wintershall Herfagrund,36266 Herfa ,36266 Herfa ,Germany
To Other Countries	19 01 13	Yes	100.0	fly ash containing dangerous substances	D12	M	Weighed	Abroad	K & S ,34/Hef-79/330-51/153	Werra Plant Underground Waste Disposal Plant,Herfa-Neurode,36266 Heringen ,36266 Heringen,Germany	K & S ,34/Hef-79/330-51/153,Werra Plant Underground Waste Disposal Plant,Herfa- Neurode,36266 Heringen ,36266 Heringen ,Germany	Werra Plant Underground Waste Disposal Plant,Herfa-Neurode,36266 Heringen ,36266 Heringen,Germany
To Other Countries	**19 01 07**	**Yes**	1194.26	solid wastes from gas treatment	D9	M	Weighed	Abroad	Indaver NV,MLAV1/98000004l85/MV/bd	Industriele Afvalverwerking,Poldervlietweg,B-2030 Antwerpen 3,B-2030 Antwerpen 3,Belgium	Indaver NV,MLAV1/98000004l85/MV/bd,Industriele Afvalverwerking,Poldervlietweg,B-2030 Antwerpen 3,B-2030 Antwerpen 3,Belgium	Industriele Afvalverwerking,Poldervlietweg,B-2030 Antwerpen 3,B-2030 Antwerpen 3,Belgium
To Other Countries	19 01 07	Yes	86.8	solid wastes from gas treatment	R5	M	Weighed	Abroad	K&S,34/Hef-79 n 330-51/153	Werk Werra,Standort Wintershall Herfagrund,36266 Herfa ,36266 Herfa ,Germany	Indaver NV,MLAV1/98000004l85/MV/bd,Industriele Afvalverwerking,Poldervlietweg,B-2030 Antwerpen 3,B-2030 Antwerpen 3,Belgium	Industriele Afvalverwerking,Poldervlietweg,B-2030 Antwerpen 3,B-2030 Antwerpen 3,Belgium

* Select a row by double-clicking the Description of Waste then click the delete button

Link to previous years waste data
Link to previous years waste summary data & percentage change

Appendix 5: Energy Audit Report

Environmental Efficiency
Consulting Engineers

Parnell House,
19 Quinsboro Road,
Bray Co.Wicklow,
Ireland.

Indaver Ireland

EPA Energy Audit

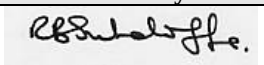
Waste Licence W0167-02

Document Number 1397-02 1.00

Email: energy@iol.ie www.enviro-consult.com
Registered Office: Parnell House, 19 Quinsboro Road, Bray, Co. Wicklow. Registered Number 243 412
Directors: Noel J. McGrath Robert B. Sutcliffe

QF 1. v2 Document Lead Sheet

Document Title	EPA Energy Audit
Project No.	1397
Document No.	1397-02
Client	Indaver
Address	Carranstown , Duleek, County Meath

Issue	Status	Date	Author	Signed for and on behalf of	
				Environmental Efficiency	Client
1.00	Approved	14/09/12	RBS		

History
1.00 Issued

EEC Document Author: Bob Sutcliffe, CEng, MIEI

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Table of Contents

1 Introduction

Indaver Ireland has a Waste Licence W0167-02 issued by the EPA. This licence requires that Indaver Ireland complete an energy audit and that the report of this audit be available on site for inspection by the EPA and a summary accompanies the AER. The scope of the required energy audit is defined by the 'Guidance Note on Energy Efficiency Auditing', published by the EPA, Johnstown Castle, Co. Wexford, Ireland. This document is intended to satisfy the specified scope.

It is noted that whilst the EPA require an energy audit, the plant is new and has been deigned and built with energy efficiency taken into consideration from the start.

2 Site description

The site includes the following areas

- Offices
- Waste reception hall
- Furnace area
- Turbine Hall
- Maintenance workshops
- Flue Gas Treatment area
- Security and associated weighbridges

The site carries out the following activities that are significant in terms of energy consumption are

- Waste incineration

Utilities necessary to support the above activities that are significant in terms of energy consumption are

- Compressed air
- Steam generation
- Conveyor systems
- Steam cooling

3 Audit

3.1 Audit timing

The audit of the site took place on 14 August 2012. This was a day of normal production and not during a holiday period.

The weather conditions were normal for the time of year, but weather does not significantly effect energy consumption.

3.2 Audit period

Due to the recent commissioning of the site, utility bills, waste incinerated and other data was only available from January 2012. Data from this date up until June 2012 was analysed.

3.3 Audit personnel

The site audit was undertaken by Bob Sutcliffe CEng, MIEI and Enda Flood, BAg Sc, PgC Green Tech.

3.4 Scope of audit

The scope of the required energy audit is as defined by the 'Guidance Note on Energy Efficiency Auditing', published by the EPA, Johnstown Castle, Co. Wexford, Ireland.

Additional requirements re the energy audit are contained in Condition 7.2 and Condition 7.3 of the Waste Licence. The scope of the audit includes these conditions which read as follows

> 7.2 The licensee shall build and operate the facility to achieve an energy efficiency of, as a minimum, 0.65 using the formulae below to calculate Energy Efficiency:
>
> Energy Efficiency = [Ep– (Ef + Ei)]/0/97 x (Ew + Ef] where
>
> Emission point = annual energy produced as heat or electricity (GJ/year) (heat produced for commercial use is multiplied by 1.1 and electricity is multiplied by 2.6)
>
> Ef = annual energy input to the system from fuels contributing to the production of steam (GJ/year)
>
> Ew = annual energy contained in the waste input using the net calorific value of the waste (GJ/year)
>
> Ei = annual energy imported excluding Ew and Ei
>
> 7.3 The licensee shall carry out an audit of the energy efficiency of the site within one year of the date of commencement of waste acceptance. The licensee shall consult with the Agency on the nature and extent of the audit and shall develop an audit programme to the satisfaction of the Agency. The audit programme shall be submitted to the Agency in writing at least one month before the audit is to be carried out. The energy efficiency audit report shall include
>
> 7.3.1 A review of opportunities for increasing the overall energy efficiency of the facility
>
> 7.3.2 Progress with those opportunities identified in the previous report

The areas, systems and activities assessed are shown in Table 5-1. Only those systems whose energy consumption is significant were examined in detail.

3.5 Audit process

The audit process carried out to arrive at the recommendations was as follows

3.5.1 Review of energy data

It is noted that the plant is a 'waste to energy' plant and therefore bought in electricity is insignificant. The energy data analysed included data for treated waste, steam produced and electricity generated.

3.5.2 Energy Efficiency

Condition 7.2 of the Waste Licence sets minimum energy efficiency. The achievement of this parameter is reviewed.

3.5.3 Review of best practice

A literature review was undertaken to determine best practice. This included review of the UK Action Energy publications (Good Practice Case Studies, Good Practice Guides and Energy Consumption Guides), BATNEEC Guidance Documents and BREF publications. This review allows identification of any lack of best practice during the audit.

3.5.4 Site audit

During the site audit all areas, processes and systems of energy significance were reviewed under the following six headings

- Whether the systems could effectively modulate energy consumption to production levels, occupancy levels, outside temperature or light levels.
- The extent of any losses from the system (e.g. heat loss, air leaks, friction or drive losses)
- The size of the system in relation to load (e.g. whether , for example, motors are under loaded)
- Whether there is good monitoring system in place (e.g. is energy input metered and production throughput measured, then analysed)
- Whether there is an opportunity for heat recovery and a use for the recovered heat

4 Energy Management System

Energy management is an all-encompassing process that should include every aspect of an organisation from finance, human resources and public relations to maintenance, purchasing and planning.

An Energy Management Diagnostic Questionnaire was completed for the site; the questionnaire is included in Appendix 1. Indaver Ireland scored 70% overall on this diagnostic. Figure 1 shows the breakdown of the score between the five pillars of energy management.

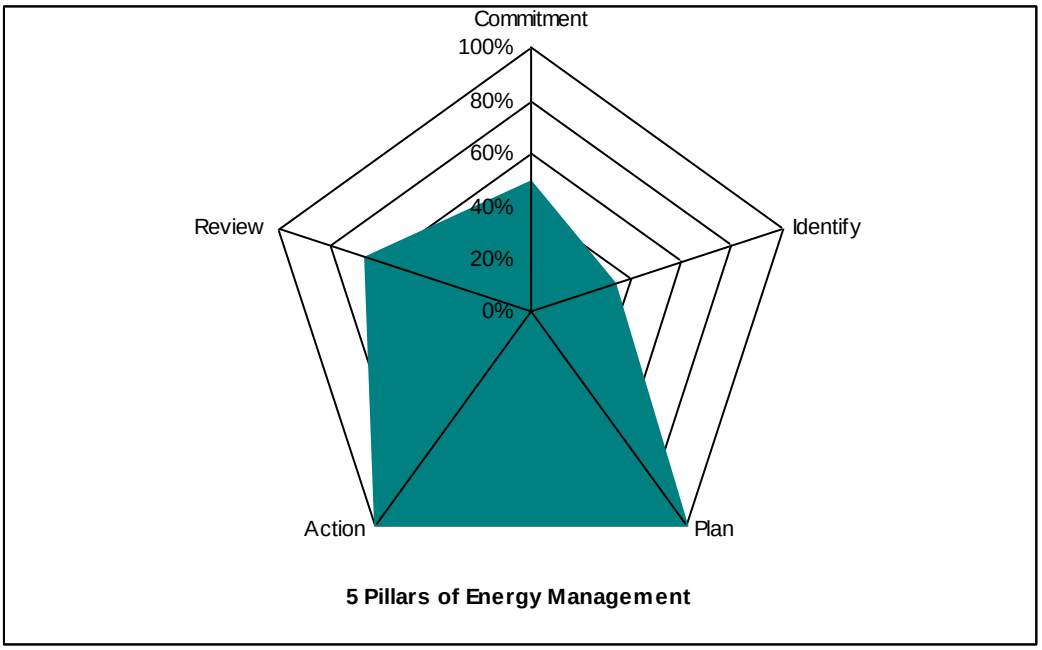

Figure 4-1 Five pillars of Energy Management

Recommendations to improve the level of energy management are shown in Section 6. The matrix shows that Indaver Ireland shows a low score for commitment however when the relevant personnel were interviewed there was a good awareness of the issues surrounding energy management.

5 Energy Performance

5.1 Site energy performance

It is noted that the plant is a 'waste to energy' facility. The prime objective of the plant is to achieve a volume reduction of the waste material by incinerating the combustible proportion. The waste material is burned in a furnace and steam is produced. The steam is then used in a steam turbine to generate electricity. The electricity, less the house load of approximately 1.75 MW is exported.

Fork lift trucks are gas (LPG) powered but as this is negligible, it is ignored.

The graph below shows treated waste (i.e. waste incinerated) per month, steam generated and electricity produced. It can be seen that the three parameters follow each other in an approximate fashion from March 2012 onwards.

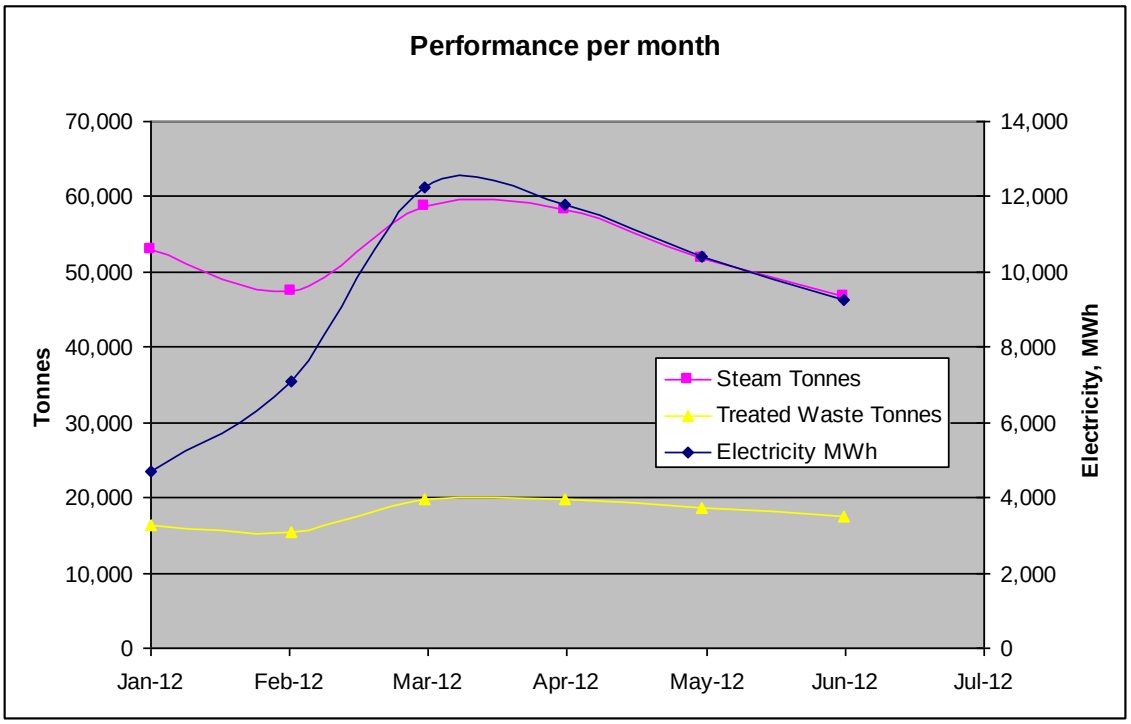

Figure 5-1 Monthly Energy Performance

The graph below shows electricity output per tonne of treated waste over the same period.

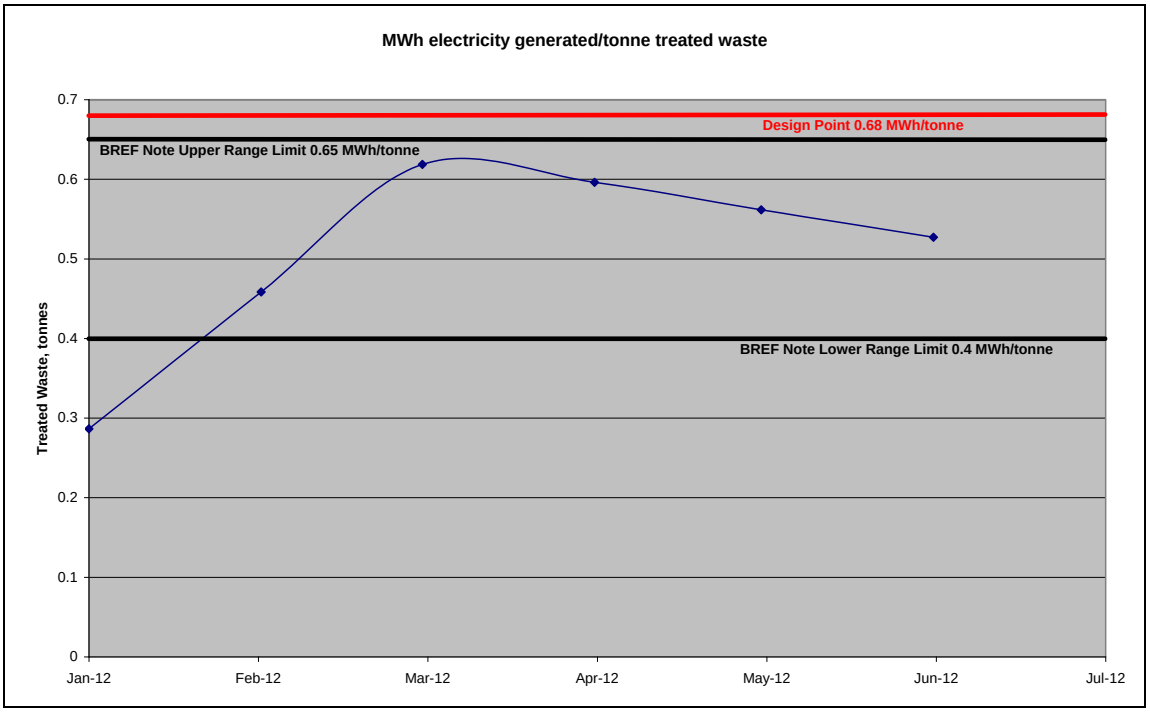

Figure 5-2 Monthly electricity output per treated tonne

Observations based on a review of the graph above are as follows

- January and February were two months the turbine was not available as the plant was still in commissioning. This explains the poor energy efficiency during that time period.
- The plant is within the BREF note range of 0.4 MWh/tonne and 0.65 MWh/tonne but has not reached the design point of 0.68 MWh/tonne

The energy efficiency of the plant has been falling from the high of 0.62 MWh/tonne achieved in March 2012. It is noted that the limits of 0.68 MWh/tonne and 0.4 MWh/tonne stated in the BREF Guidance Note do not take into account variations in the calorific value for the waste.

5.2 Energy Performance Assessment

The overall energy performance of the site can be determined by considering the energy performance of the different systems (i.e. building lighting, space heating etc). The aim of this approach is to provide an easy to interpret overview of the energy performance of the site and each sub-system in a table format. The method is also repeatable and different auditors should arrive at the same rating. This is of particular value where there is a lack of sub metering.

The performance of each significant[1] sub system is determined by reviewing the separate aspects within it. Each aspect is rated 1 to 3 where

- 1 = Needs improvement
- 2 = Fair
- 3 = Good

All systems have the same generic aspects (for each system, the most significant aspect is marked by *)

- Ability of controls to modulate output to meet demand.
- The extent of losses (air, heat etc)
- Correct sizing of system
- Monitoring
- Options for heat recovery (where applicable)

The performance of each system is therefore determined from the average of the rating of the generic aspects. Thus the rating of each system will range from 1 to 3. The overall score for the site is the average of the ratings for the individual systems. This is shown in Table 5-1.

It should be noted that these grades were assigned following a 1-day site visit and subsequent desktop review and may not be indicative of the energy performance throughout the year.

[1] A significant sub system is defined as a large group of items with similar energy characteristics determined qualitatively that can be treated as an homogenous group for the purposes of investigating energy efficiency measures.

Table 5-1 Performance of site and systems

System	Significant system	Poor	Fair	Good	Score
Office lighting	No		X		2.40
Shop floor lighting	Yes		X		2.20
Conveyors	Yes		X		2.00
Compressed air generation	Yes		X		1.80
Compressed air distribution	Yes		X		2.40
Steam production	Yes			X	3.00
Process cooling	Yes		X		2.00
Hybrid cranes	No		X		2.20
HVAC	Yes			X	2.60
Overall			X		2.29

5.2.1 Performance Office lighting

	Poor	Fair	Good	Score	Comments
Modulation of output (e.g. ability to adjust output in line with demand or conditions)		X		2	Low occupancy but only on/off control
Losses (e.g. due to inefficiencies)			x	3	High Frequency control
Sizing of system *			x	3	Light levels correct task
Energy monitoring (e.g. is the energy consumption for this system known)	x			1	No sub metering at fine enough level
Heat recovery (e.g. is any waste heat recovered)			x	3	No heat recovery practical
Score		x		2.40	

5.2.2 Performance Shop Floor Process Building lighting

	Poor	Fair	Good	Score	Select a comment
Modulation of output (e.g. ability to adjust output in line with demand or conditions)	x			1	No local switching
Losses (e.g. due to inefficiencies)			x	3	High Frequency control
Sizing of system *			x	3	Lux level is correct for task
Energy monitoring (e.g. is the energy consumption for this system known)	x			1	No sub metering at fine enough level
Heat recovery (e.g. is any waste heat recovered)			x	3	No heat recovery practical
Score		x		2.20	

5.2.3 Performance Production equipment (conveyers)

	Poor	Fair	Good	Score	Comments
Modulation of output (e.g. ability to adjust output in line with demand or conditions) *		x		2	Conveyors run when idle but very rare that they are idle
Losses (e.g. due to inefficiencies)		x		2	No comment
Sizing of system		x		2	No comment
Energy monitoring (e.g. is the energy consumption for this system known)	x			1	No sub metering at fine enough level
Heat recovery (e.g. is any waste heat recovered)			x	3	No heat recovery practical
Score		x		2.00	

5.2.4 Performance Compressed air generation

Compressed air generation refers to air compressors, but excludes driers, filters and the distribution system.

	Poor	Fair	Good	Score	Comments
Modulation of output (e.g. ability to adjust output in line with demand or conditions) *			x	3	Just one compressor has VSD, this is the lead compressor.
Losses (e.g. due to inefficiencies)	x			1	Pressure possibly higher than normal, ambient air temperature too high
Sizing of system		x		2	No comment
Energy monitoring (e.g. is the energy consumption for this system known)	x			1	No sub metering at fine enough level
Heat recovery (e.g. is any waste heat recovered)		x		2	No heat recovery but no local need for heat
Score		x		1.80	

5.2.5 Performance Compressed air distribution

The compressed air distribution system consists of the piping from the compressor to point of use including air receivers, driers and filters.

	Poor	Fair	Good	Score	Comments
Modulation of output (e.g. ability to adjust output in line with demand or conditions) *		x		2	Instrument air and plant air at different pressures
Losses (e.g. due to inefficiencies)		x		2	No comment
Sizing of system		x		2	No comment
Energy monitoring (e.g. is the energy consumption for this system known)			x	3	Sub metering and data logging
Heat recovery (e.g. is any waste heat recovered)			x	3	No heat recovery practical
Score		x		2.40	

5.2.6 Performance steam production

	Poor	Fair	Good	Score	Comments
Modulation of output (e.g. ability to adjust output in line with demand or conditions) *			x	3	No comment
Losses (e.g. due to inefficiencies)			x	3	No comment
Sizing of system			x	3	No comment
Energy monitoring (e.g. is the energy consumption for this system known)			x	3	Steam output measured, waste input measured
Heat recovery (e.g. is any waste heat recovered)			x	3	No heat recovery practical
Score			x	3.00	

5.2.7 Performance Process cooling (air cooled condensers)

	Poor	Fair	Good	Score	Comments
Modulation of output (e.g. ability to adjust output in line with demand or conditions) *			x	3	VSD operated fans
Losses (e.g. due to inefficiencies)			x	3	Fouling of heat exchange surface is monitored
Sizing of system		x		2	No comment
Energy monitoring (e.g. is the energy consumption for this system known)	x			1	No sub metering at fine enough level.
Heat recovery (e.g. is any waste heat recovered)	x			1	Uses could be found for waste heat to eliminate cooling
Score		x		2.00	

5.2.8 Performance hybrid cranes

	Poor	Fair	Good	Score	Comments
Modulation of output (e.g. ability to adjust output in line with demand or conditions)		x		2	No comment
Losses (e.g. due to inefficiencies) *			x	3	When load is lowered, crane generates electricity
Sizing of system		x		2	No comment
Energy monitoring (e.g. is the energy consumption for this system known)	x			1	No sub metering at fine enough level.
Heat recovery (e.g. is any waste heat recovered)			x	3	No heat recovery practical
Score		x		2.20	

5.2.9 Performance HVAC

	Poor	Fair	Good	Score	Comments
Modulation of output (e.g. ability to adjust output in line with demand or conditions)			x	3	Variable volume system
Losses (e.g. due to inefficiencies)			x	3	Intake air taken from hot area above boilers
Sizing of system		x		2	No comment
Energy monitoring (e.g. is the energy consumption for this system known)		x		2	SCADA system
Heat recovery (e.g. is any waste heat recovered)			x	3	No heat recovery practical as many sources of low grade heat in plant.
Score		x		2.60	

6 Recommendations

The audit recommendations are shown in the table below.

Table 6-1 Recommendations

Ref.	Measure	Inter - dependency	Predicted annual savings, kWh	Predicted annual GHG savings, t CO_2	Predicted annual cost saving, €	Capital cost measure, €	Simple payback period, yrs	Capital cost per tonne annual CO_2 savings, €/t
1	Ambient light/occupancy controllers for office lights	None	2,409	0.7	170	1,000	5.9	1361
2	Cooler air inlet for air compressor	None	39,814	12.1	2,787	1,000	0.4	82
3	Monitor energy use at finer level	None	823,221	251.1	57,625	10,000	0.2	40
	Totals		**865,444**	**263.9**	**60,582**	**12,000**	**0.2**	**45**

Notes

1. GHG savings based on electricity generated being classed as 50% green and displacing electricity with an emission factor of 0.61 g/kWh. Predicted GHG emission savings are therefore 0.305 g/kWh. (Source SEAI).

6.1 Ambient light/occupancy controllers office areas

Ambient light/occupancy controllers operate by automatically dimming the lights according to ambient light level (off when bright and gradually come on when it gets darker) and then switching off the lights when there is no one in the room.

It was noted during the audit that many office areas had good natural daylight yet the light were on, or there was no one in the room and the lights were on.

Rooms with large numbers of lights should be prioritised over rooms with a few lights as the cost of the energy saving measure is more closely related to the number of rooms than installed load.

6.2 Cooler air inlet for air compressor

It was noted that the ambient air temperature in the compressor room was very warm and much warmer than the outside ambient air temperature, the difference being in the region of 10C.

There is a system in place whereby hot air from the air compressor cooling radiator is exhausted into the room to prevent freezing of the pipes. The set point is such that a temperature of 25 C is maintained. It is understood that there was a problem on the day of the audit and the temperature in the room was higher than normal. It was agreed that this set point could possibly be lowered and that this would be investigated.

A 1% saving in energy running air compressor can be achieved for every 4C reduction in air temperature. Assuming a 10C difference the saving is 2.5%. On a cold winters day, the temperature difference could be higher and therefore the saving larger.

http://www.carbontrust.com/media/20267/ctv050_compressed_air.pdf

6.3 Monitor energy use at finer level

UK Good Practice Guide 316 "Undertaking an Industrial Energy Survey," explains the purpose of a monitoring and targeting system:

"*An energy survey can only ever be a snapshot. It is therefore best at detecting opportunities for permanent modifications to plant, equipment, buildings and operating procedures. However, your organisation may be incurring hidden costs through avoidable waste occurring at random and remaining undetected. Examples could include:*

- *Time switches and other self-acting controls failing in the 'on' position.*
- *Maintenance errors, such as fitting an oversized replacement motor.*
- *Operating errors, such as running an air compressor against a closed isolation valve*
- *Lax discipline, for example leaving auxiliaries to run when not required.*
- *Leaks.*

A management technique called Monitoring and Targeting (M&T) is the most effective defence against these kinds of loss, which a one-off survey would miss. The next best

option – a regular programme of routine energy inspections – would be a more costly exercise, and would anyway miss many kinds of energy-wasting faults because they are frequently of an unforeseen nature.

M&T works by combining regular consumption data (usually weekly or monthly) with corresponding data on production throughput, weather, or other driving factors (called 'variables' in the older literature). An M&T scheme is primed with targets for each stream of consumption, these targets being related to the relevant driving factor, so that given the level of activity in the facility, a 'correct' ration of energy can be estimated at each point of use. The deviation between actual and expected consumptions indicates the extent of any unexpected loss, which can then be converted to its implied cost in order to establish its significance. When the fault detected in this way proves persistent, the pattern of deviation can be analysed as an aid to diagnosis.

An effective M&T scheme provides, in effect, a continuous review of the site's performance, and as well as revealing random unexpected losses, it can be used to monitor and verify the effectiveness of other energy conservation measures. Verification is doubly significant if your company is engaged in emissions trading."

According to Sustainable Energy Ireland, sites using M&T have achieved savings representing 5 and 25% of the annual fuel bill. A UK Department of Energy Survey found that the average annual savings identified by companies implementing M&T was 13% and in some cases savings in excess of 25% were obtained. A conservative figure of 5% has been assumed for this report.

At present, the electricity consumption of each significant item of equipment is not monitored. However, by fitting sub metering, the energy consumption can be monitored. Examples of possible items or systems to monitor are

- Office lighting on a per floor level
- Production area lighting
- Outside lighting
- Each conveyors or groups of related conveyors
- Air cooled condenser fans
- Each air compressors

The consumption figures, normalised where appropriate, can be plotted on a daily basis and a technique such as Statistical Process Control (SPC) used to analyse the variations. A typical plot of normalised fuel consumption, using this technique but with data from another client is shown below.

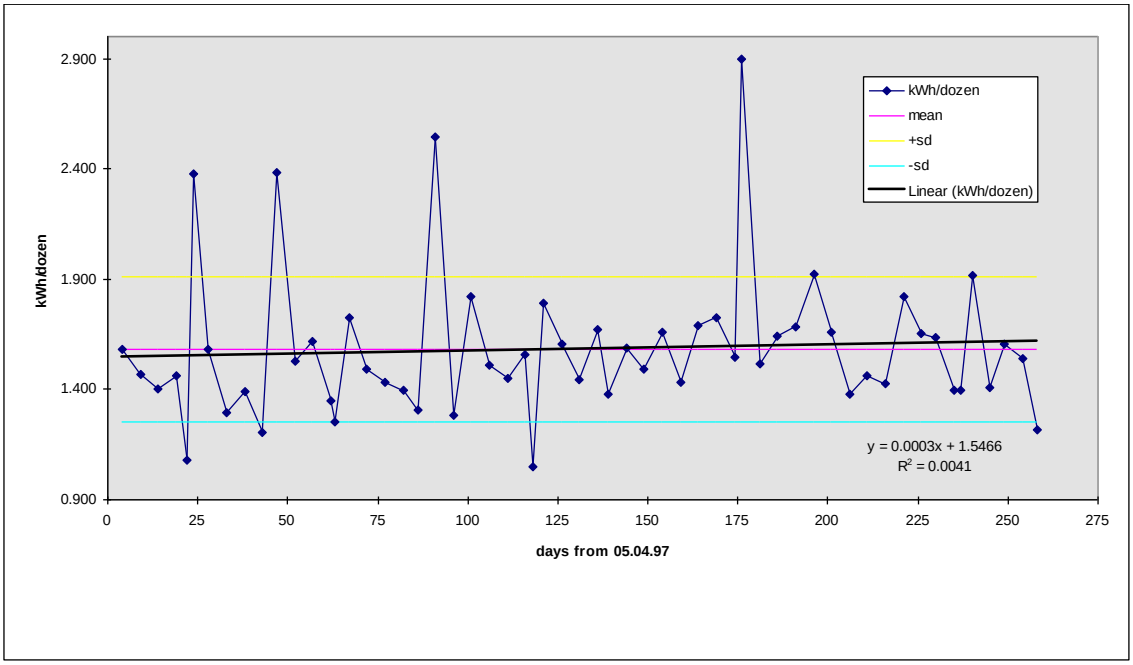

Figure 6-1 Normalised fuel consumption

If the production process were completely under control, then the actual consumption per unit of output would be a straight horizontal line similar to the line labelled 'mean' in the figure above. Because of variations due to a multiplicity of factors, e.g. changing calorific values of waste, deterioration of equipment over time, different operator practices, weather conditions and so on there will be variations in the consumption of electricity per unit of output. These variations are shown by the line labelled kWh/dozen.

The key to reducing energy consumption lies in determining which variations are due to causes which can be controlled (termed 'assignable causes') and those for which no known explanation exists or is possible - 'un-assignable causes'. In general variations due to 'assignable causes' will lie outside the upper and lower control lines (which are each one standard deviation apart from the mean line). In addition, those variations which can not be controlled will lie inside the control lines.

Appendix 1Energy Management Matrix

	Question	Assessment			
Commitment	1 Is there a Co-ordinator appointed to manage Energy Management?	◉ No	○ Informal appointment	○ Formal appointment but low priority	○ Formal appointment
	2 Is there an Energy Statement (or Energy Policy)?	○ No	○ Informal Statement	◉ Incomplete Statement	○ Complete, formal, well-communicated Statement
Identify	3 Have you identified significant energy users & factors that influence energy consumption?	○ No	◉ Informally (no quantification)	○ Informally (some quantification)	○ Yes, Formally (quantified assessment)
Plan	4 Do you have an Energy Action Plan?	○ No (None)	○ Informal, Unwritten Plan	○ Informal, Written Plan	◉ Formal Plan
Action	5 Are energy-efficient practices and energy awareness promoted amongst employees?	○ Not at all	○ Informally & infrequently	○ Informally but regularly	◉ Formally & Regularly
Review	6 Is there an energy measurement & monitoring system in place?	○ No (none)	○ Informal	◉ Incomplete System	○ Formal System

Source Energy Management Matrix acknowledge as SEAI

Appendix 6: Closed Actions for 2012

Obj. Re	Target	Action	Completion date	Dept. Resp.
1	Complete Testo Device Set Up	Set-up of Testo Device - Testo Device connected to DCS / Durag and recognized as back-up system by the Agency.	2/07/2012	Compliance/ Maintenance
1	Identification and Reduction of Fugitive Emissions	Prepare a programme for the identification and reduction of fugitive emissions on site	9/01/2013	Compliance
2	Improve systems of handling customer enquiries/communication	Develop a standard audit pack cover to give to customers when auditing Indaver facilities to ensure the relevant information is provided	5/09/2012	Compliance/ Communications
3	Establish cause of odour complaints	Complete Air flow modelling of air through the tipping hall in order to identify where odour is escaping.	11/02/2013	Operations
5	Carry out an energy audit	Energy audit to be conducted within one year of date of commencement of waste acceptance and annually thereafter. Recommendations will be incorporated where appropriate into this schedule.	20/12/2012	Compliance
5	Recovery/Recycling of Residues	Send report in relation to alternative treatment methods for bottom ash recovery/disposal to the Agency.	16/10/2012	Compliance/Com mercial
5	Ensure energy production optimised	Review options for optimising energy production in the Meath WtE facility.	20/12/2012	Commercial /Operations
5	Ensure metal recovery optimised	Review options for optimising ferrous and non ferrous metals recovery in the Meath WtE facility.	20/12/2012	Commercial /Operations
5	Optimisation of consumable usage on site	Ensure efficient working of plant Identification of best practice measures, maintenance etc	14/01/2013	Compliance/ Operations
7	Ensure environmental aspects are identfied and assessed	Finalise assessment of ME1 environmental aspects and issue register	6/02/2013	Compliance/ Operations

Appendix 7: Planned Actions for 2013

Obj. Re	Target	Action	Due date	Dept. Resp.
1	Ensure compliance with the numerous energy licences	Develop system and controls to ensure compliance with the energy licences and permits	31/03/2013	Commercial
1	Minimise the potential for odour emissions from site	Review odour complaints on an ongoing basis, if any, and report on the investigation and the actions that were put in place to rectify the situation and the effectiveness of the actions should be reviewed.	31/12/2016	Compliance/ Operations
3	Use of cleaner technology, cleaner production	Review best practice documents and BREF's and report on whether or not they are feasible to implement.	31/12/2016	Compliance/ Commercial
3	Ensure smoke vents are effective	Repair/replace smoke vents in tipping hall to ensure their effectiveness	31/03/2013	Operations
5	Follow up on recommendations from the energy audit to increase energy efficiency	Investigate the use of Ambient light/occupancy controllers for the office lights	31/12/2013	Operations
5		Investigate Cooler Air inlet for air compressor	31/12/2013	Operations
5		Monitor energy use at finer level	31/12/2013	Operations
5		Monitor Energy Usage figures for first 3 years of operation.	31/12/2014	Compliance/ Operations
5	Recovery/Recycling of Residues	Review quantities of residues removed from site in order to calculate the percentage of residues recycled/recovered. Put in place a KPI based on this and measure.	31/05/2013	Compliance/ Commercial / Operations
5	Reduction of waste going to landfill	Monitor waste generated on site for first 3 years of operation.	31/12/2016	Compliance/ Operations
5		Ensure that waste generated on site is recovered where practicable	31/12/2016	Compliance/ Operations
5		Education of all plant personnel in relation to waste recycling and other good environmental practices	31/03/2013	Compliance/ Operations
5		Review options and ensure adequate provision of waste disposal facilities on site and in the offices.	31/03/2013	Compliance/ Operations
5	Reduction in use of water	Monitor water usage for first 3 years of operation	31/12/2014	Compliance/ Operations
5		Identify methods of reducing water use on site based on the figures for water usage	31/12/2016	Compliance/ Operations
5		Monitor consumable usage for first 3 years of operation	31/12/2014	Compliance/ Operations
5		Monitor fuel usage	31/12/2014	Compliance/ Operations
6	Clarify crisis communication requirements	Carry out further training and full roll out the Incident Management plan	31/12/2013	Communications