Tawnaghmore Generating Station

IPPC Licence Reg. No. 0566-02

Annual Environmental Report 2009

Table of Contents

1.- Introduction

1.1.- IPPC Licence Number 566-02

This is the Annual Environmental Report of Tawnaghmore Peaking Power Plant for the year ending 31st of December 2009, in compliance with requirements of Integrated Pollution Control Licence Register No. P0566-02.

The plant was purchased by Endesa Ireland Ltd. from ESB and the take over date was 8th January 2009. The IPPC License was then fully transferred from ESB to Endesa Ireland.

1.2.- Name and Location of Site

Endesa Ireland,
Tawnaghmore Generating Station,
Killala
County Mayo.

1.3.- Description of Activities

The activities carried out at Tawnaghmore facility correspond to IPPC Class 2.1

"The production of energy in a combustion plant the rated input of which is greater than 50 MW".

The Electricity Supply Board installed peaking capacity electricity generators on the Tawnaghmore (ex Asahi) site to cover peaks in electricity demand. The generating units are four open cycle FT8 gas turbines fuelled with low sulphur gas oil (Max. 0.1% S) with a nominal capacity of 26 MW each. There are two electrical generators each of which is connected to two of the FT8 gas turbines. Each generator can produce 52 MW giving a total of 104MW for the site. Two of the frame 8 engines and associated generator were installed during 2008 and are designated as Unit 3. The original plant is designated as Unit 1. Demineralised water injection is used for NO_x suppression.

1.3.1.- Running regime 2009

Unit 1: This generating unit which is rated at 50MW ran for a total of 47.96 hours during 2009.

Unit 3: This generating unit which is rated at 50MW ran for a total of 41.89 hours during 2009.

1.3.2.- EPA audits 2009

There were no Agency site visits to Tawnaghmore during 2009.

1.4.- Environmental Policy

Endesa Ireland's Environmental Policy

Endesa Ireland regards environmental excellence as a fundamental value in the performance of its activities. Accordingly, it respects the environment and responds to the principles of sustainable development and sound environmental management, undertaking in this way to harness and conserve the resources it uses effectively.
To meet its environmental commitments, **Endesa Ireland** applies the following basic principles, which are included as key factors in its Environmental Policy:

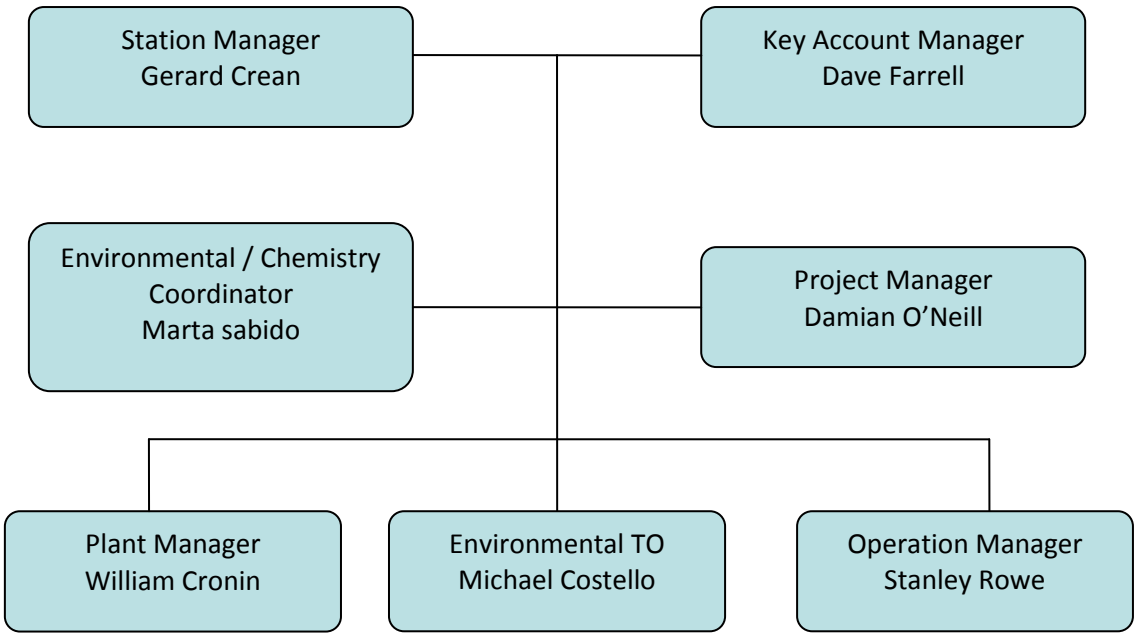
- **Integration** of environmental management and sustainable development concept in the Company's corporate strategy, using environmental criteria documented in all planning and decision making processes.
- **Rational use** of resources and reduction of waste production, emissions, discharges and any other type of environmental impact, through the application of continuous improvement programmes and the establishment of environmental objectives and targets.
- **Commitment** to the compliance with all relevant legislative and other requirements by means of a permanent monitoring of the environmental practices in all of its facilities and locations, reporting on the obtained results.
- **Conservation** of the power plants' surroundings by adopting measures designed to protect flora and fauna species and their natural habitats.
- **Implementation** of cleaner and more efficient technologies, as long as they are available and are economically affordable for the Company, encouraging research and development of renewable energies when suitable.
- **Promotion** of its employee's awareness with regard to the environmental protection and respect by communicating the Environmental Policy and making it public and available to all of them, developing specific training programmes and interacting with all types of stakeholders (authorities, institutions, local associations and interest groups).
- **Requiring** its contractors and suppliers the implementation and development of environmental policies aligned with those of **Endesa Ireland's** Environmental Policy, which shall be communicated to all of them.
- **Promotion** of a rational use and energy consume among users and society in general.

This strong commitment and the above basic principles of **Endesa Ireland's** Environmental Policy are applied consistently across all the environmental processes and activities that are carried out at all **Endesa Ireland's** facilities (Head Office and Power Plants).

Signed: Gerard Crean
Station Manager
(On behalf of the management and staff)

1.5.- Environmental Management Structure and responsibility

Figure 1. Organisational Chart



2.- Summary Information

2.1.- Emissions to Atmosphere Summary

Unit	1		3		Station Average
Stack	A1	A2	A1	A2	
Average 2009 (mg/Nm^3)	94	91	65	56	78

Table 2.1. Average NO_x emissions per unit 2009

The total quantity of CO_2 emitted was **2608.08 tonnes**.
The estimated total quantity of NOx emitted was **4.51 tonnes** – calculation shown in 3.3
The estimated total quantity of SO_2 emitted was **1.64 tonne** – calculation shown in 3.3

2.1.1.- Abatement/Treatment Control

Monitoring of water and fuel flow rates was ongoing when in production and water and fuel flow rates for each unit were continuously recorded in the control room. In addition, in the event of failure of any flow meter, back-up measures, such as pump speed or the position of control valves, can be used to ensure correct operation of the plant, and water and fuel usage can be computed from readings of tank levels, taking account of deliveries and other usage. A log of the appropriate readings is kept.

For NO_x emissions reduction, each unit is fitted with water injection equipment, through which demineralised water, in approximately the same volume as the liquid fuel, is used to enable the units to operate within the emission limit of 120 mg/m^3. The NO_x suppression water is taken from Mayo County Council public water supply and purified in an ion-exchange plant.

A Continuous Emissions Monitoring System is installed and uses a sampling system to compute NO_x and O_2 levels in each outlet duct. The system is in service whenever the units are running.

After a service the analysers are calibrated by Environmental Monitoring Systems using the gases we have on site. Unit 1 was serviced/calibrated 28/8/2009 and Unit 3 was serviced/calibrated 16/9/2009. See Appendix I for the service reports.

2.2.- Emissions to Water Summary

The site has two licensed discharge points:

- (S1), through which the effluent resulting from the regeneration of the ion exchange plant is discharged and
- (S2) for storm water run-off.

The discharge of effluent is automatically regulated by a pH controller which closes the effluent valve when the pH goes outside the range of pH 6 to pH 9 and does not allow the valve to open again until the pH has been within range for at least ten minutes. No exceedance of the ELV's occurred in 2009.

All Total Dissolved Solids (TDS's) measurements were within the ELV's as well.

2.3.- Waste Management Report

Waste leaving the site is recorded in the Waste Register, held in the Operations Office. A summary of the quantities and disposal information is shown in the Licence-Specific Report (Section 4.3).

2.4.- Resource Consumption Summary

Year	2009	2008	2007	2006	2005
Gas Oil Consumed (tonnes)	821.54	2374	2012.5	6466	8927
Demineralised Water (tonnes) *	378	3334	1800	6120	7300
Number of Start ups	55	57	70	138	145

Table 3.4.A Resource Consumption

(*) Total water supplied by Mayo Co. Council was 892 **Tonnes** for 2009.

The ion exchange plant produces demineralised water. Demineralised water is supplied with the fuel to the engines to reduce combustion temperatures and thus NO_x emission levels. One regeneration of anion/cation units is required for every 300 m^3 (approximately) of water produced. 378 m^3 of demineralised water were produced during 2009.

Item	Comment
Gas Oil	Fuel for the gas turbine engines
Demineralised Water	For NO_x reduction. Supplied from a bore hole on the neighbouring site.
Electricity	The imported electrical energy is small in relation to the amounts of electricity generated. When the plant is shut down this is basically heating and lighting.
Domestic Water	The town water supply is used for mess rooms and toilets. The number of people on site varies from one after normal hours to three or occasionally five during normal operation.

Table 3.4.B Resource Consumption Comments

2.5.- Environmental Incidents and Complaints Summary

There was a problem with the NO_x data recorder on Unit 1 on 03/06/2009 and the EPA was notified. This was an alarm light on the analyser but Unit 1 was not on load. This was repaired seven days later.

On the 10/06/2009 there was a problem with the Unit 3 NO_x data recorder and the analyser was repaired in Germany. EPA was notified. The analyser was returned to service on 16/9/2009 and EPA notified as well.

No complaints from the public during 2009.

2.6.- Non-Compliances Summary

There was no non-compliances recorded in 2009.

3.- Management of the Activity

The environmental procedures for Tawanghmore are contained in a folder held in the Operation Office and also in electronic format.

Environmental operational management at Tawnaghmore is carried out by Utility Operation and Maintenance Services (UOMS). The UOMS staff appointed at the Tawnaghmore site are: Willie Cronin, Stanley Rowe, Michael Costello. Phone 096-32872.

The Station Manager is Gerard Crean and Marta Sabido is the appointed Environmental/Chemistry Coordinator for the plant.

3.1.- Environmental Management Programme 2009

Daily and weekly checks are recorded in paper format, held in the Operations Office. A computer based work scheduling system is used and records of recurring checks and other environmental work is held in the database.

3.2.- Environmental Management Programme Proposal 2010

2010 AER			
Environmental Management Programme Proposal 2010			
Objective	**Description**	**Person Responsible**	**Completion Date**
Environmental Management Group	Periodical meetings, at least twice a year	Environmental TO/Environmental Coordinator/Operations Manager	Dec 2010
ISO 14001	Development and implementation of a formal Environmental Management System (EMS) - as defined by the ISO 14001. Application for ISO certification will be submitted when the EMS is in place and working for a number of months.	Environmental TO/Environmental Coordinator/Operations Manager	Dec 2010
Waste Management	Waste Framework Contract	Environmental Manager/Environmental Coordinator/ Purchasing and Risk	Oct 2010
Energy Efficiency	Energy Efficiency Audit	Environmental TO/Environmental Coordinator/Operations Manager	March 2010

Table 3.2. Environmental Proposal 2010

3.3.- Pollution Emission Register Report 2009

Item	Quantity (Tonnes)	Derivation
CO_2	2608.08	821.54 tonnes gas oil * 73.3 (Emission Factor tCO_2/TJ) * 43.31 (NCV TJ/tonne) * 1.0 (Oxidation Factor)/1000
NO_x	4.51	34 (2006 value) * 821.54/7814*95/120
SO_2	1.64	821.54 tonnes gas oil * 0.1/100 sulphur * 1.998 (S to SO_2)

Table 3.3. Summary PER 2009

4.- Licence-Specific Reports

4.1.- Emissions to Atmosphere Report

The following estimations of emissions are made for the purposes of the AER and reflect average running conditions over the reporting periods.

Estimations are based on the assumption of an average efficiency compatible with the above data, flue gas flows normalised to 15% O2 dry and NO_x emissions of 120 mg/Nm^3, being the IPPC license ELV with which compliance has been demonstrated. In practice, levels much lower than this were achieved.

SO_2 emissions are calculated at the max. Sulphur content of the gasoil supplied (i.e. 0.1% Sulphur).

Unit	1		3	
Stack	**A1**	**A2**	**A1**	**A2**
January	104.4	96.5	12	1.2
February	95.9	105.7	95.9	7.8
March	86.5	59	70	70
April	0	0	108	113
May	0	0	95	101
June	101.7	103	102	96
July	0	0	0	0
August	95.6	92.2	0	0
September	0	106.8	0	0
October	92.3	81.4	1.2	1
November	86.4	90.5	31	32.1
December	91.7	87.6	74.31	83.91
Emission Limit Value	***120***	***120***	***120***	***120***

Table 4.1. Average NO_x (mg/Nm^3) 2009

No exceedances of the NO_x Emission Limit Values were registered during 2009.

4.2.- Emissions to Water Report

4.2.1.- Monitoring of Emissions to Sewer

Emission Point Reference S1

Date	BOD (mg/l)	VOC (ug/l)	pH	Dissolved Solids (mg/l)
01/04/2009	71	<10	7.4	16506

Table 2.2.A S1 Sample

4.2.2.- Monitoring of Storm Water Emission

Emission Point Reference S2

Surface water discharge was monitored at point designated S2 and reported to the EPA at the end of each quarter.

pH range was generally in the middle of the authorized range.

BOD (mg/l) was generally in range: less than 2 to 4.

Conductivity (micro S/cm) range: 95 to 530, generally in the lower part of this range.

TPH (micro g/l): less than 10.

Date	BOD mg/l	Conductivity uS/cm	OFG mg/l	pH	Voc'S (TPH)
09/01/2009	<2	394	<1	7.8	<10
08/07/2009	<2	274	*	7.6	<10
04/11/2009	<2	110	10	*	<10
07/10/2009	<2	530	<1	7.5	<10
02/09/2009	<2	160	*	7.7	<10
05/08/2009	<2	134	28	8.1	<10
03/06/2009	4	181	11	7.4	<10
06/05/2009	<2	122	11	7.9	<10
11/03/2009	<2	244	12	7.7	<10
04/02/2009	<2	95	2	7.8	<10

Table 2.2.B S2 Sample Data
(*) Readings not Provided

4.3.- Waste Management Report

European Waste Code	Hazardous	Description	Quantity (tonnes)	Disposal		
				Carrier	Location	Name & Permit
20 03 01	No	General Waste	13	McGrath Industrial Waste, Turlough, Castlebar, Co. Mayo	For non-recyclables: MayoCo.Co. Landfill, Derrinumera – or Rathroeen.. Recyclable material : Smurfit Recycling, KOG Logistics Ltd. Emerald Salvage Galway Metal Co. Wood Systems.	The skips were segregated at Unit 2,Moneen Industrial Estate, Drumconlon, Castlebar. Facility permit PER25 Collection permit CW002 Waste Facility Permit WFP-MO-08-0002-01
20 03 04	No	Standard domestic sewage	16	Michael O'Brien, Annagh Cross, Ballyglunin, Tuam. Co. Galway.	Galway County Council Sewage Treatment Works, Weir road, Tuam Co. Galway	Waste Collection Permit CW371
13 08 99	Yes	Oil contaminated material	1.6	ENVA	Portlaoise	WCP-DC-08-1116-01 + WO 184-1
13 05 07	Yes	Oily Water Waste	26	ENVA	Portlaoise	WCP-DC-08-1116-01 + WO 184-1
19 09 05	No	Water Treatment Plant Spent resins	4	Noel Holmes	Rathroeen Landfill, Killala Rd, Ballina (Mayo County Council)	PER 106

Total Waste Removed from Site	2009	60.6
Total Waste Removed from Site	2008	115
Total Waste Removed from Site	2007	84.61
Total Waste Removed from Site	2006	83.59
Total Waste Removed from Site	2005	95

Table 4.3. Waste removed from Tawnaghmore during 2009

4.4.- Noise Monitoring Report

No complaints have arisen with respect to noise since generation commenced at the site.

A comprehensive noise field survey was carried out in October 29th 2008 by AWN Consultancy Ltd and demonstrated that noise levels generated from the site were well within the licence requirements after the doubling of our production capacity to 104MW with the installation of Unit 3. The results were in conformance with the required levels (55 dB daytime and 45 dB at night time).

As there has been no change implemented in the plant or the operating regime in addition to the difficulty of scheduling this type of testing due to the station's low load factor (Table 4.4), Tawnaghmore hereby proposes to the Agency to allow suspension of yearly noise surveys requirement.

Table 4.4. Tawnaghmore load factor from 2007 to 2009

Year	Station Load Factor (%)
2007	1.85%
2008	1.19%
2009	0.75%

4.5.- Tank and Pipeline Testing and Inspection

A visual inspection of all tanks was carried out locally per ESB GDS 16.3. Pipelines are inspected weekly and recorded in the station checklist.

4.6.- Review of Residuals Management Plan

The RMP was revised during 2009 updating Endesa Ireland references.

4.7.- Review of Environmental Liabilities Insurance Cover

An external audit and revision of the ELRA was carried out during 2009 by TMS Consulting. All Endesa Ireland references were updated.

Endesa Ireland have arranged for insurance cover, certificate is available for inspection.

4.8.- Energy Efficiency Audit Report

An energy efficiency audit will be carried out during 2010 and a summary of the conclusions included as an attachment to the present AER.

4.9.- Annual Emissions of SO_2 and NO_x

Data on NO_x is contained above in Summary Information.

In relation to control of SO_2 emissions, the fuel was analysed and found to have a sulphur content of 0.1%.

4.10.- Annual Energy Input

The main energy input was **821.54 tonnes of gas oil**. Electricity imports were relatively small for heating, lighting and gas turbine engine auxiliary supplies.

4.11.- Annual Carbon Dioxide

The total quantity of CO_2 emitted was **2,608.08 tonnes**.

4.12.- Surface Water Monitoring Summary

See Emissions to Water Report above and also comments in Summary Information.

4.13.- Total Net amount of Electricity Generated 2009

Year	2009	2008	2007	2006	2005
MWh Generated	3,001	7,035	8,198	26,350	31,641

Table 4.13. Total Net Amount of Electricity Generated during 2009

Appendix I

ENVIRONMENTAL MONITORING SYSTEMS
EMS

Unit 24 Stadium Business Park
Ballycoolin Road
Dublin 11
Ireland

Tel. : 00353 1 8853954
Fax. : 00353 1 8853959
E-mail: mail@emsys.ie
www.emsys.ie

Customer
Endesa Ireland.
Tawnaghmore Peak Power Plant,
Killala,
Co. Mayo

Location: Unit 1

Instrument
Sick Maihak S710 Multigas analyser

Serial No. 711802

Service Report No.: GH280809-1
Date: 28/08/09
Order No.: N/A
Contract No.: 09/102

Service Requested/Fault
Routine Service & Calibration

Work Carried Out

1. Carried out visual inspection of site.
2. Connected new Nitrogen and Nitric Oxide Cylinders to the CEMS.
3. Programmed new Nitric Oxide value into both the analyser and the CEMVIEW software.
4. Set up pressures and flow rates from the cylinder regulators to the analyser.
5. Carried out zero and span of analyser.
6. Instrument working correctly and within specification.

Calibration Values.

	NO		O2	
	Zero	**Span**	**Zero**	**Span**
Gas Values:	0.0000 mg/M3	325.62 mg/M3	0.0000 %VOL	20.800 %VOL
Act Values:	10.969 mg/M3	338.55 mg/M3	0.0107 %VOL	20.823 %VOL
	DRIFT in %		**DRIFT in %**	
ABS:	-10.1%	-3.47%	-0.79%	0.043%
DIF:	2.742%	3.970%	0.051%	0.109%

Drift Limits: +/- 50%
Calibration Date: 16/09/09
Gas Data: Nitric Oxide
Cylinder No: P2862ZD411960
Cert No: 033511
UN No: 1956
Cert Date: 27/08/09
Shelf Life: 36 Months

Time on Site: 3.0 Hours

Parts Used
N/A

Engineers Signature: Gary Heslin

Customers Signature: N/A

ENVIRONMENTAL MONITORING SYSTEMS
EMS

Unit 24 Stadium Business Park
Ballycoolin Road
Dublin 11
Ireland

Tel. : 00353 1 8853954
Fax. : 00353 1 8853959
E-mail: mail@emsys.ie
www.emsys.ie

Customer
Endesa Ireland.
Tawnaghmore Peak Power Plant,
Killala,
Co. Mayo

Location: Unit 3

Instrument
Sick Maihak S710 Multigas analyser

Serial No. 711795

Service Report No.: GH160909-2
Date: 16/09/09
Order No.: N/A
Contract No.: 09/102

Service Requested/Fault
Calibration

1. Carried out visual inspection of site.

2. Connected new Nitrogen and Nitric Oxide Cylinders to the CEMS.

3. Programmed new Nitric Oxide value into both the analyser and the CEMVIEW software.

4. Set up pressures and flow rates from the cylinder regulators to the analyser.

5. Carried out zero and span of analyser.

6. Instrument working correctly and within specification.

Calibration Values.

	NO		O2	
	Zero	**Span**	**Zero**	**Span**
Gas Values:	0.0000 mg/M3	327.23 mg/M3	0.0000 %VOL	20.800 %VOL
Act Values:	-3.6491 mg/M3	336.85 mg/M3	-0.0354 %VOL	20.615 %VOL
	DRIFT in %		**DRIFT in %**	
ABS:	-0.91%	2.938%	-0.17%	-0.90%
DIF:	-0.91%	2.938%	-0.17%	-0.90%

Drift Limits: +/- 50%
Calibration Date: 16/09/09
Gas Data: Nitric Oxide
Cylinder No: P2862ZD188917
Cert No: 033509
UN No: 1956
Cert Date: 27/08/09
Shelf Life: 36 Months

Time on Site: 3.0 Hours

Parts Used
N/A

Engineers Signature: Gary Heslin

Customers Signature: N/A