West Offaly Power Generating Station

IPPC Licence Reg. No. P0611-01

Annual Environmental Report

For the period of 1st Jan 2008 to 31st Dec 2008

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1. Introduction

1.1 IPPC Licence Number

IPPCL P0611-01

1.2 Name and Location

Electricity Supply Board

West Offaly Power Generating Station

Shannonbridge

Co Offaly.

1.3 Description of Activities

The production of energy in a combustion plant, which has a rated thermal input greater than 50 MW.

West Offaly Power is one of two new peat stations and construction commenced in the Summer of 2002 with a commercial operation date (COD) of 27-1-2005. West Offaly Power station has one unit, consisting of a boiler, turbine and auxiliary plant, with an electricity generating capacity of 150MWe. The boiler operates on peat with gas oil used for start up. It is scheduled to burn approximately 1,245,000 tonnes of peat each year.

Note: This report covers Environmental activities for the period of January 2008 to December 2008. The station is still operating under the construction warranty period.

The contractor – Foster Wheeler and ESB concluded an agreement in December 2008 to implement in 2011 a permanent solution to the long standing corrosion problems

1.4 West Offaly Power Environmental Policy and Key Objectives.

West Offaly Power Generating Station is part of ESB Power Generation Business Unit. It exports approximately 137 Megawatts of electricity produced from steam generation plant burning peat and uses gas oil for start up. The station is located on the east bank of the River Shannon in an area of significant environmental importance. Environmental monitoring demonstrates that the operation of West Offaly Power does not have a significant impact on the environment.

It is the policy at West Offaly Power Generating Station to operate our facilities in a safe, efficient and environmentally responsible manner. In doing so we will:

- Define clear accountabilities and responsibilities for the management and operation of all environmental protection systems.
- Actively promote environmental awareness among all staff through communication and training programs.
- Integrate environmental concerns into all decision making and planning at the earliest stage.
- Ensure and demonstrate compliance with applicable permits, licences and relevant legal requirements, in particular Integrated Pollution Prevention and Control Licence No P0611-01.
- Ensure all significant risks are identified, evaluated and reduced to a minimum and the necessary plans and programmes are in place to minimise or eliminate potential impacts including those arising from emergency incidents.
- Put in place systems to reduce waste production and to monitor and ensure the safe disposal of all residual wastes.
- Have regard for the concerns of neighbours and other stakeholders.
- Recognise the need for special sensitivity in all operations arising from the station's location adjacent to the River Shannon, in an area of significant tourist and amenity value.
- Encourage good environmental practices from suppliers of goods and services.
- Achieve and maintain ISO 14001:2004 certification.
- Review our environmental policy and practices on an ongoing basis, to take cognisance of changes in technology and regulations.
- Minimise the consumption of energy, water and other process raw materials.
- Acknowledge the impact of peat extraction and to influence our fuel supplier towards optimum environmental management of that resource.
- Audit and review the environmental performance of the station at regular intervals and adjust our policy, procedures, objectives and practices in the light of findings and experience.

WOP will set and update appropriate targets on a regular basis in order to deliver the above objectives and ensure continuous improvement in environmental performance.

Originally Issued : Date: 27-5-‘05

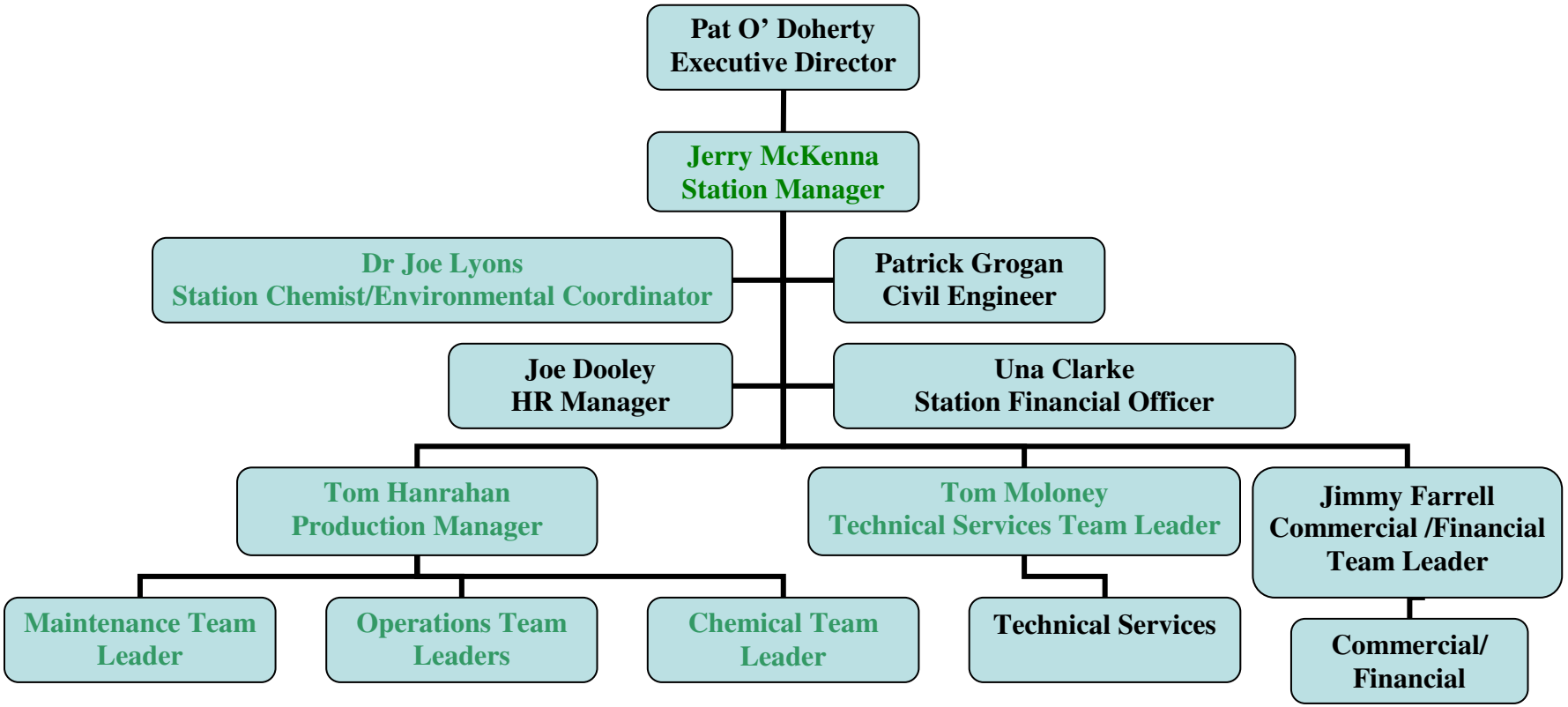
Revised : 28-8-‘08

Signed: ***Station Manager***

1.5 Environmental Management Structure and Responsibility

Environmental Management is fully integrated into all aspects of management on site. The management structure is shown in Figure 1.1. Those marked in green have a significant environmental role within the station. The Station Chemist is the Environmental Co-ordinator and is responsible for the co-ordination and management of all environmental activity at the station. The Environmental Co-ordinator works with the management team and environmental management group (EMG) to ensure that

- the station complies with or improves on the requirements of any environmental provisions specified under its IPPC licence, other licences, planning permission and environmental legislation.
- the station's EMS is operated and maintained to the required standard.
- by way of audit and management review, the EMS is effective, is adaptive to changing circumstances and is delivering continuous improvement.



Figure

Figure 1.1 Organisation Chart

2. Summary Information : Jan – Dec 2008

2.1 Emissions to Water

ESB West Offaly Power has 3 licensed emission points discharging to the River Shannon.

The following 2 have a common emission point
- PS-SW1 Condenser Cooling Water
- PS-SW2 Screen Wash Water

The following 2 also have a common emission point
- PS-SW3 Treated Sewage Effluent
- PS-SW7 Surface Water Drainage (2)

Finally, the following 3 have a common emission point
- PS-SW4 Boiler Blow-down
- PS-SW5 Water Treatment Effluent
- PS-SW6 Surface Water Drainage (1)

However, each of the above discharges has individual sampling points

See Drawing Ref: Emission & Sampling Points Fig 1 Rev 0 West Offaly Power

Monitoring of these emission points is carried out in accordance with Schedule 2(iii) of West Offaly Power IPPC license P0611-01.

A summary of the monitoring results for mass emissions to water at each of the above emission points is presented in the tables below.

Ref Point : PS-SW1 & PS-SW2 – Condenser Cooling Water & Screen Wash Water

Parameter	Licensed Conditions annually	Results for 2008 annually
Temperature	Not specified	95% of discharges < 8 ºC and 100% < 10 ºC
Chlorine	0.1mg/l	Cl not being used
Thermal Load	186 MWth (max)	Full Compliance
Volume m3	219,600,000	153,964,800

Ref Point : PS-SW3 – Sewage Treatment Effluent

Parameter	Licensed Conditions annually	Results for 2008 annually
pH	6-9	6-8
Temperature	25ºC	<16
BOD	20mg/l	<2
SS	30mg/l	<10

Ref Point: PS-SW4 Boiler Blowdown prior to dilution with surface water

Parameter	Licensed Mass Emissions (kg) annually	Mass Emissions 2008 annually
Flow	Not given	10 -17 t/hr
Orthophospate (PO4)	2	Not being used
Ammonia (kg)	25.5	1.0
Volume (m3)	43,800	390
Hydrazine	0.37	Not being used

Ref Point : PS-SW5 Neutralised Water Treatment Effluent (prior to dilution with surface water)

Parameter	Licensed Emissions Mass Emissions (kg) annually	Mass Emissions (kg) 2008 annually
pH	6 – 8.5	6 – 8.5
Total Dissolved Solids	3,285,000	110,362
Mineral Oil		0.24
SS	3,285	263
Ammonia (as N)	21.9	14.6
Volume (m3)	109,500	24,500
Toxicity (TU)	10	< 2.2 (max)
BOD	2,188	37

Ref Point : PS-SW6 Surface Water (1)

Parameter	Licensed Emissions Average Concentration (mg/l)	Average Concentration(mg/l) 2008
pH	6 – 8.5	pH = 7.6 – 8.4
Total Dissolved Solids	Not given	624
Mineral Oil (µg/l)	Not given	< 10
SS	Not given	< 10
Ammonia (as N)	Not given	< 0.2
BOD	Not given	< 3
Oil, fats & greases	Not given	< 1

Ref Point : PS-SW7 Surface Water (2)

Parameter	Licensed Emissions Average Concentration (mg/l)	Average Concentration(mg/l) 2008
pH	6 – 8.5	pH = 7.5 - 8
Total Dissolved Solids	Not given	325
Mineral Oil (µg/l)	Not given	< 10
SS	Not given	< 10
Ammonia (as N)	Not given	< 0.2
BOD	Not given	< 3
Oil, fats & greases	Not given	< 1

2.2 Outfall Drain from Holding Lagoon at Ash Disposal Facility: ADF-SW1:

There is no leachate from the ADF being sent to the leachate lagoon. All leachate is recycled onto the ADF to condition the ash and to minimise dust emission. This was confirmed by the Agency during site visits.

2.3 Annual Toxicity PS-SW5 Neutralised Water Treatment Plant Results

The Agency has not required this to be done since the 2005 results and report was submitted.

Parameter	Test Species	Limits	2005 Results
Toxicity	Daphnia Magna	10 TU	<1.1 TU
	Vibrio Fischeri	10 TU	<2.2 TU

2.4 Groundwater Monitoring Results
Station: PS-GW1 & PS-GW2
Ash Disposal Facility (ADF): ADF–GW3, ADF-GW4, ADF-GW5, ADF-GW6

2008						
Parameter	**PS-GW1**	**PS-GW2**	**ADF-GW3**	**ADF-GW4**	**ADF-GW5**	**ADF-GW6**
Al (µg/l	157	167	141	213	266	178
As (µg/l	1	2	2	1	2	1
Mo (µg/l	1	13	<1	<1	3	<1
Fe (µg/l	<2	315	137	184	134	37
Cd (µg/l	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Se (µg/l	2	4	2	<1	2	4
Cu (µg/l	<1	2	<1	<1	<1	2
Ni (µg/l	1	49	<1	5	<1	<1
Zn (µg/l	6	31	4	4	9	11
Chloride mg/l	30	130	22	21	14	32
Hydrocarbons µg/l	<10	<10	<10	<10	<10	<10
Ammonia (N) mg/l	<0.2	3.3	0.6	3.1	3.1	3.3

2.5 Metals in Peat Ash, based on Quarterly Results

2008	**Peat Ash mg/kg**			
Parameter	**Q1**	**Q2**	**Q3**	**Q4**
Al	10420	9000	8856	7360
As	35	23	18	13
Fe	13720	13120	14660	11660
Cd	<0.5	<0.5	<0.5	<0.5
Ca	110500	108600	Off load	101700
Cu	11	2	7	8
Ni	18	11	15	14
Zn	47	54	51	43
Se	<1	<01	<1	2

2.6 Emissions to Water Non-Compliance Summary

Date	Source	NC	Cause	Corrective Action
2008	PS-SW4	NH3	Regeneration of the Condensate Polishing Plant (CPP) in resulted in the emission of ammonia from the neutralisation sump at a concentration in excess of the limit set down in the IPPCL. While the plant was in compliance with the IPPCL regarding the total quantity of ammonia emitted in 2008. Regeneration of the Condensate Polishing Plant (CPP) results in the emission of ammonia from the neutralisation sump in excess of the limit set down in the IPPCL. Ammonia is required for plant operation as an alkalising agent and together with caustic soda (< 3kg/annum) is the only chemical used in the feedwater/steam cycle. For environmental reasons, West Offaly Power made some operational changes and is able to operate the plant without the use of Phosphate and Hydrazine although this was thought not possible at the IPCL application stage.	There was one regeneration of the CPP in 2008 - resulting in a significant reduction in the ammonia discharged and the plant was in compliance with the terms of the IPPCL. Two regenerations are expected in 2009 with consequently a higher ammonia emission but still complying with the IPPCL.

2.7 Emissions to Atmosphere

There are two IPPC licensed air emissions points at ESB West Offaly Power: PS-A1, Boiler Stack and PS- A2: Auxiliary Boiler.

Table 2.7.1: summary of the mass emissions at these points. Report Period: 1/1/2008 to 31/12/2008.

Table 2.7.1: Summary of Emissions to Atmosphere

Emission Point	NOx (tonnes)	SOx (tonnes)	Particulates (tonnes)	CO2 Emitted tonnes Calculated From fuel use
PS-A1	766	43	43	1,089,030
PS-A2	0.2*	0.4*	-	-

Note: It was agreed with the Agency that due to the very intermittent operation of the auxiliary boiler it is not good environmental practice to operate the boiler for a number of days in order that a test be carried out. There was difficulty in measuring particulates in 2008 due to very intermittent running and will be carried out in 2009 when/if auxiliary boiler is running for a longer period in West Offaly Power

* these values are calculated based on hours run and 0.1% sulphur in gas oil

Table 2.7.2: Emissions to Atmosphere Non-compliance Summary

Year	Date	Non-compliance	Cause	Corrective Action
2008		Full Compliance		

2.8 Waste Management Report West Offaly Power

Summary of Waste Information for 2008

Summary of Waste Information for 2008	
Item	Tonnes
Total quantity of waste produced in 2008	47,196
total quantity of waste disposed of on-site	44,464
total quantity of waste disposed of off-site	1890.8
total quantity of waste recovered on-site	710
total quantity of waste recovered off-site	130.91
Quantity of non-hazardous waste produced in 2008	47,167.7
quantity of non-hazardous waste disposed of on-site	44,464
quantity of non-hazardous waste disposed of off-site	1874
quantity of non-hazardous waste recovered on-site	710
quantity of non-hazardous waste recovered off-site	119.7
Quantity of hazardous waste produced in 2008	12.31
quantity of hazardous waste disposed of on-site	0.00
quantity of hazardous waste disposed of off-site	0.3
quantity of hazardous waste recovered on-site	0.00
quantity of hazardous waste recovered off-site	12.0

Information on each waste stream for 2008

European Waste Catalogue Code	Hazardous (Yes/No)	Description* (Sample of wastes types listed below - use/delete as applicable & add required waste streams)	Quantity (tonnes)	Disposal / Reuse / Recycling	Carrier / Transporter	Ultimate Disposal / Recovery	
					Name & Permit Details	Location	Name & Permit Details
10 01 99	No	Fuel Debris	1874.00	Disposal	Bord na Mona IPPCL No 502	Blackwater, Co Offaly	Bord na Mona IPPCL No 502
17 05 04	No	Stones/Sand	710.00	reuse	Bord na Mona IPPCL No 502	Blackwater, Co Offaly	Bord na Mona IPPCL No 502
10 01 01	No	Bottom Ash	2,710.00	Disposal	Bord na Mona IPPCL No 502	Blackwater, Co Offaly	Bord na Mona IPPCL No 502
10 01 03	No	Fly Ash	41,754.00	Disposal	Bord na Mona IPPCL No 502	Blackwater, Co Offaly	Bord na Mona IPPCL No 502
15 02 02	Yes	Oil Contaminated Materials	0.50	Recycled	ENVA Portlaoise 033/OY/18/02	Portlaoise	Atlas Waste Licence 184-1
13 05 07	Yes	Oily Water	6.00	Recycled	ENVA Portlaoise 033/OY/18/02	Portlaoise	Atlas Waste Licence 184-1
15 02 02	Yes	Oil Filters	0.01	Recycled	ENVA Portlaoise 033/OY/18/02	Portlaoise	Atlas Waste Licence 184-1
13 002 06	Yes	Waste Oils - PCB Free	5.20	Recycled	ENVA Portlaoise 033/OY/18/02	Portlaoise	Atlas Waste Licence 184-1
15 01 01	No	Waste Paper	0.50	Recycled	ENVA Portlaoise 033/OY/18/02	Tullamore	Atlas Waste Licence 184-1
15 01 01	No	Cardboard	0.50	Recycled	ENVA Portlaoise 033/OY/18/02	Tullamore	Atlas Waste Licence 184-1
15 01 02	No	Plastic	0.50	Recycled	ENVA Portlaoise 033/OY/18/02	Tullamore	Atlas Waste Licence 184-1
17 04 05	No	Scrap Metal	116.00	Recycled	Munster Metal Limerick 002/OY/02	Limerick	Munster Metal WPLK 01C
20 03 01	No	General Waste (food waste, canteen waste)	16.00	Disposal	ENVA Portlaoise 033/OY/18/02	Tullamore	Atlas Waste Licence 184-1
15 01 03	No	Timber	2.20	Recycled	ENVA Portlaoise 033/OY/18/02	Tullamore	Atlas Waste Licence 184-1
20 01 21*	Yes	Lighting	0	Recycled	Irish lamp Recycling 035(2)/OY/400/06	Athy, Co Kildare	Irish Lamp Recycling WP 200002B
20 01 33*	Yes	Batteries	0.1	Disposal	ENVA Portlaoise 033/OY/18/02	Portlaoise	Atlas Waste Licence 184-1
15 01 10*	Yes	Grease Cartridges	0.1	Disposal	ENVA Portlaoise 033/OY/18/02	Portlaoise	Atlas Waste Licence 184-1
16 05 04*	Yes	Aerosol containers	0.1	Disposal	ENVA Portlaoise 033/OY/18/02	Portlaoise	Atlas Waste Licence 184-1

Information on Waste Procedures 2008

	Waste Stream*	Procedure in Place (if Yes insert Procedure No.)	Last Revision Date of Procedure	Last Audit Date of Procedure (if available)	Is waste stream recorded in Waste Register (Yes/No)
1	Batteries	EMS 9.2-02	Aug 08	Annually	Yes
2	Spent Ion Exchange Resins	EMS 9.2-03	Aug 08	Annually	Yes
3	Oil Contaminated Materials	EMS 9.2-04	Aug 08	Annually	Yes
4	Smoke Detectors	EMS 9.2-05	Aug 08	Annually	Yes
5	Office Equipment Cartridges	EMS 9.2-06	Aug 08	Annually	Yes
6	Spent Lighting	EMS 9.2-07	Aug 08	Annually	Yes
7	Waste Chemicals, Fuel Additives	EMS 9.2-08	Aug 08	Annually	Yes
8	Waste Oils - PCB Free	EMS9.2-09	Aug 08	Annually	Yes
9	Waste Oils - PCB Contaminated	EMS9.2-10	Aug 08	Annually	Yes
10	Silica Gel	EMS9.2-11	Aug 08	Annually	Yes
11	Cardboard/Paper/Plastic	EMS9.2-12	Aug 08	Annually	Yes
12	Fire Extinguisher Powder	EMS9.2-13	Aug 08	Annually	Yes
13	Disposal of Shot Blast	EMS9.2-14	Aug 08	Annually	Yes
14	Disposal of Scrap Metal	EMS9.2-15	Aug 08	Annually	Yes
15	Cabling & Wiring	EMS9.2-16	Aug 08	Annually	Yes
16	Instruments, Switchgear & Electronic Cards	EMS9.2-17	Aug 08	Annually	Yes
17	Containers	EMS9.2-18	Aug 08	Annually	Yes
18	Brickwork	EMS9.2-19	Aug 08	Annually	Yes
19	Disposal of Spent Coolants	EMS9.2-20	Aug 08	Annually	Yes
20	Disposal of Glass	EMS9.2-21	Aug 08	Annually	Yes
21	Asbestos	EMS9.2-22	Aug 08	Annually	Yes
22	Grass & Wood	EMS9.2-23	Aug 08	Annually	Yes
23	Sludges & Slags	EMS9.2-24	Aug 08	Annually	Yes

24	Disposal of Man-Made Mineral Fibre	EMS9.2-25	Aug 08	Annually	Yes
25	CFCs & Halons	EMS9.2-26	Aug 08	Annually	Yes
26	Disposal of Paints & Varnishes	EMS9.2-27	Aug 08	Annually	Yes
27	Disposal of Radioactive Sources	EMS9.2-28	Aug 08	Annually	Yes
28	Disposal of Ash	EMS9.2-29	Aug 08	Annually	Yes
29	Disposal of Potentially Hazardous Excavated Materials	EMS9.2-30	Aug 08	Annually	Yes
30	Disposal of material by contractors	EMS9.2-31	Aug 08	Annually	Yes
31	Mercury or Equip containing mercury	EMS 9.2-32	Aug 08	Annually	Yes
32	Computer Equipment	EMS 9.2-33	Aug 08	Annually	Yes
33	General Waste (food waste, canteen waste)	EMS 9.2-34	Aug 08	Annually	Yes

2.9 Energy and Water Consumption

Energy Consumption

Year	Peat (tonnes)	Gas Oil (tonnes)	House Load MWhrs
2008	**1,235,992**	**748**	**117,979**

Energy Generated MWhrs

Year	MW hrs Generated	MWhrs Exported
2008	**1,069,941**	**951,962**

Water Consumption m^3

Year	Domestic Water Usage	Other	Plant Operation	Total
2008	**2,100**	**0***	****107,250**	**109,350**

Note:

*this is water used mainly in the DeSox plant for SO_2 removal and the DeSOx was not in operation in 2008

** this is water used solely for make-up to the steam/water cycle

2.10 Environmental Incidents and Complaints

2.10.1 Complaints Summary

No complaints received in 2008

2.10.2 Incidents Summary

No incidents in 2008

2.10.3 Queries received Summary

There were visits and queries from : Tipperary Institute of Technology 4th Year Environment class and lecturers and from Ballinasloe Secondary school - the Leaving Cert class plus teacher.

3.0 Management of the Activity

The EMP is reviewed quarterly by the station's management team and status of objectives is discussed and noted.

3.1 Environmental Management Program (Objectives and Targets) 2008

In Table 3.1 is a summary of the progress on the 10 objectives in the EMP for 2008

3.2 Environmental Management Program (Objectives and Targets) 2009

In Table 3.2 is a summary of the progress on 8 objectives in the EMP for 2009

Table 3.1 EMP 2008 **Revision No. 4** **Date of this Revision January 2009** **Date Originally Prepared Jan. '08**

Objective Ref. No.	*Objective*	*Status % Complete*	*Corrective Action Implemented/ Comments*	*Original Target Completion Dates*	*Revised Target Milestone Completion Dates*
2008/01	**Install a camera in DeSOx to monitor expansion joints for rupture** • To eliminate ash spillage due to expansion joint rupture	10	Investigation found that a camera was not suitable and a sensor beam with alarm to control room a more reliable method. Will be included as an objective in 2009	June 2008	
2008/02	**Install permanent steel piping from (i) boiler basement to furnace entry on 1st floor and (ii) in DeSOx plant** • Will eliminate potential for ash spillage in these areas	100		March 2008	
2008/03	**Investigate the possibility of putting fly ash from the boiler directly into the Ash Silo – and install if feasible** • This will further minimise ash spillage and improve tidiness.	100		June 2008	
2008/04	**Stakeholder Management** • Keep stakeholders such as local neighbourhood, Offaly Co Co and Shannon Regional Fisheries Board aware of environmental progress in the station by being proactive i.e sponsorship of local events, village improvements	100	Contact with neighbours, sponsorship etc	On going to December 2008	
2008/05	**Carry out 3 monthly check on alarms on the oil interceptors** • Ensure alarms operating at all times and recorded	100		2008	

Table 3.1 EMP 2008 **Revision No. 4** **Date of this Revision January 2009** **Date Originally Prepared Jan. '08**

Objective Ref. No.	*Objective*	*Status % Complete*	*Corrective Action Implemented/ Comments*	*Original Target Completion Dates*	*Revised Target Milestone Completion Dates*
2008/06	**Investigate more efficient use of permanent lighting system which is switched on permanently for safety reasons** • Energy saving	100		July 2008	
2008/07	**Drains Survey** • 3 yearly CCTV survey of all underground drains /pipework	100	Survey completed	May 2008	
2008/08	**Oil Usage in Gearboxes of 6.6 Kv motors – fans and boiler feed pumps** • Change from a time based oil change to a condition monitoring based oil change	100		May 2008	
2008/09	**Install hardtop contractor lay-down area** This will improve tidiness and drainage control and overall environmental management of contractors	0	Larger job than anticipated and will be done in 2009. Was used extensively in 2008 Will be an objective in 2009	June 2008	December 2008
2008/10	**Carry repair to Grade 4 and 5 failures identified in the Drains CCTV survey** • The CCTV survey categorised the failures from Grades 1 - 5 with 5 the most serious	100	Following results of the CCTV survey	July 2008	December 2008

Table 3.2 EMP 2009 Revision No. 1 Date of this Revision : March 09 Date Originally Prepared Jan. '09

Objective Ref. No.	*Objective*	*Status % Complete*	*Corrective Action Implemented/ Comments*	*Original Target Completion Dates*	*Revised Target Milestone Completion Dates*
2009/01	**Install a Sensor beam in DeSOx to monitor expansion joints for rupture** • To eliminate ash spillage due to expansion joint rupture	10		July 2009	
2009/02	**Install photo cells in the lighting in: stairways, fuel day bin area and blending bunker** • To reduce energy consumption in these areas	20		July 2009	
2009/03	**Investigate the possibility of switching off of the house transformers** • This will further minimise ash spillage and improve tidiness.	10		July 2009	
2009/04	**Stakeholder Management** • Keep stakeholders such as local neighbourhood, Offaly Co Co and Shannon Regional Fisheries Board aware of environmental progress in the station by being proactive i.e. sponsorship of local events, village improvements	25		On going	
2009/05	**Promote Sustainability awareness by (i) week dedicated to sustainability and (ii) on-going interaction with staff and colleagues in other stations to identify further improvement** • To reduce energy consumption	70		2009	

Table 3.2 EMP 2009 **Revision No. 1** **Date of this Revision : March 09** **Date Originally Prepared** **Jan. '09**

Objective Ref. No.	*Objective*	*Status % Complete*	*Corrective Action Implemented/ Comments*	*Original Target Completion Dates*	*Revised Target Milestone Completion Dates*
2009/06	**Investigate utilising heated water at the CW outfall and Settlement pond to provide heat to the station** • Energy saving	0		Oct 2009	
2009/07	**Install hardtop contractor lay-down area** ▪ This will improve tidiness and drainage control and overall environmental management of contractors	0		Sept 09	
2009/8	**Investigate harnessing the flow energy at the CW outfall using a marine turbine and supply the station with an alternative energy source that is environmentally friendly** • To conserve energy	0		Oct 09	

3.3 E-PRTR 2008

ESB West Offaly Power expected to carry out a study on heavy metals in air emissions in 2009 to coincide with similar work in other ESB power plant, however this has been postponed in other plants to 2010

3.3.1 Methodology for determination of mass emissions

The methodology for the determination of mass emissions for inclusion in the PER is as follows.

The flue gas volume generated is not measured directly in the station CEMS equipment. It is, however, possible to calculate flue gas volumes under standard conditions (as is required to express measured emission concentrations) to a high degree of accuracy based on knowledge of fuel composition, calorific value and activity.

NO_x

The NOx has an ELV of 200 mg/Nm^3. It is proposed that the NO_x emitted be calculated on the basis of the fuel quantity consumed, its consequent flue gas volume (under standard conditions) and the average NO_x concentration measured over the reporting period. An extractive measuring system in the CEMS is used for NOx measurement. Independent testing by ESB's mobile laboratory, using an extractive measurement, showed that NOx varied from 130-180 mg/Nm^3 in 2008 and the higher value of 180 mg/Nm^3 will be used in the calculation of NOx emissions for 2007.

SO_2

Similarly, the SO_2 is limited to an ELV of 200 mg/Nm^3 and is measured by an extractive system in the CEMS system. It is proposed that the SO_2 emitted be calculated on the basis of the fuel quantity consumed, its consequent flue gas volume (under standard conditions) and the average SO_2 concentration measured over the reporting period.

Particulate

The dust has an ELV of 30 mg/Nm^3 and is measured by the CEMS. It is proposed that the dust emitted be calculated on the basis of the fuel quantity consumed, its consequent flue gas volume (under standard conditions) and the average dust concentration measured over the reporting period.

CO_2

The calculation of CO2 emissions is as agreed for verification of compliance with the Emissions Trading Directive:

CO2 emitted = Fuel consumed (in tonnes) x Fuel Carbon (C content as %/100) x Conversion Factor (3.667) x Oxidation Factor (as measured)

In WOP the fuel is subject to a complex sampling regime to define its characteristics. 36 Primary samples are taken each day. These are combined and reduced to a daily sample that is analysed for moisture content. A week's set of daily samples is used to generate a period sample and that is used to calculate C and H_2 compositions. Analysis of C content and Carbon in Ash is done by an independent laboratory to EN ISO 17025.

Fuel consumption is measured by independently calibrated belt-weighers. A calibrated weighbridge is used to measure deliveries of peat by road.

The oxidation factor is calculated from the product of ash quantity and fraction of carbon-in-ash.

Exclusion of other Substances.

In 2008, Heavy Metals, Ammonia, Hydrazine and Ortho-phosphate were not included for the following reasons:

Hydrazine & Ortho-phosphate

The plant has been operating since the end of its Reliability Run in early December 2004 without the addition of Hydrazine and Ortho-phosphate and this will continue to be the operating regime for the lifetime of the plant. This mode of operation was decided on, principally for environmental reasons, after the IPPCL application was submitted in 2001.

Ammonia

Ammonia is used in the plant for cycle chemistry control in the high-pressure steam-water cycle. There is no alternative alkalising agent available for pH control purposes. There are two sources of ammonia emission in discharges to water –

- Boiler blowdown discharges
- Water treatment plant neutralisation sump discharge following regeneration of the condensate polisher resins only (no discharge arises from regeneration of normal WTP resins).

The Boiler Blowdown is comprised of two factors : (i) routine blowdown and (ii) emptying of the entire boiler/feedwater system.

(i) Blowdowns occurred at intervals of approximately one per 4/5 week at a rate of 10 tonne/hour for a period of 2/3 hours at a concentration of 0.3 mg/l. Assuming a volume of blowdown of 30 t at a concentration of 0.3 mg/l then the total NH3 discharged, as N, is 0.007 Kg/day. This is within the daily limit for WOP

(ii) During annual routine maintenance, the whole steam/water circuit of 170 M^3 is drained at a rate of 17 M^3/hour for a period of 10 hours. For technical/operational reasons it is not feasible to drain the system at a slower rate. The ammonia concentration (as N) in the feed-water is 0.33 mg/L. Thus the total NH_3 (as N) discharged on complete drainage was 0.056 Kg/10hrs. This is within the daily limit for WOP 0.07 Kg/day

Draining of the entire boiler/feed-water system occurred only once in 2009 giving a total annual amount of ammonia (as N) discharged of 0.056 Kg/annum.

The total ammonia discharged annually from both the blowdowns and emptying of the steam/water cycle is within the terms of the IPPCL and is recorded in the quarterly reports to the Agency. Therefore, ammonia emitted in blowdowns or when the boiler is emptied for annual overhaul is not significant.

Condensate Polisher Plant

A condensate polisher is an essential item of plant used in power stations operating very high pressure steam turbines. The Condensate Polishing Plant (CPP) is a vessel containing ion exchange resins. Its purpose is to remove contaminant ions such as Na^+, Cl^- and SO_4^{2-} from the condensed steam – referred to as 'polishing' of the condensate. It is essential that these

ions are removed from the high pressure water in the plant cycle due to their highly corrosive properties.

From the time of commissioning of the stations in Autumn 2004 to Jan 2006, the CPP was regenerated at intervals of 8-10 days. During regeneration, ammonia is removed from the resin and captured in the WTP neutralisation tank together with effluent from the WTP. It is not feasible to carry out ammonia stripping of the effluent since it also contains sodium hydroxide, sulphuric acid and sodium chloride solutions. The concentration of ammonia in the discharged effluent can vary from 0.2 to almost 50 mg/L which is well in excess of the IPPCL limit for WOP (0.2 mg/L).

Based on continuous sampling of the neutralisation tank effluent and analysis, WOP discharged 14.6 Kg. in 2008 which is within that allowed by the IPPCL. While the plant was within the IPPCL limit in 2008 it is likely to exceed the limit in 2009 because regenerations occur at a rate of two/annum on average

A submission was made to the Agency in February 2007 relating to ammonia emissions.

Heavy Metals

Heavy Metals can be present at trace levels in leachate from the ash disposal facility (ADF) that is monitored at ADF-SW1. However no leachate has been discharged from the leachate lagoon since it came into operation. All leachate generated has been collected in the ADF and recirculated to condition the ash in the active ash cell of the ADF. This is in line with expectations and the Agency has inspected the ADF and lagoon on a number of occasions and following the EPA audit in Lough Ree Power on the 6th December 2005, the Agency stated in the audit report that analysis of ADF-SW1 was not required until leachate was being discharged .

3.3.2 West Offaly Power PER Report for 2008

Facility Identification			
Name	ESB West Offaly Power		
IPC Register Number	P0611-01		
Reporting Period	1st January - 31st December 2008		
National Grid Reference	E 197300 N 224800		
Employee No.	41		
Pollutant Summary			
Pollutant Name	**Output to Air (tonnes)**		
	PS-A1	**PS-A2**	**Total**
Sulphur Dioxide (SO_2)	43	0.4	43.4
Nitrogen Oxides (as NO_2)	766	0.2	766.2
Carbon Dioxide	1,089,030	-	1,089,030
Particulates	43	-	43

IPPCL P0611-01 states the following under condition 5: Emission to Air.

5.7 The licensee shall report the total annual emissions of SO2, NOx, and dust (as total suspended particulates) annually as part of the AER. When continuous monitoring is used, the licensee shall separately calculate for each substance the mass emitted each day, on the basis of volumetric flow rates of waste gases.

The basis of the calculation of the pollutants in the Table is that the ultimate analysis data for the fuel was used to calculate dry flue gas volumes generated under standard conditions of 6% O2 dry and hence multiplied out to estimate this for the annual tonnage (including the contribution of gas oil to the total flue gas volume). The concentrations recorded on a 24 hour average by the CEMS was then used to determine the amount emitted annually

NCVs of fuels used in 2008

Year	Peat NCV mJ/kg	Gas Oil NCV mJ/kg
2008	**7.56**	**43.1**

4 Licence Specific Reports

4.1 Noise Monitoring Reports

The contract between Foster Wheeler and ESB for the construction of West Offaly Power station specified that Condition 8.1, 8.2 and 8.3 of IPPCL P0611-01 must be complied with and the contractor Foster Wheeler had difficulty meeting the limits. Extra noise reduction panels have been installed on a number of occasions with a 1-3dBA reduction each time. Further noise reduction measures were installed in Feb-March '06. Noise measurement by an independent consultant showed that the limit was exceeded at

one location and the source of the noise was found to be an air extractor fan in the fuel screening building. A further noise survey was carried out in December '07 and it was found that the plant is exceeding the 45dB(a) limit by 1dB at the boundary. A report was submitted to the EPA and the Agency replied that it would consider a Technical Amendment to the IPPCL, to change from boundary measurement to nearest noise sensitive location (NSL), following the submission of further information. This submission was made in on the 5th August '08 and the technical amendment was granted on the 3rd October '08.

4.2 Underground Tanks and Pipelines

The only underground tanks and pipelines in the plant are interceptors and drains. In accordance with Condition 9.4.6 of the IPPCL, a CCTV inspection was carried out on all underground interceptors and drains for integrity and water tightness in February/March 2008. The report from the specialist contractor has classified the failures from Grade 1 – Grade 5 which is the most serious. All Grade of failures to Foul drains and Processes water drains were repaired in 2008. Repair classified as Grade 3 – Grade 5 on the surface water drains were also repaired in 2008. Failures calssified as Grade 1-2 were slight cracks and were not considered necessary to be repaired and will be monitored again in 2011. This approach will be discussed with the EPA. The report is large and held on file in the station for inspection by the Agency.

The report* on the CCTV surveys carried out before and after repair *is not included in this AER because it is very large and part of it is also in electronic format. It is held in the station for viewing at any time by the Agency. If required it can be compiled and submitted.

4.3 Report on List 1 and List 11 Substance Reduction

(i) List I and List II Substance Reductions

At the time of IPPCL application it was anticipated that Hydrazine (35%) would be used in the chemical treatment of the feedwater/steam cycle. This is the only List1 and List 2 substance to be considered. During commissioning of the plant it was decided, for environmental reasons, to try and eliminate the use of hydrazine and this has been successful.

(ii) Trisodium Phosphate

At the time of IPPCL application it was anticipated that Trisodium phosphate would be used in the chemical treatment of the feedwater/steam cycle. During commissioning of the plant it was decided, for environmental reasons, to try and eliminate the use of hydrazine and this has been successful.

(iii) Chlorine

At the time of IPPCL application it was anticipated that Chlorine would be used in the treatment of the cooling water to eliminate slime build up in the tubes of the steam condenser. For environmental reasons it was decided to try a rubber ball cleaning system. To date it has not been necessary to use chlorine because of the effectiveness of the alternative. If this continues to be effective then chlorine will not be used. The EPA will be informed in advance of the use of chlorine

4.4 Energy Efficiency Audit Report Summary

General

The generating plant at West Offaly Power (WOP) station consists of one circulating fluidised bed boiler (CFB) and a Fuji steam turbine with a capacity of 150Megawatts. .

West Offaly Power is one of the most modern and efficient generating stations of its kind in the world with a conversion efficiency of the order of 37%. The CFB is the most up to date technology available. It operates almost exclusively on peat with gas oil used only in start-up.

All possible operations are computerised and automated. Sophisticated monitoring systems provide immediate warning of any deviation from normal standards.

The following are the configuration and operating particulars to year end 2008

Date C.O.D	Design Conditions		M.C.R	MW Hrs Gen
	Press. MPa	Temp. Deg. C	MW	2008
28-1-'05	165	560	150	1,069,941

Design Parameters

The plant is required to meet design operating conditions and efficiency and this determined by an 'Acceptance Test' prior to takeover of the plant by ESB. The 'Acceptance Test' was successfully carried out in Nov-Dec 2004 and the plant was accepted by ESB on commercial operation date (COD) of the 28-1-'05. All operating parameters of the plant are recorded on a computer system called the DCS. All operating parameters are analysed by a computer system known as the Operating Information System (OIS). These monitoring systems provide immediate warning of any deviation from normal standards.

Maintenance Overhauls

Over time a unit's performance will inevitably degrade, both in terms of output and efficiency. Some of this degradation is temporary and can be recovered. Some degradation however is not recoverable. Plant overhauls are scheduled based on run hours and plant starts to ensure continued reliability and to recover the temporary degradation.

The work to be carried out in these Overhauls will be as a result of in-depth and ongoing analysis of Plant Performance against 'Acceptance Test' results with detailed evaluations identifying the required work.

All of the work undertaken during overhauls improves plant efficiency, performance and availability generally. These particular works, ensure that current performance is as good as it can technically be.
A major overhaul was carried out in the Summer '08 to correct deficiencies found and warranty issues but principally to deal with ongoing corrosion issues.

Plant Corrosion

A major overhaul began on 12/7/08 and continued until 23/8/08 to carry out repair following major corrosion problems in the plant.

The contractor Foster Wheeler and ESB reached agreement in December 2008 on the implementation of corrective measures to eliminate the corrosion problems that have limited the output from the plant since commissioning in Jan 2005. Program planning has commenced by both parties and the corrective action will be implemented in the Summer of 2011.

Review of Efficiency Monitoring Practice in the Station

Unit efficiency is reported weekly by Operations staff to the Production Manager who reviews the information on an ongoing basis.

Appropriate remedial action, where necessary, is decided upon and progressed through the maintenance/operations work planning system, known as 'Maximo'.

The Production Manager in turn reports efficiency performance to the Station Manager on a weekly basis, but daily information is also provided.

Future Plans

Environmental
During design all environmental considerations were taken into account and during construction all necessary equipment was installed. Periodically minor improvements have been instituted and this will continue to be the case with station staff continually assessing procedures/plant for improvement. Each year a list of environmental objectives are drawn up for continual environmental improvement and these are monitored by station management for implementation

A number of environmental sustainability projects are planned for 2008

Running Regime
It is ESB's intention that the station will run on Base Load for most of its operating life. However, the final decision rest with the Commission for Electricity Regulation (CER) and the station loading may be variable in nature involving reduced load at night time and weekends. As the plant is not as efficient at part load, Thermal Efficiency will inevitably be impacted. The station will review maintenance and operations practice to minimise any environmental impacts.

Conclusion
It is concluded that the station is focussing on key efficiency improvements and will make significant progress in future years. The improvement areas may have significant capital expenditure.

4.5 Review of Environmental Liabilities Insurance Cover / Environmental Risk Assessment Report

Report submitted on 12/6/2006.

4.6 Groundwater Monitoring

Submitted in the quarterly reports to the EPA in 2007

4.7 Bund Testing

Report submitted in 2008

4.8 Annual Landfill Status Report

Landfill Name	Ash Disposal Facility (ADF)
Licence Number	P0611-01
Landfill Location	Blackwater, Co Offaly
Owner	ESB
Operator	Bord na Mona

	Active Areas
Cell in Operation	1st cell Full in Dec 07 and 2nd cell in put into operation.
Area occupied by waste	15,600 m^2
Volume and composition of waste deposited in 2008	Pulverised Fuel Ash 41,754 tonnes Furnace Bottom Ash 2710 Total 44,464
Methods of Depositing	Delivered by wagon train. Fill and Compact
Time and duration of depositing	One wagon train of 12 wagons daily 8AM to 5PM 6 days a week
Total Accumulated quantities of waste deposited	122,503 tonnes
Stability Checks Undertaken	None required
Results of Monitoring Programme:	
a) Surface Water Monitoring	Refer to Section 2.2
b) Groundwater Monitoring	Refer to section 2.4
c) Leachate Monitoring	Refer to Section 2.2
d) Waste Stability ,levels, Void Monitoring	None
e) Meteorological Monitoring	2008 Rainfall 1,112 mm
f) Dust Monitoring	None – ash conditioned with water prior to leaving the power station
Summary of Monitoring Non Compliance & Corrective Actions	None
Revisions to Landfill Operational Plan	None
Summary of any developmental / remedial works carried out in the preceding year	None since construction. Operational Plan, CQA Report and Leachate Lagoon Report submitted to the EPA in 2004.
Calculated Remaining Capacity	1st cell full – 2nd cell in operation. 10 cells remaining
Calculated final capacity of site	550,000 tonnes (estimated)
Year in which final capacity of site is expected to be reached	2019
Progress on restoration of completed cells	1st cell was capped in the Summer of 2008 - following discussion with the EPA

4.9 Auxiliary Boilers

The auxiliary boiler is only in operation intermittently for short periods when plant is off load

Date	Hours in Operation
2008	**153**

4.10 Total Annual Emissions of SO2, NOx, CO2 and Particulates.

Method of calculations is described in section 3.3

SO_2	**43.4** tonnes
NO_2	**766.2** tonnes
CO_2	**1,089,030** tonnes
Particulates	**43** tonnes

4.11 Fuel Use and Energy Input Summary

Fuel Use

Peat (tonnes)	Gas Oil (tonnes)	Year
1,235,992	**748**	**2008**

Run hours on Peat and Gas oil.

Peat	Gas Oil	Year
7,435	**0**	**2008**

Note: Gas oil used only for start-up**.**

Energy Input MWHrs Generated

Peat	Gas oil	Total	YEAR
1,069,941	**0**	**1,069,941**	**2008**

Energy Produced MWHrs Exported

Generated	Exported	House Load	Year
1,069,941	**951,962**	**117,979**	**2008**

Appendix

AER Electronic Report