Rhode Generating Station

IPPC Licence Reg. No. 0694-01

Annual Environmental Report 2009

Table of Contents

1.- Introduction

1.1.- IPPC Licence Number 0694-01

This is the Annual Environmental Report of Rhode Peaking Power Plant for the year ending 31st of December 2009, in compliance with requirements of Integrated Pollution Control Licence Register No. P0694-01.

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,
Rhode Generating Station,
Coolcor,
Rhode,
County Offaly.

1.3.- Description of Activities

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

Rhode Generating Station is part of Endesa Ireland. It was commissioned in 2004 and has been operated commercially ever since. The process involves the combustion of gasoil on quick response to National Grid requests for load and has a nominal maximum capacity of 104 MW electric (MWe), delivered from two generators, each of them driven by two combustion turbines. Demineralised water injection is used for NO_x suppression.

1.3.1.- Running regime 2009

Unit 1: This generating unit which is rated at 50 MW ran for a total of **55 hours** during 2009.
Unit 2: This generating unit which is rated at 50 MW ran for a total of **21 hours** during 2009.

1.3.2.- EPA audits 2009

There was one Agency site visit to Rhode during 2009.
Water samples were taken by an EPA technician during the year.

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:

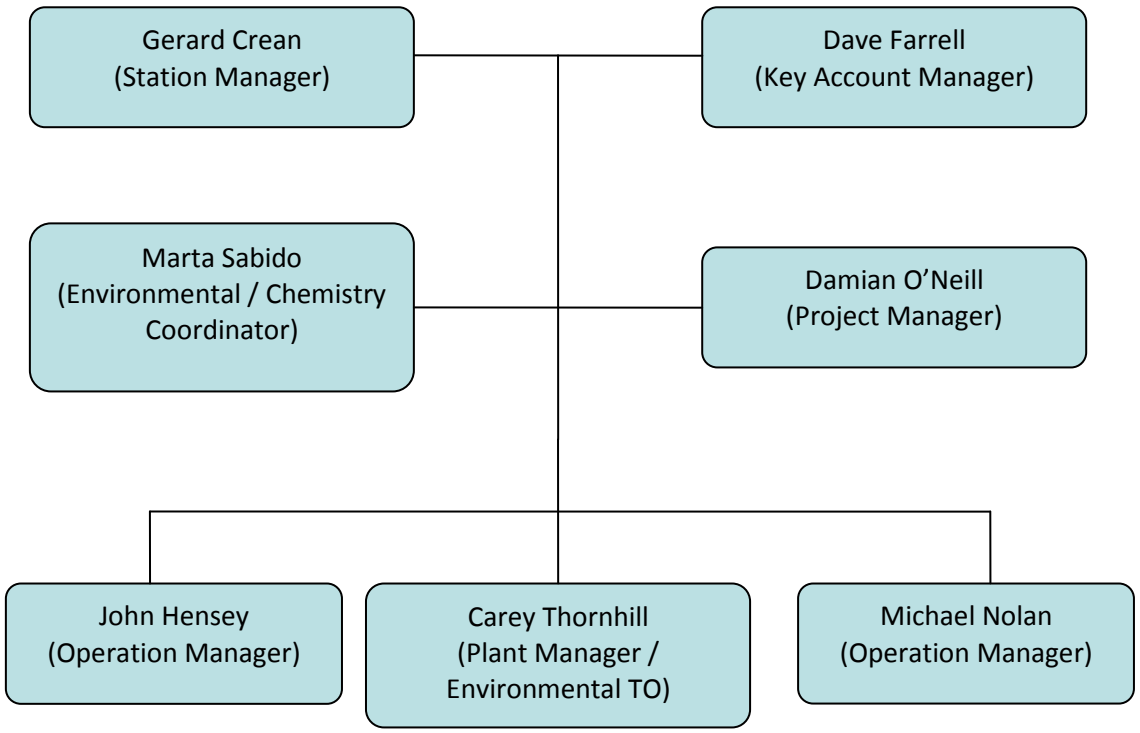
- **Integration** of environmental management and sustainable development concept in the Company's corporate strategy, using environmental criteria documented in all planning and decision making processes.
- **Rational use** of resources and reduction of waste production, emissions, discharges and any 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.- Rhode Generating Station Organisation Chart



2.- Summary Information

2.1.- Emissions to Atmosphere Summary

Unit	1		2		Station
Stack	A1	A2	A3	A4	Average
Average 2009 (mg/Nm^3)	86	95	98	99	95

Table 2.1. Average NO_x emissions per unit 2009

The total quantity of CO_2 emitted was 2,168 tonnes.
The estimated total quantity of NOx emitted was **3.75 tonnes**.
The estimated total quantity of SO_2 emitted was **1.36 tonnes**.

2.2.- Emissions to Water Summary

The discharge points S2 and S3 were inspected daily and the results were recorded in the station checklist. Monthly samples from S2 and S3 were analysed for BOD, pH, conductivity and Total Petroleum Hydrocarbons (TPH), as required by the IPPCL. The average yearly values are shown in the Licence-Specific Report (Section 4.2.).

Values for pH have been high since the station was commissioned. Previous investigation indicated that leaching from fresh concrete was a contributing factor. The S2 sampling point has reduced to a pH average of 7.9. The S3 pH has reduced to an average value of 8.5. A special investigation into the pH was carried out at EPA request following their inspection on 15/01/2009 and concluded on the 16th of September, 2009. This confirmed the findings of the previous report and the downward trend in pH.

Boreholes BH1 & BH2 were sampled and analysed by Tobin Consulting Engineers. The DRO values were below the detectable limit and the pH was normal. The conclusion was “it is evident from the groundwater analysis at the Rhode facility that there is no contamination of the groundwater from the facility”.

Results Legend	Sample Identity	BH1	BH2
# ISO17025 accredited.	Depth (m)		
M mCERTS accredited.	Sample Type	Water(GW/SW)	Water(GW/SW)
sub=subcontracted test.	Date Sampled	08/12/2009	08/12/2009
** This result relates to the % recovery of the surrogate standard added to the sample to check on the efficiency of the method. Acceptable limits for most organic methods are 70 - 130 %. The results of the individual compounds within the sample are not corrected for this recovery.	Date Received	09/12/2009	09/12/2009
	SDG Ref	091210-57	091210-57
	Lab Sample No.(s)	716100	716152

Component	LOD/Units	Method		
Ionic Balance Generic	% Diff	Calulation	1.09	-1.68
Total Dissolved Solids (Grav)	<40 mg/l	TM021	439 #	450 #
Total Alkalinity Filtered as CaCO3	<2 mg/l	TM043	360	400
Bicarbonate Alkalinity Filtered as CaCO3	<2 mg/l	TM043	360	400
Conductivity (at 20 deg.C)	<0.014 mS/cm	TM120	0.667 #	0.709 #
Manganese Dissolved	<0.6 µg/l	TM152	707 #	496 #
EPH Range Organics (C10 - C40) (Aqueous)	<10 µg/l	TM172	<10 #	<10 #
Sulphate (soluble)	3 mg/l	TM184	28.5 #	30.6 #
Chloride	<2 mg/l	TM184	12.1 #	14.4 #
Nitrate	<0.3 mg/l	TM184	0.331 #	0.472 #
Nitrate as N	<0.0677 mg/l	TM184	0.0747 #	0.107 #
Calcium Dissolved	0.012 mg/l	TM228	98.6	104
Sodium Dissolved	0.076 mg/l	TM228	7.85	8.5
Magnesium Dissolved	0.036 mg/l	TM228	36.8	38.5
Potassium Dissolved	2.335 mg/l	TM228	<2.34	<2.34
Iron Dissolved	0.019 mg/l	TM228	<0.019	<0.019
pH value	<1 pH Units	TM256	7.41 #	7.4 #

Effluent from the Water Treatment Plant Neutralising Tank was discharged within a pH range of 6 to 9, as specified by the IPPCL. The total quantity for the year 2009 was **52 cubic metres** at 7.6 average pH.

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)	683.01	1470	2152	7814	9238
Demineralised Water (tonnes) *	597	1324	1880	6424	7880
Number of Start ups	34	62	87	155	172

Table 2.4.A. Resource Consumption

(*) Demineralised water is supplied with the fuel to the engines to reduce combustion temperatures and thus NO_x emission levels.

Item	Comment
Gas Oil	Fuel for the gas turbine engines
Demineralised Water	For NO_x reduction. Supplied from a borehole on the neighbouring site.
Electricity	The imported electrical energy is small in relation to the amounts of electricity generated. When the plant is not running, 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 working hours) to three or occasionally five (during normal operation).

Table 2.4.B. Resource Consumption Comments

2.5.- Environmental Incidents and Complaints Summary

A communications fault on 28/10/09 resulted in loss of NOx data on Unit 1 from 17:20 hrs to 18:41 hrs and the EPA were informed. During this time water injection for NOx suppression was in service and operating conditions were normal (so there is not assumption of NO_x levels above the average during this non-monitoring period). The fault was repaired before further operation of the plant.

There were no complaints from the public during 2009.

2.6.- Non-Compliances Summary

Following a visit to site on 15th January 2009 by the EPA Inspector, there was one non-compliance raised relating to testing of retaining bunds on chemical tanks and the diesel generator. These were tested immediately following the visit and bund retention was confirmed.

There were five observations to be addressed. These have all been attended and the EPA informed 2nd of July 2009.

i. Surface water monitoring results. An investigation into the pH values for the S3 Sampling Point was carried out. An investigation was completed on the high pH levels at Sampling Point S3, as requested in your inspection report of 29th January 2009. A copy of the report was sent to the EPA just after the 16th of September 2009. The report confirms that the high pH values are likely to be due to leaching from concrete and that the pH values are continuing to fall. We note that sampling for S2 can be done bimonthly but will continue to sample monthly as it gives a comparison for S3.
ii. Annual servicing and calibration of the Continuous Emission Monitoring System (CEMS) was arranged. (Appendix I)
iii. Financial Provision. Endesa have arranged insurance to cover any environmental liabilities.
iv. Groundwater monitoring. Results for the extra groundwater sampling tests, carried out as part of the change of ownership process, were included in the 2008 AER, as requested. Groundwater sampling from boreholes BH1 & BH2 has been carried out.

3.- Management of the Activity

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

Environmental operational management at Rhode is carried out by Utility Operation and Maintenance Services (UOMS). The UOMS staff appointed at the Rhode site are: John Hensey, Mick Nolan and Carey Thornhill. Phone calls to 0469737785 are transferred to the mobile phone of the person on duty.

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

3.1.- Environmental Objectives and Targets for 2009

As stated in AER 2008, the objectives and targets included in the annual Environmental Programme for 2009 were the following:

Objective	Description	Person Responsible	Status
Diesel bunds test	Testing the integrity of the chemical and emergency diesel bunds	Environmental TO/Environmental Coordinator/Operations Manager	**Completed**
Special Surface Water Investigation and Report	Investigation of pH trend at monitoring point S3	Environmental TO/Environmental Coordinator	**Completed**
CEMS	Arranging of an annual calibration service	Environmental TO/Environmental Coordinator	**Completed**
Risk and financial provisions	Environmental risk and financial provisions review	Environmental Manager/Environmental Coordinator	**Completed**
Groundwater monitoring	Extra groundwater sampling tests	Environmental TO/ Operations Manager	**Completed**

Table 3.1. Environmental Objectives and Targets 2009

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 Usage	Environmental TO/Environmental Coordinator/Operations Manager	Dec 2010

Table 3.2. Environmental Management Programme Proposal 2010

3.3.- Pollution Emission Register Report 2009

Item	Quantity (Tonnes)	Derivation
CO_2	2168.29	683.01 tonnes gas oil * 73.3 (Emission Factor tCO_2/TJ) * 43.31 (NCV TJ/tonne) * 1.0 (Oxidation Factor)/1000
NO_x	3.75	34 (2006 value) * 683.01/7814*95/120
SO_2	1.36	683.01 tonnes gas oil * 0.1/100 sulphur * 1.998 (S to SO_2)

Table 3.3. Summary PER 2009

4.- Licence-Specific Reports (IPPCL Schedule 6)

4.1.- Emissions to Atmosphere Report

Unit	1		2	
Stack	**A1**	**A2**	**A3**	**A4**
January	95	99	96	106
February	87	92	100	103
March	69	117	0	0
April	0	0	0	0
May	0	97	0	0
June	81	88	0	0
July	0	0	0	0
August	76	86	0	0
September	90	85	113	97
October	83	95	0	0
November	93	93	93	92
December	99	97	87	99
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

	BOD Mg/l		Conductivity MuS/cm		pH		TPH MuG/l	
Sampling Point	**S2**	**S3**	**S2**	**S3**	**S2**	**S3**	**S2**	**S3**
2009	<2	<2	201	457	7.9	8.5	<10	<10
2008	2.0	4.8	215	445	8.1	9.0	<10	28
2007	2.2	2.0	219	330	8.1	9.1	<10	119
2006	3.0	2.9	203	718	8.5	10.0	419	7561
2005	2.0	2.0	204	1162	9.0	9.9	827	3241

Table 4.2. Averages for monthly water sample analyses

4.3.- Waste Management Report

European Waste Code	Hazardous	Description	Quantity (tonnes)	Disposal		
				Carrier	Location	Name & Permit
20 03 01	No	General Waste	6.20	AES	Tullamore	County Waste Disposal
20 03 99	No	Recycling bins	6.50	AES	Tullamore	
13 05 07	Yes	Oily water	18.20	ENVA	Portlaoise	ENVA
20 03 04	No	Sewage Sludge	1.50	Accelerated Drains Ltd.	Edenderry	Edenderry Treatment Plant

Total Waste Removed from Site	2009	32.4
Total Waste Removed from Site	2008	42.03
Total Waste Removed from Site	2007	51.13
Total Waste Removed from Site	2006	98.62
Total Waste Removed from Site	2005	132.75

Table 4.3.A Waste Removed from Rhode during 2009

Company	Title	Carrier Permit	Disposal Permit
AES	Advanced Environmental Services, Athlone	053(2)/OY/351/06	W0104-01
ENVA	ENVA, Clonamin Industrial Estate, Portlaoise	033(2)/OY/281/05	County Waste Disposal
Accelerated Drains	Accelerated Drains Ltd.	158(2)/OY/433/06	Edenderry Treatment Plant

Table 4.3.B Waste Carrier and Disposal Permits

4.4.- Noise Monitoring Report

Noise tests were carried out during commissioning in 2004 and in September 2005. The results were in conformance with the required levels (55 dB daytime and 45 dB at night time). As there had been no changes implemented in the plant or the operating regime, the EPA were

requested to allow suspension of yearly tests requirement and this was agreed by letter of 19/10/2007 (EPA Ref: P0694-01/gc10td-mon freq.doc).

4.5.- Groundwater Monitoring Report

See Summary Information.

4.6.- Tank and Pipeline Testing and Inspection

A visual inspection of all tanks was carried out locally per ESB GDS on the 16/03/2009. Pipelines are inspected weekly and recorded in the station checklist. Underground piping was inspected, as required by the IPPCL, using CCTV.

4.7.- Review of Residuals Management Plan

The RMP was revised during 2009 updating Endesa Ireland references.

4.8.- 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 has arranged for insurance cover and certificate is available for inspection.

4.9.- Energy Efficiency Audit

The initial Energy Efficiency Audit for Rhode Peaking Plant was carried out in 2007. The conclusion was that there was no scope for improvement in gas turbine energy conversion efficiency, other than by routine maintenance, overhauls and internal engine washing. For the balance of plant there were minor savings possible by adjusting plant area heating thermostats seasonally and by reducing station lighting. The Rhode Work Scheduling System was used to schedule regular checks on the heating thermostats. Station lighting was reduced by 30% to what was considered a minimum for safety of staff on the site.

The Energy Efficiency Audit carried out during 2009 looked again at the station plant areas with a view to energy savings. No significant opportunities for energy saving were identified. Energy control is kept by way of adjusting heater thermostats and lighting.
Detailed information on the 2009 Energy Efficiency Audit is outlined in Appendix II.

4.10.- 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 an average sulphur content of 0.1%.

4.11.- Annual Energy Input

The main energy input was **683.01 tonnes of gas oil**. Electricity imports were relatively small for heating, lighting and gas turbine engine auxiliary supplies.

4.12.- Annual Carbon Dioxide

The total quantity of CO_2 emitted was **2168.29 tonnes.**

4.13.- Surface Water Monitoring Summary

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

4.14.- Total Net Amount of Electricity Generated during 2009

Year	2009	2008	2007	2006	2005
MWh Generated	**2,542**	5,927	8,860	32,206	38,213

Table 4.14. 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.
Rhode Peak Capacity Power Plant,
Rhode,
Co. Offaly

Location: Unit 1

Instrument
Sick Maihak S710 Multigas analyser

Serial No. 711800

Service Report No.: GH030909-2
Date: 03/09/09
Order No.: N/A
Contract No.: 09/101

Service Requested/Fault
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 Data.

	NO		O2	
	Zero	**Span**	**Zero**	**Span**
Gas Values:	0.0000 mg/M3	326.02 mg/M3	0.0000 %VOL	20.800 %VOL
Act Values:	0.1515 mg/M3	321.53 mg/M3	0.0547 %VOL	20.686 %VOL
	DRIFT in %		**DRIFT in %**	
ABS:	-2.16%	-14.3%	0.542%	0.142%
DIF:	0.038%	-1.38%	0.260%	-0.53%

Drift Limits: +/- 50%
Calibration Date: 03/09/09
Gas Data: Nitric Oxide
Cylinder No: 318248

Analysis No:	33332
UN No:	1956
Cert Date:	21/08/09
Shelf Life:	36 Months
Time on Site: 2.0 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.
Rhode Peak Capacity Power Plant,
Rhode,
Co. Offaly

Location: Unit 2

Instrument
Sick Maihak S710 Multigas analyser

Serial No. 711801

Service Report No.: GH030909-1
Date: 03/09/09
Order No.: N/A
Contract No.: 09/101

Service Requested/Fault
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	323.47 mg/M3	0.0000 %VOL	20.800 %VOL
Act Values:	1.3332 mg/M3	322.45 mg/M3	0.0316 %VOL	20.794 %VOL
	DRIFT in %		**DRIFT in %**	
ABS:	0.367%	-2.27%	-0.59%	-6.76%
DIF:	0.333%	-0.32%	0.150%	-0.03%

Drift Limits: +/- 50%
Calibration Date: 03/09/09
Gas Data: Nitric Oxide
Cylinder No: 120026
Analysis No: 33333
UN No: 1956
Cert Date: 21/08/09
Shelf Life: 36 Months

Time on Site: 2.0 Hours

Parts Used
N/A

Engineers Signature: Gary Heslin

Customers Signature: N/A

APPENDIX II

Energy Efficiency Audit 2009

Summary

The initial Energy Efficiency Audit for Rhode Peaking Plant was carried out in 2007. This examined the station electrical supplies in relation to usage discretion, potential for saving and possible saving action. The conclusion was that there was no scope for improvement in gas turbine energy conversion efficiency, other than by routine maintenance, overhauls and internal engine washing. For the balance of plant there were minor savings possible by adjusting plant area heating thermostats seasonally and by reducing station lighting. The Rhode Work Scheduling System was used to schedule regular checks on the heating thermostats. Station lighting was reduced by 30% to what was considered a minimum for safety of staff on the site.
The 2008 Energy Efficiency Audit examined this report again and concluded that as there was no change to plant further potential for energy saving was not available.
This audit looks again at the station plant areas with a view to energy savings. No significant opportunities for energy saving were identified.

Gas Turbine Engines

Control of gas turbine energy conversion efficiency still relies on routine maintenance, overhauls and internal engine washing. Plant auxiliaries such as pumps and compressors are required for operation of the engines.
Heating and ventilation of the engine enclosures is required to avoid deterioration in the plant when it is not running. There is no scope for energy reduction.

Local Engine Control Rooms

The local control rooms have heating and air conditioning. This is needed to prevent deterioration of electrical and electronic equipment. There is no scope for energy reduction.

Emission Monitoring Enclosures

Heating ventilation and air conditioning is required to protect the equipment. There is no control other than ensuring settings are correct.

Remote Control Room

There are electrical supplies for protection relays, PC's and space heating. There is no scope for energy reduction.

Power Distribution Centre

There are heat losses from the Auxiliary Transformer iron and copper. There is no scope for improvement. Heaters in this area are usually switched off. Battery chargers are in this area, with no scope for improvements.

110kv Electrical Compound

This contains two 55 MVA Transformers and associated equipment. There is no scope for energy reduction.

Fuel Treatment and Pumping

There is no discretion in use of centrifuges and pumps when they are required for service. They are serviced annually by service contract. Thermostats for heaters are adjusted seasonally, scheduled by the Rhode Work Scheduler.

Trace heating is used on the fuel supply lines to the engines.

Water Treatment Plant

This contains ion exchange units for producing demineralised water. Pumps used in the process are operated only occasionally and there is no scope for savings. Space heating is turned off after the winter period.

Offices and General Areas

This refers to offices for operation and security staff, also the mess room, toilets and the first aid room. The Rhode Work Scheduling System will be used to schedule regular checks on the heating thermostats.

Carey Thornhill, UOMS Operations Manager
Date: 22nd September 2009