



**KILLINGHOLME POWER STATION  
ENVIRONMENTAL PERFORMANCE REVIEW  
2004**

**Station Manager's Message**

Welcome to the Killingholme Power Station's Environmental Performance Review (EPR). It is designed to inform our neighbours, and other interested parties, on how we performed in the past year to enable you to track our progress year-on-year. The Environmental Management System (EMS) in place at Killingholme Power Station has been verified and this EPR validated by Lloyd's Register Quality Assurance<sup>1</sup> against the requirements of the European Community Eco-Management and Audit Scheme (EMAS).

This is the first year that the power station has been under the ownership of Centrica Energy – a leading integrated energy supplier. Killingholme is a Combined Cycle Gas Turbine Plant (CCGT), which provides an efficient way of producing electricity from natural gas with significant environmental advantages over some other types of power generation. The power station is designed and operated to have a minimum impact upon the environment. Our operations are regulated by the Environment Agency (EA), which sets stringent limits on station emissions to air, land and water.

Over the last 12 months the output from the power plant has significantly increased over 2003. This was partly due to an improved selling price for electricity and also less downtime for maintenance activity than in the previous year.

During the last year we have continued to invest in environmental improvements, with environmental management woven into our everyday operations. We recognise that by continual improvement in environmental performance we can increase efficiency and improve our use of resources. Our performance against the environmental objectives and targets set for 2004 and our objectives and targets for the forthcoming year are included in this review.

We continue to have strong links with the local community and have again welcomed many visitors to our site.

We hope you find this review informative, but if you would like clarification or further information, please contact us and we will do our best to help.

**David Smales**

**Station Manager**

**24 February 2005**

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<sup>1</sup> Lloyd's Register Quality Assurance (LRQA), Coventry, UK, Accreditation Number UK-V-005



## **Our Environmental Policy**

1. Killingholme Power Station will conduct its operations in a manner, which meets the requirements of Environmental Legislation and any Centrica Energy Group environmental policies.
2. Killingholme Power Station shall maintain an Environmental Management System, which is independently audited to retain certification to ISO 14001 and EMAS.
3. Killingholme Power Station is committed to continual improvement of our environmental performance. The Station Health, Safety and Environment Forum will contribute to setting annual environmental objectives and targets and monitor their achievement. Our policy and environmental objectives and performance will be made available to the public.
4. An Environmental Aspects Evaluation will be conducted periodically to establish procedures to minimise the significant environmental impacts arising from emissions to air (including noise), discharges to water, waste disposal to land and promote the efficient use of resources. The station will continue to monitor significant pollutants in order to ensure that control measures remain adequate and potential adverse impacts are picked up at an early stage.
5. Killingholme Power Station will provide their employees with the necessary resources and training to ensure that site activities are carried out in a manner, which considers and minimises the impact on human health and the environment in a prudent manner.
6. Killingholme Power Station is committed to encouraging environmental awareness amongst suppliers, contractors and visitors. This shall be undertaken through a combination of, site induction, procurement procedures and Killingholme Power Station educational programmes.
7. Any construction related project, major planned modification, or significant operational change shall be the subject of an environmental assessment to identify all necessary pre-construction consents and possible issuances before proceeding beyond the preliminary development stage. Final development shall be dependant upon obtaining all necessary consents and licences. Killingholme Power Station shall endeavour to prevent or limit the impact of environmental incidents through effective and proactive contingency planning.
9. Killingholme Power station will encourage dialogue on the company's environmental performance with employees, regulators, local communities and other interested parties; investigate the ideas these discussions generate and implement the most appropriate to the business.
10. Killingholme Power Station will work with local opinion forming groups to promote environmental good practice and will also seek to influence and contribute to corporate thinking on environmental matters.

### **RESPONSIBILITIES**

The Station Manager will be responsible for ensuring that this Environmental Policy is implemented and will annually review its operation and monitor its effectiveness through audit and the Environmental Management System. Through the Production Manager he will also be responsible for environmental management at Killingholme Power Station and will ensure that emergency situations can be adequately handled if they should arise. He will also appoint designated environmental experts where appropriate either from staff or through consultancy services.

Managers, Team Leaders and designated environmental experts will be responsible for performance of the Policy in their areas of responsibility and will ensure effective and efficient use of resources to enable this Policy to be effectively applied.

Each member of staff will take reasonable care for the environment and will cooperate in the implementation of company policies and procedures and bring to the attention of management any situations that may have an adverse effect on the environment.

### **CONSULTATIVE ARRANGEMENTS**

The Local Health, Safety and Environmental Forum will consider, advise and make recommendations upon environmental matters. This forum will consist of representatives from the management team and staff representatives responsible for environmental matters.

All members of this forum will play an important role in the interests of the environment. They will be granted, if applicable, the appropriate time off with pay and given the appropriate training to enable them to perform the role effectively.

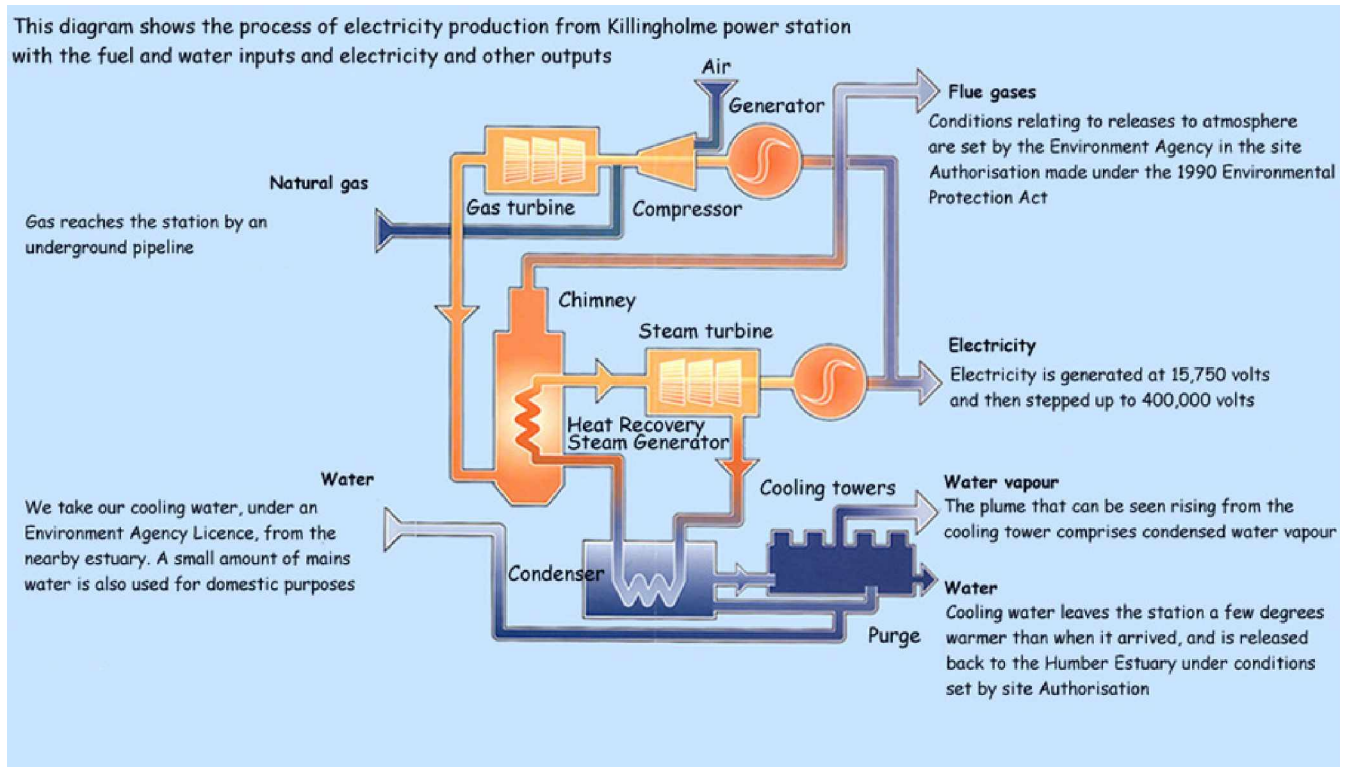
### **COMMUNICATION OF POLICY**

The Environmental Policy will be issued to all staff at Killingholme Power Station. It will also be prominently displayed on various notice boards around site for the benefit of all contractors and visitors and it is also available to the public through the EPR and also on request. Any revisions to the Environmental Policy will also be brought to the attention of staff through its formal authorisation, dating and reissue.

## How Killingholme works

Killingholme has three 147-megawatt (MW) gas turbines and the waste heat from these is used to produce steam to drive a 224 MW steam turbine. Re-using the waste heat from the gas turbines makes CCGTs one of the most efficient methods of generating electricity.

The diagram shows the process of electricity production at Killingholme power station with the fuel and water inputs and electricity and other outputs. For simplicity, only one of the gas turbines is shown.



## Natural gas

Gas reaches the station by an underground pipeline.

Fuel gas used (GWh)*	2001	2002	2003	2004
	7961	9016	4056	6654

\*A gigawatt-hour (GWh) is one thousand megawatt-hours (MWh) or one million kilowatt-hours (kWh).

The natural gas is burned with air at high pressure. The hot gases (1070 degrees C) pass through the gas turbine, where much of their energy is converted to mechanical energy, driving the gas turbine generator to produce electricity. (Trace amounts of unburned gas are vented during plant shut downs).

The waste gases, leaving the gas turbine at 525 degrees C, pass into a heat-recovery steam generator (HRSG), where they give up more heat, turning water into steam, which drives the steam turbine and associated steam turbine generator.

## Electricity

Electricity is generated at 15,750 volts and then stepped up to 400,000 volts by transformers before being passed to the National Grid transmission system.

Electricity generated (GWh)	2001	2002	2003	2004
	3478	4035	1779	2949

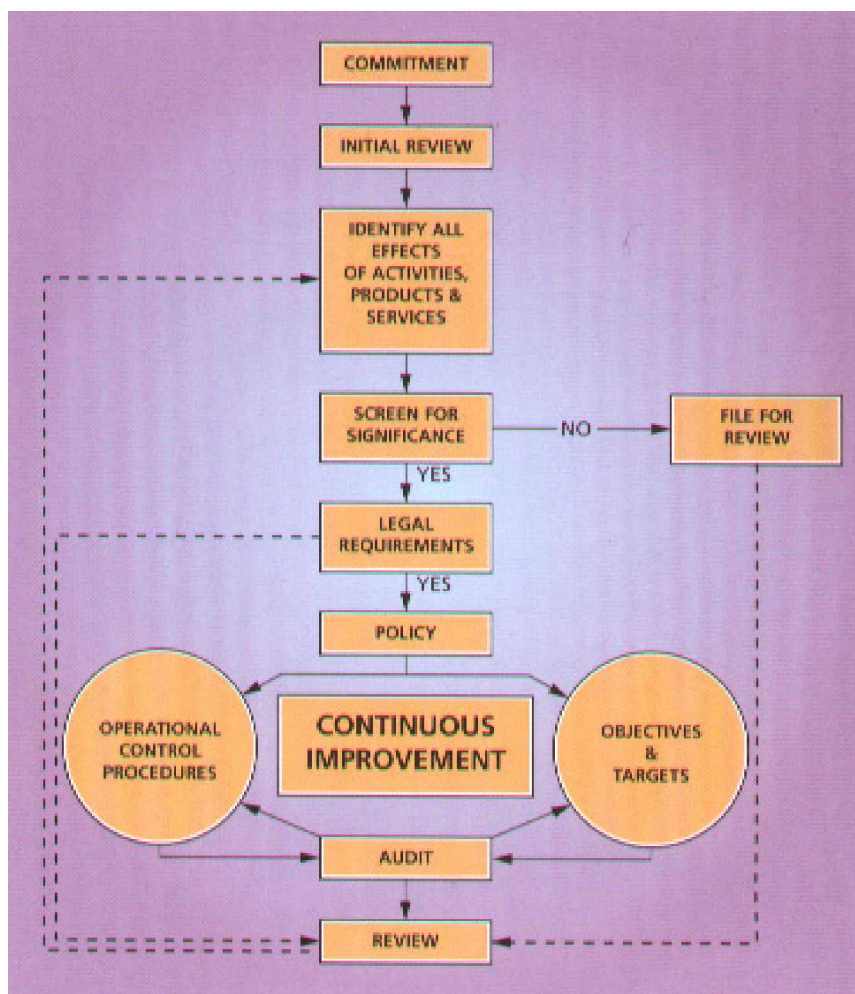
## Understanding and Managing our Environmental Aspects\* and Impacts\*

Our direct and indirect environmental aspects and impacts have been studied and monitored for a number of years. There is a large amount of information that has been produced for a variety of purposes over this time. This work has been drawn together by reviewing our environmental aspects in a methodical and systematic manner. This process does not stop at the major emissions and discharges but also considers materials only present in minute quantities. We have also included assessment of resource utilisation and issues of local importance such as noise, traffic and land management.

Our objective in conducting this evaluation is to determine which aspects are “significant”. It is these, which are addressed in our environmental management system. In order to assess the significance of each aspect, we have a set of criteria which is publicly available and which we have discussed with a wide range of statutory and non-statutory bodies, including the local community.

This is not a static process and during 2004, we completely reviewed and amended our aspects evaluation to ensure that it kept pace with changes in site operation, in addition to statutory and local obligations. The Environmental Aspects Evaluation will again be reviewed during 2006.

\*An environmental “aspect” can be anything associated with our activities or products that can interact with the environment. An environmental “impact” is any change to the environment resulting from these aspects.





We manage our significant aspects in one of three ways:

### **1. Control the Aspect**

This means using operational controls already in place and improving these, where possible. Their effectiveness is regularly assessed. At Killingholme many of our significant aspects are also subject to statutory control and we use a compliance plan procedure to ensure that all statutory conditions are met.

### **2. Set an Improvement Objective**

Our EMS includes a process for setting objectives and then developing a programme of targets to achieve them. Responsibilities and timescales are allocated for all of the targets within the programme.

### **3. Further Investigation**

We must ensure that we fully evaluate the significance of our environmental aspects and impacts on the basis of sound information. Consequently, to better understand an impact, once the outcomes of the aspects evaluation are known a programme of monitoring, or further investigation may be necessary.

## Principal Significant Aspects, Impacts, Controls and Improvements

Significant Aspects and Impacts	Control and Improvement
<p><b>Natural Resources</b></p> <p>The burning of natural gas depletes a natural resource and releases carbon dioxide which may contribute to climate change.</p>	<p>The power station continually monitors thermal efficiency and makes improvements where appropriate</p>
<p><b>Emissions to Air</b></p> <p>Oxides of nitrogen are formed in the combustion process which may contribute to the formation of acid rain</p>	<p>Dry Low-NOx burners are already fitted to our gas turbines. The Station has a compliance plan procedure in place to ensure that we do not exceed emission limits set by the Environmental Agency.</p>
<p><b>Discharges to Water</b></p> <p>Warm water and residual oxidant in our effluent discharges to the River Humber may impact on flora and fauna.</p>	<p>Our compliance plan aims to control releases of polluting substances.</p>
<p><b>Waste Management</b></p> <p>Waste generated from Killingholme has associated disposal impacts</p>	<p>We maintain a close management control of waste and continue to operate our waste recycling plan.</p>
<p><b>Noise</b></p> <p>Noise from power plant operation may create a nuisance</p>	<p>Noise surveys are carried out to confirm that the power plant has minimal impact on the local community.</p>
<p><b>Procurement Activities</b></p> <p>Contractors and suppliers activities may cause pollution incidents</p>	<p>We maintain an environmental procurement system to ensure that contractors and suppliers work to approved procedures.</p>

Where improvements are required these will be included in the Environmental Objectives and Targets for 2005

## Summary of Environmental Performance

### Flue gases

Flue gases released through the chimney are at a temperature of approximately 100 degrees C. They contain nitrogen, oxygen, water vapour and carbon dioxide. Nitrogen oxides are present in very small concentrations and sulphur dioxide as a trace. Conditions relating to releases to atmosphere are set by the Environment Agency in the site Integrated Pollution Control (IPC) Authorisation (no. AF 0920) made under the Environmental Protection Act, 1990.

<b>Emissions (kilotonnes)</b>	2001	2002	2003	2004
Carbon dioxide	1458	1646	744	1229
Oxides of Nitrogen (expressed as NO <sub>2</sub> )	1.6	2.0	0.9	1.5

In any one year the total quantity of gases discharged to the environment depends largely on the output of the power station. Consequently, a better measure of the station's environmental performance can be seen in the following table, which shows the quantity of the emitted carbon dioxide and nitrogen oxides in relation to the amount of electricity generated.

<b>Emissions (kilograms per MWh generated)</b>	2001	2002	2003	2004
Carbon dioxide	419	408	418	417
Oxides of Nitrogen (expressed as NO <sub>2</sub> )	0.46	0.49	0.50	0.50

### Water Abstraction

We take our cooling water (CW), under an Environment Agency Licence, from the nearby Humber Estuary. A relatively small amount of mains water is also used for boiler water make-up and domestic purposes.

<b>Water abstraction (1000 m<sup>3</sup>)</b>	2001	2002	2003	2004
River water	9480	10384	6614	7981
Mains water	108	60	53	75

## Water Discharged

Cooling water leaves the station a few degrees warmer than when it arrived and is released back to the Humber Estuary under conditions set by the site Authorisation.

River water returned (1000m <sup>3</sup> )	2001	2002	2003	2004
	6289	6709	4664	5478

The site also has a small package sewage treatment plant to treat domestic wastewater prior to its return to the Humber Estuary. Our site Authorisation again sets conditions for the release of this effluent.

## Water vapour

The plume that can be seen rising from the cooling towers comprises condensed water vapour coming from the water circulating through the evaporative cooling system.

## Waste

Whilst CCGT power generation is an inherently clean process there is inevitably some waste production, chiefly from maintenance activities.

Waste Disposed to Landfill (tonnes)*	2001	2002	2003	2004
Non Special Waste	275	278	534	314
Special Waste	48	15	1	34

Waste Recovered and Recycled (tonnes)*	2001	2002	2003	2004
Non Special Waste	86	54	72	48
Special Waste	3	3	6	4

\*Estimated from transfer and consignment notes or invoices received

**Performance against Objectives and Targets 2004:**

<b>Objective</b>	<b>Target</b>	<b>Completion date</b>
<b>Continue to improve the site EMS</b>	Retain ISO 14001 and EMAS registration <i>Interim assessment of ISO 14001 and EMAS (Feb and Sept 04) Only minor observations recorded and registration maintained.</i>	31/12/04
	Produce a 2003 EPR <i>EPR 2003 was validated and registration to EMAS maintained</i>	1/3/04
<b>Legislative compliance</b>	Undertake further improvements to comply with Oil Storage (2000) Regulations within the time permitted by the regulations <i>All oil storage facilities are in compliance with the oil storage regulations</i>	1/12/04
	Undertake improvements in site legislation register in advance of their implementation <i>Legislation register revised and issued</i>	1/6/04
	Continue to Identify changes required for the forthcoming Pollution Prevention & Control regime, in advance of the implementation in the electricity sector planned for 2006 <i>Several meetings occurred throughout the year and the station will be able to submit an application for permit in 2006</i>	31/12/04
<b>Monitoring</b>	Improve monitoring of residual oxidant in main cooling water circuit by the installation of continuous monitoring analyser <i>Monitor fitted and working effectively</i>	1/6/04
	Undertake an environmental noise survey <i>This survey showed that the Power Station is not creating noise levels that significantly impact on the local community.</i>	1/9/04
<b>Improve risk assessment systems</b>	Incorporate environmental risk assessments into station risk assessment system <i>Single system now in place for both safety and environmental risk assessment</i>	1/6/04

### Specific Objectives and Targets for 2005

Objective	Target	Timescale
<b>Continue to improve the site EMS</b>	Retain ISO 14001 and EMAS	31/12/05
	Update environmental. training CD-ROM	1/6/05
	Carry out improvements to waste management reporting processes	28/2/05
	Develop more representative methods of tracking the station's environmental performance	1/6/05
<b>Legislative compliance</b>	Undertake improvements in procedures for carbon dioxide accounting	1/4/05
	Undertake actions required by Large Combustion Plant Directive variation to station authorisation	31/12/05
	Undertake further improvements to the site legislation register	1/6/05
	Carry out desk top review of waste disposal sites used by station waste contractors	31/12/05
<b>Monitoring</b>	Undertake groundwater monitoring survey	1/6/05
	Undertake testing of the drift eliminators on the cooling towers, both before and after cooling tower refurbishment to demonstrate optimisation of tower post work.	31/12/05
	Undertake noise survey during steam turbine start-up	1/9/05
<b>Improve risk assessment systems</b>	As part of preparation for Pollution Prevention & Control permitting, inspect site drains, to demonstrate they are maintained in a sound manner.	1/9/05
	Carry out two specific environmental site inspections per year	31/12/05
	Follow a transfer of waste from station to final disposal site	1/9/05

## **Noticeboard**

Part of the purpose of this Environmental Performance Review is to demonstrate our openness in discussing areas where difficulties exist or improvements can be made.

An environmental noise survey was carried out in August 2004 to evaluate the effect of the power station on the local community. This survey was undertaken to update and confirm data from a previous survey in July 2002 before the transfer of the station to Centrica Generation Ltd. At the time of this survey the station was operating with an average load factor for the time of year. Throughout the survey the weather conditions were dry, with variable winds from a south or south-westerly direction. Weather conditions were not considered to have influenced the validity of any of the measurements. The report concluded that the off-site noise levels measured were within the range of values expected for such locations. Normal operation of the station is therefore unlikely to result in a noise nuisance given that the report also noted that background noise from traffic has increased since the previous report.

During the past year due to continuous monitoring and careful control of emission release points we are pleased to report that no public complaints were received by the power station, in addition there were no exceedances of any of the IPC Authorisation conditions or non-compliances with other statutory obligations.

Over the past year, we have continued to develop relationships with external interested parties by promoting the use of the Killingholme Visitor Centre. Our on-site visitor centre remains fully equipped as a classroom, ideally for a maximum of 36 pupils. Along with this we have a team of Station Guides and during 2003, 1581 students and adults visited the "Killingholme Experience". In 2004 this increased to approximately 1738 visitors over 53 visits – this represents both the highest number of visits and visitors in a year since the scheme began in 1998.

We will issue our next validated Environmental Performance Review by March 2006

If you would like further information, please telephone Robert Musgrove on 01469 552342 or e-mail at [robert.musgrove@centrica.com](mailto:robert.musgrove@centrica.com)



## ECO-MANAGEMENT AND AUDIT SCHEME

### VERIFICATION DECLARATION

*Centrica Generation Ltd  
Killingholme 'A' Power Station,  
North Killingholme, North Lincolnshire  
United Kingdom*

*The verified environmental management system is applicable to:*

*Site activities including and associated with the generation of electricity  
by use of combined cycle gas turbine power conversion plant.*

#### DECLARATION:

*Based on site visits, interviews, documentation, data and information examined, Lloyd's Register Quality Assurance has concluded that the environmental management system, initial environmental review, if relevant, and the environmental audit and its results comply with the requirements of the EC Eco-Management and Audit Scheme Regulation No 761/2001.*

*A programme of regular verification visits has been agreed with the organisation to cover the next 36 months.*

*This verification declaration is only valid with the applicable validation details bearing the same number and organisation details.*

LRQA Ref No: LRQ 0770201/B

Date of verification: 25 February 2005

Verification Expiry: 29 February 2008

*Paul Smith*

*On behalf of: Lloyd's Register Quality Assurance*

*Accreditation Number: UK-V-005*

*Issued by: Lloyd's Register Quality Assurance Limited, Coventry, UK*

*This document is subject to the provision on the reverse*

*71 Fenchurch Street, London EC3M 4BS, United Kingdom. Registration number 1879370*

*The above declaration together with the validation details constitutes the record of verification and validation for submission to the Competent Body under Article 3 of the Regulation. The text of the verification declaration and validation details may be included in the organisation's environmental statement and must be quoted in full.*

Macro Revision 12

LLOYD'S REGISTER QUALITY ASSURANCE