



West Burton B CCGT Power Station

ENVIRONMENTAL STATEMENT 2016



Welcome to our third Environmental Statement for West Burton B CCGT Power Station

1. FROM THE STATION MANAGER

Welcome to the third Environmental Statement, for West Burton B Combined Cycle Gas Turbine (CCGT) Power Station. This has been prepared to inform our neighbours, visitors and other interested parties about our environmental performance during 2016, our third full year of operation.

West Burton B CCGT power station has been in commercial operation since August 2013 and is operated and maintained by EDF Energy Plc. Approximately 1,300 megawatts (MW) of electricity can be generated for use via the UK national transmission system, enough to meet the needs of 1.5 million homes (the equivalent of the city of Sheffield). This is one a new generation of highly efficient, natural gas burning power stations using the latest CCGT technology. CCGT power stations are more efficient than conventional power stations as they make double use of the heat produced, first in gas turbine engines then, with the waste exhaust heat, by raising steam to power steam turbines. Both the gas and steam turbines rotate generators to produce electricity. The high efficiency achieved means less fossil fuels are consumed and lower levels of emissions are produced for every unit of electricity generated.

There is so much to be proud of in 2016. Overall our environmental performance was very strong against a backdrop of major maintenance outages. Our ability to generate electricity was significantly reduced by this essential maintenance work. The lower generation resulted in an associated drop in emissions and reduced gas consumption. We will continue to ensure that the environment and safety go “hand in glove” and are continued to be seen with equal importance. Our on-going development of both processes and systems has continued, being recognised externally and across EDF Energy’s Coal Gas and Renewable (CGR) businesses. New in 2016, EDF is investing £27m on the construction of a 49 megawatt (MW) battery storage facility at West Burton to expand and diversify electricity supply options provided on the site.

We are committed to the development and implementation of world-class environmental management practices. At West Burton B CCGT Power Station, the Environmental Management System (EMS) is a key part of our Integrated Business

Management System, which is certified to internationally recognised standards. These systems provide the foundation for this Environmental Statement, which complies with the requirements of the European Union’s Eco-Management and Audit Scheme (EMAS) Regulation. This information is independently verified against the requirements of the EMAS Regulation and we update the data presented annually.



*Chris Bebbington
Head of Gas Operations*

If you would like any further information regarding our environmental performance, or if you have any comments to make on our Environmental Statement, please contact us and we will do our best to help.

2. ENVIRONMENTAL POLICY

Our Environmental Policy was last issued in November 2016 and is reviewed annually.

This Environmental Policy relates to West Burton B Combined Cycle Gas Turbine (CCGT) Power Station, operated by EDF Energy PLC. This Policy is communicated to all staff and contractors and is made available to members of the public, on request.

We are committed to achieving the best possible environmental performance. This is important to everyone who works at West Burton B CCGT Power Station. Care and concern for the environment by preventing pollution is a permanent commitment by all staff and contractors for the sake of present and future generations.

To achieve this we will;

- Comply with all applicable legal and other requirements along with compliance obligations which relate to our environmental activities and to interested parties;
- Seek effective working partnerships with relevant authorities and other interested parties;
- Maintain the integrated business management system to meet the requirements of the International Standard for Environmental Management Systems (ISO 14001) and for Energy Management Systems (ISO 50001) obtaining third party assurance and providing a framework for setting and reviewing objectives and targets and identifying risks and opportunities;
- Protect the environment and wherever reasonably practicable seek to reduce the impact of our activities on the environment by adopting appropriate environmental management practices;
- Pursue continual improvement of our environmental, energy performance and our management system by including environmental action plans and measurable targets in our business planning arrangements;
- Ensure the availability of information and of necessary resources to achieve this policy and objectives and targets set out in the business plan;
- Engage with staff, contractors and other interested parties by ensuring that we discuss matters in a transparent way and maintain relationships;
- Use resources, including energy efficiently and in a sustainable way through integrating environmental, social and economic factors into business plans whenever practicable by;
 - Maintaining, and where reasonably practicable, improving the high level of efficiency achieved by the plant;
 - Pursuing a detailed plan for improving energy efficiency;
 - Supporting the purchase of energy-efficient products, services and design for energy performance improvement;
 - Minimising the use of raw materials and subsequent waste arising (waste avoidance and minimisation);
 - Adoption of recycling and re-use initiatives;
 - Undertake monitoring to facilitate the management of emissions and environmental impacts and other aspects of plant operations and use the results of monitoring to assess performance and develop annual targets.

3. ENVIRONMENTAL MANAGEMENT SYSTEM

Environmental management is an integral part of our business activities. It is one of eight key aspects of our business activities which also include: health and safety; people; asset management; finance and commercial; community; and quality.

Responsibilities, accountabilities, and resources for implementing environmental policy and for improving environmental performance have been defined within the system.

The operation of West Burton B CCGT Power Station is independently certified according to the following standards:

- Occupational Health and Safety Assessment Series (OHSAS) 18001 Safety Management;
- International Standards Organisation (ISO) 14001 Environmental Management Systems;
- ISO 50001 Energy Management;
- ISO 55001 Asset Management;
- ISO 223001 Business Continuity;
- ISO 9001 Quality Management
- British Standards (BS) Publicly Available Standard (PAS) 99 for Integrated Management Systems.

Maintaining certification under these standards requires that the relevant management systems are subject to regular checking (auditing) by specialist accredited independent organisations.

In 2016 we received certification to the latest updated versions of the Environmental and Quality Management Standards published in 2015.

Our Integrated Business Management System (IBMS) considers:

- Legal and other requirements;
- The environmental aspect of all plant activities;
- The environmental characteristics of the site and surrounds;
- The views of interested parties including regulators (such as the Environment Agency and Bassetlaw District Council), of stakeholders and of local residents.



A morning planning meeting

The IBMS includes procedures for:

- The routine operation and maintenance of the Plant;
- 'Outage' activities (when the Plant is closed-down for essential maintenance);
- Emergency situations;
- Communicating internally, with staff and contractors, and externally on all issues relating to environmental protection;
- Internal and external auditing and assessment of compliance against all identified legal and other requirements;
- Annual aspects review.

The annual CCGT business plan provides the means for identifying objectives and targets for continual improvement of environmental performance.

4. ENVIRONMENTAL ASPECT - CONSIDERATIONS AND IMPACTS

Environmental considerations have been key during the development and life of West Burton B CCGT Power Station. This includes the following:

- Site selection;
- Use of latest generating technology;
- Selection of a cooling system;
- Section 36 (Planning Permission) Application;
- Identification and management of the environmental aspects of significant activities;
- Consideration of protected species and biodiversity;
- The planned decommissioning of the plant after approximately 30 years of operation.

Environmental considerations associated with the long-term operation of West Burton B CCGT Power Station are described in Section 5 of this Environmental Statement.

4.1. Site Selection

The Power Station is sited on 187,000 square meters (18.7 Hectares or 21.5 acres) of land previously used

for the disposal of pulverised fuel ash (PFA, the residue remaining from the combustion of coal) from the operation of the adjacent coal-fired power station. As such, the development of West Burton B has enabled the re-use and redevelopment of a so-called 'brown field' site thus preserving green-field (undeveloped) land and it has been possible to make use of the existing infrastructure for the export of electricity. This has avoided the need to construct new overhead transmission lines.

Gas is delivered by a new, buried gas pipeline connection, approximately 19 km in length, which is owned and operated by the station.

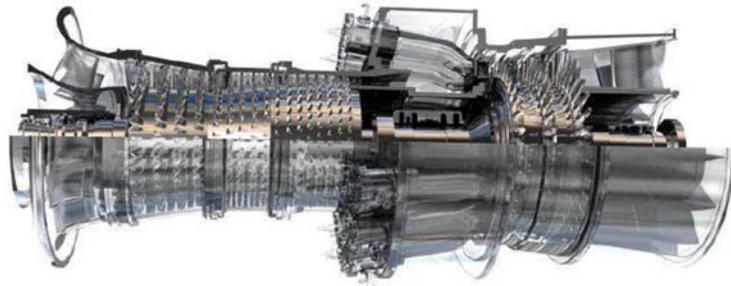
By locating the Power Station adjacent to the River Trent, it is possible to use this resource for satisfying all process water needs of the plant including cooling purposes and closed loop boiler systems.



Site pre-development

4.2. Use of Latest Generating Technology

The Power Station comprises three electricity generating units of identical design. The principle feature of each of the three generating units is the latest technology gas turbine supplied by General Electric (GE). The '9FB' gas turbines are controlled by a computerised Dry Low NO_x system which ensures that fuel gas combustion is very efficient and the emissions of oxides of nitrogen (NO_x) and carbon monoxide are minimised.



A Gas Turbine Engine

The heat from the gas turbine exhausts is recovered by individual Heat Recovery Steam Generators (HRSG) to produce steam which is used to drive steam turbine generators. Spent steam leaving the steam turbines is condensed under vacuum in a condenser and the water is recycled back to the Heat Recovery Steam Generators (HRSGs) to produce more steam. The HRSG has three water-steam circuits – Low Pressure (LP) at 4.4 bar(g) and 270 °C Intermediate Pressure (IP) at 26bar(g) 566°C and High Pressure (HP) at 128 bar(g) 566°C. An auxiliary boiler is installed to provide start-up steam on the rare occasions that no other source is available for warming though the main systems.

4.3. Selection of a Cooling System

Condenser cooling systems are essential for efficient generation of electricity by the CCGT power plant. Potential cooling options include: Once-through or direct cooling, Indirect cooling involving the use of mechanical draught or hybrid cooling towers; Air cooled condenser.

The choice of cooling system has a significant impact on process efficiency and the environmental impact associated with the long-term operation of a power station.

A hybrid cooling tower was selected due to the relatively high efficiency of the process and the significantly smaller quantity of water abstracted and discharged compared with a once-through system.



Views of the Cooling Towers

4.4. Planning Application and Consents (Section 36)

Potential environmental issues associated with the siting, building and running of the Power Station were initially considered in 2006 as part of the application for consent for the development, as required under Section 36 of the *Electricity Act 1989*. The results of this process, known as Environmental Impact Assessment, were presented in an Environmental Statement which accompanied the planning application. The Environmental Impact Assessment considered a range of issues including air quality, land use; planning; socio-economic issues; water quality; ecology; visual and landscape issues; noise and vibration; traffic and transport and hydrology. Also considered were the significant aspects and impacts arising from operations and on the surrounding areas on completion of commissioning. Where potential environmental impacts were noted, measures were taken to either prevent the environmental effect from occurring or to reduce its significance where required to be implemented.

Power Stations are some of the most regulated industrial facilities in the UK. For example, West Burton B CCGT Power Station is operated according to limits and requirements specified by the Environment Agency in the Environmental and Greenhouse Gas Emissions Permits and conditions specified by Bassetlaw District Council in the Planning Permission for the plant. A list of the key consents for the plant is presented in the following table. In 2016 the environmental permit was varied twice, in January for compliance with the EU Industrial Emission Directive and in June following a CCGT request for implementing practical arrangements for releases of Ammonia and Chlorine concentrations discharged to the River Trent.

Table 1 Summary of Environmental Consents for West Burton B CCGT Power Station

Regulatory Body	Consent	Reference
Environment Agency	Environmental Permit	CP3035MK
Environment Agency	Greenhouse Gas Permit	UK-E-IN-11927
Environment Agency	Abstraction Licence	03/28/69/0070
Department of Trade and Industry	Section 36 Consent	GDBC/001/00255C
Department of Business, Enterprise and Regulatory Reform	Pipeline Construction Authorisation	30-10-2007
Natural England and English Heritage	Schedule 9 Statement	30-01-2014
Bassetlaw District Council	Planning Permission 49MW Battery Storage Facility	16/00954/FUL

Measures have been adopted in the design of the Power Station to ensure that the long-term operation of the plant will not lead to a significant deterioration of the site land e.g. by the use of an engineered drainage system. Measures adopted during the build stage e.g. avoidance of underground storage tanks will minimise potential risks to the ground and ground water. To return the site to an appropriate condition after approximately 30 years of operation (e.g. in 2043), a closure plan includes analysing soil and groundwater to assess conditions compared to that recorded prior to building the Installation. Eventually, the demolition plan is to remove all plant and structures back to ground level.

4.5. Significant Operational Environmental Aspects and Impacts

The assessment and our experience of plant construction, commissioning and operations have provided the basis for an on-going annual review, as part of the Environmental Management System and has enabled us to identify significant impacts and provide a focus for environmental management and improved performance.

Key environmental impacts associated with operating and maintaining the Plant are listed below:

- Use of resources including natural gas, water from the River Trent, drinkable mains (potable) water and other materials such as water treatment chemicals, engineering and office supplies.
- Burning natural gas that releases carbon dioxide (a greenhouse gas, contributing to climate change) and nitrogen oxides (which relate to local air quality and the formation of acidic rain).
- Abstractions from, and discharges to, the River Trent for cooling purposes.
- Generation of small quantities of solid wastes, which are taken off-site for recycling or disposal at a landfill site.
- Generation of noise that could disturb local residents and wildlife.

4.6. Biodiversity and Protected Species

The potential for impacting on nature conservation as a result of power station activities is minimised as West Burton B CCGT Power Station is located on a brownfield site of previously limited nature conservation value. The CCGT site comprises 187,000 square meters (18.7 Hectares or 21.5 acres) of land previously used for the disposal of pulverised fuel ash (PFA, the residue remaining from the combustion of coal) from the operation of the adjacent coal-fired power station. There are no unbuilt areas of land available for wildlife habitat within the site security fencing, which is occupied by buildings, plant, equipment roads, paths and areas covered with stones for technical, safety, storage and outage lay-down purposes. Within the CCGT Environmental Permit and outside of the site perimeter fencing a small green area of approximately 0.35 Hectares, (<2% of the site area) has been planted as a wildflower meadow. The final quantity of unused CCGT ground available to support a sustainable eco-structure is therefore so limited as to be a non-viable option. However, the CCGT project included responsibility for restoration of approximately 174,000 m² (17.4 hectares, 43 acres) outside of the site boundary which were used temporarily for construction and commissioning. This planned restoration work was successfully completed in 2016 and the long term management of the EDF Energy land at West Burton surrounding the CCGT Power Station is once again managed by the pre-existing 'A' coal fired Station. Consequently in future this core EMAS indicator will not be relevance to the CCGT site.

Ecological surveys of surrounding areas were undertaken prior to construction. The project included responsibility for restoration of approximately 174,000 m² (17.4 hectares, 43 acres) around the site boundary which were used temporarily for construction and commissioning and is equivalent to 93% of the built up area.

These surveys confirmed the presence of the following protected species:

- Great crested newts and grass snakes (both protected under the Wildlife and Countryside Act 1981).
- Badgers (protected under the Protection of Badgers Act 1992).



Great Crested Newt



Badger



Grass Snake

Surrounding areas also provides important foraging habitat for grass snakes. Piles of vegetation in or near the wetland areas will provide egg-laying sites, whilst mammal burrows, tree roots, tree stumps and piles of logs situated within scrub and trees on the boundaries of the CCGT site provide places to hibernate. Mitigation measures were put in place to prevent impacts to areas containing these species during construction of the plant (installation of newt-proof fencing).

Ecological surveys were undertaken following the completion of construction works in 2014 by specialist ecologists: these surveys confirmed that the construction of the Plant, and its subsequent operation, has had no significant impact on the local populations of these species.

Following construction, creative conservation and habitat enhancement initiatives have been undertaken including the planting of large areas with native hedgerow and tree species, including oak, ash and field maple, the erection of bat and bird boxes and the seeding of wild flower meadow areas. Rabbits, pheasants, squirrels, foxes and Roe deer have also been seen in these areas.



Roe deer

The River Trent supports eels, a species protected under the requirements of the Eels (England and Wales) Regulations 2009. To minimise the potential for impacts on eels as a result of the abstraction of water from the Trent, the intake pipe is fitted with a 'passive water intake screen'. Such screens are regarded as the best available technology for protecting juvenile and larval fish.



On site bee keeping

New to the site in 2016 was a hive of honey bees which were donated by a CCGT employee. The bees thrive on the local wild flowers and are due to be incorporated in the visitor experience.

The planned restoration works were completed in 2016 and the long term management of the EDF Energy land at West Burton surrounding the CCGT Power Station is once again managed by the pre-existing 'A' coal fired Station. In the long term the core EMAS statement element of Biodiversity may be excluded as this is not of any significance within the site boundary.

5. ENVIRONMENTAL PERFORMANCE

5.1. Control of Operations

Shift teams control Plant operations continuously each day. Electricity is produced to satisfy commercial arrangements with the National Grid. This may involve 'two-shifting' that is starting and stopping electricity production each day, typically from 7am to 11pm or 'base loading' for continuous generation. In addition the station may be called upon to assist with stabilising the National Grid power transmission frequency.

During 2016, three events were reported to and accepted by the Environment Agency. No further regulatory action was taken. An MCERTS dispensation was granted for continuing generation with greater than 8%

uncertainty for monitoring the discharge of water treatment effluent and cooling water flow to the River Trent. River discharge limits of pH were exceeded without environmental impact for less than one minute on two occasions. In addition twelve events were raised as internal incidents and six events were raised as near-hits for preventative action. Each event was investigated and actions taken to prevent recurrence including: procedure revision, plant modification and further training.



Switch yard connection to the National Grid



Central Control Room Operations

5.2. Electricity Production and Energy Efficiency

Electricity is generated at 24,000 volts and then stepped up to 275,000 volts by transformers before being exported from the site via the UK National Transmission System. CCGT power stations are more efficient than conventional power stations as they make double the use of the heat produced from burning fuel, first in the gas turbines then, with the HRSGs capturing the waste heat, raising steam to power steam turbines. The high efficiency achieved by West Burton B CCGT Power Station means less fuel consumption and lower levels of emissions for every unit of electricity generated.

As certification to the requirements of the Energy Management System ISO standard 50001 (2011) has been achieved, energy efficiency is monitored and opportunities for continual improvement in efficiency, and associated reductions in greenhouse gas emissions, are identified and implemented. Certification to ISO 50001 facilitates compliance with the Energy Savings Opportunity Scheme Regulations (ESOS) 2014. Electricity production decreased in 2016 due to a significant decrease in the hours of operation of the plant due to maintenance Outages.

Table 2 Summary of Electricity Production and Energy Efficiency

Energy Generation	2014 data	2015 data	2016 data
Electricity generated, net	4,988 GWh(e)	6,209 GWh(e)	5,368 GWh(e)
Net Efficiency,	55.3%	53.7%	54.1%

5.3. Air Emissions

West Burton B CCGT Power Station includes pollution control technology, known as dry low

NOx burners, to control emissions of nitrogen dioxide. Continuous Emissions Monitoring systems (CEMs) are installed on each of the station's three stacks (chimneys) to demonstrate to the Environment Agency that emissions limits are achieved. Computer modelling was used to select the height of the stacks (80 metres) to minimise visibility in the landscape whilst optimising the dispersion of emissions.



HRSG Stacks Units 1, 2 and 3

Combustion of natural gas gives rise to negligible emissions of sulphur dioxide and no dust or ash (which historically has been linked with 'acid rain' damage to ecosystems and respiratory irritation in people).

Mass emissions of carbon dioxide, oxides of nitrogen, carbon monoxide and sulphur dioxide decreased in 2016, when compared with comparable data for 2015, due to a decrease in the hours of operation of the plant

Table 3 Summary of Emissions to Air

Emissions to air	2014 data	2015 data	2016 data
Oxides of Nitrogen (NO _x)	926 tonnes 0.186 t/GWh(e)	1,210 tonnes 0.195 t/GWh(e)	969 tonnes 0.181 t/GWh(e)
Carbon Monoxide (CO)	62 tonnes 0.012 t/GWh(e)	66 tonnes 0.0106 t/GWh(e)	43 tonnes 0.0081 t/GWh(e)
Sulphur Dioxide (SO ₂)	2.4 tonnes 0.0005 t/GWh(e)	3.1 tonnes 0.0005 t/GWh(e)	2.6 tonnes 0.0005 t/GWh(e)

Climate Change

Industrial installations and transport are important sources of the key greenhouse gas, carbon dioxide. Power stations, in particular, are recognised as being a major source of carbon dioxide. The emissions from West Burton B CCGT are subject to monitoring and reporting requirements specified in the Greenhouse Gas Emissions Permit issued by the Environment Agency, as required by the European Union's Emissions Trading Scheme (EU ETS). The EU ETS is one of the key policies that have been introduced by the EU to combat the serious threat of climate change. The scheme works on a 'cap and trade' basis. EU Member States set an emission limit (cap) for all installations covered by the scheme. Each relevant installation, such as the West Burton B CCGT Power Station, has to purchase Carbon Credits which must offset the quantity of carbon dioxide released, which is independently verified. West Burton B CCGT produces approximately half the carbon dioxide, for every unit of electricity generated, compared to a coal fired plant, due primarily to the higher energy efficiency of the CCGT plant.

Table 4 Summary of Emissions to Air of Greenhouse Gases

Emissions to air	CO ₂ Factor	2014 data	2015 data	2016 data
Carbon dioxide (CO ₂) from gas and diesel oil	1	1,842,770 t CO ₂ eq. 369 t/GWh(e)	2,371,371 t CO ₂ eq. 382 t/GWh(e)	2,029,550 t CO ₂ eq. 378 t/GWh(e)
Methane (CH ₄)	25	444 t CO ₂ eq. 0.09 t/GWh(e)	29 t CO ₂ eq. 0.005 t/GWh(e)	1,144 t CO ₂ eq. 0.21 t/GWh(e)
Nitrous Oxide (N ₂ O)	298	9,677 t CO ₂ eq. 1.9 t/GWh(e)	12,399 t CO ₂ eq. 2.0 t/GWh(e)	10,650 t CO ₂ eq. 2.0 t/GWh(e)
Hydrofluorocarbons (HFCs)	1,700	31 t CO ₂ eq. 0.01 t/GWh(e)	37 t CO ₂ eq. 0.006 t/GWh(e)	0 t CO ₂ eq. 0.00 t/GWh(e)
Sulphur hexafluoride (SF ₆)	22,800	0 t CO ₂ eq. 0 t/GWh(e)	30 t CO ₂ eq. 0.005 t/GWh(e)	75 t CO ₂ eq. 0.014 t/GWh(e)

In line with EMAS III guidelines Green House Gas emissions are reported in terms of CO₂ equivalent. Perfluorinated chemicals (PFCs) are not used at West Burton CCGT.

5.4. Raw Material Consumption

West Burton B CCGT Power Station is only fuelled by natural gas supplied by a 19 kilometre underground pipeline connection to the national grid for gas. As a standby fuel, such as distillate oil, is not used, we avoid

significant emissions of sulphur dioxide and particles (soot), minimise the releases of carbon dioxide and nitrogen oxides and eliminate environmental risks associated with the bulk storage of fuel oil. Chemicals are essential for water treatment purposes i.e. for water purification, corrosion prevention and cooling tower management. Other, small quantities of additional raw materials are used in the operation and maintenance of West Burton B CCGT Power Station by site personnel.



Gas Reception Facility and River Trent



Chemical Tanker Delivery

Table 5 Summary of Raw Material Consumption

Raw Materials	2014 data	2015 data	2016 data
Natural Gas	9,992,737,141 kWh gross 2.003 GWh(g)/GWh(e)	12,799,919,357 kWh gross 2.062 GWh(g)/GWh(e)	10,997,329,522 kWh gross 2.049 GWh(g)/GWh(e)
Process Chemical Purchased and Use	3,292 tonnes 0.660 t/GWh(e)	3,852 tonnes 0.620 t/GWh(e)	4,087 tonnes 0.761 t/GWh(e)
Oil Lubricants & Hydraulic Fluids purchased	17 tonnes 0.003 t/GWh(e)	27 tonnes 0.004 t/GWh(e)	10 tonnes 0.002 t/GWh(e)

Consumption of natural gas decreased in 2016, when compared with 2015, due to a decrease in the hours of operation of the plant. The use of process chemicals increased due to the replacement of resins in the water treatment plant and automation improvements for the dosing control systems.

5.5. River Water Abstraction and Discharge

Water is withdrawn (abstracted) from the adjacent River Trent in line with the controls of the Abstraction Licence issued by the Environment Agency. The abstracted water is purified by a river water treatment plant for cooling purposes and then by a demineralisation plant for the production of high quality water for the generation of steam by HRSGs for the steam turbine generators.

To cool the plant, the water passes through a new generation hybrid cooling system to reduce the temperature to an acceptable level prior to its return to the River Trent. Hybrid cooling eliminates the visible plume normally associated with conventional cooling under most weather conditions. Typically, water vapour from the hybrid cooling towers is only visible when the background air temperature is below 5 degrees centigrade and the relative humidity is above 95%. Water is returned to the River Trent in accordance with the limits specified by the Environment Agency in the Environmental Permit. A combination of continuous monitoring, comprising a Continuous Water Monitoring (CWM) system, and regular sampling of the discharge is undertaken to confirm compliance with permit limits.

Table 6 Summary of Emissions to Water

Water	2014 data	2015 data	2016 data
Water taken (abstracted) from the River Trent	5,183,058 m3 1,039 m3/GWh(e)	6,121,111 m3 986 m3/GWh(e)	5,261,133 m3 980 m3/GWh(e)
Net abstraction (abstraction minus return)	3,755,870 m3 753 m3/GWh(e)	4,032,982 m3 650 m3/GWh(e)	3,369,875 m3 628 m3/GWh(e)
Water returned (discharged) to the River Trent	1,427,188 m3 28%	2,088,129 m3 34%	1,891,258 m3 36%
	286 m3/GWh(e)	336 m3/GWh(e)	352 m3/GWh(e)

Consumption of water from the River Trent decreased in 2016, when compared with 2015, due to the implementation of process improvements, notably the replacement of the Heat Recovery Steam Generator system valves. Repairs of on-site drainage systems resulted in an increase in the percentage of water returned to the River Trent.

5.6. Waste Management

No solid waste is generated as a result of the combustion of natural gas to produce electricity. Waste arising is limited to controlled (non-hazardous) waste arising as solids from the river water treatment plant, plant maintenance activities particularly during plant outages and typical waste from offices. Small quantities of hazardous waste arise when the use of hazardous substances is unavoidable. The quantity of waste requiring off-site disposal is minimised via the adoption of waste avoidance/minimisation, re-use and recycling initiatives. Waste materials are subject to segregation and temporary storage within marked containers located within specified areas. Waste is collected via licensed contractors and disposed at licensed sites.



Waste Segregation Area

Table 7 Summary of Waste Generation

Waste Generation	2014 data	2015 data	2016 data
Controlled (general non-hazardous) waste arising	13,326 tonnes 2.67 t/GWh(e)	9,267 tonnes 1.49 t/GWh(e)	5,171 tonnes 0.96 t/GWh(e)
Hazardous waste arising	28 tonnes 0.006 t/GWh(e)	7 tonnes 0.001 t/GWh(e)	326 tonnes 0.061 t/GWh(e)
Quantity of waste recycled, recovered, re-used or incinerated with energy recovery	13,316 tonnes 99.9%	9,260 tonnes 99.9%	5,497 tonnes 100.0%
	2.670 t/GWh(e)	1.491 t/GWh(e)	1.024 t/GWh(e)

In 2016 total waste production continued to fall. Hazardous waste arising during 2016 increased significantly as a result of two non-typical activities including the emptying of drainage oil interceptors and the generation of chemical residues requiring safe disposal off-site. All waste arising in 2016 (controlled and hazardous) was recycled, recovered, re-used or incinerated with energy recovery. No waste arising during 2016 was disposed of to landfill.

6. Community Relations

An official opening event for the visitor centre was held in July 2015. A ceremony was performed by EDF Energy Chief Executive Vincent de Rivaz and local MP John Mann for invited guests including members of the local community and neighbouring coal stations personnel.



In July 2016 a primary school was invited to celebrate the centre's first birthday event.

The centre provides an interactive and fun environment where all audiences can learn more about EDF Energy, the future of our energy mix and most importantly how we generate our megawatts at the gas fired power station. Plans include engagement with schools and Science Technology Engineering and Maths (STEM) educational support.



Over 1900 people visited the centre in 2016, which also provided the venue for the 'John Mann Summer School' reward event for high achieving children from surrounding schools.

Environmental Enquiries

As part of the business management system all complaints received are logged and investigated as appropriate. No complaints were received in 2016.

Helping Hands

Throughout 2016, as part of EDF Energy's charity partnership, West Burton B CCGT continued to support charities including Marie Curie, Supercharge Paralympics Guide Dogs for the Blind, British Heart Foundation and Breast Cancer Now. Over £25,000 was raised in conjunction with other EDF Energy Stations.

Charitable and Community events promoted by West Burton B CCGT employees and contractors in 2016 included the following:

- In May, support was given to the British Heart Foundation with a 'Spot the Ball' competition.
- In June, as part of Diversity and Inclusion Week, Guide Dogs for the Blind were supported with a competition to estimate the number of dog biscuits in a jar.
- In July, site personnel repaired, painted and fitted a new kitchen into an outside class room at Rampton Primary School Nottinghamshire.



- In October, Breast Cancer Now was supported with a competition to estimate the number of sweets in a jar and a voluntary sky dive from 13,500 ft.
- In September a CCGT employee rode by bicycle from London to Paris to raise money for Breast Cancer Now.
- In December a Christmas raffle and festive jumper competition has held to support Save the Children and Make a Wish Foundation.

7. ENVIRONMENTAL IMPROVEMENT OBJECTIVES AND TARGETS

7.1. Performance against 2016 Objectives

Continual environmental improvement is achieved via the implementation of an annual programme of environmental improvements. At the beginning of each year, a programme is prepared and progress is monitored. Potential environmental improvements are identified based on the results of the annual environmental review.

The key 2016 environmental improvements are presented below with a description of progress in their completion.

2016 Environmental Improvement Objectives	Progress
<p>Monitoring of Environmental Parameters. Consult with Environment Agency to agree and implement variations on the permit for practical and sustainable future operations.</p>	<p>Applications were submitted to the Environment Agency for minor technical variations relating to limits for chlorine and temperature and for changes to original permit application details regarding ammonia in discharges to water. A new Environmental Permit was issued on 30th June 2016 with respect to chlorine and ammonia. Further impact assessment information was requested and provided regarding the temperature of the discharge.</p>
<p>Consumption of Water Reduce HRSG water demand to enable single stream demineralised water treatment plant operations for 80% time.</p>	<p>HRSG system valves were replaced on units 1 & 2 achieving a reduction of water demand. Overall for the year the WTP supplied 93% of CCGT's boiler water requirements but double stream operations were maintained.</p>
<p>Consideration of Wildlife. Certify the site to the requirements of the EU standard for biodiversity.</p>	<p>Application for biodiversity accreditation was submitted.</p>
<p>Waste Management. Minimise waste and optimise management plans for all waste streams with a continued objective of Zero to Landfill.</p>	<p>Duty of Care compliance checks completed for all waste streams. No waste was disposed of to landfill sites.</p>
<p>Site Infrastructure. Deliver the site drainage improvement plan.</p>	<p>Drain repairs completed before the final valve for the discharge of water treatment plant effluent and cooling water to river. The surface water drain was sealed. An underground boiler blow down tank was sealed. A new sewer drain pit was installed.</p>
<p>Consumption of Raw Materials. Further reduce to the minimum end-to-end site chemical use to benefit the environment and reduce costs against 2015 figures.</p>	<p>Optimisation of auto-control dosing for the safety of the Hybrid Cooling Towers increased the minimum requirements for biocide and de-chlorinator. Ferric chloride and Sodium Hydroxide used for water treatment was reduced. Oils and hydraulic fluid consumption was reduced.</p>

7.2. Improvement Objectives for 2017

The CCGT Business plan for 2017 considered input from all staff and permanent contractors; it covers all aspects of the business and includes the following key objectives for environmental improvement.

2017 Environmental Improvement Objectives	Initiatives
<p>Environmental Performance. Establish Zero Harm to the Environment by targeting zero environmental incidents and encouraging near-hit reporting.</p>	<ul style="list-style-type: none"> Consider improvements for the on-site movement of hazardous substances for protection of the discharge to river. Review the Lime bund overflow system and produce a business case for improvement. Investigate ways of reducing energy and costs in the management of blind drainage pits. Review bund emptying systems and investigate alternatives to improve the robustness of our process and ongoing management.
<p>Site Infrastructure. Deliver improvements to the discharge to river enabling optimisation of plant performance.</p>	<ul style="list-style-type: none"> Consult with the Environment Agency to agree and implement variation to the permit limits for the temperature of the discharge to river and for re-direction of the water treatment effluent and cooling water drain's route. Install commission and operate new river intake temperature monitoring. Finalise, install and commission the water treatment effluent and cooling water pump over design and update associated control documentation. Eliminate risks of oil and chemical leaking into ground and of discharge by site drains to river and install a new oily water separator.
<p>Energy Efficiency. Plant Efficiency is optimal at all levels of the business reducing energy consumption wherever possible</p>	<ul style="list-style-type: none"> Maintain thermal efficiency above 54%. Identify top efficiency losses, ensure effective plans strategies are put in place to either eliminate or reduce the impact of the losses Develop efficiency KPI's and reporting to show the overall energy performance of the station and continually improve energy performance. Identify inefficiencies whereby gains can be achieved with minimal investment and deliver the efficiency opportunity from concept to completion.
<p>Environmental Awareness. Ensuring future skills and capabilities for all to support the station's requirements.</p>	<ul style="list-style-type: none"> Complete the adaptation of Environmental Awareness training for delivery to staff and contractors.
<p>Raw Material and Waste Management. Identify opportunities with short term or long term benefit at minimal cost.</p>	<ul style="list-style-type: none"> Review and improve control of HCT cooling water concentration factor for a reduction in chemical use. Review and improve Water Treatment operations for a reduction in chemical use. Reduce water losses on HRSG 3. Survey the Fire Fighting System for water leaks. Improve the SF6 switch gear apparatus. Minimise waste and optimise management plans for all waste streams. Establish alternative disposal opportunities for Densadeg 'silt'. Consider opportunities for reducing paper and packaging. Report resource consumption and waste production in a format visible to all. Conserve resources by reducing to the minimum the use of chemicals, oils and other raw materials, energy and water consumption.

8. Abbreviations

CCGT	Combined Cycle Gas Turbine	GW	Gigawatt
CEMS	Continuous Emissions Monitoring System	HCT	Hybrid Cooling Tower
CO ₂	Carbon dioxide	HRSG	Heat Recovery Steam Generator
CWM	Continuous Water Monitoring	ISO	International Standards Organisation
EMAS	Eco-Management and Audit Scheme	MW	Megawatts
EMS	Environmental Management System	NO ₂	Nitrogen dioxide
ESOS	Energy Savings Opportunity Scheme	NO _x	Oxides of nitrogen
ETS	Emissions trading Scheme	OHSAS	Occupational Health and Safety Advisory Service
EU	European Union	PAS	Publicly Available Specification
		PFA	Pulverised Fuel Ash
		SSSI	Site of Special Scientific Interest
		SO ₂	Sulphur dioxide

9. VERIFICATION OF THIS STATEMENT

AFNOR UK Ltd (UK-V-0010) verified this statement against the requirements of the EMAS Regulation 1221/2009.

10. CONTACT DETAILS

If you require more information on our environmental activities please contact our site information line.

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This statement will be made available at:
www.edfenergy.com/energy/power-stations/west-burton-b-ccgt



Fishing Ponds adjacent to EDF Energy's West Burton B CCGT Power Station Cooling Tower 3

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