



SCOTTISHPOWER

Longannet Power Station EMAS STATEMENT 2012



CONTENTS

Introduction

OVERVIEW OF LONGANNET POWER STATION, THE SECOND LARGEST COAL-FIRED PLANT IN THE UK
PAGE 4

Our EMS

EXPLAINING THE STRUCTURE OF THE STATION'S ENVIRONMENTAL MANAGEMENT SYSTEM
PAGE 5

Key Issues

A SUMMARY OF ENVIRONMENTAL LEGISLATION AND THE FUTURE CHALLENGES FACING LONGANNET
PAGE 6

Station Processes

EXAMINING THE STATION'S INPUTS AND OUTPUTS FOR 2012 AND OUR ENVIRONMENTAL PERFORMANCE
PAGE 12

Targets & Achievements

WE LIST OUR CURRENT OBJECTIVES AND REPORT ON THE PROGRESS TO DATE IN ACHIEVING OUR TARGETS
PAGE 19

Social & Community

LONGANNET AND ITS STAFF HELP A WIDE RANGE OF COMMUNITY PROJECTS AND GOOD CAUSES
PAGE 20

Conservation & Biodiversity

THE STATION AIMS TO WORK IN HARMONY WITH THE WILDLIFE THAT THRIVES ON OUR SITES
PAGE 21

Glossary of Terms

A USEFUL REFERENCE TO THE TERMS AND ABBREVIATIONS USED IN THE 2012 EMAS STATEMENT
PAGE 22

EMAS Validation

DECLARATION FROM THE VERIFIER OF THE ECO-MANAGEMENT AND AUDIT SCHEME (EMAS)
PAGE 23



Our team effort to

In recent years station management and staff have been conscious of the pressing challenges facing Longannet as it approaches its 40th anniversary.

The environmental and political landscape has altered dramatically since Scotland's largest generating station became fully operational in 1973.

We recognise the demanding challenges we must meet if Longannet is to have a successful long-term future.

That's why, in December 2012, we launched an important new strategy – Team Longannet: Securing the future beyond 2020.

Simply put, it will need team action, everyone pulling in the same direction, to ensure the plant can look forward with confidence.

We must work together to meet ever-tightening legislation on emissions and identify what must be done to get the ageing plant in shape.

And crucially, Team Longannet must demonstrate a strong case for investment to extend the life of the station – by being reliable, efficient, compliant and profitable.

Team Longannet: Securing the future beyond 2020 lays the foundation for Longannet to continue operating for many years to come.

The strategy consists of four separate work streams – looking at People, Housekeeping, Maintenance and Combustion.

The **People** work stream will provide the right leadership and support to energise our workforce and engage with our mission.

Housekeeping is about improving our own environment, making the station a safer, healthier and more enjoyable place to work.

The team involved in **Maintenance** will deliver a strategy that drives productivity and improved plant availability. And finally, the **Combustion** work stream will concentrate on our main purpose in life – generating the most electricity we can from each tonne of coal whilst at the same time minimising our

INTRODUCTION
by IAN CHISHOLM
Station Manager



impact on the external environment.

This will be achieved by improving the performance of our coal mills and boilers and fine tuning the complex processes involved. Improving combustion has a direct impact on our emissions to air.

Delivering the work streams will be challenging – and exciting.

We hope the reward will be Longannet's operational life being extended, possibly towards 2030.

That would safeguard the jobs of our colleagues and contractors, offer the Scottish coal industry a long-term future and provide security of energy supply for homes and business in Scotland.

Innovation and ingenuity have always been trademarks of our workforce and I am confident they will rise to the challenge again.

Next year will see an example of innovation in action as the station closes in on a solution to reducing one of our key emissions to air, oxides of nitrogen (NO_x).

The forthcoming Industrial Emissions Directive (IED) will introduce strict new targets for NO_x emissions when it comes into force in January 2016.

Being able to meet the new limits for NO_x is a critical element of the plan to secure our future – and we will be the first power station in the UK to test a particular suite of cutting-edge NO_x reduction technologies, covered in more detail later in this statement.

We are starting to benefit from our substantial investment in abatement to reduce our sulphur dioxide (SO₂) emissions. Flue Gas Desulphurisation (FGD) is aimed at

The Securing the Future strategy is being reinforced with new branding and staff are encouraged to listen in to a daily message recorded by Station Manager Ian Chisholm about plant status, key messages and key tasks for the day.



secure Longannet's future



scrubbing our SO₂ emissions from three units by up to 94% and enabling us to comply with the IED's limits on sulphur.

Unit 1 FGD operated for much of the year and the reduction in SO₂ emissions from the unit has been dramatic. We can look forward to FGD being commissioned on Units 2 and 3 in the year ahead.

The station also benefited from a multi-million pound investment in 2012 to improve Units 2 and 4.

The scope of outage work for Unit 2 was, in fact, the largest we have seen at the station for many years and included the replacement of some of the station's original components for the first time.

Our outages were not without their

challenges – but most importantly, they were delivered safely and will improve our performance going forward.

This year's Eco-Management Audit Scheme (EMAS) Statement contains a mixture of success stories from a busy year in the life of Longannet – and an outline of some of our actions to secure our future in the months ahead.

There were also occasions in 2012 when we did not meet our own high expectations – these are reported too, along with what we are doing to up our performance.

In many ways, 2013 will be a defining year for Longannet – but we will continue operating with one eye on a long-term future while continuing to deliver for today.

Environmental Policy

Longannet Power Station, the largest in Scotland, produces electricity through the combustion of fossil fuels and biomass.

The station, its managers and employees are fully committed to Scottish Power and the IBERDROLA Group's environmental policies and principles. We are also committed to the ScottishPower Generation's "Respect the Environment goal", ensuring we minimise our environmental impacts, preventing pollution wherever possible.

Our Environmental Management System details the responsibilities and procedures for ensuring the requirements of all environmental legislation and company policies are complied with using a documented and maintained system.

Longannet will measure, monitor and audit its environmental performance; working together with the business environment team and, where appropriate, set achievable targets for continual improvement.

As a minimum standard we shall:

- Fully comply with or improve on legislative and regulatory requirements
- Consider environmental impacts as part of our decision making and integrate these with business planning
- Aim for zero breaches of consent and community complaints, setting realistic reduction targets year on year
- Strive for continuous improvement in environmental performance as detailed in an annual environmental plan
- Minimise our emissions to air, land and water
- Minimise our usage of resources by promoting the three "Rs" – Reduce, Re-use and Recycle
- Optimise plant efficiency to reduce our fuel consumption and minimise pollution
- Ensure that all contractors are aware of, understand and meet our minimum environmental standards
- Identify environmental training requirements and provide adequate resources to deliver them
- Continue our strong relationship with the local community, keeping them informed of our operations
- Carry out regular management reviews to demonstrate our commitment and to track progress on our environmental performance.

Our Operations in 2012: Longannet performed strongly and made the most of market opportunities arising from wind generation

Longannet Power Station is owned and operated by ScottishPower Generation Holdings Ltd, which is part of the IBERDROLA Group.

With its landmark 183-metre chimney, Longannet is the second largest coal-fired station in the UK and one of the largest in Europe. The station, which has an installed capacity of 2,400 MW generated from four 600 MW units, has played an important role in meeting Scotland's energy needs since 1972 and became fully operational in 1973.

Longannet is principally a coal station but, when necessary, combustion can be supported by firing natural gas.

The station's generated output increased slightly during the year – from 9,139 GWh in 2011 to a new total of 9,525 GWh in the current reporting period (a load factor of about 50%).

However, a number of factors affecting the station's availability and performance meant our initial budget figure for generated output was not attained.

For a second consecutive year, Longannet participated in Constrained Management contracts operated by the National Grid, while upgrading work was carried out on the transmission system between Scotland and England. The network improvements reduced system capacity on the grid and, at times during spring and early summer, units at Longannet were shut down in agreement with the grid operators.

Scotland's growing renewable energy capacity continues to have an increasing influence on the way that Longannet is required to operate by National Grid, who have to balance energy supply with demand.

By September 2012, Scotland had 3,811 MW of installed onshore and offshore wind generation capacity. Wind generation capacity will continue to grow sharply in the near future, with a further 12,307 MW already under construction, consented or in the planning process for onshore sites in Scotland and around the coast.

During periods of plentiful winds, when conditions are suitable for wind generation, National Grid has, on occasions, negotiated output to be lowered at Longannet and even for units to be taken out of service for a specified period.

The station achieved 159 starts in 2012 as it came on load and off again, in many cases in response to the fluctuating levels of renewable output. However, this total was around a third less (31%) compared with the record 232 starts in 2011.

Availability was also constrained as a result of planned outage work on Units 2 and 4, both of which commenced in June and had to be



extended beyond their target finish dates.

The scope of work for the outage on Unit 2 was the largest undertaken on any unit at Longannet for several years and included a range of boiler improvements and the replacement of the station's original HP turbine steam chest and generation transformer.

The shorter Unit 4 outage was scheduled as a statutory inspection along with additional work streams to carry out maintenance to minimise boiler tube leaks and improve its overall reliability.

During the Unit 4 shutdown, a routine inspection discovered cracking in the boiler's transition welds that join areas of high-grade steel with a lower-grade material.

The most serious cracks required immediate repair, extending the outage period, and the unit will be taken off again in 2013 for further work to renew the welds.

In addition, issues were experienced with the reliability and availability of Unit 2 and Unit 3 in spring 2012 as a result of boiler fouling issues (see page nine).

As a result of these challenges, our availability rate reduced from 84.5% in 2011 to 77% in 2012 – although the station has benefited from a range of projects that will ensure better performance going forward.

The transition weld repairs on Unit 4 underlines ScottishPower's commitment to process safety – protecting our people, assets and the environment from major hazards.

ScottishPower is acknowledged as an industry leader in process safety.

Our electronic Cintellate recording system continued to play a valuable role in 2012, by improving how staff record, investigate and close-out environmental and safety incidents and near-misses.

A major success in 2012 was the commissioning of Flue Gas Desulphurisation (FGD) on Unit 1 to scrub our emissions of sulphur dioxide (SO₂) by around 94%.

Unit 1 FGD began in regular service in March, allowing station staff to become familiar with its operation and how it interacts with the environment, and the abatement technology is already achieving dramatic improvements in SO₂ emissions from the unit.

Commissioning started on Unit 2 FGD in December and by the end of 2013 we should have all three of our FGD units in operation and fully commissioned.

We continue to implement a low-sulphur coal strategy for Unit 4, which is not fitted with FGD.

Longannet consumed 4,138 ktonnes of coal in 2012 – the highest figure since 2002-03 – and almost half of our supply (47%) was sourced from Scottish mines. We continue to import quantities of low and medium-sulphur coals from Russia and Colombia respectively.

Longannet ceased co-firing biomass material with coal in 2012. In the past we have consumed Waste Derived Fuel (WDF) and sawdust pellets – but we ceased using WDF in April and no other biomass was sourced.

Environmental Management: The station's EMS provides the structure and systems for ongoing environmental improvement

Longannet's Environmental Management System (EMS) is certified to the International Standard for EMS, ISO 14001: 2004.

The EMS provides the structure and systems for developing, implementing, achieving, reviewing and maintaining our Environmental Policy. Its main components are shown in the diagram (right).

The station's Aspects & Impacts register documents the impacts or potential impacts of our operations and activities – past, present and future – under normal, abnormal and emergency conditions and using defined criteria that are publicly available.

Longannet has identified all of its legal requirements and maintains a register that is available for stakeholders to view on request.

The station successfully underwent a full ISO14001: 2004 recertification audit at the beginning of 2012, providing certification until 2015.

In line with parent company IBERDROLA introducing common systems and processes throughout its thermal stations, Longannet moved to AENOR as certification provider for ISO 14001 in early 2012.

Preparations are well in hand for the next step in this process, which is to move to an Integrated Management System (IMS) covering the ScottishPower liberalised businesses, Generation and Retail.

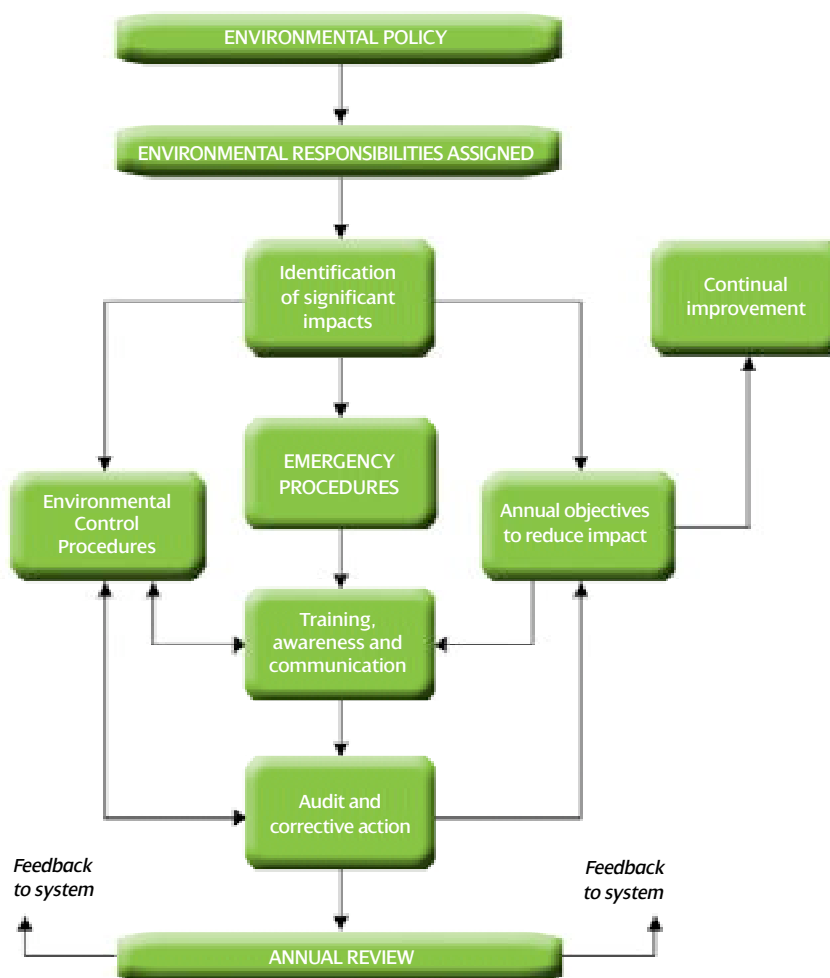
The first integrated internal audit took place in November 2012 when ScottishPower's UK Technical Services department examined housekeeping, recording of environmental complaints and emergency procedures.

The audit found significant improvements had been made to housekeeping – part of the Team Longannet programme – including the renewal of the fixed vacuum point system to reduce airborne dust.

It found that management of environmental complaints was robust and comprehensive and good work had been achieved on emergency preparedness.

A small number of non-conformances and improvement actions were raised and addressed.

An external audit of Longannet's Integrated Management System will take place in March/April 2013



Members of Longannet Power Station Environment Team, from left, Richard Christie, Richard Steventon, Moira Campbell, Stewart Dettlaff and Jim Redfern

The Environmental Team is an integrated part of the Production Department at Longannet Power Station.

Team members meet regularly with management and liaise with employees and contractors to achieve continual improvement in the station's environmental performance through the promotion of a 10-point list of green behaviours.

Green behaviour topics were rolled out monthly to site personnel in 2012 and the environment team prepared Toolbox Talks on subjects including reporting faults and incidents, and the serious implications of burning waste on site. The Toolbox Talks were supported by poster campaigns and articles in the station's Newline internal newsletter.

The Environment Team provides a first response to any environmental incidents and carries out site checks and inspections to ensure compliance with our PPC Permits.

The team assists our regulator SEPA, on any issues arising at the station, including the annual auditing for the Compliance Assessment Scheme (CAS) – see page six.

A new SEPA inspector was appointed for Longannet and was hosted on a series of familiarisation visits to the station.

The team also manages the Aspects & Impacts register and specialist staff can also be co-opted to attend meetings to address the environmental aspects of specific projects, such as FGD.

Key Issues: Longannet operates within strict European legislation that is designed to minimise our emissions to land, water and air

Pollution Prevention & Control

Longannet operates under conditions set out in a Pollution Prevention and Control (PPC) permit that is issued and monitored by the Scottish Environment Protection Agency (SEPA) under the Pollution Prevention and Control Regulations 2000.

These regulations remain applicable to existing sites such as Longannet until January 7th 2014 when they will be superseded by the Pollution Prevention and Control (Scotland) Regulations 2012, which will come into force for operators of new plants on January 7th 2013.

The PPC Regulations are driven by the EU's Integrated Pollution Prevention and Control (IPPC) Directive and require the use of Best Available Techniques (BAT) to eliminate or minimise all polluting emissions.

The PPC permit covers emissions to air, land and water, as well as noise, vibration and heat loss. It also covers the use of energy and raw materials, waste reduction and the management of potential environmental risks.

A PPC permit for the operation of the power station was secured in 2007, along with a separate PPC permit for the operation of Valleyfield Ash Lagoons.

A key element of Longannet's PPC activities is the control of emissions. Longannet is opted-in to the Large Combustion Plant Directive (LCPD) via the National Emission Reduction Plan (NERP).

Under the NERP, the station has been set finite annual emission allowances, or 'bubbles' for SO₂, NO_x and dust (or particulate matter).

Emission allowances can be traded with other NERP participating sites, however, the national 'bubble' is set to ensure an overall reduction in the UK's emissions.

In the final quarter of 2012, the station applied for a variation to its PPC permit to revise the formal commissioning dates for FGD on Units 2 and 3 to March and December 2013 respectively. Longannet has explained to SEPA the cause of the requested timescale extension, which relates to the additional workload and time considerations involved in the extended Unit 2 2012 outage and the resulting slippage in planning for 2013's outage on Unit 3.

Longannet Ash Lagoons (a separate site to Valleyfield Ash Lagoons) continued in 2012 to operate as a waste transfer station under a modified Waste Management Licence.

The lagoons have been refused a PPC permit due to concerns that the depth of the impermeable clay layer beneath the ash in one section of Lagoon No.1 may be insufficient.

Ash deposition ceased at Lagoon No.1 in 2007 and the station is drawing up plans in consultation with SEPA to withdraw the lagoon from future service, as it is thought it will no longer be needed for future ash storage and disposal. Station management continued talks with SEPA in 2012 about the possibility of a PPC

Our Compliance Assessment Rating 2012

SEPA introduced its Compliance Assessment Scheme (CAS) in 2009 as a way of assessing an operator's compliance with permits, authorisations and licences, including PPC.

The overall compliance band awarded is based on an operator's performance measured by two conditions: Environmental Limit Conditions (ELC) which relate to emissions limits and reporting and Environmental Management Conditions (EMC) that relate to management procedures being in place and observed, to ensure environmental protection.

Performance against the EMC band can range from High to Low. The overall site compliance rating combines ELC and EMC performance in a matrix that rates the operator's overall performance in a range of Excellent to Poor.

Longannet Power Station's CAS rating under the EMC was High Performance and the overall compliance rating was Good for the fourth consecutive year. The rating was influenced by two reportable noise incidents in July (see the Noise section on page 18); a minor oil release from emission point W10 that, although not breaching the discharge limit, SEPA classified as an Environmental Event; and Units 1 and 2 SO₂ emissions being above the target of 400mg/m³ as set by PPC Permit variation VN04 (which extended the FGD commissioning period). For the first time, Valleyfield Lagoons' CAS compliance rating fell from Excellent to Good – this was as a result of a breach of suspended solid discharge emissions that occurred in December (see page 17). Also in 2012, the operation of Longannet Lagoons under its waste management licence was subject to a CAS audit for the first time – resulting in Excellent and High Performance scores in the relevant categories.

permit being issued for the remaining active lagoon at Longannet, Lagoon No.2.

Under PPC permit conditions, and as required by the LCPD, Longannet must continuously measure the emissions going up the station chimney.

Station staff must check the Continuous Emissions Monitoring System (CEMS) instrumentation regularly to ensure they stay within their calibrated ranges. The instruments must also undergo annual testing, by an independent testing company, to verify their accuracy and compliance with the European standard EN14181.

Emissions to air are recorded via the station's Multiple Emissions Reporting System (MERS) and reported to SEPA, as required by the PPC permit.

In addition, Longannet has a monitoring station at Blair Mains to monitor and record local air quality, specifically any effect on local air quality with regard to SO₂.

Longannet also has an aqueous discharge monitoring programme to monitor compliance with the PPC permit emissions limits set for the station's nine permitted emission points to the Forth Estuary.

Results are reported to SEPA each quarter, or immediately should any exceedance of a limit be detected.

All necessary 2012 reports were submitted on time to SEPA. The Agency carries out regular independent sampling and analysis of discharges to air and water, and its officers meet regularly with station staff to discuss permit conditions, Best Available Techniques and to conduct site inspections as part of the Compliance Assessment Scheme (CAS).



A specialist contractor carries out maintenance on Unit 2 feed pump during the major outage

Global Climate Change

In 2012, Longannet prepared for the launch of the third phase of the EU Emissions Trading System (EU ETS).

EU ETS is the primary mechanism for driving a reduction of 20% in carbon dioxide (CO₂) emissions across power generation and heavy industry throughout Europe by 2020.

The system imposes a price on carbon to encourage companies to reduce their operational emissions and invest in lower carbon technologies. At Longannet, operators strive to minimise overall CO₂ emissions per GWh by ensuring the plant is operated as efficiently as possible.

Under EU ETS, an overall CO₂ cap is set and carbon allowances are distributed through a National Allocation Plan (NAP). These may be



Station staff and contractors supervise as a massive turbine rotor is lifted into position on Unit 2 during the major outage that started in 2012 – see page 14

used in respect of CO₂ emissions from their allocated plant, or traded.

When Phase 3 EU ETS starts on January 1st 2013, free allocation of CO₂ allowances will effectively cease for single-purpose electricity generating stations such as Longannet.

This will mean that, going forward, ScottishPower must purchase all the carbon allowances required to match Longannet's CO₂ emissions.

Phase 3 will also introduce more rigorous monitoring and reporting methodologies that require additional supporting procedures and greater CO₂ sampling frequencies. Some additional small emission sources will also be included under Phase 3, such as CO₂ emissions from the propane gas used during maintenance welding work.

Longannet's robust management system already meets many of the new elements of Phase 3 but, during the year, we detailed our approach to the tougher regime in our application to SEPA for a new Phase 3 Greenhouse Gas permit.

EU ETS requires each eligible installation to produce an annual Greenhouse Gas emissions report for the previous calendar year, which must be externally verified and submitted to the regulator by the end of March. Allowances equal to these verified emissions must then be surrendered by the end of April.

Meanwhile, the UK Government is set to introduce a carbon floor price on fossil fuel generators from 1st April 2013 as part of the

amended Climate Change Levy regime.

The carbon floor price will comprise the current cost of EU ETS allowances plus a tax – known as the carbon price support mechanism (CPSM) – based on the average carbon content of fossil fuels delivered to the station.

UK generators were waiting at the end of 2012 for final confirmation of how the carbon support price will be calculated but it is anticipated that Longannet will be able to use the same data collection methods as are currently used for EU ETS

The CPSM will effectively be a top-up tax to ensure the cost of emitting CO₂ does not drop below a certain, floor, level.

The carbon floor price has been designed by the UK Government to drive investment in low-carbon technologies. However, it will significantly increase costs incurred by coal-fired stations, such as Longannet.

Acidification & Air Quality

Power stations must control emissions to air of SO₂, NO_x and particulate (dust) under the terms of the LCPD and the IPPC Directive.

SO₂ and NO_x emissions affect air quality and can disrupt ecosystems through acid rain damage to vegetation and watercourses.

Along with ozone and fugitive dust emissions, they have also been linked with respiratory conditions and may be harmful to human health.

Emission limits will be further constrained by

the Industrial Emissions Directive (IED), which comes into force from January 1st 2016 and will require coal-fired power stations to install further abatement technologies.

The IED will consolidate seven existing directives, including the LCPD, the IPPC Directive and the Waste Incineration Directive (WID) into one cohesive piece of legislation.

The directive focuses on limiting air pollutants such as SO₂, NO_x and dust and will significantly tighten emission limit values for large combustion plants and other industries throughout the EU. It also strengthens the concept of Best Available Technology (BAT) in controlling emissions and introduces new requirements for monitoring, plant inspections and compliance reporting.

Flue Gas Desulphurisation (FGD), which is operational on two units and undergoing final construction on a third unit at Longannet, will ensure the station can comply with SO₂ emission limits set by the forthcoming IED. However, the station must invest in additional abatement technology to reduce its emissions of NO_x to comply with the future limits.

As a general rule, installations such as Longannet have until 2016 to comply with the stricter emission limits or opt-out of the IED.

Operators must decide by December 2013 if they wish to opt out of IED and commit to limited hours of operation, within the emission limits set by the LCPD, and closure by the end of 2023. Under a third option, a plant could opt-in by entering into a Transitional National Plan

(TNP) from 2016 to June 2020. Longannet has indicated to DEFRA it intends joining the TNP and will continue to explore suitable NO_x reduction technologies.

The TNP is designed to allow operators time to comply with the stricter IED limits although they would have to operate within emissions limits set by the TNP. It is anticipated the TNP would operate in a similar way to the current NERP, with tradable emission limit bubbles being set for SO₂, NO_x and dust.

NO_x reduction technologies

A key area of focus for Longannet in recent years has been exploring ways to reduce its NO_x emissions to less than 200mg/Nm³ to meet the stricter limits of the forthcoming IED.

In 2013, the station will move towards a strategic solution that combines improved monitoring of combustion conditions in the station's furnaces with changes to the way that pulverised fuel is supplied and burned in the boiler.

The technologies have been proved at coal plants in Spain operated by our parent company IBERDROLA and their competitors.

All four boilers at Longannet will be fitted with automatic gas sampling equipment in 2013. Eight sample probes will be installed in the boiler wall above the eight columns of coal burners on each unit.

These will analyse combustion gases at regular intervals, providing operators with a real-time feedback on combustion conditions. This will enable controls to be fine tuned to ensure combustion is balanced across the furnace, reducing the conditions for NO_x formation and ensuring the most efficient use of fuel.

Meanwhile, as part of the second stream of work in 2013, modifications will be made to the pipework that carries pulverised fuel from the coal mills to the Unit 3 boiler to improve the overall flexibility of supplying fuel to the furnace.

The top row of the boiler's four rows of burners will no longer be used to burn pulverised fuel with the result that the coal fireball will occur lower in the furnace.

This will provide coal particles with greater residence time to burn, helping minimise thermal NO_x formation. It will also reduce the temperature in the higher part of the furnace and thus prevent any overheating of the superheater pendants.

Meanwhile, the output from the coal mills serving the redundant burners (A and H) will be redirected through new pulverised fuel pipework to feed the lower three burner rows to provide additional mill capacity and better flexibility.

This will give unit operators the ability to create oxygen-lean areas low down in the furnace that promotes the formation of elemental diatomic nitrogen (N₂) rather than NO_x. The project

will also improve combustion efficiency, due to more thorough burning of fuel, reduce the amount of unburned coal in ash and promote the longevity of the boiler and its components due to the relatively cooler furnace conditions.

The technology, which is expected to reduce NO_x emissions to between 300 and 350mg/Nm³, will be fitted during the Unit 3 outage in 2013. It will then undergo a period of evaluation in the latter part of the year.

The results will help inform ScottishPower's decision whether or not to enter Longannet into the TNP, following which the technology could be rolled out to the station's other three units.

Further NO_x abatement will be required, however, to meet the new IED limit and the station is investigating fitting a trial Selective Non Catalytic Reduction (SNCR) injection plant on Unit 3 in 2013.

This would inject ammonia into the top of the furnace where it would react chemically with nitrous oxide, producing elemental nitrogen and water.

Boosted Over Fire Air (BOFA)

Longannet's four units continue to benefit from BOFA technology that is designed to reduce NO_x emissions by up to 25%.

BOFA helps ensure the station remains within the NO_x emission limit of 1.8 Te/GWh as set by the PPC permit (equivalent to the monthly average limit of 500mg/Nm³ set by the LCPD until the end of 2015).

However, there have been historical issues relating to the reliability of the BOFA system and in 2012 a station-led project team liaised with the turnkey supplier to seek ways of optimising its availability and performance.

Repairs were made sequentially to cracking on BOFA's fan impellor cones following vibration issues that were noted in 2011 and project staff have attempted to fine tune hardware and software interlocks and calibrate the vanes that control the BOFA Fan throughput.

It is expected that work carried out as part of a coal mill optimisation strategy, to increase secondary air flow, will finally create the right conditions for BOFA to operate as designed and, going forward, to compliment the new NO_x reduction technologies being installed at Longannet in 2013.

Mill Optimisation Strategy

A formal strategy to improve the performance of Longannet's coal mills was launched in September 2012.

The long-term project is critical to the success of the new low NO_x system being trialled at the station and part of a combustion workstream aimed at ensuring the longevity of Longannet beyond 2020.



At the outset, the strategy recognises that the coal types now consumed by the station have a higher calorific value than those used when the plant was first built. As a result, less fuel needs to be burned to achieve Longannet's original design full load.

The coals now being supplied are, however, more resistant to grinding in the coal mills – the measure of coal hardness is the Hardgrove Index, the lower the Hardgrove Index value the harder the coal is to grind – with the result that the pulverised fuel supplied to the furnace is currently more coarse compared with the original station requirements.

The strategy will move the plant towards delivering a more finely ground fuel with each individual coal mill grinding a lower tonnage of coal, with an increase from six to seven operational mills and modifications to ensure mill fuel/air flow velocities are maintained.

A similar strategy implemented at Cockerzie Power Station in East Lothian resulted in improved combustion of the finer coal particles, better efficiency, a reduction in NO_x and carbon monoxide (CO) emissions and less temperature stress on the boiler and its components,



Station Chemist Tony Corless with a sample of the boiler clinker



Teams tackle boiler fouling

Station teams pulled together to restore unit availability after boiler fouling on Units 2 and 3 in spring 2012 resulted in challenging operating conditions.

An investigation by Longannet's production team identified the cause and a solution, while staff and contractors engaged in a major clean-up operation to remove hundreds of tonnes of accumulated clinker.

The root problem was identified as a failure of sootblowers, which remove soot and dust from the furnace surfaces, combined with the blends of coals that the units were supplied with.

As a result, excessively high flue gas temperatures were present in the boiler and molten ash from coal condensed and accumulated, forming clinker, on boiler tubes and platen superheater pendants.

The units were taken off load and cleaned, with workers using jackhammers to remove

the densest areas of clinker, and the maintenance and engineering teams brought back into service the boiler slope long lance sootblowers.

Meanwhile, the station began a regime of dropping load to 300MW overnight across all four units on alternate nights.

Thermally cycling the boilers in this way causes any clinker to cool and naturally drop off the boiler components.

Monitoring of boiler temperatures using a thermal imaging camera was an important part of the project and checks are carried out daily to identify any further fouling – which is removed regularly when the unit is taken off load.

Clinker build up can also affect combustion conditions and can occlude the gas path through the boiler, with an impact on emissions such as NO_x, CO and dust.

The excessive temperatures experienced can also put strain on the boiler and its components, affecting asset life.

Station Chemist Tony Corless carries out checks with a thermal imaging camera and, inset, build up of clinker around boiler tubes

improving asset longevity. Implementing the mill optimisation strategy will involve a project team that comprises personnel from engineering, maintenance, operations and chemistry. By the end of 2013, it is anticipated that pulverised fuel throughput and fineness will have been optimised on 80% of the station's mills, with the project 100% complete by April 2014.

NO_x performance in 2012

Significant effort by station teams in 2012 has identified a solution to reduce NO_x emissions from Longannet Unit 4. The unit has historically experienced higher NO_x emission levels compared with its sister units and this resulted in a minor breach of the plant's PPC permit limits in 2011.

A project team was set up to investigate the issue and improve control of Unit 4's combustion performance to reduce NO_x formation.

Unit 4 is not being fitted with FGD and requires a low-sulphur coal diet to stay within its

SO₂ emission limit – but it was identified that the combustion of such fuels appeared to encourage higher NO_x concentrations.

Trials were carried out in spring 2012 involving subtle changes to the fuel mix for Unit 4 and, towards the end of the year, the unit began being supplied with a blend of 80% low-sulphur Russian coal and 20% Scottish coal to control NO_x while enabling the unit to remain within its SO₂ emissions limit.

All units at Longannet met their annual mass NO_x emission limits in 2012 and the overall station emissions in tonnes/GWh reduced slightly from 1.68 in 2011 to 1.66 in 2012.

Flue Gas Desulphurisation

FGD is designed to ensure Longannet can comply with emission limits for SO₂ set by both the LCPD and the forthcoming IED.

For the first time in 2012, the station was able to operate consistently with two absorber pumps in operation, supplying seawater to scrub around 94% of the SO₂ emissions on Units 1 and 2 and with high levels of availability.

By the end of 2013, as a result of the Coal Mill Optimisation work stream, it is anticipated pulverised fuel throughput and fineness will have been optimised on 80% of the station's mills, with the project 100% complete by April 2014.

The FGD absorber on Unit 1 began in regular service in March and was fully commissioned in December 2012. Unit 2 FGD operated intermittently in the first six months and started its formal commissioning phase when the unit came back in December after its major outage.

The technique used by Longannet is Seawater Scrubbing FGD that uses the inherent alkaline properties of seawater to absorb and neutralise acidic SO₂. It works by bringing the seawater which has already been used as Longannet's condenser cooling water, into close contact with the flue gases in purpose-built absorber towers to absorb the SO₂, resulting in harmless soluble sulphate (SO₄) that can be discharged back to the Forth Estuary.

The process does not require chemicals – only seawater and air are used – and safeguards are in place to ensure the discharged seawater complies fully with environmental regulations.

Operators have seen significant reductions in SO₂ emissions – the end-of-year figures indicate that Unit 1 produced 5,000 tonnes of SO₂ during 2012 while Unit 3 produced 19,000 tonnes operating at a similar output.

Across all four units, the station's SO₂ emissions reduced by 13% from 3.9 tonnes per GWh in 2011 to 3.4 tonnes per GWh in 2012.

Nevertheless, there was a minor breach of SO₂

emission limits on Units 1 and 2 which were above the target of 400mg/m³ as set by PPC Permit variation VN04 (which extended the FGD commissioning period) in September and May respectively.

Construction work to rebuild Unit 3's FGD absorber that was damaged by fire in 2010 was approaching completion by the end of 2012 and moving towards full commissioning by December 2013. Work will be carried out to 'tie in' the absorber to Unit 3 during next year's major outage.

Meanwhile, the FGD system benefited in 2012 from the return to service of two refurbished seawater absorber pumps that work to push 20,000 tonnes of seawater per hour through each absorber.

Vibration issues as a result of degraded bearings were experienced on all four pumps in 2011. All should be back in operation after an overhaul by their manufacturer in Germany by spring 2013, in time for the start of FGD operations on all three installed units at Longannet.

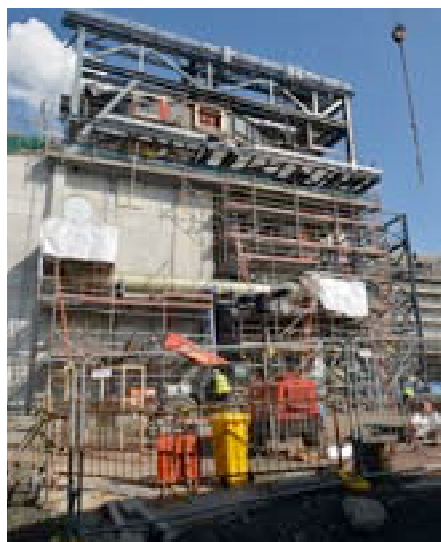
Meanwhile, four self-cleaning in-line strainers have been installed on the discharge side of the absorber pumps between December 2011 and October 2012. The strainers are required to prevent marine debris from reaching the FGD absorbers and potentially blocking the nozzles which create the spray inside the absorbers to ensure maximum contact between the combustion gasses and the seawater.

Each strainer can remove 70 tonnes of marine debris per hour from the extracted water and they are improving the effective flow of water supply for FGD by removing the need for fine filters on the inlets to the absorber pumps.

It was identified that having filters on the inlets to the absorber pumps was contributing to the pump vibration issues in 2011.

Coal Management

Longannet consumed 4,138 ktonnes of coal in 2012 – approaching 10% more than in 2011 (3,781 ktonnes) and the highest figure since 4,160 ktonnes were burned in 2002-03. We



The Unit 3 FGD absorber rebuild continued during 2012 towards a commissioning date in late 2013

continued to ramp up the use of indigenous coal to levels that have not been recorded since the former Longannet Mine closed in 2002.

Our fuel procurement team also continue to operate on the world market to secure stocks of medium-sulphur coals from Colombia and low-sulphur fuels from Russia to support the station's coal strategy.

Our coal plant operator has a key role in managing stocks and sending the correct "diet" of fuel to each of the station's units to ensure compliance with sulphur emission limits and the effective operation of the units' boilers.

From late 2012, this has included sending a blend of Russian coal with 20% higher-sulphur Scottish coal to Unit 4, which is not fitted with FGD sulphur abatement, to help minimise its NO_x emissions whilst still fully complying with the Low Sulphur Strategy agreed with SEPA as Best Available Technique (BAT) for sulphur control at Longannet.

During the year, 77% of the station's total coal supplies were delivered by rail from Hunterston Terminal in Ayrshire, where foreign stocks are offloaded, and the Ravenstruther coal rail terminal in South Lanarkshire that serves as a hub for opencast mines in Ayrshire.

Lorries supplied the rest of our coal from mines in Lanarkshire and Fife.

This coal is delivered to 4,000-tonne capacity Exchange Hopper, at the northwest end of the site, where it is crushed and sampled before joining with the rest of the coal for delivery to the units by conveyor belt.

The coal delivery and handling operations feeding the Exchange Hopper are controlled by the Scottish Coal Company Limited (SCCL), under a separate Part B PPC Permit issued by SEPA.

During 2012, the station trialled coal varieties from the South Appalachians in the United States and from new suppliers in Colombia.

It is a requirement of our PPC permit that any potential new fuels are thoroughly tested to confirm they will have no impact on the station's baseline emissions.

The new Colombian and American stocks were trialled successfully and have been included in the station's fuel portfolio.

Supply Chain Management

The majority of Longannet's purchasing is undertaken by, or with assistance from, ScottishPower's central Procurement Department.

The Procurement Team is committed to maintaining compliance against UK and European legislation and codes, and demonstrating this as part of the authorisation process for each contract.

Our standard approach to supplier pre-qualification and tender evaluation includes assessing the environmental, social and ethical credentials of potential suppliers, as well as ensuring financial value.

We use the Achilles Utilities Vendor Database Verify scheme – a second stage supplier verification and assessment scheme for high-risk contracts.

Almost half (47%) of the coal we used in 2012 – almost two million tonnes – was sourced from Scottish opencast mines in Central Scotland, helping reduce our coal miles and supporting local jobs and communities.



Coal Procurement

ScottishPower's coal procurement activities are now fully integrated within IBERDROLA's global energy management section.

Our parent company sources around seven million tonnes of coal each year that is suitable for Longannet and its three coal stations in Spain, providing economies of scale and valuable synergies.

Shiploads of coal can be redirected to Scotland or Spain, as necessary, while in transit to ensure security of supply.

Longannet obtained 47% of its coal from Scottish suppliers in 2011 – up from 38% in 2010. Just 20% of coal was sourced locally in 2009. ScottishPower has a number of long-standing coal-supply agreements in place with suppliers who operate opencast mines in Fife, Lothians, Lanarkshire and Ayrshire.

Using local coals reduces the station's dependency on imports and significantly reduces the carbon footprint of "coal miles".

ScottishPower is a member of the Association of UK Coal Importers and our representatives have helped produce guidelines on standards of corporate social responsibility for those involved in the coal importation supply chain.

Assessing new, potential suppliers not covered by the Achilles database may involve



Cooling water returned to the discharge flume is monitored to ensure it meets permitted standards

Understanding FGD water chemistry

Longannet's chemists have gained greater knowledge during 2012 of the dynamics of FGD and how the system interacts with the Forth Estuary.

Seawater Scrubbing FGD uses the inherent alkaline properties of seawater to absorb and neutralise acidic SO₂ from the station's flue gases.

The operation of Unit 1 FGD absorber from March 2012 has enabled station chemists to monitor how the safeguards built into the control system operate to ensure there is no adverse impact on the Forth or the FGD plant.

At low tides or during periods of high rainfall or snow melt, the alkalinity levels in seawater can fall below the level required to operate FGD without potentially impacting on water quality in the estuary.

Greater use of coals that have a higher sulphur content can also upset the important chemical balance, although alkalinity levels in the Forth are naturally replenished with each high tide.

Remote online sensors constantly monitor the variation of alkalinity of water being extracted from the Forth and the

levels of acidity and dissolved oxygen concentrations in the water being returned to the estuary via the cooling water discharge flume.

A bypass system opens automatically as permitted levels are approached and diverts a proportion of the flue gases containing SO₂ to the chimney.

If the control systems detect that permitted levels are about to be exceeded, the automatic protection system initiates, resulting in the FGD process being fully bypassed – as happened for the first time in December 2012 during a period of high rainfall and low tides.

Going forward, the monitoring will be critical when three FGD absorbers are in service towards the end of 2013.

Station chemist Tony Corless said: "We've learned a lot and are continuing to learn. We are testing the assumptions made during the modelling for FGD and gaining understanding of the process.

"Our online instruments are accurate and reliable and we are building up confidence the safeguards will protect the plant and estuary during adverse conditions."

visits to overseas operations. We also deal with reputable traders who source coal from multiple mines and incorporate anti-corruption and anti-bribery clauses into our contracts.

Waste Derived Fuel

SEPA formally withdrew an enforcement notice against Longannet in 2012 after the station ceased co-firing Waste Derived Fuel (WDF) with coal.

Pelletised WDF from the Daldowie Sludge Drying Facility, near Glasgow, has been co-fired at the station since 2002. However, final deliveries took place at the start of 2012 and co-firing ceased by the end of April.

SEPA issued its enforcement notice as Longannet is not compliant with the EC's Waste Incineration Directive (WID). This followed a court ruling in 2005 that defined WDF as a waste rather than a fuel.

ScottishPower explored alternative uses for WDF, including constructing a dedicated biomass-to-energy power station at Longannet.

However, the pellets are now being supplied as a fuel in WID-compliant cement kilns operated by Lafarge, providing continued beneficial reuse of the pellets to produce energy.

ScottishPower received confirmation from SEPA on October 18th 2012 that the Enforcement Notice was withdrawn as of the October 9th 2012.

A total of 10,465 tonnes of WDF was co-fired at Longannet in the first four months of the reporting period. The station has not co-fired any other biomass products in 2012.

Use of Energy

Station teams replaced Unit 2's original generation transformer during 2012 with a more efficient model that will improve overall efficiency.

The massive 280-tonne transformer, which converts the station's power output before it is exported via the National Grid, was approaching 40-years old and had reached the end of its operational life.

A bespoke transformer was manufactured for Longannet by Dutch company Smit and installed along with new water and oil cooling pipework during the outage on Unit 2. Weighing in at 320 tonnes before it is filled with oil, the equipment was manoeuvred into position on a 14-axle single-point mooring trailer.

The new transformer is 150kW or 7.5% more efficient than its predecessor (based on test certificates for the original transformer from 1972), resulting in energy consumption savings and improvements in overall sent-out power.

The generator transformer on Unit 3 will be replaced with a refurbished transformer of the original design during the 2013 outage programme while station management are looking at options for similar work for Unit 4.

Although not as efficient as the new design installed on Unit 2, the refurbished transformer will still deliver improved performance compared with the current transformer.

The station's operational electricity use increased to 599 GWh in 2012 – a slight rise

Our processes: Our inputs and outputs and our interaction with other businesses on site

- Longannet burns Scottish coal that is delivered by rail and road, and foreign low-sulphur coal, that is imported by ship then delivered to Longannet by rail. The coal is ground to a fine powder in the milling plant before being burned in the boiler – 4,138 ktonnes of coal were burned in 2012.
- In 2012, Longannet stopped co-firing WDF with coal from the end of April. A total of 10 ktonnes of WDF were burned in the first three months. The station has not co-fired other biomass products, such as wood pellets, as a fuel since 2010.
- Gas for start-up and combustion support arrives at the station via a pipeline that links into Transco's gas transmission system. It passes through a pressure-reducing facility, managed by Greystar, before being injected into the boiler.
- Water for steam generation comes from the townswater supply and is purified using a strictly-controlled amount of chemicals. Steam

leaving the turbines is converted back to water in the condensers then re-circulated back to the boilers.

- Water from the Forth Estuary is used for ash transportation and cooling purposes. It is then returned to the river. Strictly controlled amounts of chemicals are added to inhibit rust and prevent the growth of mussels and other marine organisms.

Discharges to the estuary are monitored regularly and controlled by discharge consents, conditions of which are set by SEPA.

- Electrostatic precipitators (ESP) capture dust from the boiler flue gases and prevent it reaching the atmosphere via the chimney. Other control techniques, such as dampening, are also used around the site, especially at the ash lagoons and coal plant, to control fugitive dust emissions.

- In 2012, Longannet supplied 9,525 GWh of electricity for ScottishPower.

FUEL USE

	2012		2012	2011	2010	2009	2008
Gas Use	41.6 Mm ³	m ³ /GWh	4,116	11,315	14,769	19,041	21,508
		GJ/GWh	155	406	531	668	775
Coal Use	4,138 kTe	Te/GWh	409	390	384	364	369
		GJ/GWh	9,683	9,247	9,121	8,691	8,864
WDF	10.4 kTe	Te/GWh	1,035	3,834	4,372	5,209	7,184
		GJ/GWh	15	59	68	80	107
Biomass Use	0	Te/GWh	0	0	1	2	2
		GJ/GWh	0	0	17	39	36

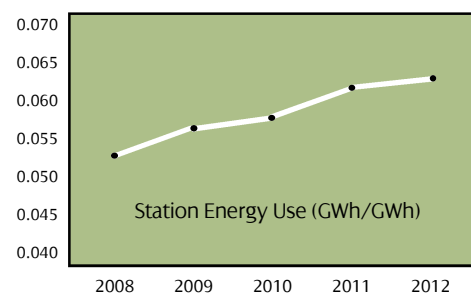
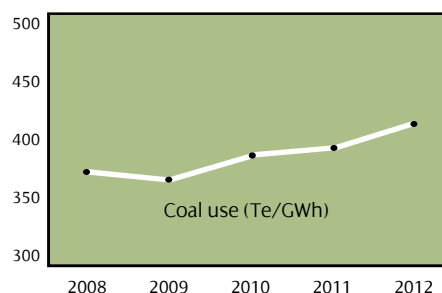
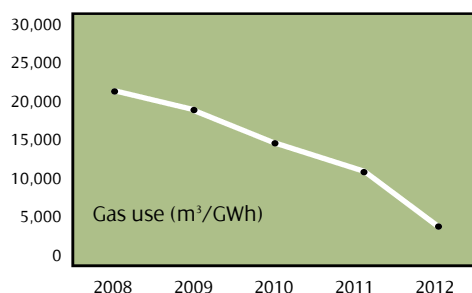
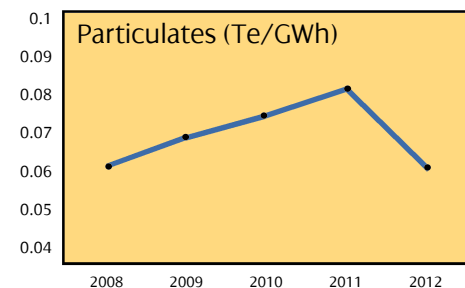
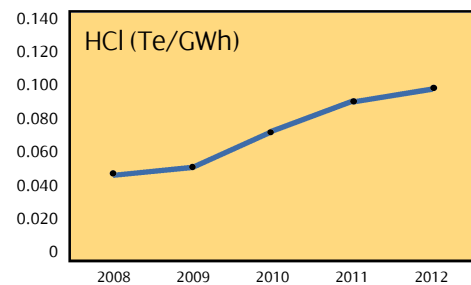
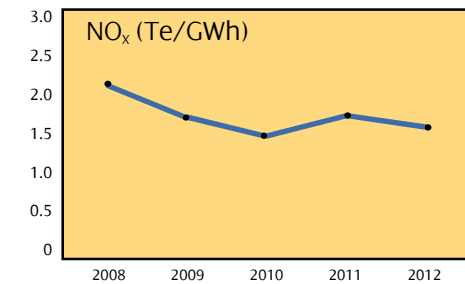
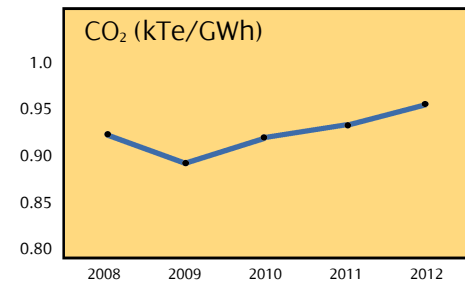
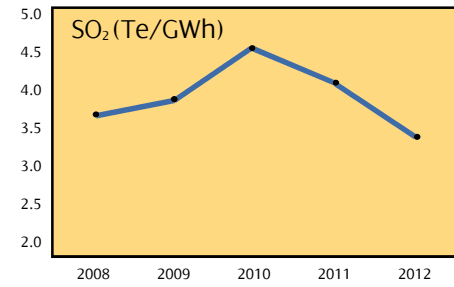
ELECTRICITY AND TOWNSWATER USE

	2012		2012	2011	2010	2009	2008
Electricity Use	599 GWh	GWh/GWh	0.063	0.062	0.057	0.056	0.05
Townswater Use	2.45 Mm ³	m ³ /GWh	258	245	252	252	262
Boreholewater Use	0.43 Mm ³	m ³ /GWh	45.2	37.3	45.1	65.8	76.6

TRANSPORT AND HEATING FUEL

	2012	2011	2010	2009	2008
Unleaded Petrol (l)	87	166	178	113	279
Transport Diesel* (l)	18,382	19,024	21,253	17,484	16,108
Plant Diesel* (l)	716,640	694,531	1,004,527	1,085,385	1,041,181

- The way we present diesel use figures was changed in 2007, to separate transport diesel from fuel consumed by the plant, including its generators and plant vehicles



STACK EMISSIONS

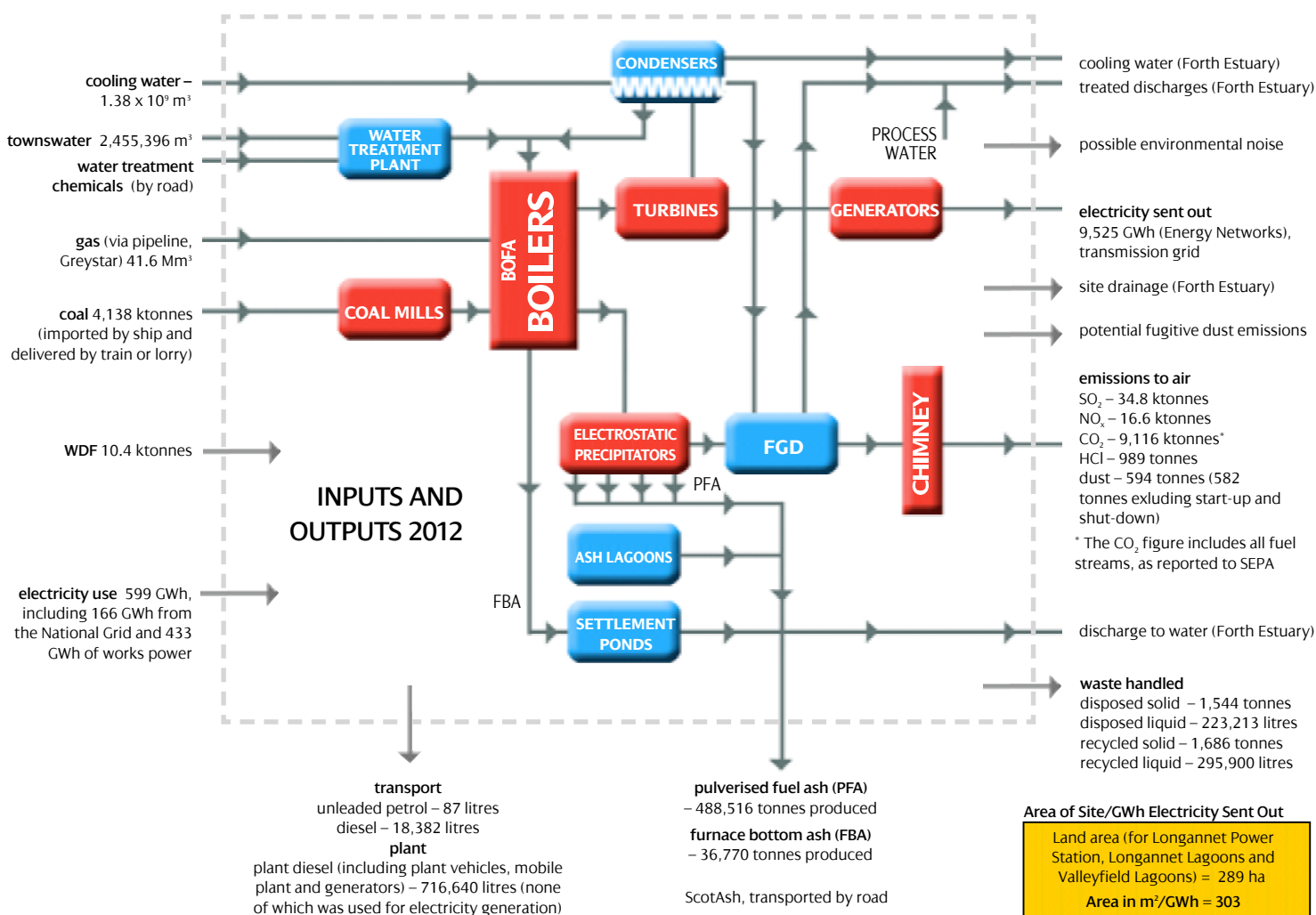
	2012	2012	2011	2010	2009	2008	
SO ₂	34.8 kTe	Te/GWh	3.4	4.1	4.6	3.9	3.7
NO _x	16.6 kTe	Te/GWh	1.65	1.8	1.5	1.8	2.2
CO ₂	9,116 kTe	kTe/GWh	0.9571	0.9357	0.9227	0.8952	0.9252
Hydrogen Chloride	989 Te	Te/GWh	0.104	0.092	0.073	0.054	0.045
Particulates	594 Te	Te/GWh	0.06	0.081	0.074	0.069	0.061

• Figures for Particulates (dust) includes start-up and shut-down operations

EMISSIONS 2012 (TONNES OF EQUIVALENT CO₂)

	TONNES	Global Warming Potential	Tonnes of equivalent CO ₂
N ₂ O	108.64	298	32,274.7
Methane	65.31	25	1,632.8
HFCs	0	0	0
PFCs	0	0	0

• As per JEP Pollution Inventory 2011 Electricity Supply Industry Methodology. Factors as per DEFRA/DECC's 2011 Guidelines



ASH PRODUCED

	2012	2011	2010	2009	2008
Inert PFA (Te)	488,516	422,977	413,295	324,107	269,818
Inert FBA (Te)	36,770	31,838	31,109	24,395	18,235

RECYCLED WASTE AS % OF TOTAL (EXC ASH)

	2012	2011	2010	2009	2008
Percentage	53	49	37	58	–

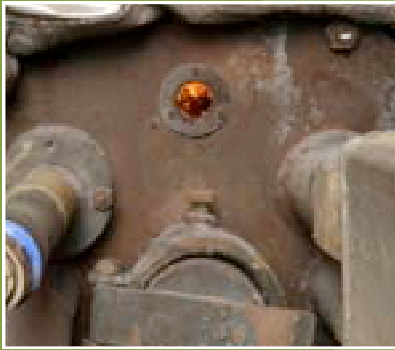
WASTE PRODUCED/RECYCLED

	2012
Disposed solids (te)	1,544
Disposed liquids (l)	223,213
Recycled solids (te)	1,686
Recovered liquids (l)	295,900

- In 2012, 488 ktonnes of Pulverised Fuel Ash (PFA) and 37 ktonnes of Furnace Bottom Ash (FBA) were produced. Some of this ash was sold by ScotAsh for re-use in construction products and the rest was sent by pipeline to our ash storage lagoons.
- The station holds appropriate waste management licences and exemptions. Since 2008, we have reported on recycled materials as a percentage of our overall waste produced. We recycled 53% of our total waste, excluding ash, in 2012.
- Longannet has been reporting our volumes of hazardous and non-hazardous wastes, as required by EMAS, since 2010.

HAZARDOUS WASTE

	2012
Hazardous liquids (l)	299,590
Non-hazardous liquids (l)	219,523
Hazardous solids (Te)	196
Non-hazardous solids (Te)	3,034



The refurbished flame eyes in operation

Improving control of Natural Gas

A project to improve Longannet's control and safety protection systems when using natural gas for combustion support has continued in 2012 to achieve substantial savings in gas use.

In 2011, the station carried out maintenance to upgrade the main gas control valve and improve the reliability of the gas and coal flame eyes that monitor conditions in the boiler and recognise when there is a flame.

This has allowed the plant to operate in 2012 without combustion support gas burners when loads are above 300MW and there is no requirement to change load.

In the first full year of operation in 2012 using the new controls, our gas usage figure has dropped by 73% to 41.6Mm³, from 154Mm³ in 2010 before the new operating procedures, and is less than a fifth of our 2008 gas usage figure (21.5Mm³).

A maintenance plan has been written for the ongoing upkeep of the controls and further optimisation was carried out during the year to fine tune the way we use our gas burners for combustion support.



Gas burners in operation on Unit 4 at start up

▶▶ CONTINUED FROM PAGE 11

from 568 GWh the previous year. The 2012 figure consists of 166 GWh of electricity imported from the National Grid and 433 GWh of works power.

Energy consumption has increased because of the requirement to supply fans associated with BOFA and the larger ID fans and 13 aeration blowers for FGD. As a result, the sent-out capacity of the units will drop from 576 to 562 MW on Units 1, 2 and 3 when FGD is fully commissioned and to 574 MW on Unit 4 (which is only fitted with BOFA).

A number of other projects and improvements were carried out in 2012:

- A long-standing drainage issue at the ash plant roadway has been rectified and a pump that operated to remove the flood water has been removed, resulting in energy savings.
- New energy-efficient lighting has been installed in the main station workshop as part of a major reorganisation of the workshop space during 2012.

Better storage has been provided for equipment used by the Maintenance and Engineering Team and additional office space has been created for supervisors.

Further work will be carried out in 2013 to reorganise other satellite maintenance stores and workshops.

Continual Improvement

Our staff and contractors strive to achieve a continual improvement in the station's efficiency, controllable losses, performance, reliability and compliance.

Controllable losses are the measure of our success in improving combustion efficiency and reducing our raw material consumption. The term describes the amount of deviation from ideal design values for a number of important process measurements, such as temperature, pressure and flow.

In 2012, we achieved our target to reduce controllable losses below 5.5%. Our end-of-year figure of 5.37% was the lowest for at least three years and reflected hard work by station teams and contractors to improve key contributors to controllable losses, such as condenser back pressure and boiler tramp air ingress.

Many improvements that reduce controllable losses are also being driven by Longannet's new maintenance strategy that was launched in 2012. As part of the review, the number of full-time supervisors has been increased to 16 (from six previously).

Each month a list of the top 10 maintenance tasks to rectify performance defects is prepared by staff in the Performance department.

These are tackled on a priority basis by maintenance teams when an appropriate opportunity arises.

In recent years, the main cause of increasing controllable losses was the restricted availability of the station's four cooling water (CW) pumps

due to planned and breakdown outages to repair the pumps' gearboxes.

This resulted in a reduced volume of CW flowing through the condensers, contributing to a drop in back pressure, or vacuum at the discharge of the low pressure steam turbines.

Each gearbox has now been overhauled and, by the end of 2012, the station had three pumps in service while No.2 pump was undergoing commissioning.

Going forward, the station will benefit from four CW pump availability. The renovated pumps improve condenser performance, increasing turbine efficiency and decreasing the likelihood of the station potentially dropping load if a pump failure occurs.

No.2 pump will also benefit from a refurbished intake drum screen that filters out marine debris from the CW before it reaches the pump. Unit 2 drum screen was the last to be refurbished across the four units.

Work is ongoing to optimise combustion performances across Longannet's units and achieve continual improvement.

Considerable work has been done in recent years to minimise air ingress, or tramp air, to the combustion system which is normally run under an overall slight suction of 0.6mbar, ensuring that combustion gases are controlled and do not leak out into the boiler house.

A database has been set up to enable staff to report faults – such as cracked ductwork or holed boiler casing – that may cause air to be sucked into the system.

A pre-outage inspection of Unit 2's boiler in 2012 identified a number of areas of air ingress. These were repaired during the station shutdown and around 50m² of plating on the boiler casing was replaced.

The boiler has shown a 20% reduction in tramp air ingress since its return to service – not only reducing controllable losses but improving combustion performance and giving station operators better control of NO_x.

Savings in energy use are also being realised as the ID fans need to run at a lower intensity to move the combustion gases through the precipitators and out towards the chimney.

The work scope of the Unit 2 2012 outage was the largest at Longannet for several years. Other projects carried out that will improve combustion performance and controllable losses include the replacement of three of the furnace's 32 Low NO_x burners.

The main boiler work, however, involved the replacement of 16 complete superheater pendent elements, each of which weighed three tonnes, and the installation of a new secondary superheater inlet header in the boiler top dead space.

These replacements will improve the reliability of the Unit 2 boiler by reducing the likelihood of boiler tube leaks.

The critical work path for the outage was the replacement of the life-expired HP turbine rotor and left-hand steam chest – both projects will improve the reliability and availability of the unit, along with measures carried out during the

Opportunities to reduce the rate of the Longannet's controllable losses are identified by the members of the Performance Team and discussed each day directly with the Unit Controllers at the station's production meeting.



The new Smit generation transformer arrives at the station and, below left, the old unit is removed

Generation transformer swap over

Unit 2's generation transformer was an original component put in place when Longannet was built nearly 40 years ago.

The 280-tonne unit had reached the end of its operational life and was replaced with a new, more efficient design during Unit 2's outage in 2012.

Management of waste and opportunities for recycling are now considered by project teams during the planning phase of the station's outages. As part of the

transformer replacement, plans were put in place to scrap the transformer on site and recover its valuable components.

Large volumes of copper and steel were recovered for recycling – including a quantity of high-grade steel laminations that will be reprocessed in India and China for reuse in smaller transformers.

Meanwhile, 120,000 litres of oil were drained from the transformer and sent away for renewal.

unit shutdown. Other station-led projects were designed to improve compliance and achieve continual improvement.

- The Furnace Bottom Ash (FBA) settling ponds have been upgraded in 2012 to significantly reduce the likelihood of suspended solids escaping to the Forth Estuary.

High water levels in 2010, combined with periods of heavy rainfall, caused the ponds to flood resulting in two suspended solid environmental limit breaches.

Remedial work was carried out at the time but, in the current reporting period, the ponds were dredged and new weirs were created between the ponds. This has resulted in a slower flow of water and increased settling time for solids before reaching the water discharge point to the Forth.

- Collapsible bunds are now provided for use with portable oil purifiers after a small number of oil spills associated with the equipment. The new bunds will prevent any oil leak from reaching basement drains.

In addition, the Environment and Engineering teams are investigating alternative hose material for use with the portable purifiers following an incident where a supplied hose wasn't designed to carry warm oil and degraded, becoming

brittle over time, causing a small oil leak.

- Longannet significantly reduced the quantities of hydrazine required to be stored on site during 2012.

Hydrazine is a toxic and unstable chemical however it is an effective oxygen scavenger and



Inspection of the hydrazine dosing plant

is injected into in the condensate water to control concentrations of dissolved oxygen.

The hydrazine reacts with oxygen to produce ammonia, which is alkaline and helps to inhibit rust corrosion in the station's boiler water system. In 2012, a new ammonia injection plant came into service that has reduced the

hydrazine concentrations required to ensure protection of the plant.

As a result, hydrazine usage fell by 31% in 2012, from 213 tonnes in 2011 to a new figure of 147 tonnes. There has been a corresponding increase in ammonia usage (up from 16 tonnes in 2011, to 27 tonnes in 2012).

Planned outages in 2013

Detailed planning for a major 16-week outage on Unit 3 began during the current reporting period.

Its scope of work is similar to the overhaul completed successfully on Unit 2 in 2012, but will also include the installation of new NO_x abatement technologies to be trialled at Longannet.

Minimising tramp air ingress on the Unit 3's boiler will be a key area of focus, with plans to repair 500m² of boiler skin casing and install a high temperature expansion joint to improve the vacuum seal at the ash hearth, as part of a complete replacement of the existing ash hearth structure. A similar joint was installed on Unit 4 in 2009 and has delivered high levels of performance in minimising air ingress.

Other combustion improvements will include

fitting five new gas/coal burners and repairing others, and the replacing the boiler's sootblower pipework. Replacement of part of the High Pressure Turbine steam chest and the generator transformer are also planned during the Unit 3 outage.

A six-week outage is planned on Unit 4 to complete the replacement of a number of secondary superheater outlet transition welds that were identified as defective during 2012.

Water Abstractions/Discharges

Water is an essential part of Longannet's operations but we aim to use water efficiently without causing harm to the environment.

Townswater for steam generation is stored in Longannet's twin million gallon tanks before being purified using a strictly-controlled amount of chemicals.

Steam leaving the turbines is converted back to water in the condensers, before being recirculated back to the boilers. Controlled amounts of chemicals are added to the recirculated condensate water to control its pH and minimise any oxygen in the water to protect some types of steel in parts of the boiler.

Seawater extracted from the Forth Estuary is used for cooling the condensers and to absorb SO₂ in the FGD absorber towers.

Again strictly-controlled doses of chemicals are added to protect the condenser tubes and prevent the growth of marine organisms in the CW systems. The seawater is returned to the Forth after use in line with discharge limits in the station's PPC Permit.

The Water Framework Directive requires all European inland and coastal waters to reach "good" ecological status by 2015. The Directive requires Longannet to be registered for abstracting water, including cooling water.

Longannet has been measuring and collating data on abstractions for future reporting since January 2008. Meanwhile, in line with the resource use requirements of the site's PPC permit, Longannet seeks to reduce townswater consumption where possible.

Longannet's townswater usage increased slightly during 2012 – from 249m³/GWh in 2011 to 258m³/GWh – and is the most per GWh since 2008 (262m³/GWh) although figures have been relatively stable in recent years.

The increase was despite greater availability of borehole water, from underground aquifers on the station's land, during the reporting period.

In 2011, the borehole's pump control system failed due to pump equipment becoming fouled with deposits of iron oxide and the station was without borehole water from mid August until the end of the year.

Borehole water is used for general duties, such as washing down, dust suppression and in the fire hydrant system. The overhauled pump operated effectively throughout 2012, resulting in extracted borehole water volumes increasing to 430,199m³, from 340,658m³ in 2011.

Water leak repairs are a recurring theme in the top 10-list of monthly maintenance tasks, helping reduce wastage and controllable losses.

Issues such as leaking and passing valves, and



The borehole water extraction point near Longannet – we increased our use of aquifer water in 2012

wastage from pipework and drains, are now being prioritised in maintenance plans and attacked as resources, spares and opportunity become available.

The Unit 2 outage scope of work also included a raft of valve replacement and repair work in and around the boiler. Outage work to replace the first stage radiant platen elements on Unit 2 and repair the primary reheater on Unit 4 helped reduce the potential for boiler tube leaks.

Although primarily an availability issue, tube leaks can result in water wastage – as the boiler has to be drained when a tube leak occurs.

Meters have been fitted throughout the station's water systems to provide data on water use and two additional meters were fitted/wired up in 2012. Data from the meters will feed in to the water monitoring system to further improve information about water consumption and loss.

Longannet's Cold Weather Action Plan was implemented again in the winter months, including measures to improve the protection of the station's water systems from frost damage.

Waste Management

Volumes of waste solids and liquids produced increased significantly in 2012 – largely as a result of the major outage on Unit 2.

The extensive programme of work included the one-off disposal of a number of large items of plant equipment, including the 280-tonne Unit 2 generation transformer.

Meanwhile up to 500 extra contractors were on site for several months, with an associated increase in mixed municipal waste and sewage sludge. Nevertheless, Longannet's environment team and project teams continued to identify opportunities to reuse, recover and recycle.

In 2012, 53% of the total waste produced on site (excluding ash) was recovered for reuse or recycling – the highest figure since 2009 (58%).

The volume of solid non-hazardous waste increased from 2,692 tonnes to 3,034 tonnes in the reporting period – a rise of 13% – of which 56% was recycled. This figure includes material such as cardboard, paper, metals and plastics that are routinely recycled at waste segregation stations located throughout the plant.

Waste handling and the quality of segregation is scrutinised by senior station management on their weekly housekeeping tour of the plant and

Longannet's water abstraction licenses and registrations are issued by SEPA under the Controlled Activities Regulations (CAR). Discharge consents are also governed by the CAR regime or under the PPC Permit as appropriate.



regular spot checks. Any issues are reported at our Health, Safety and Environment meetings for follow-up action by team leaders.

At the end of 2012 a review of the satellite waste segregation stations has been started to identify what can be done to improve waste segregation "at source" by staff and contractors – i.e. put the right waste in the right bin.

More than 1,300 tonnes of metals and steel were recovered for recycling, a large proportion of which was associated with the Unit 2 outage and the smaller Unit 4 outage in 2012.

There was also a significant 41% increase in the amount of hazardous liquid waste, mostly oil, arising from station activities – up from 175,480 litres in 2011 to a new figure of 299,590 litres. The vast majority of hazardous liquid is oil from equipment – including 120,000 litres recovered from Unit 2 generation transformer that was scrapped in 2012.

We achieved 100% reuse and recovery of the waste oil. Water and other contaminants are laundered by a specialist contractor from Longannet's bulk turbine lubricating oil which is then returned for reuse by the station, while general waste oil is dewatered and cleaned for reuse as a low grade fuel. In the past three years, half a million litres of waste oil have been recovered at Longannet for reuse.

The other waste to show a large increase was

non-hazardous liquids – up from 119,242 litres in 2011 to 219,523 in 2012.

The 46% rise is related to the increase in septic tank sludge arising from the temporary increase in station population during the unit outages.

Hazardous solid waste, such as oil absorbent and insulating material, showed a slight decrease during the year – from 231 tonnes in 2011 to 196 tonnes in 2012. Of this total, 0.1% was recycled – mostly fluorescent tubes.

Despite the large increase in solid waste arising in 2012, there was only a slight increase in the overall amount disposed of to landfill – from 1,519 tonnes in 2011 to 1,544 tonnes in the current reporting period.

Wherever possible, the station's environment team seek to reduce the amount of waste produced, and promote the reuse and recycling of materials.

In 2012, Longannet sent 351 tonnes of marine waste collected at the CW drum screen trash baskets to an organic waste recycling plant Cumbernauld for composting with anaerobic digestion.

The resulting methane gas is sold to generate power while a nutrient-rich biofertiliser by-product is sold to local farmers. The plant has capacity to provide power for around 2,000 homes.

Twelve Dyson hand driers were installed in the station toilets during the year to reduce the volume of paper towel waste. The new driers are also energy efficient, contributing to a reduction in works power use.

Meanwhile, Longannet's FGD project team are exploring opportunities for reuse and recycling as the construction phase starts to wind down.

At its peak, the project employed up to 900 staff and contractors who were housed in a purpose-built 'cabin village' accommodation area on site.

As part of the FGD project, new roads and hardstanding areas were created and large volume of equipment were brought on to site. By the end of 2012, only around 140 FGD contractors remained – all of whom should have left by the end of next year.

Much of the surplus office equipment – computers and furniture – has already been sent off site for reuse.

A discussion began in 2012 about the future of the cabin village. It is due to be demolished at the end of the FGD contract but Longannet is now looking at potential of retaining the buildings as accommodation for future outage teams.

In addition, several hundred tonnes of 'type one' compactable gravel material, used as road surface protection and handstanding during the FGD works, will be retained for station use,

offering a more environmentally and commercially sensible option to disposal at the end of the contract.

Resource recovery

The largest volume of material produced at Longannet is power station ash that is created during the combustion process.

Pulverised Fuel Ash (PFA), or fly ash, is the fine powder that is removed from the combustion flue gases by electrostatic precipitators. Furnace Bottom Ash (FBA), which is produced in much smaller quantities, has a coarser texture and is collected from the base of the furnace. ScotAsh Ltd, a joint venture

between ScottishPower and Lafarge Tarmac, processes Longannet's ash for reuse by the construction industry and manufactures specialist cements, grouts and waste stabilisation products.

PFA not sold by ScotAsh is mixed with water and pumped to Valleyfield Ash Storage Lagoons, 6km east of the station, for disposal to landfill. ScottishPower pays Landfill Tax in respect of ash sent to the lagoons.

There was a breach of suspended solid discharge to water emission limits at Valleyfield Lagoons in December 2012, arising from issues with the cenosphere collection pond and final settling pond.

Cenospheres are lightweight ash beads formed in the high temperatures in the station's furnaces. The hollow beads float on water and the collection pond is designed to capture the material, which is then recovered and sold by ScotAsh for specialist applications in paint and heat-resistant coatings.

During freezing conditions, ice had formed on the surface of the collection pond and inhibited the settling of suspended solids.

When the cenospheres were being skimmed off the collection pond, solids were disturbed and made their way to the final collection pond and then into the Forth Estuary.

This resulted in twice the permitted level of suspended solids being found during a routine sample at the water discharge point – although any environmental impact would have been negligible.

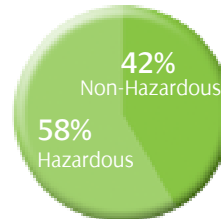
An investigation was carried out and an improvement plan put in place for the collection ponds. They were drained and excavated to restore their volume and improve the settling process. It is anticipated the ponds will return to service by the end of January 2013.

Meanwhile, construction of the new 900,000-tonnes capacity Lagoon No.22 at Valleyfield was completed in 2011 and the facility was fully commissioned in 2012.

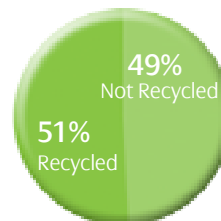
Waste Solids



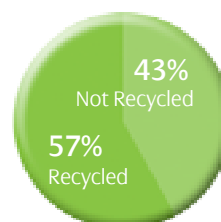
Waste liquids



Recycled solids



Hazardous Liquids



Noise

Longannet experienced various noise issues in 2012 that resulted in two reportable incidents and six justified community complaints.

The most significant noise incidents, which affected the station's CAS rating, both occurred in July. Unit 4's Reheater safety valve R57 lifted as the unit increased load following its return to service after an outage, resulting in a loud and sustained noise that was heard over a wide area.

Due to the seriousness of the incident and the number of community complaints/enquiries that arose, our regulators SEPA deemed it as a reportable incident.

Our investigation determined the lift was caused by flakes of magnetite, an oxide of iron, blocking the fine holes in the IP turbine steam inlet strainers. This restricted steam flow to the unit's IP turbine causing the pressure in the Reheater section of the boiler to rise.

It was believed water had entered the steam pipework during leak testing carried out at the beginning of the outage and this had caused the pipe's magnetite coating to flake off.

This was the first time such an incident had been recorded at the station and a number of improvements were implemented. These included a review of leak test procedures and the installation of a pressure signal alarm to give operators an early warning of issues with the reheat steam pressure.

In addition, temperature monitoring will be fitted to the Unit 4 Superheater and Reheater safety valves during 2013 to aid quick identification of valve lifts. This monitoring is already installed on the other three Units.

The second loud noise incident in July was a result of a safety valve lift associated with Unit 3's sootblower systems. We identified that a control valve had failed to throttle as the steam supply increased in pressure – the safety valve was subsequently refurbished.

Other community noise complaints in 2012 related to what could be described as nuisance noise emanating from the station.

As part of the station's new maintenance programme, a noise strategy is being implemented and maintenance teams are planning a systematic condition-based assessment of valves and silencers.

During the Unit 2 outage, the station's original steam drain valves SD4-8 were replaced – when worn, these can cause loud hissing when they are passing steam – and a set of new safety valve silencers was fitted to the Superheater Safety Valves on the boiler roof.

Looking ahead, steam leg drain valves and flange warming steam supply valves will be replaced or overhauled on Unit 3 – again these are a potential source of nuisance noise. Opportunities will also be taken to carry out remedial or interim repairs to steam leg drain valves on Units 1 and 4 and overhaul the flange warming steam supply valves on Unit 2.

Maintenance staff will also install additional noise insulation in the housing for the gear-driven air blowers that help oxygenate the FGD discharge water at the outer flume seal pit.



New safety valve silencers have been installed high up on the boiler roof to help control process noise

Emergency/Abnormal Conditions

Our procedures to manage abnormal or emergency conditions are audited regularly via the station's EMS and audits conducted by Generation's Environment Team.

Senior management also organise regular emergency exercises to test the response of station teams. In May 2012, a full site evacuation was organised as part of a business continuity exercise involving staff and the emergency services. The scenario examined the station's response if a bomb was found on site.

In autumn 2012, Longannet's chemical spill procedure was revised and tested during a

exercise relating to the station's arrangements for handling delivery of bulk chemicals to site. Learning points from both emergency exercises have helped to improve the station's procedures.

Meanwhile, a fire risk evaluation of all ScottishPower's generating sites has identified a number of action points for Longannet.

These are aimed at ensuring the integrity of the fire prevention and detection system on site and ensuring the availability and efficient operation of the station's fire-fighting system. A station-led team has implemented measures, including improvements to diesel tank level monitoring and gas bottle storage area.

A full inspection of the condition of more than 100 storage tanks at the station will be carried out in 2013. The tanks come in all shapes and sizes and contain substances from corrosive acids to oils and water.

The fabric of the tanks will be examined and a number of structures will be repaired and redundant tanks removed, including a waste oil tank associated with the station's main oil interceptor at the seal pits at Longannet's flume.

The tank has reached the end of its operational life and will be replaced by a new double-skinned waste oil recovery tank in June 2013, improving environmental protection.

Longannet's Cold Weather Action Plan was again deployed in the winter months, following the severe disruption caused by extreme cold in 2010-11. This includes ensuring the station has sufficient resources for four-weeks' baseload operations to ensure continuity of output.

The station has invested in new equipment to keep its environs clear of snow and ice, including new tractor-mounted salt spreaders.

Contaminated Land

Prevention of contamination and management of contaminated land is built in to our EMS.

We maintain up-to-date registers of our landholdings in which each site is allocated a risk rating. This helps to prioritise investment in measures to minimise contamination risks.

Under the IPPC Directive, we had to conduct contaminated land surveys at Longannet as part of the process of applying for PPC permits and to hold regular ongoing reviews.

During 2012 we contributed to a business review of the process for identifying and monitoring contaminated land. One of the outputs has been to ensure that copies of all the historic reports are available to all staff via our document management system, Documentum.

A procedure for carrying out site excavations has also been reviewed to ensure it contains appropriate reference to checking contaminated land records before commencing work.

Work was also carried out to survey the condition of boreholes at Longannet, Valleyfield and the site of the former Kincardine Power Station. There are more than 100 boreholes on these landholdings that are used to monitor for groundwater, leachates and contaminants.

The monitoring, carried out by a hydrologist and the Environment Team, catalogued and photographed boreholes and a schedule was drawn up for their repair and maintenance.

A new noise monitoring point is proposed at the water abstraction boreholes north of the station. We have also upgraded our on-line noise monitors to alert operations staff when noise levels from the station are high.

Targets & Achievements: Longannet operates an improvement plan that sets out station targets and records our progress

Longannet has a rolling programme of environmental objectives and targets.

The Environmental Plan featured in this report covers the period 2012-2016 and aims to deliver continual improvement in key areas such as emissions, water and energy use.

This section covers our achievements in 2012 and outlines future targets, which are covered in our new Environmental Plan for 2013-2022.

Targets/Outcomes in 2012

ENVIRONMENTAL COMPLIANCE

Target: We aim to minimise notifiable incidents to SEPA and receive zero regulatory actions

Outcome: There were five notifiable incidents – see panel (right) and Key Issues text. There were no incidents classified as catastrophic or major and no new enforcement notices, prosecutions, fines or formal actions by SEPA.

Target: Achieve CAS performance ratings of 'Good' for the power station and an 'Excellent' assessment of our performance under CAS for the power station and Valleyfield respectively and incorporate Longannet Lagoons into CAS for the first time.

Outcome: Achieved 'Good' rating for Longannet Power Station. The rating for Valleyfield Lagoons dropped from 'Excellent' in 2011 to 'Good' in 2012. Longannet Lagoons achieved 'Excellent' in its first assessment.

PPC PERMIT

Target: Comply with all reporting, notification and upgrade installation dates.

Outcome: All reporting and notification requirements met, or an extension applied for and agreed with SEPA as necessary. Monthly updates sent to SEPA on FGD progress. Data was submitted on schedule to comply with Scottish Pollutant Release Inventory requirements.

Target: Develop a decommissioning plan for the station.

Outcome: Target met. Plan will be reviewed and revised every two years.

Target: Cease co-firing of WDF

Outcome: Target met in on 30th April 2012. SEPA Enforcement Notice lifted now formally withdrawn.

EMISSIONS

Target: Measure SO₂, NO_x and dust emissions using CEMS to ensure compliance with the UK's NERP bubble limits under the LCPD.

Outcome: Target met and reported emissions verified by SEPA.

Target: Submit EU ETS Phase II monitoring and reporting plan on schedule for independent verification.

Outcome: Target met.

Reportable incidents in 2012

There were five incidents in 2012 – one more than in 2011 – and the station missed its target of reducing reportable incidents to zero.

Two environmental incidents related to loud noise emissions from lifting safety valves on the main plant.

There was a minor SO₂ emissions limit breach on Units 1 and 2 which were above the target of 400mg/m³ as set by PPC Permit variation VN04 (which extended the FGD commissioning period).

There was also a minor oil release from emission point W10 that was classified as an Environmental Event, although it did not breaching our discharge limit.

The final incident was an environmental limit breach involving a release of suspended solids to the estuary at Valleyfield Lagoons.

This is the first reportable incident at the site for at least four years since the start of SEPA's compliance assessment scheme. These incidents are discussed in the Key Issues section of the report.

Target: Complete commissioning of FGD absorbers on Units 1 and 2 and complete reconstruction of Unit 3 absorber.

Outcome: Unit 1 commissioned. Units 2 and 3 scheduled for completion in March and December 2013, respectively. Extension to commissioning dates for Units 2 and 3 agreed by SEPA following submission of a PPC Permit Variation Application.

Target: Report on FGD the post commissioning performance of Unit 1 FGD to SEPA.

Outcome: Report finalised internally. To be submitted to SEPA in early 2013.

Target: Minimise emissions to air.

Outcome: Tramp air ingress targeted during outage periods to assist combustion efficiency and reduce NO_x production

Target: Minimise emissions to water.

Outcome: Refurbishment of transition weirs between the FBA settlement ponds to reduce suspended solids level, completed in October.

RESOURCE USE and WASTES

Target: Review resource, water and energy use to identify further efficiency measures and minimise waste.

Outcome: New water meters installed. Water and energy monitoring continued to identify potential reductions. We continue to operate a waste segregation system and work with site personnel and contractors to maximise re-use and recycling of wastes.

ENVIRONMENTAL PROTECTION

Target: Continue to deliver Biodiversity Action Plan targets and actions

Outcome: 80% of actions delivered to September 2012, following change to the ranger service instigated by Fife Coast & Countryside ServiceTrust.

Target: Progress with design of the identified Best Available Technology for fish return.

Outcome: Dialogue with SEPA is ongoing, dates set in PPC Permit VN04 for carrying out further investigation and design work were revised by agreement with SEPA from 2012 to 2013 when Permit Variation VN05 was issued.

STAKEHOLDERS

Target: Minimise community complaints (6 justified).

Outcome: Seven justified complaints received – six relating to noise, one relating to dust.

ENVIRONMENTAL MANAGEMENT SYSTEM

Target: Maintain certification to ISO 14001 and EMAS.

Outcome: The station successfully underwent a full ISO14001: 2004 recertification audit at the beginning of 2012, providing certification until 2015. An external audit of Longannet's Integrated Management System will take place in March/April 2013.

Targets for 2013

ENVIRONMENTAL COMPLIANCE

Target: Achieve 'Good' rating or higher in CAS assessment for Valleyfield Lagoons and Longannet Power Station in 2013 assessment.

ENVIRONMENTAL PROTECTION

Target: Install NO_x reduction technology, including improved combustion gas sample monitoring across all four units and trial pulverised fuel control improvements on Unit 3.

Target: Review procedures for managing oil and chemicals, including deliveries, to prevent the risk of pollution.

USE OF RESOURCES

Target: Develop Resource Efficiency Action Plan for the station and develop electricity and water usage reduction measures for the Longannet administration building.

STAKEHOLDERS

Target: Achieve six or fewer community complaints.

Target: Identify alternative method for providing ranger service for Longannet and Valleyfield.

Social and Community: How Longannet engages with our local community and stakeholders, and our workforce's charity giving

Longannet Power Station is committed to engaging with local communities and other interested parties and being a 'Good and Trusted Neighbour'.

The station continues to operate at the very heart of the West Fife community, providing jobs for more than 250 direct employees and a further 150 contracting colleagues.

There are also direct benefits from the influx of contractors to the station, for projects such as the 2012 Unit 2 outage. Around 500 additional staff were on site during the year, many of whom stay in West Fife hotels and guest houses and support local shops and restaurants.

Station management is represented at the regular meetings of Kincardine, Culross and Low Valleyfield Community Councils and quarterly Valleyfield Ash Liaison Committee meetings to respond to any environmental concerns or requests for information.

We are also represented on the management group of the Forth Estuary Forum which brings together businesses and organisations to help coordinate the sustainable use of the Forth's coastline and marine areas.

In recent years, we have strengthened our association with the emergency services both at Longannet and on the site of the former Kincardine Power Station.

We have opened up our facilities and landholdings for special training initiatives that will help prepare emergency workers to save lives, fight crime and protect property.

In 2012, the station continued its partnership with the Scottish Police College at Tulliallan. The extensive site at Kincardine is leased to the college and used for training by police officers from forces throughout Scotland.

Meanwhile, a state-of-the-art firefighting centre is operated by Central Scotland Fire & Rescue Service at the Kincardine site.

We have also worked closely with Central Scotland Police, Fife Constabulary and the Scottish Ambulance Service's Special Operations Response Team, and given them access to our facilities. ScottishPower is also providing a free meeting place, at Valleyfield Lagoons Site Office,



Pictured at the opening of the new pavilion, from left, Alan Kemp, Willie Ferguson and Ron Hunter

Community complaints in 2012

There was an increase in community complaints – up from three in 2011, to seven in the current reporting period.

We missed our target of achieving six or fewer complaints during the year.

Six complaints were related to nuisance noise and all occurred in the second half of the year.

Remedial action and repairs were carried out at the earliest opportunity and each complaint was investigated by station management, who ensured the complainant was kept informed about the action being taken. A schedule of work, detailed on page 18, is designed to improve our noise controls.

The other complaint related to nuisance dust from lorries moving on the station's coal stock during a period of dry, windy weather.

Although the lorry roadway had been sprayed with water to dampen down dust, the surface had dried more quickly than expected and fugitive dust escaped. The coal plant operators have been reminded about the need for vigilance in dry weather and when vehicles are moving on the stockpile.

for public engagement meetings held every two months when Fife Police meet to address the concerns of members of the community.

A long-running joint initiative to sponsor a community police vehicle came to an end in 2012. The station and its key contractors have sponsored a community police vehicle since 2004 to provide transport for community police activities in the West Fife villages.

An agreement in principle was reached in 2012 to continue the sponsorship when the current car's lease expired. However, Fife Police did not proceed with the initiative due to the uncertainty over proposals to create a new single national police force.

In recent years, ScottishPower has targeted support for community facilities in Kincardine through the Landfill Tax Scheme.

The station pays landfill tax in relation to ash disposal at Valleyfield and Longannet Lagoons. Payments have been made in the past to help provide a new all-weather sports pitch, a multi-purpose arena, for sports such as basketball and five-a-side



football, a children's play area and skateboard park.

In 2012, the third phase of the programme was completed with the opening of a the Stewart Rankine Community Pavilion at the site off Feregait, near Tulliallan Primary School.

It brings to around £250,000 the sum invested by ScottishPower since the start of the programme, through Landfill Tax payments.

Station staff Alan Kemp and Willie Ferguson, the Fife Council representative for the area, and ScottishPower Director Ron Hunter, were present at the opening of the new facility.

It will serve four local football teams, provide a meeting place for Kincardine and Tulliallan groups and serve as a base for community events, such as the annual gala.

The pavilion, which cost £300,000, was a much-needed resource – the former building was dilapidated and had no hot water for footballers to shower after their match.

Councillor Ferguson said: "Without the money from ScottishPower, none of these facilities would have been possible.

ScottishPower works in partnership with Cancer Research UK and Longannet staff and contractors raised almost £2,000 for the charity in 2012 through raffles and events. A donation of £276 was also made to Sports Relief.

Biodiversity & Conservation: Our work to benefit habitats and wildlife on our sites

Longannet Power Station and our ash disposal site at Valleyfield Lagoons extend over 289 hectares and feature a wide variety of habitats used by wildlife.

Our landholdings include our operational areas – the generating station, coal plant, car parks and hardstanding, offices, workshops and active lagoons.

But there are extensive areas of semi-natural grassland, plantations of native trees, pockets of scrubland and wetlands.

At Valleyfield, 6km east of Longannet, this mosaic of habitats has led to the site being designated part of the Firth of Forth Site of Special Scientific Interest (SSSI) in 1991 and included in the 683-hectares Torry Bay Local Nature Reserve (LNR) designation in 1996.

The Valleyfield site is also an important element in the make-up of the Inner Forth Estuary, which is internationally recognised for its value to wildlife, especially birds.

The area is covered by natural history designations including the Firth of Forth Ramsar site and Special Protection Area.

To encourage biodiversity on our site, the power station maintains a Biodiversity Action Plan (BAP) which was launched in 2004 and updated in 2009.

For many years, we have co-sponsored a Countryside Ranger to manage Torry Bay LNR and to help implement the station's BAP along with the Environment Team.

This arrangement came to an end in September 2012, at the instigation of the Fife Coast and Countryside Trust who redeployed the Ranger to other duties. As a consequence, Longannet is now seeking an alternative solution to delivering the actions within its BAP.

A key focus of the BAP in 2012 was the continuation of seed trials using Furnace Bottom Ash as a growing medium at Lagoon No.5 at Valleyfield.

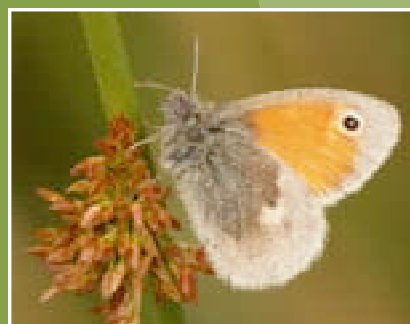
In October 2011, 12 x 25m² plots were planted with grass seeds – a mix of native and cultivated species to determine which grew best in the ash.

The trial was assessed in spring/summer 2012, and it was found to have been successful. This means FBA could be usefully recycled as a capping material at the site, promoting re-use of waste and offsetting more valuable aggregates, such as colliery shale, which has been used for capping in the past.

The FBA was subsequently used for growing annual flowering plants, such as marigolds, with similar success.



Ghost Moth, this is a female, was new for site



Small Heath is a UK BAP butterfly species

Meanwhile, monitoring of Valleyfield and Longannet's wildlife continued in the first nine months of the year, with the ranger joined by a botanist and other naturalists.

Up to nine species of birds listed on the UK Biodiversity Action Plan (UK BAP) have been recorded nesting at ScottishPower's sites: Skylark, House Sparrow, Common Linnet, Reed Bunting, Grey Partridge, Lapwing, Song Thrush, Grasshopper Warbler and Starling.

A nestbox scheme is operated for small birds at both Longannet and Valleyfield, while artificial nestboxes have been put in place on islands at Valleyfield for ducks.

One new species of bird was seen during the year – a Pomarine Skua.

Monitoring continued for bumblebees and butterflies – Small Heath, a UK BAP species, was added to the Valleyfield list for the first time in 2012. Another species, the Comma was also seen for the first time – this species is rapidly expanding its range north into Scotland

A moth enthusiast also carried out a series of 'light trapping' sessions – with several new species found including the UK BAP Ghost Moth, Scalloped Hazel, Old Lady, Marbled Minor, Lime-speck Pug, Willow Ermine, Small Magpie, Ingrailed Clay, the Flame and Setaceous Hebrew Character.

In addition, a new mammal was found for Valleyfield – the Daubenton Bat.



The new pavilion was supported by ScottishPower and Fife Council

"The old pavilion did not do much to enhance the reputation of the village. Now visiting teams and referees praise it as a superb facility – better than some senior league teams can offer.

"We have put a management agreement in place to maintain the pavilion going forward. It is a real asset to the community."

The station continues to support community initiatives with donations at the station manager's discretion. We continued our sponsorship of the children's races at Kincardine Gala Day in 2012. A payment was also made to support the planting of flowers and bulbs in Low Valleyfield as part of their Village in Bloom submission. The community won a Silver Award in the contest.

Longannet also supported the Culross Festival in 2012 – the 20th year of the annual celebration of arts and music in the village.

Longannet Power Station's Visitor Centre continues to welcome organised parties to find out more about the station's activities.

In 2012, more than 500 adults and children took part in station visits, with a high proportion from schools, colleges and universities.

These included the Universities of St Andrews and Stirling, and Wellington, Falkland House, Kilgraston and Queen Anne schools.



Scalloped Hazel moth

Glossary of terms: A quick guide to some of the abbreviations and technical terminology used in this year's EMAS Statement

BAP	Biodiversity Action Plan
biomass	biological material, such as wood, agricultural crops and other plant substances, that can be used as a source of fuel
BETTA	British Electricity Transmission and Trading Arrangements. GB-wide electricity market arrangements launched in April 2005
BOFA	Boosted Over Fire Air: Technique used to reduce emissions of oxides of nitrogen during the combustion process.
CAR	Controlled Activities Regulations
CAS	Compliance Assessment Scheme
CEMS	Continuous Emissions Monitoring System
CFD	Computational Fluid Dynamics
CO₂	Carbon dioxide. A greenhouse gas associated with climate change
CW	Circulating, or cooling water: Longannet extracts significant amounts of riverwater from the Forth Estuary for its cooling processes
EFOR	Effective Forced Outage Rate
EMAS	Eco-Management and Audit Scheme
EMS	Environmental Management System
EU ETS	European Union Emissions Trading Scheme
FBA	Furnace Bottom Ash: A residue generated by coal-fired power stations, such as Longannet
FEED	Front End Engineering Design
FGD	Flue Gas Desulphurisation: Process used to reduce emissions of sulphur dioxide from fossil-fuel power generation
GWh	Gigawatt hour, 10 ⁹ watt hours. Unit of power
HCl	Hydrogen Chloride
IED	Industrial Emissions Directive, which will replace the Large Combustion Plants Directive (LCPD) and other legislation and will tighten considerably emission limit values for NO _x , SO ₂ and dust
IPC	Integrated Pollution Control. A UK regulatory system of control over industrial emissions which reflects the interdependence of the environmental media (water, atmosphere and land) by considering them together and issuing a single authorisation
IPPC	European Commission Directive on Integrated Pollution Prevention and Control. This replaced IPC and Waste Management licences at Longannet Power Station and Valleyfield Lagoons
ISO 14001	International standard for EMS
kg/s	kilograms per second
kTonnes	kTe. kilo tonnes. 1,000 Tonnes
KPI	Key Performance Indicator
kWh	Kilowatt hour: 10 ³ watt hours. Unit of power
LCPD	Large Combustion Plant Directive: Directive 2001/80/EC of the European Parliament and the Council on the limitation of emissions of certain pollutants into the air from large combustion plant
LNR	Local Nature Reserve
Load Factor	The amount of electricity produced by a power station in relation to its capacity
Low NO_x burners	Equipment to reduce emissions of oxides of



Two new salt spreaders purchased as part of our Cold Weather Action Plan

	nitrogen from coal-fired stations
Mm³	Millions of cubic metres
MTU	Mobile Test Unit
MW	MegaWatt. One million Watts
NO_x	Oxides of nitrogen, which contribute to acid rain causing damage to vulnerable freshwater systems, forestry etc; also leads to poor air quality
OPRA	Operator and Pollution Risk Appraisal, which is carried out by SEPA
PFA	Pulverised Fuel Ash. A by-product generated by coal-fired stations
pH	Measure of acidity/alkalinity
Ramsar	The Convention of Wetlands is an inter governmental treaty that provides a framework for national action and international co-operation for the conservation and wise use of wetlands and their resources
ROCs	Renewable Obligation Certificates, that are awarded under the Renewables Obligation to energy generators for each unit of electricity that is generated from a renewable source
ROFA	Rotating Opposed Fire Air
RSPB	Royal Society for the Protection of Birds
SEPA	Scottish Environment Protection Agency, the environmental regulatory authority in Scotland
SCR	Selective Catalytic Reduction: a method of NO _x abatement, currently being considered by Longannet, to reduce emissions by up to 90%
SNCR	Selective Non Catalytic Reduction
SSSI	Site of Special Scientific Interest
SO₂	Sulphur dioxide, which contributes to acid rain and can affect local air quality
Two shifting	A flexible system of plant operation whereby units start up when market prices are advantageous and shut down when they are not
WDF	Waste Derived Fuel
WID	Waste Incineration Directive

Certificate of Registration



**Scottish Power PLC
Longannet Power Station
Kincardine-on-Forth
Clackmannanshire**

Site activities, including Valleyfield Ash Lagoons, associated with the generation of electricity by the combustion of fossil fuel and waste derived fuel in accordance with the publicly available environmental policy.

This organisation, having committed to legal compliance and continual improvement in environmental performance, having implemented an environmental management system and having published an environmental statement in accordance with the requirements of EU Regulation 1221/2009, is registered under the Eco-Management and Audit Scheme and is entitled to use the EMAS logo in accordance with the Regulation.

**VERIFIED
ENVIRONMENTAL
MANAGEMENT**

REG. NO. UK-000079

This certificate is valid until 30th April 2014

A handwritten signature in black ink, appearing to be 'USA', is written over a faint circular stamp.

*Signed on behalf of the EMAS
Competent Body on date of registration*



ScottishPower is part of the IBERDROLA Group, one of the four largest energy companies in the world by market capitalisation.

ScottishPower Generation Holdings Ltd operates ScottishPower's diverse generation portfolio, which includes coal, gas and hydro power stations.

For more information, visit the Generation business's website: www.spenergywholesale.com

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