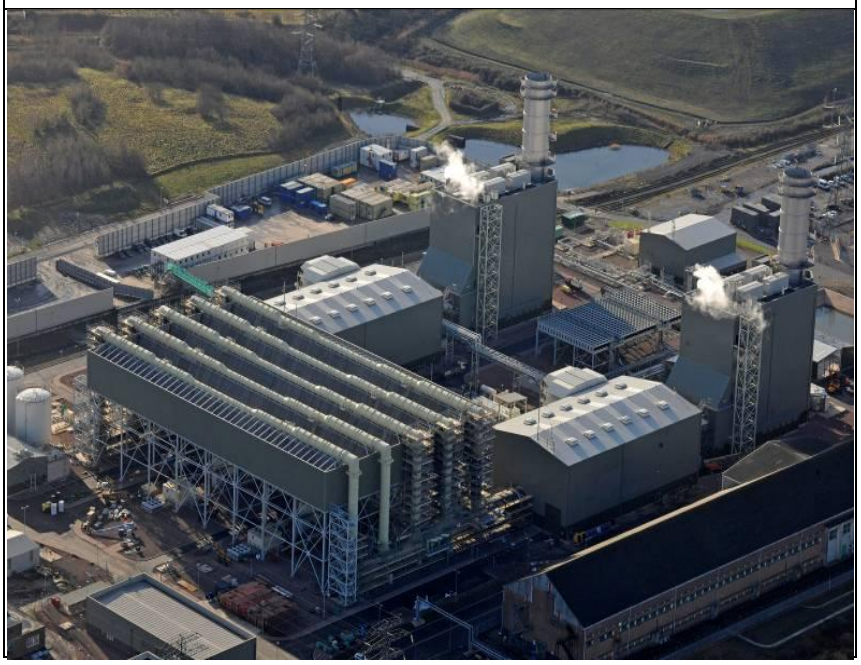
# SEVERN POWER STATION ENVIRONMENTAL PERFORMANCE REPORT 2016



SIEMENS

# 1. Performance Report including a review of monitoring and assessment

## Emissions Trends and Significant Events

Monitoring results for the year were reviewed and found to be consistent. The performance of the two units in relation to emissions of combustion gases such as NOx and CO2 was entirely consistent with the running regimes throughout the year. There were no identifiable trends to indicate significant changes in the emissions of the two gas turbines over time. This was borne out in the figures previously submitted to NRW.

## Emissions to Air – an Examination of data from the Envirosoft System

### *Preamble*

A set of quarterly graphs showing NOx output for each of our gas turbines has been used to illustrate the way in which CEMS data can be examined to enhance our understanding of emissions and their relation to plant operations.

The graphs in Appendix 2 and Appendix 3 depict the recorded data extracted from Envirosoft software. The data points on the graph cover the whole time period, whatever the running status of the gas turbines.

In our permit, we are required to calculate and report mean concentrations of gases emitted when the gas turbines are running at 70% load and above. Envirosoft performs the relevant calculations and provides us with tabulated figures which we report to NRW every quarter.

To obtain direct, obviously unaltered data so that we can gain a full understanding of how Envirosoft captures our emission concentrations, we have examined graphs drawn directly from Envirosoft. These graphs cover the whole period under scrutiny, whatever the running status of the gas turbine in question.

We therefore have graphs which display several high peaks in NOx concentration. Having examined these peaks in detail, including comparison of Envirosoft data with data from our plant management software, T3000 we have reached the following conclusions.

### *Analysis and conclusions*

A series of graphs showing the NOx emissions for our Unit 10 (LCP 324) and Unit 20 (LCP 325) for each quarter of the year are included as Appendices 2 and 3 of this report respectively.

The orange line on the graphs indicates NOx output in mgm-3 The scale of the graph means that 100 on the graph is equivalent to a concentration of 100mgm-3 of NOx in the exhaust gas.

The dark blue line shows the unit load in MW. By comparing these two lines we can see the measured NOx concentration and how it relates to the output of the system.

### *Explanation of the graphs*

Overall, the NOx trends when the gas turbines are running show a consistent pattern of NOx production throughout the year for both gas turbines.

Sudden spikes in the NOx concentration during the daytime and when the unit is not running are attributed to calibration, as the actual output of NOx when the unit is not running is known to be zero. Also, we can corroborate the time of a calibration using other records in our systems. During calibration sample gas containing oxides of nitrogen is introduced into the CEMS units.

Other brief peaks in NOx emission are due to gas turbine starts. In the case of gas turbine start up, the readings are of questionable accuracy because the CEMS systems, which are situated at ground level start pumping gas samples down from the sample point. Accurate readings are only obtained after the pumps have been running for five minutes. These potentially erroneous peaks are, of course not counted in our mean figures because, as stated above we only calculate from data obtained at 70% load and above. Start-up and shut-down are by definition, excluded from our calculations.

Due to the long time scales, some very brief peaks can appear to be significant even if they last only a few seconds. This is due to the software constructing a curve based on the available data points. We have examined several such spikes and in every case, the spikes have lasted seconds and therefore contributed nothing significant to the mean figures which we record as part of our quarterly reports, even if they occur when the turbine is above 70% load.

There were no breaches of emissions limits to report during the year for either of the gas turbines.

As shown in the appendices the mean NOx emissions were always well below limits, but variations and trends could be detected.

## Scope for Future Work

***Correlation between Ambient Conditions and NOx***

For example, it can be seen that for Unit 10 there was a slight downward trend in mean NOx emission from early May to late June. We were able to rule out weather as a factor because the December figures are similar to those seen in June, so ambient temperature is not thought to be significant.

Other potential factors are being investigated, but no obvious reasons are evident. The variation is small and even the highest figures are below limits. However if we can understand the factors driving these changes, the scope for finding further improvements may become apparent.

***Gas Composition***

From periodic independent analysis, we know that our gas composition was consistent throughout the year. If variations in gas composition were a factor, changes in the longer-term NOX figures would be expected. No such correlation has been detected. If there are variations in gas composition in future, we will be able to compare emissions data to gas composition.

***Correlation between MW output & NOx***

If we find emergent trends in NOx output we will examine them in more detail to establish any links. This may in turn allow us to improve on our emissions in future. We will give an update on our progress in subsequent reports.

In the coming months we will examine like-for-like figures for the same months in 2016 and 2017 and look for patterns.

***Examination of CO Emissions***

Similarly, trends in CO emissions will be examined and any opportunities for improvement will be captured.

In 2017 we plan to make year on year comparisons of 2016 and 2017 data and possibly identify opportunities for further improvement in our emissions.

## Emissions to Water - Summary

The parameter measured for our emission of process waste water to Controlled Waters (River Usk) is pH. The measurement location specified in our permit is the outlet of a mixing tank. pH monitoring is by automated equipment which is calibrated as part of our quality control processes for instruments. The accuracy of the probes is therefore assured in the same way as for other process-critical measurement systems. Written protocols for calibration and maintenance continue to be followed.

The water is measured post-treatment. Batches of treated water are only released when the pH has been verified as being within limits. Discharge is therefore conditional upon the pH readings being within limits.

The reported figures are therefore very consistent and no breaches have been recorded.

## EHS Legal Requirements

The most significant change to legal compliance this year was a change to our Environmental Permit

On January 1st 2016 our newly revised environmental permit, drawn up in line with the requirements of the European Industrial Emissions Directive (IED) 2010/75/EU came into force. This revised permit was the focus of many months of discussion with both the regulator, Natural Resources Wales (NRW) and our customer during the period March to December 2015.

H&S Law remained unchanged following the major change implemented last year with the new CDM 2015 Regulations, which continue in force.

We continue to use ‘Simplifi’ software to maintain a live register of legal requirements

## Environmental Permit Compliance – Other Significant Events

At the end of January 2016 we submitted our final report to NRW under the conditions of our old permit. This covered the calendar year 2015.

From then on, under the conditions of the new permit, we submitted reports to NRW every three months. All of these reports were submitted on time and there were no violations to report.

Throughout the year we cooperated with our customer, Calon Energy, NRW to develop a new method for on-site treatment of ammonia-contaminated wastewater.

In October members of our team accompanied our customer on a visit to view the proposed new treatment system at the contractor's premises. We compiled a draft permit application so that our Environmental Permit can be varied when the new installation is ready for operation.

At the request of our NRW Inspector our site was the venue for a 'working at height 'training session for NRW staff. The training session took place in March. Using our site as a venue gave NRW staff the opportunity to learn about working at heights and to have practical experience of a site with good 'working at height' practices and an in-house rescue team.

A steam leak in 20UMC on 28th March resulted in the triggering of the fire fighting system and subsequent release of a limited quantity of fire fighting foam. This material was contained within the building itself and the associated underground catchment system. A comprehensive visual and photographic survey of the drainage system was made to establish the limits of any contamination and the affected area was cleared of foam. There was no release to the wider drainage system or to the environment. This event did not require notification to NRW as there was no release to air or to the aquatic environment.

In 2016 the former Pollution Inventory (PIEDC) system for annual environmental data reporting was replaced by the new Pollution Release and Transfer Register. The reporting deadline for 2015 data was in June 2016. Our data reporting was completed on time.

In late May and early June the annual parallel sampling of emissions to atmosphere took place. This activity was carried out by independent contractors as required by the conditions of our Environmental Permit. The sampling programme included 'QAL2' sampling of both units, which is an additional requirement that we have to perform every 5 years. The relevant report was received, checked and sent on to our client during July.

In October inspectors from NRW attended site for a routine 'Operator Monitoring Assessment' (OMA) Audit. This is an audit of our processes for monitoring and recording emissions to air and water. It occurs every 4 to 5 years. We received the inspectors' report in November. Our overall score was 86%, a 6% improvement on our previous score despite the revised scoring scheme being tougher than last time.

The newly installed Envirosoft CEMS data acquisition software recorded its first full month of data in December 2016. This system will be used from now on to compile data on emissions to atmosphere.

Waste materials including those classified as Hazardous Waste continued to be dispatched in accordance with relevant Regulations throughout the year. Handling of the legal documents and statistics is part of our remit as O&M contractor.

## Complaints from Neighbours

A single complaint regarding a possible noise nuisance was received via our customer on 21st December. The complaint was received as an e-mail from a Mr Jack Davies who stated he was a 'resident of Nash (Nash Road)' but gave no other details of his address, but we assume that he is indeed a 'neighbour'.

He described the noise as a 'constant buzzing day and night' which also 'went on until 06:00'. These statements were contradictory, but without further dialogue with Mr Davies it was not possible to establish whether the noise terminated at 06:00 or continued during the day.

*Actions taken following complaint*

During 21st December a calibrated Type 1 noise meter was used to make noise readings at the southeast corner of the site adjacent to the fire pump house. (this being closest to the supposed location of the complainant's property).

No abnormal noise and no 'buzzing' were audible. The SPL was as normal.

Also on 21st December a member of staff made a series of subjective checks along Nash Road and Traston Road between 18:00 and 18:20. Both units were running at the time.

The member of staff reported that no 'buzzing' noise was audible anywhere in the area.

Traffic noise from A48 and noise of railway trains were distinctly audible but there was no noise that could be attributed to Severn Power Station. The weather was dry and there was a light breeze.

Both units of the station were known to be running normally at the time.

On the morning of 22nd December we contacted Mr Davies via email and asked for more details. There was no reply to our e-mail. By the end of the year there was still no reply from Mr Davies and no further complaints had been received.

The evidence collected gave us no indication of a valid link from Mr Davies‘s complaint any activities on our site. The file remains open in case we receive further communications from Mr Davies.

## 2. Total power generated in GWh for 2016

Generation Figures for 2016 were:-

| Annual Production (As required in Table 4.2 of Permit) | |
|---|---|
| Parameter | Units |
| Power Output Unit 10 (LCP 324) | |
| **1650** | **GWh** |
| Power Output Unit 10 (LCP 324) | |
| **1878** | **GWh** |
| Total (LCP324 and LCP325) | |
| **3528** | **GWh** |

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