2015 Annual Performance Report

Aberthaw Power Station

Permit Number: RP3133LD

March 2016

RWE

The energy to lead

Summary

This document gives details on the performance of station activities over 2015, as required by condition 4.2.1 of the Station's Environmental Permit (EP), RP3133LD.

In 2015, there were two Environmental Permit variations;

- EPR/RP3133LD/V011 – allows the conversion to Low NOx Boilers which will significantly reduce the emissions of oxides of nitrogen, amends ash reprocessing as a Part A Listed Activity following implementation of the Industrial Emissions Directive 2010, and removes conditions relating to the use of Selective Catalytic Reduction as this will no longer be installed.
- EPR/RP3133LD/V012 – implements the provisions of Chapter III of the Industrial Emissions Directive, consolidates all previous variations of RP3133LD, and modernises generic conditions. Also authorises reduced pH and alternative coal trials.

The station's full load operating factor was equivalent to 58% with just over 8TWh generated. There was an extended major outage on U9 (May-Dec) in order to retrofit the Low NOx Boiler technology. Work continued on investigating the future operation of the power station under the Industrial Emissions Directive (IED) (2010/75/EU) and at the end of the year the station opted into the Transitional National Plan. The station was also successful in securing a generation contract in the second capacity market auction for the period Quarter 4 2019 to Quarter 3 2020 under the UK Electricity Market Reform (EMR).

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1. Review of Results for Emission Monitoring

1.1. Air Quality Review

There have been no significant changes to the activities, assumptions or parameters used in the assessment of the impact of the air emissions submitted with the application. Since the original permit application in 2006 there has been a reduction in the Emission Limit Value (ELV) for oxides of nitrogen to reflect improvements made in NOx control.

Table 1 below summarises the results for point source emissions to air during 2015. The data shows that there have been no exceedences against EP ELVs and therefore, that the impacts of the activities will be less than the initial site assessment.

Table 1: Summary of compliance with emission limits for point source emissions to air for 2015 (Table S4.1 and S4.4 EP)

Emission Point	Parameter	EP Emission Limit Value		Reference Period	Measured Data		
Windshield A1	Particulate Matter	**25**	**mg/m^3**	Calendar monthly average	11.81	mg/m^3	Maximum
		55		48 hour mean as 97%ile	14.14		Annual 97%ile
	Sulphur Dioxide	**400**	**mg/m^3**	Calendar monthly average	274.60	mg/m^3	Maximum
		440		48 hour mean as 97%ile	315.55		Annual 97%ile
		14,769	**tonnes**	Annual B Limit	5789.3	tonnes	Annual
	Oxides of Nitrogen	**1100**	**mg/m^3**	Calendar monthly average	792.48	mg/m^3	Maximum
		1210		48 hour mean as 95%ile	858.81		Annual 95%ile
		33,000	**tonnes**	Annual B Limit	25,021.0	tonnes	Annual

The measured concentrations at the Font-y-Gary air quality monitoring station indicates that there were no exceedences of the Air Quality Strategy (AQS) objectives for either Sulphur Dioxide or Oxides of Nitrogen from 1st Jan – 31st May 2015. All values were significantly lower than the AQS targets. Hence, the aims of the Air Quality Strategy Management Plan for Aberthaw Power Station have been met. A proposal to close the Font-y-Gary air quality monitoring station in May 2015 was accepted by Natural Resources Wales (NRW) as it has been demonstrated that the continued operation of Aberthaw Power Station does not pose a significant risk to maintaining compliance with AQS objectives. The Highwayman Inn local air quality monitoring station operated by the Vale of Glamorgan Council closed on the 27th May 2014.

1.2. Water Quality Review

There have been no significant changes to the activities, assumptions or parameters used in the assessment of the impact of the water emissions submitted with the application. Since the original permit application in 2006 the Mass ELVs for cadmium, lead and zinc have been removed because relatively high background levels compared to discharge concentrations have resulted in unreliable determinations of differential concentrations. Concentration ELVs for lead and zinc have been added to replace the annual mass ELV. The mercury daily concentration ELV has been removed in agreement with NRW due to high levels of uncertainty.

During 2015, the Station has continued to use the same independent external laboratory for analysing water samples which it changed to in September 2009 following difficulties with previous laboratories. Duplicate samples have continued to be collected for monthly samples which generally continue to show good repeatability. Table 2 below summarises the results for point source emissions to water during 2015.

The data shows that for emission point W2, into the Bristol Channel, there was one exceedence against the EP instantaneous minimum pH ELV. This incident occurred on the 14th June 2015 when the pH fell below the permit limit for a period of approximately 54 minutes. The incident was caused by an operator not directing the water treatment plant discharge to the effluent storage tanks whilst the cooling water system was shutdown. A review of the quantity discharged and tidal conditions confirmed that the low pH effluent did not travel down the outfall tunnel and was held and diluted onsite by the incoming tide. NRW confirmed that they considered no breach of permit condition 3.1.2 (W2 discharge pH less than 5.8) had occurred and assigned a Category 3 permit non-compliance (potential for minor environmental effect) for failure to manage discharge of the water treatment plant effluent in a manner to minimise risks of pollution. As a corrective measure an interlock will be implemented to automatically prevent a reoccurrence. Considering this and that there were no other EP ELV exceedances for W2 it can be concluded that the impacts of the activities will be less than the initial site assessment.

The data shows that for FGD Absorber Outlet emission points into the seawater treatment pond, there were exceedances for Unit 7 and Unit 8 against the monthly mercury EP ELV (after accounting for laboratory uncertainty). For Unit 7 there were 4 individual exceedances in June, July, October and November with duplicate samples showing similar results. An investigation into these results has been unable to determine the root cause of the elevated results. There was no increase in the corresponding W2 mercury concentrations or significant differences identified in operating conditions. For Unit 8 there was 1 exceedance in August, which is considered to be an anomalous outlier as it 4 times the ELV. NRW have concluded that the elevated FGD Absorber Outlet discharges associated with the composite sampling regime are considered to be approaches to limit due to uncertainty in the measurements.

It should also be noted that annual marine sediment and biota surveys have been undertaken to assess trace element discharge impacts, which have confirmed that although there has been some minor increase in mercury in the immediate vicinity of the outfall, this declines to background levels within a few hundred metres and has shown no discernible impact on the populations of the target species or on the overall communities in Limpert Bay. The station has experienced many difficulties with the sampling and analysis regime for the FGD Absorber Outlets since it was implemented in 2008 and will continue to work with the regulator to resolve the issues.

Table 2: Summary of compliance with emission limits for point source emissions to water for 2015 (Table S4.2, S4.3 and S4.4 EP)

a) Emission Point W2 (Cooling Water Outlet)

Emission Point	Parameter	EP Emission Limit Value		Reference Period	Measured Data		
W2	Differential total suspended solids	**50**	**mg/l**	Weekly average of daily samples	22	mg/l	Maximum
	Ammoniacal nitrogen	**0.1**	**mg/l**	Monthly average of daily samples (above background)	0.1	mg/l	
	Differential temperature	**13.5**	**°C**	98%ile of continuous daily average values	9.2	°C	
	Total hydrocarbon oil	**3**	**mg/l**	Monthly average of daily samples	0.4	mg/l	
	pH	**5.8**	**pH units**	Instantaneous	**2.3** (5.9)	pH units	Minimum
		6		95%ile of instantaneous measurements	6.0		
		8.5		95%ile of instantaneous measurements	8.3		Maximum
	Mercury	**60**	**kg**	Annual Mass Release	36.4	kg	Annual

b) Emission Point SWTP1, SWTP2, SWTP3 (FGD Absorber Outlets)
(Note: Brackets () used to denote maximum value following exclusion of outlier.)

Emission Point	Parameter	EP Emission Limit Value		Reference Period	Measured Data		
SWTP1 (U7 FGD Absorber Outlet)	Mercury	**0.0005**	**mg/l**	Monthly average value (above background)	**0.00089**	mg/l	Maximum
	Cadmium	**0.0002**			0.000004		
	Lead	**0.004**			0.00062		
	Zinc	**0.01**			0.005		
SWTP2 (U8 FGD Absorber Outlet)	Mercury	**0.0005**	**mg/l**	Monthly average value (above background)	**0.00214** (0.00046)	mg/l	Maximum
	Cadmium	**0.0002**			0.000041		
	Lead	**0.004**			0.00375		
	Zinc	**0.01**			0.006		
SWTP3 (U9 FGD Absorber Outlet)	Mercury	**0.0005**	**mg/l**	Monthly average value (above background)	0.00030	mg/l	Maximum
	Cadmium	**0.0002**			0.000000		
	Lead	**0.004**			0.00339		
	Zinc	**0.01**			0.003		

2. Annual Improvement Targets Summary

Aberthaw Power Station continues to maintain its ISO 14001 Certification for the "Generation of electricity, by the combustion of fossil fuel and biomasses, together with the associated sale or disposal of ash". The station had 2 surveillance visits by Lloyds Register Quality Assurance during 2015 and no non-conformities were identified. Table 3 provides details of the improvement targets for 2015 and the performance against those targets.

Table 3: Environmental Performance 2015

Objective	Target	Target Date	Responsible Person	Final Status
Maintain a High Level of Environmental Compliance	No more then 2 environmental incidents resulting in justified complaints.	End 2015	All employees	0
	No more then zero exceedences of permit conditions which result or have potential to cause significant environmental harm. (Natural Resources Wales CCS Category 1 and 2).	End 2015	All employees	0
	Minimise exceedences of permit conditions which result or have potential to cause minor environmental harm. (Natural Resources Wales CCS Category 3). Fully investigate all exceedences of this type and implement improvements to minimise the likelihood of environmental harm.	End 2015	All employees	2 - CW low pH Discharge & Noise from de-glazing
	No more than zero non-compliance with emissions limits or conditions as set out in EPR permits (Natural Resources Wales CCS Category 4). Submit all NRW reporting on time.	End 2015	Environmental Compliance Engineer	0

Objective	Target	Target Date	Responsible Person	Final Status
	Provide environmental support for the Low NOx Boiler Project including environmental permitting, impact assessment and analysis.	Ongoing	Environmental Compliance Engineer	Permit Variation received 28/08/15.
	Complete response to Improvement Condition 35 – Cost benefit appraisal of best available technique for safe passage of eel.	30/06/2015	Environmental Compliance Engineer	Response submitted 24/06/15.
	Complete responses to Improvement Condition 7: (1) 2015 soil sampling/vegetation analysis report. (2) 2014 Third year monitoring report	31/08/2015 13/11/2015	Environmental Compliance Engineer	(1) Report submitted 20/08/15. (2) Report submitted 13/11/15.
Ensure Efficient Uses of Resources	Waste < 15 segregation non-compliances. Non-compliance definition: - >10% wrong material in the skip. - Waste causing a safety or environmental hazard.	End 2015	All employees	6
	Monitor and regularly report waste disposal and recycling statistics to identify minimisation opportunities.	Ongoing	Environmental Compliance Engineer	Completed
	Water 5% reduction on 2013 target < 110 m3/GWh process water (Ely Wells and St Lythans supplement).	End 2015	All employees	Dec - 229m3/GWhr YTD - 173m3/GWhr
	Monitor and regularly report process and potable water use to identify minimisation opportunities.	Ongoing	Section Head Performance & Commercial Section Head Regulation	Completed
Be Responsive to Concerns and Complaints regarding our Operations	Provide response to public enquiries and complaints within 48hrs of normal office hours.	Ongoing	Section Head Regulation Environmental Compliance Engineer	Compliant
Be Accountable by Publicly Reporting our Environmental Performance	Hold a Local Liaison Committee.	Nov-15	Station Manager Section Head Regulation	Held 28/10/15 - no issues.
Reduce the Carbon Intensity of Electricity Generated	To meet the business plan targets for biomass burn and thermal efficiency.	End 2015	Section Head Materials Handling Section Head Performance & Commercial	Biomass -39% TEMP -0.45%
Drive Continuous Improvements in Standards of	Ensure the Environmental Management System (EMS) is maintained to ISO 14001 and plan for updating the EMS to the revised 2015 Standard.	Ongoing	Section Head Regulation Environmental Compliance Engineer	BIP created. Two successful surveillance visits. Training attended.

Objective	Target	Target Date	Responsible Person	Final Status
Environmental Management	Ensure all staff and residential contractors (managers and first line supervisors) new to site in 2015 have completed the environmental training program.	End 2015	Section Heads Technical Officers	Staff - 71% Contractors - 100%
	Progress development of a new environmental training program.	Q4 2015	Environmental Compliance Engineer	Contract in place and work in progress.
	Update the Biodiversity Management Plan.	Q3 2015	Environmental Compliance Engineer	Draft received.
	Upgrade the emissions to air monitoring and reporting systems to meet the requirements of the Industrial Emissions Directive.	Dec-15	Environmental Compliance Engineer	MERS, G2 & PIPB Updated.
	Plan for demolition of the 3MW carbon capture pilot plant.	Q2 2015	Section Head Regulation	Planning Permission Condition for demolition removed.
	Complete installation of water meters on the process water system.	Q4 2015	Station Chemist	2 Magflow Meters waiting for installation on HP and LP (AR 15/500976 & 15/500977).
	Install oil in water monitor in the site drainage system at P2.	Q4 2015	Station Chemist	Installation planned.
	Install a weather station at Aberthaw Centre for Energy and the Environment.	Q4 2015	Section Head Regulation	Weather station installed awaiting connection to PIPB.

3. Performance Parameters

3.1. Power Generated 2015 (Table S5.2 EP)

Aberthaw Units 7-9 (Gross Generation, no deductions for works power)	8,104	GWh
Aberthaw OCGTs 7-9	0.030	GWh
Total Site Power Generated:	8,134	GWh

3.2. Water Usage 2015 (Table S5.3, EP)

Seawater cooling water (CW)

Aberthaw seawater CW usage	1,412,515,961	m^3
m3/unit output:	174,299	**m^3/GWh**

Note: The CW discharge volume is the same as the abstracted volume.

Abstracted Water

Ely Wells (borehole abstraction)	1,168,809	m^3
m3/unit output	144	**m^3/GWh**

Towns Water

St Lythans (Town Mains supplement)	267,742	m^3
Town Mains water usage (excluding St Lythans supplement)	41,549	m^3
m3/unit output	38	**m^3/GWh**

3.3. Fuel usage 2015 (Table S5.3, EP)

Coal	2,691,365	tonnes
	71,800,841	GJ
High Carbon Ash	15,367	tonnes
	222,937	GJ
Gas Oil	12	tonnes
	510	GJ
Heavy Fuel Oil	21,167	tonnes
	863,439	GJ
Processed Fuel Oil	0	tonnes
	0	GJ
Solid Biomass	64,278	tonnes
	526,621	GJ
Liquid Biomass	2,797	tonnes
	104,676	GJ

Note: Data is as submitted to EU Emission Trading Scheme which has been subject to final year end accounting and external verification.

4. Contamination/Decontamination of Site

4.1. Site Contamination

There have been no incidents or emissions which may have caused any site contamination during 2015.

4.2. Site Decontamination

There have been no requirements to decontaminate the site during 2015.