

Environment Agency

Review of an Environmental Permit under the Environmental Permitting (England & Wales) Regulations 2010 (as amended)

Decision document recording our decision-making process following review of a permit

The Permit number is: EPR/SP3836SP
The Operator is: BAE Systems Marine Limited
The Installation is: Barrow Shipyards
This Variation Notice number is: EPR/SP3836SP/V005

What this document is about

All Environmental permits which permit the operation of large combustion plant (LCP), as defined by articles 28 and 29 of the Industrial Emissions Directive (IED), need to be varied to implement the special provisions for LCP given in the IED, by the 1 January 2016 (Article 82(3)). The IED makes special provisions for LCP under Chapter III, introducing new Emission Limit Values (ELVs) applicable to LCP, referred to in Article 30(2) and set out in Annex V.

The IED provides a period of transition towards the new ELVs via Article 32, the Transitional National Plan (TNP). It also makes provision for plant that wish to be exempted from compliance with the new ELVs in Article 33, the Limited Life Derogation (LLD). Other derogations include limited operating hour regimes for sites using 500 hr or 1500 hr derogations. There are also options for exemption from emission limits based on operating hours.

The operator has submitted a response to our notice requiring information, issued under regulation 60(1) of the Environmental Permitting Regulations (EPR), which has provided us with information on which compliance route they wish to follow for each LCP. The response also includes specific details relating to each LCP, necessary for accurate implementation the IED requirements. A copy of the regulation 60 notice and the operator's response is available on the public register.

We have reviewed the permit for this installation, including all variations since the last permit consolidation, and referred to the operator's response to the regulation 60 notice requiring information. This is our decision document, which explains the reasoning for the consolidated variation notice that we have issued.

It explains how we have reviewed and considered the compliance routes and, where relevant, the emissions limits proposed by the Operator for each LCP on the installation. This review has been undertaken with reference to the:

- Chapter III and annex V of the IED
- “IED BAT Non-ESI Review Paper, 28 October 2014” produced by the Environment Agency (referred to as the “2014 Non-ESI BAT review paper” in this document)
- “Electricity Supply Industry – IED compliance protocol for Utility Boilers and Gas Turbines”, published by the Joint Environmental Programme.

It is our record of our decision-making process and shows how we have taken into account all relevant factors in reaching our position. It also provides a justification for the inclusion of any specific conditions in the permit that are in addition to those included in our generic permit template.

As well as implementing the chapter III IED compliance of the installation, the consolidated variation notice takes into account and brings together in a single document all previous variations that relate to the original permit issue. It also modernises the entire permit to reflect the conditions contained in our current generic permit template.

The introduction of new template conditions makes the Permit consistent with our current general approach and philosophy and with other permits issued to installations in this sector. Although the wording of some conditions has changed, while others have been deleted because of the new regulatory approach, it does not reduce the level of environmental protection achieved by the Permit in any way. In this document we therefore address only our determination of substantive issues relating to chapter III review and any changes to the operation of the installation.

How this document is structured

Glossary

1. Our decision
2. How we reached our decision
3. The legal framework
4. Key Issues

Annex 1 – Review and assessment of changes that are not part of the Chapter III IED derived permit review.

GLOSSARY

BAT	best available techniques
CHP	Combined Heat and Power Plant
ELV	emission limit value set out in either IED or LCPD
IED	Industrial Emissions Directive 2010/75/EC
LCP	large combustion plant – combustion plant subject to Chapter III of IED
LCPD	Large Combustion Plant Directive 2001/80/EC
LLD	Limited Life Derogation
MSUL/MSDL	Minimum start up load/minimum shut-down load
OMA	Operator Monitoring Assessment
SMITE	Submarine Machinery Installation and Test Establishment
TNP	Transitional National Plan

1 Our decision

We have decided to issue the Variation Notice to the Operator. This will allow it to continue to operate the Installation, subject to the conditions in the Consolidated Variation Notice.

We consider that, in reaching that decision, we have taken into account all relevant considerations and legal requirements and that the varied permit will ensure that a high level of protection is provided for the environment and human health.

The Consolidated Variation Notice contains many conditions taken from our standard Environmental Permit template including the relevant annexes. We developed these conditions in consultation with industry, having regard to the legal requirements of the Environmental Permitting Regulations and other relevant legislation. This document does not therefore include an explanation for these standard conditions. Where they are included in the Notice, we have considered the techniques identified by the operator for the operation of their installation, and have accepted that the details are sufficient and satisfactory to make those standard conditions appropriate. This document does, however, provide an explanation of our use of “tailor-made” or installation-specific conditions, or where our Permit template provides two or more options.

2 How we reached our decision

2.1 Requesting information relating to the requirements of Chapter III of and Annex V to the IED

We issued a Notice under Regulation 60(1) of the Environmental Permitting (England and Wales) Regulations 2010 (a Regulation 60 Notice) on 31/10/14 requiring the Operator to provide information for each LCP they operate, including:

- The type of plant, size and configuration.
- The proposed compliance route.
- Minimum start up and shut down loads.
- The proposed emission limits and how they accord with the 2014 BAT review paper.

The Regulation 60 Notice response from the Operator was received on 25/03/15.

We considered it was in the correct form and contained sufficient information for us to begin our determination of the permit review.

The Operator made no claim for commercial confidentiality. We have not received any information in relation to the Regulation 60 Notice response that appears to be confidential in relation to any party.

3 The legal framework

The Consolidated Variation Notice will be issued under Regulations 18 and 20 of the EPR. The Environmental Permitting regime is a legal vehicle which delivers most of the relevant legal requirements for activities falling within its scope. In particular, the regulated facility is:

- an installation as described by the IED;
- subject to aspects of other relevant legislation which also have to be addressed.

We consider that, in issuing the Consolidated Variation Notice, it will ensure that the operation of the Installation complies with all relevant legal requirements and that a high level of protection will be delivered for the environment and human health.

We explain how we have addressed specific statutory requirements more fully in the rest of this document.

Meeting the requirements of the IED

The table below shows how each requirement of the IED has been addressed by the permit conditions.

IED Article Reference	IED requirement	Permit condition
30(6)	If there is an interruption in the supply of gas, an alternative fuel may be used and the permit emission limits deferred for a period of up to 10 days, except where there is an overriding need to maintain energy supplies. The EA shall be notified immediately.	Not applicable
32(4)	For installations that have applied to derogate from the IED Annex V emission limits by means of the transitional national plan, the monitoring and reporting requirements set by UK Government shall be complied with.	Not applicable
33(1)b	For installations that have applied to derogate from the IED Annex V emission limits by means of the Limited Life Derogation, the operator shall submit annually a record of the number of operating hours since 1 January 2016;	Not applicable
37	Provisions for malfunction and breakdown of abatement equipment including notifying the EA.	Not applicable
38	Monitoring of air emissions in accordance with Ann V Pt 3	3.5, 3.6
40	Multi-fuel firing	Not applicable
41(a)	Determination of start-up and shut-down periods	2.3.7 Schedule 1 Table S1.4
Ann V Pt 1(1)	All emission limit values shall be calculated at a temperature of 273,15 K, a pressure of 101,3 kPa and after correction for the water vapour content of the waste gases and at a standardised O2 content of 6 % for solid fuels, 3 % for combustion plants, other than gas turbines and gas engines using liquid and gaseous fuels and 15 % for gas turbines and gas engines.	Schedule 6, Interpretation
Ann V Pt 1	Emission limit values	3.1.2 Schedule 3, Table S3.1
Ann V Pt 1	For plants operating less than 500 hours per year, record the used operating hours	Not applicable
Ann V Pt 1(6(1))	Definition of natural gas	Schedule 6, Interpretation
Ann V Pt 2	Emission limit values	3.1.2 Schedule 3, Table S3.1
Ann V Pt 3(1)	Continuous monitoring for >100MWth for specified substances	3.5, 3.6 Schedule 3, Table S3.1
Ann V Pt 3(2, 3, 5)	Monitoring derogations	3.5.1 Schedule 3, Table S3.1
Ann V Pt3(4)	Measurement of total mercury	Not applicable

IED Article Reference	IED requirement	Permit condition
Ann V Pt3(6)	EA informed of significant changes in fuel type or in mode of operation so can check Pt3 (1-4) still apply	2.3.1 Schedule 1, Table S1.2
Ann V Pt3(7)	Monitoring requirements	3.5.1 Schedule 3, Table S3.1
Ann V Part 3(8,9,10)	Monitoring methods	3.5, 3.6
Ann V Pt 4	Monthly, daily, 95%ile hourly emission limit value compliance	3.6.7 Schedule 3, Table S3.1
Ann V Pt7	Refinery multi-fuel firing SO2 derogation	Not applicable

4. Key Issues

Unless the decision document specifies otherwise we have accepted the applicant's proposals.

Where relevant and appropriate, we have incorporated the techniques described by the Operator in their Regulation 60 Notice response as specific operating techniques required by the permit, through their inclusion in Table S1.2 of the Consolidated Variation Notice.

The variation notice uses new LCP numbers in accordance with the most recent DEFRA LCP reference numbers.

LCP 438, LCP 439 & LCP 450

The installation includes three LCPs. Each LCP consists of a 80-100 MW_{th} boiler, to be confirmed, which vents via a dedicated emission point as part of a common support structure. The emission points for the boilers are A1, A2 and A3 respectively. All boilers burn gas oil as a fuel and there is no standby fuel.

The boilers are located in the Submarine Machinery Installation and Test Establishment (SMITE) and are an essential part of the build programme for nuclear powered submarines. They are used to generate steam for testing the main propulsion machinery package which will be installed into each submarine later on in the build programme. Each submarine takes typically 2 years to build, with the main propulsion machinery package trials carried out for approximately 4 months (1 month commissioning and 3 months testing, several months later).

The purpose of the main propulsion machinery package testing is to simulate the normal operations of the submarine. Most of the time only one boiler is required, operating at low loads (< 30%) to simulate normal cruising operation. There are short periods of time when two boilers are needed to simulate "fast cruise" operations. The third boiler is for standby purposes only.

Compliance Route:

The operator has proposed to operate these LCPs under the ELV compliance route.

Net Rated Thermal Input:

The Applicant has stated that the Net Thermal Input is 80-100 MW_{th} for each boiler. This has been determined by calculation although no further information has been provided to justify how this calculation has been derived. IP14 has been added to ensure that BAE Systems carry out a performance test to verify the thermal input. The date for completion has been identified as one month after commissioning of the boilers prior to the next round of main

propulsion machinery package trials to reflect the cyclic nature of the operation of the boilers with the submarine build programme.

Minimum start up load and Minimum shut-down load:

The Operator has defined the “minimum start up load” and “minimum shut-down load” for the LCP in their response to question 6 of the Reg 60, in terms operational parameters (steam pressure, flue gas temperature, steam temperature at exit of the boiler, and oxygen content of flue gas), although no information has been provided on the actual levels which will be used.

IP13 has been included to ensure that the operator carries out further work to define the minimum start up and shut down load during commissioning of the boilers prior to the next round of main propulsion machinery package trials. It should be noted that the nature of trial operations means that most of the time only one boiler is operational, typically at < 30% load.

Table S1.3 and Table S1.4 of the permit have been amended accordingly. Standard permit condition 2.3.7 has been set to define the period of start up and shut down, referring to the thresholds in this table.

Emission limits:

The operator has proposed limits in line with annex V of the IED and the 2014 BAT review paper. Consequently we have accepted the proposed limits and incorporated them into table 3.1 of the permit.

Emissions limits values for all three LCPs are based on boilers < 100 MW_{th} burning liquid fuel that have were permitted before 7th January 2013.

Normally boilers of this size are only subject to periodic monitoring, however, BAE systems have continuous emission monitors (CEMs) installed on the boilers.

The calendar monthly mean has been taken as the ELV specified in annex V of the IED. A daily monthly mean of validated hourly averages has been set at 110% of the ELV and 95% of hourly averages validated over a calendar year has been set at 200% of the ELV in accordance with the requirements in annex V of the IED for continuous emission monitors.

LCP 438, LCP 439 & LCP 450

Parameter	Existing mg/m3	Reference Period	Annex V mg/m3	New Permit limit mg/m3
Oxides of Nitrogen (NO and NO ₂ expressed as NO ₂)	450	Calendar monthly mean	450	450
	495 Note 1	Daily mean of validated hourly averages	495	495
	None	95% of validated hourly averages within a calendar year	900	900
Sulphur dioxide	1700 Note 2	Calendar monthly mean	350	350
	None	Daily mean of validated hourly averages	385	385
	None	95% of validated hourly averages within a calendar year	700	700
Dust	50	Calendar monthly mean	30	30
	55 Note 3	Daily mean of validated hourly averages	33	33
	None	95% of validated hourly averages within a calendar year	60	60

Note 1: Limit was based on 48 hour mean as 95%ile

Note 2: Monitoring carried out once per campaign

Note 3: Limit based on 48 hour mean as 97%ile

Energy efficiency:

The installation does not have CHP. In line with the DEFRA Part A guidance, to report on the scope for further improvement, a condition has been included for the operator to carry out a 4-yearly efficiency review.

Standby fuels:

All the boilers run on gas oil and there is no standby fuel used

In order to ensure the efficiency of plant using fossil fuels or biomass is maximised and regularly recorded, condition 1.2.1(c), condition 4.2.2(b) and table S4.3 have been added to the permit.

Monitoring & standards:

Although there is no requirement to carry out continuous emission monitoring given the size of the boilers (< 100 MW_{th}), BAE Systems have installed continuous emission monitors (CEMs) on the boilers. Currently these monitor for NO_x and dust. There is the facility to monitor for SO₂ and this will be set up for the next time that the main propulsion machinery package testing take place.

During a recent Operator Monitor Assessment (OMA) issues were identified in carrying out parallel reference measurement to verify the performance of the CEMs (Ref: 150810 BAESML OMA Final Report). BAE Systems have an MCERTS Testo gas analyser and this will be used for verifying the measurement of combustion gases (NO_x and SO₂); however, it is very difficult to carry out reference measurements for dust (particulates). During most of the main propulsion machinery trials the boilers are operating at low loads, typically less than 30%, and the parallel measurement results that would be obtained at this load would not be representative. The boilers only operate at higher loads for very short periods of time, to simulate the operation of the submarine, and it would be very difficult to schedule parallel measurements at these times.

The original permit specifies that monitoring should be carried out in accordance with BS EN 14181. The National Monitoring Specialist, present at the OMA, has advised that BAE Systems will be unable to meet this standard given the issues outlined above. He has recommended continuous emission monitoring be carried out in accordance with BS EN 15267-3 which is the relevant standard for CEMs which are not subject to Chapter III (Combustion) or Chapter IV (Waste Incineration) of the IED.

The consolidated permit has been amended to reflect this advice and is justified on the basis that under Chapter III of the IED, continuous monitoring is not required for boilers less than 100 MW_{th}, therefore compliance with BS EN 14181 is not mandatory.

Standards for assessment of the monitoring location for measurement of oxygen, water vapour, temperature and pressure have been added to the permit template for clarity.

A row has been included in table S3.1 which requires the operator to confirm compliance with BS EN 15259 in respect of monitoring location and stack gas velocity profile in the event there is a significant operational change (such as a change of fuel type) to the LCP.

Condition 3.1.5 relating to protection of soil, groundwater and groundwater monitoring, has been included to ensure compliance with IED requirements.

Conditions 4.3.1 and 4.3.2 relating to notifications have been updated to ensure in compliance with IED requirements.

Annex 1: Review and assessment of changes that are not part of the Chapter III IED derived permit review.

Minor amendments have been made to the Directly Associated Activities in Tables S1.1 as follows:

- The fuel oil storage tanks associated with the DDH have been removed as they are no longer in use.
- The plant reference number for chemical storage area A28 has changed to A62.
- The ion exchange water treatment plant has been replaced by a reverse osmosis plant.

Minor amendments have been to the emission points to water shown in Table S3.2 compared to the original permit.

- Emission point W3a has been renumbered emission point W3.
- Emission point W3b has been removed as there are no longer any discharges direct water via the SMITE WTP holding tanks.
- Emission point W3c is renumbered emission point W4.
- Emission point W4 is renumbered emission point W5.