eni Liverpool Bay Operating Company Limited

Point of Ayr Site Protection and Monitoring Programme

overview

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Executive Summary

This is the 4-yearly update to the Site Protection and Monitoring Programme (SPMP) for Point of Ayr (POA) Gas Terminal, operated by eni Liverpool Bay Operating Company Limited (eni LBOC). This document is required to be submitted to the regulator within 2 months of the date of issue of the site Environmental Permit, and to be reviewed at least every 4 years.

The SPMP was originally submitted to the Environment Agency in pursuance of Condition 2.8/2.8.2 of former Environmental Permit No. ZP3331LM, issued to BHP Billiton.

The POA Gas Terminal was operated by BHP Billiton up 31st March 2014. On April 1st 2014 the operatorship was transferred to eni LBOC. The eni site environmental permit is now issued by Natural Resources Wales (NRW) and has reference number EPR/DP3934EW.

The results of routine monitoring are collated into a Monitoring Report and submitted to NRW annually, by 28th February. The Monitoring Report contains recommendations for changes to this Site Protection and Monitoring Programme (if any).

The testing, inspection and maintenance programme for pollution prevention infrastructure at the site (the Infrastructure Monitoring Programme) is as detailed in the report below.

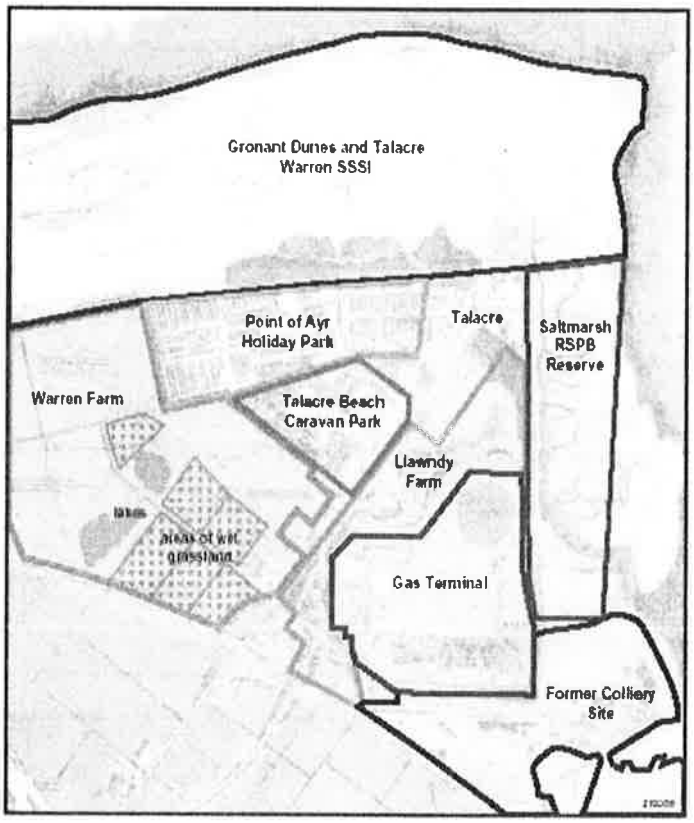
1 Introduction

The eni LBOC onshore gas processing terminal is located at Point of Ayr (POA) in Flintshire, North Wales. It treats all of the natural gas produced from eni LBOC offshore facilities. The gas is treated to sales quality and exported to the power station at Connah's Quay. The Gas Terminal is able to treat approximately 335,000 m^3 of gas per hour. The gas treatment process involves the removal of hydrogen sulphide (H_2S), other sulphurous compounds (chiefly mercaptans), heavy hydrocarbons, and water from the gas. Sulphur compounds are converted to elemental sulphur for export, hydrocarbon condensate and water are returned to the Douglas production platform for further processing.

The POA Gas Terminal site is bound to the east by the sea wall and the Dee Estuary, and to the southeast and south by the site of the former Point of Ayr Colliery and the Chester to Holyhead railway line.

The POA Terminal site covers an area of approximately 37 hectares. eni LBOC owns a further approximate 110 hectares of dunes, warren and farmland adjacent to the Terminal, designated as a Site of Special Scientific Interest. It is managed for conservation benefit under land management agreements regulated by Natural Resources Wales (NRW).

Figure 1.1 POA Installation Boundary



2 Objectives

The objectives of this report are:

- To describe the monitoring programme in place for permit compliance, pollution prevention infrastructure and early warning of any release of polluting substances.
- To review, and if necessary amend, the inspection, testing and maintenance programme for pollution prevention infrastructure at the installation to ensure continued integrity.

3 Details of Installation applicable to this SPMP

3.1 THERMAL OXIDIZER

The thermal oxidizer (TOX) is designed to incinerate hydrogen sulphide, light hydrocarbons and sour water to produce acceptable levels of effluent gas for emission to atmosphere. The process involves thermally oxidizing sulphur components at 850ºC to produce sulphur dioxide. Combustion is supported by LP fuel gas (or propane as a back-up). Air and fuel flow rates are controlled by a temperature control loop in the exhaust gas stream to ensure optimum combustion and minimization of emissions.

3.2 SULPHUR RECOVERY UNIT (SRU) AND TAIL GAS UNIT (TGU)

Sulphur is recovered from the gas in a two-step process. The Sulphur Recovery Unit (SRU) is the first stage in the sulphur recovery process, which is based on partial oxidation and chemical conversion. The unit is capable of producing approximately 20 tonnes of elemental sulphur per day. The elemental sulphur produced by the unit is stored as a liquid on-site and exported by road tanker for use elsewhere as a chemical feedstock.

The second stage of the process is a Tail Gas Unit (TGU). This improves the overall recovery of sulphur by converting remaining SO_2 into H_2S, which is then recycled through the SRU. The unit consists of two sections; a catalytic converter section and an amine section. The amine section is similar in operation to the main gas sweetening unit and absorbs the H_2S from the tail gas. The cleaned tail gas flows to the thermal oxidiser for the conversion of any residual H_2S to SO_2 and is subsequently discharged to atmosphere via a 45 m high stack.

3.3 HP AND LP FLARE SYSTEMS

The function of the flare systems is to safely dispose of hydrocarbon gases discharged from relief valves and from emergency blow down. The systems also permit various equipment on the plant to be depressurized in a safe and controlled manner for plant shutdown or maintenance.

Separate low pressure and high pressure flare systems are provided. All HP system relief and blowdown streams routes the gases to the HP flare KO drum. Under normal operation, gas from the HP KO drum is routed to the 1st stage flare tip.

The LP flare system comprise a single tip. Low pressure discharges are routed to the LP flare KO drum via the main LP flare header and various sub-headers. The flare stack is located approximately 300 metres to the west of the process area. A 'sterile area' of 100 metre radius

is designated around the flare stack. Gas for pilot fuel and for purging is provided from the LP fuel gas header, or as a back-up from the propane package.

3.4 POWER GENERATION (TURBINE GENERATOR)

The turbine generator package provides the primary source of electrical power for the installation. The turbine is driven by HP fuel gas from the fuel gas system. The generator supplies electrical power to the site power distribution system.

The essential services generator package provides an independent supply to the essential services switchboard. This provides sufficient power to maintain safety and shutdown systems in the event of loss of the main.

A waste heat recovery unit is fitted to the turbine generator exhaust gas system to pre-heat heat transfer oil from the hot oil system, prior to final heating in the Hot Oil Heaters.

3.5 DRAINS SYSTEM AND SURFACE WATER DISCHARGE

Various closed drain systems exist to handle arising of potentially hazardous process fluids. These systems include:

- Site-wide closed drains system.
- Sweetening unit amine drains.
- TGU solvent drains.
- Glycol unit drains.

The Open Drains System comprises oily water and clean water drains. Blow-downs from the cooling water and steam system are also routed through the oily water system. Oily water streams are contained at source by the use of appropriate kerbs and sumps. The drains are routed by gravity to a tilted plate separator package, which separates oil from the water. The water drains to the clean water collection sump, whilst the oil is retained at the separator prior to transfer to road tanker for disposal.

General surface water runoff from roofs, roads and general off-plot areas is routed to the clean water drains. Under normal circumstances these areas are expected to remain uncontaminated by process liquids. The drains flow by gravity to the petrol/oil Interceptor and this can be emptied by road tanker. Water from the interceptor flows to the clean water collection sump. The sump is emptied by pumps, operating on level control.

Discharge from the collection sump is to the outfall basin. The basin is divided into two sections. The smaller section is used to hold a volume equivalent to 12 hours capacity. The contents of this section are sampled by the plant chemist to check for:

- pH
- Temperature
- Microtox
- Free-halogens
- Total oxygen content

If required the liquid is dosed and re-tested prior to transfer to the main section of the Outfall Basin. From this point water is discharged to the adjacent watercourse by outfall sump pumps.

The storm-water surge pond provides an overflow for the outfall basin to cope with high rainfall conditions. The storm-water surge pond would also be used to hold firewater run-off from fire-fighting operations.

Water from pig receiver wash-down collects in a dedicated Pig Receiver Sump. Liquids are periodically removed from this sump by road tanker. The laboratory has a dedicated collection sump which stores all effluent from the laboratory for regular transfer to road tanker.

Chemicals are stored in a dedicated, hard-standing storage area, which is bunded and has its own dedicated run-off sumps. This prevents the possibility of spilt chemicals contaminating land.

There are no planned changes to operational site layout or processes.

4 Monitoring Programme

4.1 ENVIRONMENTAL MONITORING PROGRAMME

The following table summarises the environmental monitoring which takes place onsite, for:

- emissions to air (continuous online sampling of emissions from the Thermal Oxidiser and Turbine Generator) and
- emissions to water (spot sampling of outfall pond prior to discharge to the external brook).

Regulator	Permit Type and Number	Plant/ Equipment	Activity	Specified Limits	When to Report	Reporting Responsibility	How to Report
Natural Resources Wales (formerly Environment Agency)	Environmental Permit (PPC) EPR/DP3934EW	Thermal Oxidiser (TOX)	Operating temperature	TOX operating temperature not to fall below 850 °c.	If TOX operating temp falls below 850 °c or if any TOX equipment fails.	Production Supervisor informs Plant Manager of excursion, and report made to NRW by Plant Manager. HSE Team consulted if necessary. Plant Manager to ensure any necessary item/s are also reported into the BHPB incident reporting system. Also see BHPB POA Standing Instruction 29 continuous emissions monitoring systems (CEMS).	To notify NRW of the breach of any limit or of the failure of any equipment, Part A of the notification section in PPC permit (page 16) must be submitted to NRW within 24 hours. The Part A notification must be followed up by the Part B notification as soon as is practicable, to update NRW on status of excursion.
		Thermal Oxidiser (TOX)	Emissions to air of oxides of nitrogen (NO & NO_2 expressed together as 'NOX')	TOX NOX emissions to be maintained below 120 mg/m³.	If NOX emissions exceed 120 mg/m³ or if any TOX equipment fails.		
		Thermal Oxidiser (TOX)	Emissions to air of Sulphur Dioxide (SO_2)	TOX SO_2 emissions to be maintained below 190 mg/m³.	If SO_2 emissions exceed 190 mg/m³ or if any TOX equipment fails.		
		Turbine Generator	Emissions to air of oxides of nitrogen (NO & NO_2 expressed together as 'NOX')	Turbine NOX emissions to be maintained below 120 mg/m³.	If NOX emissions exceed 120 mg/m³ or if any turbine equipment fails.		
		POA site water outfall pond	BOD of water discharge to external drainage (brook).	Biological oxygen demand not to exceed 15 mg/ml.	No water discharges must take place unless within specified limit.	If a discharge is made outside of these limits, Production Supervisor informs Plant Manager of excursion, and report made to NRW by Plant Manager. HSE Team consulted if necessary.	If a discharge is made outside of these limits, follow reporting process above.
		POA site Water outfall pond	pH of water discharge to external drainage (brook).	pH to be within the range 6 – 9.	No water discharges must take place unless within specified range.		
		POA site operational activities	Noise emissions	Excessive Noise and vibration from BHPB activities.	See eni LBOC community complaints procedure H-000-GG-099.	Plant Manager and eni LBOC External Affairs.	See eni LBOC community complaints procedure H-000-GG-099.
		POA site operational activities	Odour emissions	Odour emission levels likely to cause annoyance.		Plant Manager and eni LBOC External Affairs.	

4.2 INFRASTRUCTURE MONITORING PROGRAMME

Site personnel conduct daily routine inspections, including visual checks, of the infrastructure at every shift change. For example:

- Columns and vessels – Inspect lagging, passive fire protection, identification labels, degradation, leaks and level/pressure transmitters/indicators working.
- Pumps – Excessive noise, leaks, oil levels, lagging, acoustic hoods in place, seal pot pressure/level and spare pump available.
- Compressors – Excessive noise, leaks, oil levels and lagging.
- Tanks - Inspect lagging, identification labels, degradation, leaks, level/pressure transmitters/indicators working and bunds not full of rainwater.
- Heat exchangers - Leaks, degradation, excessive noise and high temperatures.

In addition, many processes are constantly electronically monitored, and loss of pressure or product would be identified by control room staff almost immediately.

4.3 INTEGRITY MANAGEMENT

Integrity Management Services are provided to eni LBOC by an independent UKAS accredited in-service inspection body. They follow a planned schedule of inspections in order to satisfy

the Pressure Systems Safety Regulations. Systems checks include bunds, which are subject to a walkover and visual inspection for mechanical degradation periodically. The frequency and extent of inspection is dependent on the criticality of a piece of equipment, the properties of the process fluid and the consequence of failure. Additionally a competent contractor performs 3-monthly thermography scans of hot tanks/vessels to identify the formation of hot-spots leading to potential loss of containment.

Sump systems have a 10-year inspection schedule, involving emptying, cleaning, inspecting and possibly an ultrasound scan, depending upon the risks identified.

Condensate, oily water waste and incoming gas pipelines are subject to a separate detailed programme of inspection, including use of corrosion inhibitor and intelligent pigging.

The site preventative maintenance philosophy procedure number is H-000-XB-001.

4.4 ENVIRONMENTAL MANAGEMENT SYSTEM

eni LBOC has an ISO14001 EMS, certified by Lloyd's Register Quality Assurance, which includes all attributes of this SPMP. The EMS describes the planned preventive maintenance programme and the planned inspection and testing programme, for environmental aspects.

4.5 TRAINING

Personnel responsible for sampling, maintenance and inspection are appropriately competent. A HSE Training Matrix is in place identifying all competency requirements, in additional to individual training records.

The site induction programme covers general environmental awareness, chemical handling (H-000-BG-004 and H-100-WO-025) and spill procedures (H-100-WZ-006).

5 Assessment and Reporting Processes

5.1 ASSESSMENT PROCESS

There is a system in place for the regular assessment, recording and reporting of environmental monitoring results for the purposes of demonstrating continued compliance with Environmental Permit conditions.

5.2 REPORTING PROCESS AND DATA MANAGEMENT

Summaries of environmental monitoring data for the site are submitted annually to NRW during January/February:

- PI/REPI
- OPRA
- PPC Report
- EEMS

Records are retained as per the Environmental Management Records Procedure, H-000-BG-008.

6 Conclusion

Implementation of this Site Protection and Monitoring Plan ensures (as far as is practicable) that pollution prevention measures in place are sufficient to prevent the emission of pollutants to land, water and air from the eni LBOC POA Gas Terminal.

Historic records demonstrate the effectiveness of these pollution prevention measures, and hence their continued suitability throughout the future life of the installation, considering that there are no planned changes to the site layout or processes.

Records also demonstrate that adequate maintenance, inspection and testing of infrastructure are in place, to protect the environmental from accidental releases, and to ensure compliance with Environmental Permit conditions.

7 2014 IED Requirement

eni LBOC note the NRW Industrial Emissions Directive (IED) requirement, as described in a letter of 24th January 2014:

Periodic monitoring shall be carried out at least once every 5 years for groundwater and 10 years for soil, unless such monitoring is based on a systematic appraisal of the risk of contamination.

Compliance with this requirement will be described in the 2018 update to this SPMP.