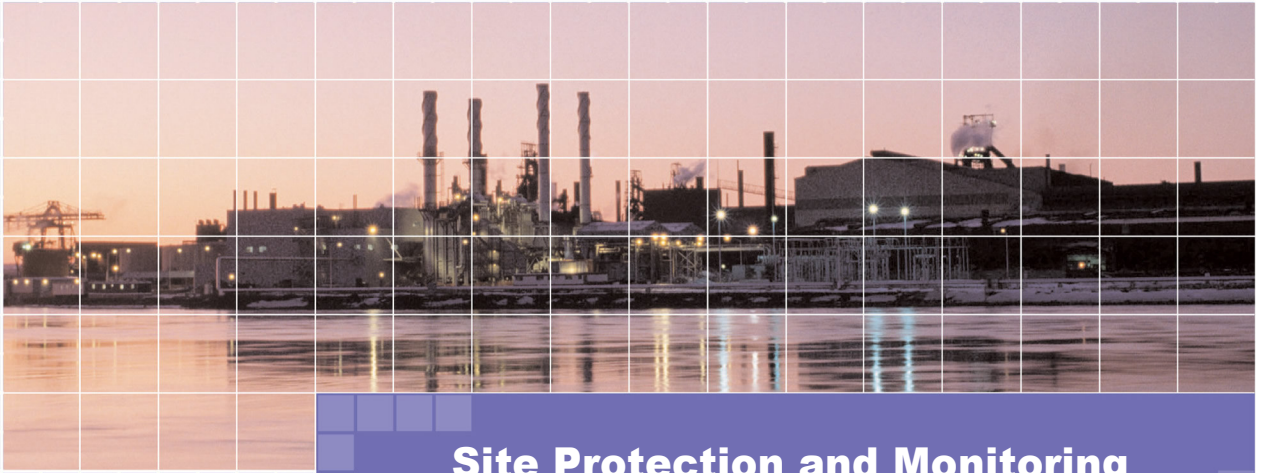




Site Protection and Monitoring Programme

South Hook LNG Terminal Company Ltd

September 2008

QM

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
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Executive Summary

This document represents the design Site Protection and Monitoring Programme (SPMP) for South Hook LNG Terminal Company Ltd, Milford Haven, Pembrokeshire required to be submitted to the Environment Agency (Wales) in pursuance of the requirements of Permit No. XP3538LD (the "Permit") authorising the operation of a Liquefied Natural Gas (LNG) terminal to receive, store and vaporise LNG (the "installation").

This document is required to be submitted to the Environment Agency (Wales), in accordance with South Hook's Environmental Permit.

An intrusive investigation for the SPMP is not required as the installation is new and will be constructed in accordance with BAT standards. Therefore on-going environmental monitoring will not be conducted. However, intrusive investigations were carried out prior to, during, and after site preparation, so site baseline data is available for future reference. Groundwater quality monitoring was also carried out as required by the Planning Approval.

The testing, inspection and maintenance programme for pollution prevention infrastructure at the site (the Infrastructure Monitoring Programme) has been designed and is detailed in Section 3.4 and **Appendix B**.



1 Introduction

South Hook LNG Terminal Company Ltd (hereafter known as SHLNG) is required to produce a Site Protection and Monitoring Programme (SPMP) for their Liquefied Natural Gas (LNG) terminal near Milford Haven, Pembrokeshire. The terminal will receive, store and vaporise LNG for supply of gas to the National Transmission System (NTS). This SPMP has been produced by WSP Environmental Limited on behalf of the applicant SHLNG, in accordance with the requirements of their Environmental Permit (Reference Number XP3538LD) issued under the Environmental Permitting (England and Wales) Regulations 2007.

This document is intended to be read in conjunction with the following supporting documents:

- Application Site Report (ASR), dated September 2008
- PPC Application Permit XP3538LD, issued 13th June 2006
- PPC Permit Variation XP3535ME, issued 19th May 2008

1.1 SITE LOCATION

The installation is located at:

South Hook LNG Terminal Company Ltd

Dale Road

Hubberston

Milford Haven

Pembrokeshire

SA73 1DR

The centre of the site is at National Grid Reference SM 875 064

The site covers an area of approximately 210 hectares, with the storage and processing of LNG undertaken in Zone 1, the ancillary materials and waste oil stored in Zone 2, and the transformers and jetty situated in Zones 3 and 4, respectively. A site plan can be seen in **Appendix A**.

1.2 DETAILS OF THE INSTALLATION

At the time of writing, the SHLNG installation was in the construction phase with the anticipated date for completion being September 2008. The following information was extracted from the Environmental Permit.

The installation is situated on the site of a former oil refinery and is surrounded predominantly by countryside with a few isolated, major industrial developments in the Milford Haven area.

The installation is a LNG terminal designed to receive, store and vaporise LNG for eventual supply to the National Transmission System (NTS). The terminal will act as a base load facility, meaning a facility that will operate throughout the year rather than on a seasonal basis. Consequently, with the exception of unloading activities, the plant will operate continuously.



LNG will be transported from Qatar to the terminal in specially designed ships. The ships will dock at the jetty head and the LNG will be pumped from the ship cargo tanks to the five LNG storage tanks.

LNG is vaporised for supply to the national gas transmission system. Reheat from about -161°C is achieved by burning a proportion of gas in submerged combustion vaporisers (SCVs). With this technique, gas is burnt and the combustion gases are passed through a volume of water. The cold LNG then enters the pipework which is immersed in the warm water bath, and exits the facility as ambient temperature gas. The combustion products from burning the gas passes to atmosphere through 24 metre high stacks.

Initially 8 SCVs will be installed, a further 7 units being added as part of the expansion phase. There will be releases to atmosphere of oxides of nitrogen from the SCVs.

A small amount of nitrogen is added to the natural gas to meet the specifications for domestic gas supply. This nitrogen is added before the natural gas enters the national gas transmission system.

Excess water produced by the SCVs will be neutralised using sodium hydroxide, and discharged directly to the Haven at the jetty head, about 1km from the foreshore. Site surface water will pass through interceptors, and discharge into the Haven close to the foreshore.

A flare is provided to burn the gas produced during commissioning activities, but will otherwise only be required in exceptional circumstances.



2 Objectives

The objectives of this report are:

- To design a monitoring programme for the installation to:
 - Monitor the effectiveness of pollution prevention infrastructure and provide early warning of any release of polluting substances to ground or groundwater.
- To review and if necessary amend the inspection, testing and maintenance programme for pollution prevention infrastructure at the installation to ensure their continued integrity.



3 Monitoring Programme

3.1 OBJECTIVES OF THE MONITORING PROGRAMME

3.1.1 Objectives of the Environmental Monitoring Programme

An Environmental monitoring programme is not required for the SHLNG site as the installation is new and will be constructed in accordance with BAT standards. It is therefore not considered necessary to undertake an intrusive investigation to obtain reference data for the site and as a result on-going environmental monitoring will not be conducted.

3.1.2 Objectives of the Infrastructure Monitoring Programme

To test the integrity of the pollution prevention infrastructure and to evaluate the monitoring, inspection and testing programme in place to maintain the infrastructure as detailed in Sections 2.3.3 (Emissions to Water and Sewer) and 2.3.5 (Fugitive Emissions to Surface Water, Sewer and Groundwater) of the IPPC application.

3.2 ENVIRONMENTAL MONITORING INFRASTRUCTURE

It is not proposed to undertake an intrusive investigation as the SHLNG installation is new and will be constructed in accordance with BAT standards to minimise the likelihood of pollution associated with the activities to be undertaken on site.

Intrusive investigations were carried out prior to, during, and after site preparation, so site baseline data is available for future reference. Groundwater quality monitoring was also carried out as required by the Planning Approval.

3.3 ENVIRONMENTAL MONITORING PROGRAMME

A detailed current site baseline is already available, so it is not considered necessary to undertake further intrusive investigations and therefore on-going environmental monitoring will not be undertaken for the purpose of the SPMP.

However, groundwater monitoring of boreholes and coastal springs will be carried out as part of the Environmental Management System. Any abnormal findings will be reported to the Environment Agency (Wales) and dealt with in accordance with the emergency reporting procedure with appropriate remedial action taken.

3.4 INFRASTRUCTURE MONITORING PROGRAMME

Infrastructure will be monitored as part of the Planned Maintenance Programme and Environmental Management Systems to be introduced on site.

Maintenance of plant and equipment will be essential to minimise environmental impact, ensure safe working of plant and equipment and to supply product to the required quality.

Activities, such as planned preventive maintenance, scheduled inspections and testing of equipment during normal operating conditions will be viewed as planned maintenance. Reactive maintenance activities will be performed as necessary following equipment breakdown, upset operating conditions and emergency situations and will be in accordance with relevant procedures.



Both the inspection programme and planned maintenance programme will be the responsibility of the Senior Environmental Engineer and Maintenance Supervisor. The programme will include the external inspection of all tanks, secondary containment, transformers, pipework, waste oil storage, concrete hardstanding and tarmac roadways.

Any waste generated by maintenance activities will be disposed of appropriately. Hazardous Waste will be contained and labelled and disposed of via a licensed contractor.

The infrastructure monitoring protocol is summarised in **Appendix B** and comprises the following inspection programmes:

Surfacing

Areas where potentially polluting materials are handled and stored will be covered with concrete hardstanding or tarmac.

To ensure the integrity of impermeable hardstanding and tarmac surfaces a programme of visual inspections will be carried out for defects that could allow liquid materials to migrate to soil. Due to the size of the site, it is proposed that high risk areas, where chemicals are handled, be subject to more regular inspections.

Visual inspection of chemical off-loading and storage areas will be undertaken once every four weeks with failures reported for corrective action.

Visual inspection of impermeable concrete hardstanding and tarmac road surfaces will be undertaken once every 12 weeks with failures reported for corrective action.

Subsurface Structures

Relevant subsurface structures include effluent drains, effluent lines, interceptors, settlement ponds, and storage area bunds, all of which are new.

Where practical, subsurface structures will be visually inspected from specific viewing points, including manhole covers.

The effluent monitoring programme ensures that discharges from pipework on site are regularly monitored. In addition to this, the groundwater monitoring programme is designed to detect fugitive emissions from site drainage.

Visual inspections of the discharge and subsurface infrastructure will be undertaken where practicable once every four weeks.

Secondary Containment

LNG Storage Tanks

The LNG tanks comprise of an inner tank and an outer tank which provides 100% containment in the event of leakage from the internal tank wall.

Continuous temperature monitoring and continuous liquid level monitoring is undertaken to identify any leak from the internal tank. In addition to this, a series of sensors and alarms are in place to detect potential releases or process variations.

LNG is not considered to be a polluting material in relation to potential ground contamination.



Infrastructure Monitoring Data

For infrastructure, an assessment of the potential for a failure of containment facilities will be undertaken. The assessment will be carried out by responsible persons with suitable technical and operational experience.

A summary of infrastructure monitoring data indicating any identified failures of pollution control measures and corrective actions will be held at site for inspection by the Environment Agency (Wales) on request, or reported to them under any subsequent agreement.

3.5.2 Reporting Procedure

In the event of an environmental incident, the Reporting and Notification procedures will be followed. Where necessary, the Environment Agency (Wales) will be informed of the incident and suitable data will be supplied if required.

Infrastructure monitoring will be recorded, as will summaries of any pollution incidents and failure of containment measures resulting in emissions.

Records of any pollution incidents or failure of containment measures resulting in emissions to land or groundwater will be submitted to the Environment Agency (Wales) in accordance with Section 5.1.4 of the PPC permit.

3.5.3 Reporting and Data Management

Any assessment sheets used for the infrastructure monitoring assessment and records of any pollution incidents will be stored appropriately in a secure location under the Environmental Management System.



4 References

Application Site Report, dated September 2008

PPC Permit Application, dated November 2003

Application Permit XP3538LD, issued 21st August 2006

PPC Permit Variation XP3535ME, issued 19th May 2008



5 Glossary

ASR – Application Site Report

BAT – Best Available Technique

EMS – Environmental Management System

LNG – Liquefied Natural Gas

NTS – National Transmission System

SCV – Submerged Combustion Vaporiser

TMSI – Terminal Management System for Continual Improvement



Appendix A Figures and Plans



Appendix B Inspection and Monitoring Protocols

Appendix B Infrastructure Monitoring Protocols

Infrastructure	Protocol	Area for Monitoring	Monitoring Frequency	Assessment Personnel
Surfacing	Visual inspection for defects that could allow liquid materials to migrate to soil.	Chemical offloading and storage areas	Once every four weeks	Operations and maintenance staff
		All other areas of hardstanding	Once every twelve weeks	Operations and maintenance staff
Sub Surface structures	Visual inspections of effluent drains, interceptors (via manhole), settlement ponds.	Access points to subsurface structures	Once every four weeks	Operations and maintenance staff
	Visual inspections of effluent, interceptors (via manhole) and settlement pond outflow.	Effluent discharge points W1 & W2.	Once every four weeks	Operations and maintenance staff
LNG tank secondary containment	Continuous liquid level and temperature monitoring to identify any leak from internal tank	LNG Tanks	Continuous	Operations and maintenance staff
Ancillary material storage tanks	Visual inspections of storage area and fuel tanks	Fuel and bulk chemical storage	Once every four weeks	Operations and maintenance staff
	Visual inspections of storage area and fuel bunds	Fuel and bulk chemical storage	Once every four weeks	Operations and maintenance staff
	Visual inspections of storage area and fuel pipework	Fuel and bulk chemical storage	Once every four weeks	Operations and maintenance staff