SOUTH HOOK
LNG TERMINAL COMPANY LTD

Mr Mark Broom
Technical Specialist Pollution Prevention & Control (PPC)
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Maes Newydd
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SA10 6JQ

Our Ref: SHLNG-TS-ENV-C-548

Your Ref: EPR/XP3538LD

Date: 26 January 2018

Dear Mr Broom,

Operator: South Hook LNG Terminal Company LTD.
IED Environmental Permit Number EPR/ XP3538LD
Condition 4.2.2(a) – Report on Review and Assessment of the Permit Monitoring Results - 2017

Please find enclosed the report on the review and assessment of the permit monitoring results for the South Hook LNG Terminal permitted installation over the previous year 2017, as required by the above permit.

Please do not hesitate to contact me should you have any queries.

Yours sincerely

Dr Shane Evans
Senior Environmental Engineer.

Attachments:

- Report on the review and assessment of the permit monitoring results over the year 2017.

cc. Mr Abdulla Al-Ghadid, Technical Services Manager.

Operator: South Hook LNG Terminal Company LTD.

Permit Number: EPR/XP3538LD

Installation: South Hook LNG Terminal

Condition 4.2.2(a) – Report on Review and Assessment of the Permit Monitoring Results 2017

Signed.....B Evans..... *Date*....26/1/2018.....
Dr Shane Evans, Senior Environmental Engineer.

(Authorised to sign as representative of Operator).

1.0 INTRODUCTION

South Hook LNG Terminal Company LTD operates in accordance with an EPR environmental permit, (Permit Number EPR/XP3538LD) under The Environmental Permitting (England & Wales) Regulations 2016, as amended.

Condition 4.2.2(a) of the EPR Permit requires the operator annually, to provide 'a review of the results of the monitoring and assessment carried out in accordance with the permit including an interpretive review of that data'.

This report presents the review of the results of the permit monitoring and assessments carried out in 2017, in compliance with the above permit condition.

2.0 INTERPRETATIVE REVIEW OF THE RESULTS FOR 2017

A review is presented below of the permit monitoring and assessment for releases to air and water in 2017, as permitted in Schedule 3 of the South Hook LNG Terminal Company LTD. EPR environmental permit to operate. Interpretation of the results was carried out in accordance with the relevant permit conditions, including the emission limit values (ELVs).

2.1 W1 Site drainage (Surface and Groundwater)

The emissions performance of the permitted site drainage discharge (emissions point reference W1) for 2017 is presented below:

2.1.1 pH

pH was monitored daily throughout 2017, in compliance with the permit. The pH data throughout 2017 were within the permitted ELVs, i.e. all results were found to be >6 and <9 pH units. The daily minimum and maximum pH recorded in 2017 were 7.0 and 7.9 pH units respectively. The main contributor to the site drainage (surface and groundwater) flow is rainfall related, so pH levels are not related to the permitted process.

2.1.2 Turbidity

No ELVs are specified for turbidity, in the EPR environmental permit. The average turbidity for 2017 was 2.1 nephelometric turbidity units (NTUs), whilst the maximum was 41 NTUs. Elevated turbidity is often associated with high rainfall (run-off) events, as expected.

2.1.3 Oil and Grease

A non-numeric condition (of no visible oil & grease) is specified in the EPR environmental permit (Number XP3538LD) issued on 14 October 2017. All visual assessments recorded "none visible" in 2017, in compliance with the permit.

2.1.4 Total Organic Carbon (TOC)

No ELVs are specified for TOC, in the EPR environmental permit. The maximum TOC result measured during 2017 was 12 mg/l; with an annual average of 2 mg/l. Review of the data indicated compliance with the permit.

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2.1.5 List 2 metals (copper, zinc, and iron only)

No ELVs are specified for List 2 metals (copper, zinc, and iron only), in the EPR environmental permit. List 2 metals were monitored monthly throughout 2017 and reported in compliance with the permit.

2.2 W2 (Process effluents)

The emissions performance of the permitted process effluents discharge (emissions point reference W2) for 2017 is presented below:

2.2.1 Flow Rate

Flow of the process effluents discharge (W2) was monitored continuously throughout 2017, in compliance with the permit. The ELVs for effluent flow volume and rate are <3500m3/day and <164m3/hour respectively. The maximum daily volume discharged and flow rate during 2017 were 745.03 m3/day and 114.78 m3/hour respectively. Review of the data indicated compliance with the permit. The effluent flow volume and rate were positively and directly correlated to production (of natural gas send out), as expected.

2.2.2 pH

pH of the process effluents discharge (W2) was monitored continuously throughout 2017, in compliance with the permit. The pH data throughout 2017 were within the permitted ELVs, i.e. all results were found to be >6 and <9 pH units. The daily minimum and maximum pH recorded in 2017 were 6.2 and 8.7 pH units respectively, with an annual daily average of 7.4 pH units. Review of the data indicated compliance with the permit.

2.2.3 Nitrates

Nitrates in the process effluents discharge (W2) was monitored throughout 2017, in compliance with the permit. The annual daily maximum nitrates concentrations and loads recorded during 2017 were 12 mgN/l and 7.5 kgN/day, whilst the annual daily mean nitrates concentrations and loads were 8.4 mgN/l and 2.10 kgN/day respectively. Therefore, the emissions of nitrates from the installation during 2017 were below the permitted ELVs, i.e. <50 mgN/l, and <100 kgN/day and <50 kgN/day annual mean. The emissions of nitrates from the installation were positively and directly correlated to production (of natural gas send out), as expected. Review of the data indicated compliance with the permit.

2.2.4 Oil and Grease

The results were as for W1, see section 2.1.3 above. All visual assessments in 2017 were "none visible" for oil and grease, in compliance with the permit.

2.2.5 Temperature

Temperature of the process effluents discharge (W2) was monitored continuously throughout 2017, in compliance with the permit. The maximum temperature recorded in 2017 was 26 C° on 5 August 2017. Review of the data indicated compliance with the permit.

2.2.6 BOD

No ELVs are specified for BOD, in the EPR environmental permit. BOD was monitored monthly throughout 2017, in compliance with the permit. During the period, the Terminal operated for extended periods at low, and sometimes minimum, send out, which were associated with variable and in some cases elevated BOD emissions in the SCV produced waters. However, in accordance with maintaining safe reliable (compliant) operations, the mass flows were also reduced, with no significant adverse effect on the environment. The

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maximum BOD recorded in 2017 was 75 mg/l, with an annual mean of 27mg/l. Review of the data indicated compliance with the permit.

2.1.7 Total Residual Oxidant (as total free Chlorine)

Total Residual Oxidant (as total free chlorine) was monitored monthly throughout 2017, in compliance with the permit. The ELV for total residual oxidant is 0.1mg/l. All results for 2017 were measured at <0.02mg/l, in compliance with the permit.

2.3 Emissions to air

2.3.1 Continuous Emission Monitoring (CEMS) NOx Emissions - SCVs A8 & A11

NOx emissions from SCVs A8 & A11 were monitored continuously whilst the SCVs were online throughout 2017, in compliance with the permit.

To support safe operations at minimum/low send out rates, the SCVs fitted with continuous emission monitoring systems (CEMS) for NOx have been unavailable, as follows:

- Minimum Send Out: between 24 January 2017 and 1 March 2017, and
- Minimum Send Out and to allow statutory internal inspections and essential maintenance: from 4 May for SCV2A and 10 May for SCV1H.

As per standard agreed procedures, during these periods NOx has been monitored discontinuously (DCM) every 12 hour shift on one SCV per train with inactive CEMS, and this is scheduled to continue until the SCVs with CEMS are returned to service.

The annual daily mean NOx concentrations for 2017 were 49.2 mg/Nm^3 for SCV A8 and 55.2 mg/Nm^3 for SCV A11 respectively. The emissions of NOx were not correlated to production (of natural gas send out), as expected. Review of the data indicated compliance with the permit.

2.3.2 Discontinuous (quarterly) NOx and CO Emissions - SCVs A1-A8 and A11-A17

During 2017, the National Physical Laboratory (NPL) carried out quarterly stack monitoring on behalf of the Company, in compliance with the permit. The monitoring programme that was implemented in 2017 is presented in Table 1 below:

Monitoring Period	SCV's monitored
1st Quarter 6th - 10th March 2017	12 SCV's monitored
2nd Quarter 8th – 11th May 2017	11 SCV's monitored
3rd Quarter 7th – 10th August 2017	10 SCV's monitored
4th Quarter 6th – 9th November 2017	10 SCV's monitored

Table 1 – Programme of quarterly stack monitoring undertaken by NPL during 2017

During the period, the Terminal operated for extended periods at low, and sometimes minimum, send out, which were associated with variable and in some cases elevated CO in SCV stack emissions. However, in accordance with maintaining safe reliable (compliant) operations, the mass flows were also reduced, with no significant adverse effect on the

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environment. Assessment of the results of the discontinuous monitoring campaigns that were undertaken during 2017 indicated compliance with the permit.

3.0 CONCLUSION

This report presents of the results of the permit monitoring and assessments carried out in 2017, in compliance with Condition 4.2.2(a) of the EPR environmental permit, (Permit Number EPR/XP3538LD). Interpretation of the results was carried out in accordance with the relevant permit conditions, including the emission limit values (ELVs).

The emissions performance of the site drainage discharge (emissions point reference W1) for 2017 is presented in section 2.1, whilst the emissions performance of the process effluents discharge (emissions point reference W2) for 2017 is presented in section 2.2. The emissions performance of the emissions to air is presented in section 2.3.

The assessment indicated that during 2017 the Company monitored in compliance with the permit. In addition, review of the emissions data indicated compliance with the permit. The data supports the environmental performance of the Company in 2017.

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