

Shell U.K. Limited Fife Natural Gas Liquids (FNGL) Plant

SEPA Initiated Variation Variation Number PPC/A/1013495 VAR02

Permit (Variation) Number: PPC/A/1013495 VAR02
Operator: Shell U.K. Limited PUBLIC

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1 NON TECHNICAL SUMMARY OF DETERMINATION

The two existing ground flares at the Mossmorran complex are located on the Shell operated Fife Natural Gas Liquids (FNGL) plant and are used by both sites. A new ground flare is currently under construction at the neighbouring Fife Ethylene Plant (FEP), which is due to become operational by April 2023. This new ground flare will only be connected to the FEP, leaving the existing Shell ground flares for their sole use.

The existing ground flares are approaching the end of their serviceable lives and Shell have committed to the procurement of a modern totally enclosed ground flare system by December 2025. This will meet the Best Available Technique (BAT) requirement for the Site as follows:

1. A minimum operational capacity of 54 tph for the gas compositions at the permitted installation.
2. Continuous monitoring and recording of gas flows to the ground flare system.
3. Continuous monitoring and recording of the composition of flare gas to the ground flare system.
4. A maximum ground flare noise of 85 decibels at 1 metre from the wind/noise barrier of the ground flare.
5. A smokeless capacity of 100%.
6. Availability of 99%.
7. A minimum combustion efficiency of 99%.

SEPA have reviewed the design and timeline for the project and are satisfied that the proposal is BAT and deliverable on time. This Variation will incorporate requirements for a detailed Project Plan to be provided to SEPA by 31 January 2023 and for the new ground flare to be operational by 31 December 2025.

SEPA is also taking the opportunity of this variation to introduce additional stack air emission testing requirements to recognised standards, as required by the Medium Combustion Plant Regulations. This will provide additional assurance that the air emissions are within the Permit limits.

A technical change to require a regular review of the Environmental Monitoring Plan every two years or following a significant change is also being introduced.

Glossary of terms

BAT	-	Best Available Techniques
CO	-	Coordinating Officer
ELV	-	Emission Limit Value
FNGL	-	Fife Natural Gas Liquids

2 EXTERNAL CONSULTATION AND SEPA'S RESPONSE

Is Public Consultation Required? No

Rest of table deleted

Officer: [REDACTED]

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3 ADMINISTRATIVE DETERMINATIONS
Determination of the Schedule 1 activity:
No change – The processing of natural gas liquids described as the purifying or refining of the products of an activity mentioned in paragraph (a) or its conversion to a different product – 1.2(f)
Determination of the stationary technical unit to be permitted:
No change
Determination of directly associated activities:
No change
Determination of 'site boundary'
No change
Officer: XXXXXXXXXX

4 INTRODUCTION AND BACKGROUND

4.1 Historical Background to the activity and variation

The two existing ground flares at the Mossmorran complex are located on the Shell operated Fife Natural Gas Liquids (FNGL) plant and are used by both sites. A new ground flare is currently under construction at the neighbouring Fife Ethylene Plant (FEP), which is due to become operational by April 2023. This new ground flare will only be connected to the FEP, leaving the existing Shell ground flares for their sole use.

The existing ground flares are approaching the end of their serviceable lives and Shell have committed to the procurement of a modern totally enclosed ground flare system by December 2025.

This Variation (VAR02) will incorporate requirements for a detailed Project Plan to be provided to SEPA by 31 January 2023 and for the new ground flare to be operational by 31 December 2025.

SEPA is also taking the opportunity of this variation to introduce additional stack air emission testing requirements to recognised standards, as required by the Medium Combustion Plant Regulations. This will provide additional assurance that the air emissions are within the Permit limits.

A technical change to require a regular review of the Environmental Monitoring Plan every two years or following a significant change is also being introduced.

4.2 Description of activity

The Fife Natural Gas Liquids (FNGL) Plant operated by Shell U.K. Limited, and the Fife Ethylene Plant (FEP) operated by ExxonMobil Chemical Limited are permitted as a single PPC installation. As the two plants are operated by separate operators, they have separate permits.

Natural Gas Liquids (gasoline, ethane, propane, and butane) are pumped along a pipeline to the FNGL plant from the St Fergus Gas Plant at Peterhead (also operated by Shell U.K. Limited). At the FNGL plant three separate modules carry out identical processes to separate the ethane, propane, and butane.

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Ethane is forwarded to the adjacent FEP, where it is converted to ethylene by steam cracking.

The products from the installation are transported by pipeline or road tanker, predominantly to the Braefoot Bay marine terminal operated by Shell U.K. Limited and ExxonMobil Chemical Limited near Aberdour in Fife, from where it is shipped to other locations. Some of the propane and butane produced is forwarded to the adjacent Avanti Gas facility who supply gas for heating. The Avanti Gas facility is not part of the PPC installation and does not carry out any PPC activities.

4.3 Outline details of the Variation applied for

This is a SEPA initiated variation, so no application was made. See section 4.1 for the areas covered by the variation.

4.4 Guidance/directions issued to SEPA by the Scottish Ministers under Reg.60 or 61.

The Environmental Protection (exclusion of information from registers) (Scotland) Direction 2007.

4.5 Identification of important and sensitive receptors

The Mossmorran Installation (FNGL and FEP) is located in Fife close to a number of communities including Cowdenbeath, Lochgelly, Auchtertool and Crossgates. Closer to the site there are a number of houses, farms and businesses.

The closest watercourse to the site is the Dronachy Burn which runs along the north side of the installation and receives emissions from both plants. The Dronachy Burn flows into the Raith Lake, which is used as a trout fishery, and then onto the Firth of Forth in the area of Kirkcaldy Sands. The Dronachy Burn also flows through the Auchtertool Linn wildlife site, a wooded gorge containing swamp areas. There are a number of other woodland areas in the vicinity, for example, Calais Muir, Humble Wood, Moss Easy and Townhill Muir.

5 KEY ENVIRONMENTAL ISSUES

5.1 Summary of significant environmental impacts

The new ground flare will result in reduced air emissions through improved combustion, lower noise output and reduce the use of the elevated flare.

The air monitoring requirement will not have any direct environmental impact but will provide assurance on process emission levels.

The change to the Environmental Monitoring Plan will not have any direct environmental impact.

5.2 Implications of the Variation on - Point Sources to Air

The two existing ground flares will be replaced by a single modern ground flare, which will also take the occasional, small routine gas flows which currently use the elevated flare. The new ground flare will operate to modern standards which includes a smokeless capacity of 100%, availability of 99% and a minimum combustion efficiency of 99%. As such the emissions from the Site of particulate and VOCs are expected to be reduced. The visibility of flaring will also come down.

5.3 Implications of the Variation on - Point Source Emissions to Surface Water and Sewer

None – the variation is to require (i) the installation of a new ground flare (ii) a requirement to carry out air emission monitoring and (iii) add in a review requirement to the Environmental Monitoring Plan.

5.4 Implications of the Variation on - Point Source Emissions to Groundwater

None – the variation is to require (i) the installation of a new ground flare (ii) a requirement to carry out air emission monitoring and (iii) add in a review requirement to the Environmental Monitoring Plan.

5.5 Implications of the Variation on - Fugitive Emissions to Air

None – the variation is to require (i) the installation of a new ground flare (ii) a requirement to carry out air emission monitoring and (iii) add in a review requirement to the Environmental Monitoring Plan.

5.6 Implications of the Variation on - Fugitive Emissions to Water

None – the variation is to require (i) the installation of a new ground flare (ii) a requirement to carry out air emission monitoring and (iii) add in a review requirement to the Environmental Monitoring Plan.

5.7 Implications of the Variation on – Odour

None – the variation is to require (i) the installation of a new ground flare (ii) a requirement to carry out air emission monitoring and (iii) add in a review requirement to the Environmental Monitoring Plan.

5.8 Implications of the Variation on – Management

None – the variation is to require (i) the installation of a new ground flare (ii) a requirement to carry out air emission monitoring and (iii) add in a review requirement to the Environmental Monitoring Plan.

5.9 Implications of the Variation on - Raw Materials

None – the variation is to require (i) the installation of a new ground flare (ii) a requirement to carry out air emission monitoring and (iii) add in a review requirement to the Environmental Monitoring Plan.

5.10 Implications of the Variation on - Raw Materials Selection

None – the variation is to require (i) the installation of a new ground flare (ii) a requirement to carry out air emission monitoring and (iii) add in a review requirement to the Environmental Monitoring Plan.

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5.11 Implications of the Variation on - Waste Minimisation Requirements

None – the variation is to require (i) the installation of a new ground flare (ii) a requirement to carry out air emission monitoring and (iii) add in a review requirement to the Environmental Monitoring Plan.

5.12 Implications of the Variation on - Water Use

None – the variation is to require (i) the installation of a new ground flare (ii) a requirement to carry out air emission monitoring and (iii) add in a review requirement to the Environmental Monitoring Plan.

5.13 Implications of the Variation on - Waste Handling

None – the variation is to require (i) the installation of a new ground flare (ii) a requirement to carry out air emission monitoring and (iii) add in a review requirement to the Environmental Monitoring Plan.

5.14 Implications of the Variation on - Waste Recovery or Disposal

None – the variation is to require (i) the installation of a new ground flare (ii) a requirement to carry out air emission monitoring and (iii) add in a review requirement to the Environmental Monitoring Plan.

5.15 Implications of the Variation on – Energy

None – the variation is to require (i) the installation of a new ground flare (ii) a requirement to carry out air emission monitoring and (iii) add in a review requirement to the Environmental Monitoring Plan.

5.16 Implications of the Variation for - Accidents and their Consequences

None – the variation is to require (i) the installation of a new ground flare (ii) a requirement to carry out air emission monitoring and (iii) add in a review requirement to the Environmental Monitoring Plan.

5.17 Implications of the Variation for – Noise

The new ground flare will have a requirement for maximum noise of 85 decibels at 1 metre from the wind/noise barrier. Accompanied by the closure of the two existing ground flares this is not expected to be audible off site.

5.18 Implications of the Variation for – Monitoring

The current air emission monitoring is carried out using a handheld device. This will be updated to the use of the recognised EN Standards for Nitrogen Oxides (NOx) and Carbon Monoxide (CO) on an annual basis, as required by the Medium Combustion Plant Directive (MCPD).

A regular review of the Environmental Monitoring Plan every two years or following a significant change has been introduced to reflect the changing nature of the Site's environment.

5.19 Implications of the Variation for – Closure

None – the variation is to require (i) the installation of a new ground flare (ii) a requirement to carry out air emission monitoring and (iii) add in a review requirement to the Environmental Monitoring Plan.

5.20 Implications of the Variation for - Site Condition Report (and where relevant the baseline report)

None – the variation is to require (i) the installation of a new ground flare (ii) a requirement to carry out air emission monitoring and (iii) add in a review requirement to the Environmental Monitoring Plan.

5.21 Implications of the Variation for - Consideration of BAT

The considerations of BAT for a ground flare at this site incorporated three elements:

1. Guidance and recent experience.
2. Sizing case.
3. Timeline.

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1. Guidance and recent experience

SEPA have been involved with two recent examples of ground flare replacement or enhancement, which has led to detailed consideration of BAT for this technology. Key guidance documents are the Refining of Mineral Oil and Gas and Common Waste Gas and Water (CWW) BAT Reference Documents (BREFS).

The agreed specifications from these documents and SEPA's experience elsewhere are:

1. A minimum operational capacity of 54 tph for the gas compositions at the permitted installation (see Sizing Case below for more detail).
2. Continuous monitoring and recording of gas flows to the ground flare system.
3. Continuous monitoring and recording of the composition of flare gas to the ground flare system.
4. A maximum ground flare noise of 85 decibels at 1 metre from the wind/noise barrier of the ground flare.
5. A smokeless capacity of 100%.
6. Availability of 99%.
7. A minimum combustion efficiency of 99%.

2. Sizing case

The existing ground flares have a combined capacity of 54 tph and this is an existing permit requirement. As part of the determination of this variation the case for this capacity was revisited. This was done by assessing the possible events on and off site that could lead to flaring. SEPA is satisfied that the existing size is suitable for all but the most significant events and will provide protection for the community from noise and light disturbance. It is therefore considered BAT for this Site.

3. Timeline

The timeline for the procurement and installation of the new ground flare is based upon a robust assessment of all the variables that can affect the delivery of a complex project like this. This includes a contingency for some delays of 25%. SEPA is satisfied that the proposed date of 31 December 2025 is deliverable and realistic and that all opportunities to bring this forward will be taken. A detailed Project Plan is required by 31 January 2023 and quarterly meetings will take place to update SEPA on progress.

Additionally, a demonstration has been made to SEPA that the existing ground flares will be able to continue to operate effectively until 31 December 2025 (in Shell only use from 01 April 2023). SEPA is therefore satisfied that there will not be a gap in ground flaring capability at the Site.

6 OTHER LEGISLATION CONSIDERED
<i>Nature Conservation (Scotland) Act 2004 & Conservation (Natural Habitats &c.) Regulations 1994</i>
Is there any possibility that the proposal will have any impact on site designated under the above legislation? No
Justification: the variation is to require (i) the installation of a new ground flare (ii) a requirement to carry out air emission monitoring and (iii) add in a review requirement to the Environmental Monitoring Plan.
Officer: XXXXXXXXXX

7 ENVIRONMENTAL IMPACT ASSESSMENT AND COMAH

How has any relevant information obtained or conclusion arrived at pursuant to Articles 5, 6 and 7 of Council Directive 85/337/EEC on the assessment of the effects certain public and private projects on the environment been taken into account?

N/A –the variation is to require (i) the installation of a new ground flare (ii) a requirement to carry out air emission monitoring and (iii) add in a review requirement to the Environmental Monitoring Plan.

How has any information contained within a safety report within the meaning of Regulation 7 (safety report) of the Control of Major Accident Hazards Regulations 1999 been taken into account?

N/A – the variation is to require (i) the installation of a new ground flare (ii) a requirement to carry out air emission monitoring and (iii) add in a review requirement to the Environmental Monitoring Plan.

Officer: [REDACTED]

8 DETAILS OF PERMIT

Do you propose placing any non-standard conditions in the Permit? Yes

In Interpretation of Terms the following is inserted:

“change in operation” has the same meaning as in the Regulations;

5.1.6 At least every two years, or following a change in operation, the operator shall carry out a review of the Environmental Monitoring Programme as required by Conditions 5.1.1, 5.1.2 and 5.1.3, and update as necessary. The reviewed plan must be reported to SEPA.

Do you propose making changes to existing text, tables or diagrams within the permit? Yes

Outline of change:

Table 2.1 - Reporting and Notification Requirements

Summary of Information to be Reported or Notified	Condition	Date/Within period/ Frequency to be Reported	Date First Report Due
EMP Review	5.1.6	At least every two years.	31 July 2024

Details including justification:

Changes to table 2.1 to reflect the updated reporting requirements.

4.3.14 By 31 January 2023, the Operator must submit, in writing to SEPA a project plan for a totally enclosed ground flare system for the Fife Natural Gas Liquids (FNGL) Plant, to meet the requirements of Condition 4.3.15. The plan shall cover all stages of design, procurement, installation and commissioning to the point of routine operation and identify key milestones and the critical path for completion.

Details including justification:

Changes to Condition 4.3.14 to reflect updated date.

4.3.18 From 31 December 2025 a new totally enclosed ground flare shall be operational and maintained to meet the requirements in Condition 4.3.15.

Details including justification:

New Condition 4.3.18 to reflect agreed installation date.

Table 4.2 - Emissions to Air Monitoring Requirements

Parameter	Emission point number	Spot Sampling (SS)		
		Standard	Frequency	Operational Mode
Oxides of Nitrogen	A01, A02 & A03	Direct measurement with portable Flue Gas Analyser	Monthly	Operational
Oxides of Sulphur	A01, A02 & A03	Direct measurement with portable Flue Gas Analyser	Monthly	Operational
Carbon Monoxide	A01, A02 & A03	Direct measurement with portable Flue Gas Analyser	Monthly	Operational

Details including justification:

Removal of out-of-date testing requirements.

Table 4.2 - Emissions to Air Monitoring Requirements

Parameter	Emission point number	Spot Sampling (SS)		
		Standard	Frequency	Operational Mode
Oxides of Nitrogen	A01, A02 & A03	BS EN 14792	Annual ¹	Operational
Oxides of Sulphur	A01, A02 & A03	BS EN 14791	Annual ¹	Operational
Carbon Monoxide	A01, A02 & A03	BS EN 15058	Annual ¹	Operational

Notes:

1. Required from 01 January 2023.

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Details including justification:

Changes to table 4.2 to reflect the updated monitoring requirements.

9 EMISSION LIMIT VALUES OR EQUIVALENT TECHNICAL PARAMETERS/ MEASURES

Are you are dealing with either a permit application, or a permit variation which would involve a review of existing ELVs or equivalent technical parameters? No

Justification: Not applicable

10 PEER REVIEW

Has the determination and draft permit been Peer Reviewed? Yes

Name of Peer Reviewer and comments made: [REDACTED]

Response from Co-Ordinating Officer: Satisfied that proposal meets BAT and the timeframe is justified based on current position of project.

11 FINAL DETERMINATION

Issue variation to Permit PPC/A/1013495 VAR02

Based on the information available at the time of the determination SEPA is satisfied that

- The applicant will be the person who will have control over the operation of the installation.
- The applicant will ensure that the installation plant is operated so as to comply with the conditions of the Permit.

Officer: [REDACTED]

12 REFERENCES AND GUIDANCE

Refining of Mineral Oil and Gas BAT Conclusions – October 2014

Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector BAT Conclusions – June 2016

AECOM Review of Ground Flare Capacity Cases and BAT Report – dated 07 April 2022

FNGL Ground Flare Capacity Technical Note – dated 17 February 2022