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**15 April 2026**

**Mossmorran & Braefoot Bay Independent Air  
Quality Expert Advisory Group**

**2025 Annual Report**

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## **Mossmorran & Braefoot Bay Independent Air Quality Expert Advisory Group**

We provide advice and recommendations to Fife Council regarding the monitoring of air emissions arising from the operations at the Mossmorran Complex and the Braefoot Bay Marine Terminal facilities (Mossmorran and Braefoot Bay facilities) (operated by Shell UK Limited (Shell) and ExxonMobil Chemical Limited (ExxonMobil)). We do this by independently reviewing air quality data collected from several sources as well as considering the potential impact that any major plant changes could have on air quality. We produce annual reports to present our findings of the review and any recommendations we may have.

Following a review by Fife Council in 2020 (See section 1.2) the group was reconstituted as the Mossmorran and Braefoot Bay Air Quality Expert Advisory Group (AQ EAG). This report has been produced by the AQ EAG.

Related URLs:

Fife Council Annual Air Quality Progress Report 2025 is available at the Fife Council Air Quality Webpage in Publications Section at:

<https://www.fife.gov.uk/kb/docs/articles/environment2/environmental-health/air-quality>

Scottish Environment Protection Agency (SEPA) Mossmorran and Braefoot Bay Website

<https://beta.sepa.scot/local-environmental-issues/mossmorran/>

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## KEY FINDINGS AND RECOMMENDATIONS

Overall, based on the data available from SEPA for 2025, emissions from the Shell and ExxonMobil facilities at Mossmorran and Braefoot Bay have not resulted in exceedances of the Scottish statutory air quality objectives for the monitored pollutants, indicating that air pollution in the region has not reached levels considered harmful to the community. It was observed that the PM<sub>10</sub> Daily Air Quality Standard (AQS) of 50 µg m<sup>-3</sup> (which should not be breached more than seven times in a year) was exceeded up to a maximum of four times by an individual monitoring station, with these elevations believed to be caused by a transboundary event, specifically Saharan dust transport. The group recommends that the AQ EAG continue to review information provided from Fife Council's air quality network, from SEPA and data from INEOS with respect to the Mossmorran and Braefoot Bay facilities in future years.

The Mossmorran & Braefoot Bay Air Quality Expert Advisory Group (AQ EAG) advises Fife Council regarding the air quality monitoring and related health impacts arising from operations at the Mossmorran and Braefoot Bay facilities. Shell UK Limited (Shell) and ExxonMobil Chemical Limited (ExxonMobil) operate these facilities, which are named the Shell Fife Natural Gas Liquids (FNGL) Plant and the ExxonMobil Fife Ethylene Plant (FEP) in this report.

The AQ EAG reviews air quality data collected from various sources, including air monitoring data from Fife Council, SEPA, INEOS, and emissions monitoring by ExxonMobil and Shell, as required by their permit.

The AQ EAG also considers the potential impact that any major plant changes could have on air quality and liaises with representatives from community councils and the local health service.

Flaring, undertaken to protect plant safety during maintenance work and network disruption, has been of concern to nearby communities. Both companies make efforts to minimise the flaring required.

In April and May 2025, Shell FNGL reported planned flaring during safety critical planned shutdown and maintenance activities.

Air monitoring by SEPA around the Mossmorran and Braefoot Bay facilities, along with other sources of air quality data from Fife Council and INEOS did not indicate any exceedances of air quality standards at ground level from flaring events in 2025.

Fife Council is required to periodically review and assess air quality in its area to ensure air quality standards and objectives for specific pollutants are not exceeded. For the Mossmorran and Braefoot Bay facilities, this process includes taking account of the AQ EAG findings. Both facilities are also regulated by the Health and Safety Executive (HSE), which is responsible for the regulation and enforcement of workplace health, safety and welfare. The HSE is also part of the Competent Authority (with relevant environmental agencies), which regulates issues concerning the health and safety of people on and off site under the Control of Major Accident Hazard Regulations 2015.

# 1 BACKGROUND

## 1.1 WHAT ARE THE MOSSMORRAN AND BRAEFOOT BAY FACILITIES?

Shell UK Limited (Shell) operates the Fife Natural Gas Liquids (FNGL) plant, which uses natural gas liquids pumped from the St Fergus gas plant at Peterhead, separating natural gasoline, ethane, propane and butane. These products are key raw materials for a range of everyday items used by the general public and businesses. The plant at Mossmorran comprises three identical process units that are fed directly from the pipeline. Large atmospheric pressure tanks store propane, butane and gasoline. Underground pipelines supply these products to the Braefoot Bay deep-water loading facility, where they are loaded on to tankers. The Shell FNGL plant also supplies approximately 10% of propane and butane it produces to the adjacent Avanti Gas Road Loading Terminal.

The neighbouring Fife Ethylene Plant (FEP) operated by ExxonMobil Chemical Limited (ExxonMobil) takes the ethane gas from Shell FNGL, and creates ethylene, a much higher value product used to manufacture many plastics. ExxonMobil FEP is permitted to produce 820,000 tonnes of ethylene per year and is one of approximately 40 ethylene crackers in Europe.

## 1.2 WHO ARE THE MOSSMORRAN & BRAEFOOT BAY INDEPENDENT AIR QUALITY EXPERT ADVISORY GROUP?

In 2020, at a meeting of the Environment and Protective Services Subcommittee of the Fife Council (17 September 2020), the recommendation was made that the Mossmorran and Braefoot Bay Community and Safety Committee would be the recognised forum for community oversight. This would be an umbrella committee where issues or concerns from the community could be raised. Three Expert Advisory Groups would be formed under this committee: one on air quality; one on noise, light and vibration; and one on communications. These groups would carry out tasks assigned by the Mossmorran and Braefoot Bay Community and Safety Committee. These tasks include the generation of this report, which is completed independently. The final report is then sent to the Community and Safety Committee.

The Air Quality Expert Advisory Group (AQ EAG), formed in 2021, replaces the Mossmorran & Braefoot Bay Independent Air Quality Monitoring Review Group (Review Group), formed to provide advice and recommendations to Fife Council regarding the monitoring of air emissions arising from the operations at the Mossmorran and Braefoot Bay facilities. Membership of the AQ EAG in 2025 is provided in APPENDIX 1.

## 1.3 WHO PAYS FOR THE AQ EAG'S WORK?

Since the Mossmorran and Braefoot Bay facilities were given planning permission in 1977, the operators of the complex have paid for the costs of a consultant to produce annual independent air quality reports. Despite the relevant planning records no longer being available, it is standard practice for Fife Council to request the developer to fund liaison groups and any reporting required for similar developments. The funding model shall therefore continue on this basis and be the subject of review by the AQ EAG as appropriate.

This report and its summary are independently developed by the Institute of Occupational Medicine (IOM) for the AQ EAG as required under the planning permits for FEP and FNGL and financed by site operators. This summary has been approved by the Mossmorran and Braefoot Bay Community and Safety Committee's Expert Advisory Group on Communications.

Fife Council covers costs of the administration of the Committee and constituent groups including the AQ EAG. Other members of the AQ EAG are employed and funded by the organisations they represent.

#### **1.4 WHAT ARE THE AIMS OF THE AQ EAG ANNUAL REPORT?**

The aims of this Annual Report are to:

- Outline any substantive changes in the facilities at Mossmorran and Braefoot Bay and any potential to impact on local air quality
- Describe any changes in air quality regulation and changes in knowledge on health effects of possible emissions from the facilities
- Comment on the emissions from the facilities
- Summarise the available data on flaring
- Review other information about local air quality, including monitoring data from the area
- Detail any advice and recommendations the AQ EAG proposes

A summary of relevant ongoing initiatives and plant updates that have occurred are also included.

#### **1.5 HOW DOES THE AQ EAG UNDERTAKE THEIR ROLE?**

The constitution and terms of reference outline the approach taken to the AQ EAG's work. The AQ EAG's focus is to review data surrounding air quality issues of relevance within the local communities. The aims and objectives of the group include provision of independently reviewed advice, consideration, advisory and recommendation on outcomes of monitoring data, and submission of reports to the Mossmorran and Braefoot Bay Community & Safety Committee. More information regarding the AQ EAG, and the new terms of reference, can be found in APPENDIX 2.

#### **1.6 HOW DOES THE AQ EAG MAINTAIN THEIR INDEPENDENCE?**

The AQ EAG provides advice and recommendations to Fife Council. At each AQ EAG meeting, members are requested to declare any conflicts of interest. None were declared during the reporting period. Minutes are taken at each AQ EAG meeting, with copies of these publicly available on the Fife Council website ([www.fife.gov.uk/airquality](http://www.fife.gov.uk/airquality)).

ExxonMobil and Shell provide information from their facilities and have the opportunity to provide comment on draft versions of the report. The AQ EAG reserves the right to take these comments into account (or otherwise) when finalising their report.

The AQ EAG has engaged IOM as an independent consultant to gather information, evaluate, and produce the air quality report. IOM works with the AQ EAG on the final content of the report.

IOM declares that there were no conflicts of interest in the preparation of this report.

The responsibility for the content of the AQ EAG annual report lies solely with the AQ EAG.

### **1.7 WHAT MEETINGS DID THE AQ EAG PARTICIPATE IN DURING 2025?**

The AQ EAG did not meet formally during the calendar year 2025. The content, reporting structure and technical scope of the annual air quality review have been well-established for several years, and no substantive methodological or regulatory changes were introduced during the period. As such, routine review activities were undertaken via email correspondence, which was considered proportionate and sufficient. A formal meeting will be reconvened when emerging issues or significant changes require collective expert discussion.

The action points from meetings in previous calendar years are available on the Fife Council Mossmorran and Braefoot Bay Air Quality website:

<https://www.fife.gov.uk/kb/docs/articles/environment2/environmental-health/mossmorran-and-braefoot-bay>

## **2 SUBSTANTIVE CHANGES IN THE FACILITIES THAT MAY IMPACT ON LOCAL AIR QUALITY**

### **2.1 WHAT CHANGES HAVE BEEN REPORTED BY THE FACILITIES THAT COULD IMPACT ON LOCAL AIR QUALITY?**

There were no major changes to the ExxonMobil FEP or Shell FNGL during 2025 that would be anticipated to adversely affect local air quality.

### **2.2 WHAT ARE THE AQ EAG'S COMMENTS AND RECOMMENDATIONS (WHERE RELEVANT)?**

The AQ EAG will continue to outline any substantive changes in the facilities at Mossmorran and Braefoot Bay and any potential they might have to impact on local air quality.

### 3 AIR QUALITY INDICATORS REVIEWED

#### 3.1 WHAT ARE THE POLLUTANTS REVIEWED?

The burning of fuel results in the release of a number of pollutants, which are described in this section. For more information on air pollutants, please see <http://www.scottishairquality.scot/air-quality/pollutants>. The pollutants described in this report are primarily of interest because of their potential to affect health. This report does not include greenhouse gas emissions, as those are primarily related to climate change.

Soot occurs when there is not enough oxygen to burn the fuel completely. Smoke is a collection of these tiny, unburned soot particles. Smoke has regulated consent limits during normal operation at the Mossmorran and Braefoot Bay facilities, measured as PM<sub>10</sub>.

*Particulate Matter (PM)*: is the term used to describe solid or liquid particles suspended in the atmosphere<sup>1</sup>. Particle size affects how deep a particle can penetrate into the lungs and be absorbed. Particles can be generated mechanically (e.g. dust from vehicle tyres driving over roads), through combustion (e.g. burning wood or fuel) or through chemical reactions. Particles may also be made of or carry substances which affect health.

- *PM<sub>10</sub>*: This is particulate matter with a diameter of less than 10 µm. PM<sub>10</sub> are defined by international convention as being able to be deposited in the lung. Because it has the potential to cause effects on health, it is regulated in the UK and must meet a certain level.
- *PM<sub>2.5</sub>*: This is particulate matter with a diameter of less than 2.5 µm. These particles can penetrate even deeper into the lung and blood. This is also sometimes called 'fine particulate matter' and has been associated with various health impacts. Fine particles can cause inflammation and heart and lung diseases including impairing lung development in children. In addition, fine particles may carry surface-absorbed carcinogenic compounds into the body.

*Nitrogen dioxide (NO<sub>2</sub>)*: This gas is produced by the reaction of oxygen and nitrogen during combustion. Vehicle emissions are a major source, especially in cities. Nitric oxide (NO) always occurs when NO<sub>2</sub> is formed. The two gases together are known as oxides of nitrogen, sometimes described in shorthand form as NO<sub>x</sub>. NO<sub>2</sub> may have adverse effects on the health of the lung. NO<sub>2</sub> can irritate the lungs and lower resistance to respiratory infections such as influenza.

*Carbon monoxide (CO)*: This is a colourless, odourless gas produced by incomplete, or inefficient, combustion of fuel. It is predominantly produced by road transport, in particular petrol-engine vehicles. CO prevents the normal transport of oxygen by the blood.

*Sulphur oxides (SO<sub>x</sub>)*: Sulphur oxides are a group of chemicals that can be found in the air as gases and particles. SO<sub>x</sub> are produced when a fuel containing sulphur is burned. Sulphur dioxide (SO<sub>2</sub>) is the form which is of greatest concern to health. In the UK, the predominant source of SO<sub>2</sub> is power stations burning fossil fuels, principally coal and

<sup>1</sup>Scottish Environment Protection Agency. *Air quality monitoring at Mossmorran*. <https://beta.sepa.scot/local-environmental-issues/mossmorran/air-quality-monitoring>.

heavy oils. Widespread domestic use of coal can also lead to high local concentrations of SO<sub>2</sub>. SO<sub>2</sub> can cause irritation of the lungs and mucous membranes. Moderate concentrations of SO<sub>2</sub> may result in a fall in lung function in asthmatics. Tightness in the chest and coughing occur at high levels, and lung function of asthmatics may be impaired to the extent that medical help is required. SO<sub>2</sub> pollution is considered more harmful when particulate and other pollution concentrations are also high.

**Benzene:** This hydrocarbon is a minor component of petrol. Fuel distribution and car exhausts are the major contributors to benzene levels in the air, as well as industrial emissions. Benzene can also be produced from other sources of burning, such as fires and cigarette smoke. Benzene is no longer permitted to be used in consumer products. Benzene is a carcinogen, and air quality objectives are established to minimise this risk. Possible health effects that may result from long-term exposure to benzene include cancer, central nervous system disorders, liver and kidney damage, reproductive disorders, and birth defects.

**Volatile organic compounds (VOCs):** Carbon-based (or organic) chemicals that readily evaporate and are sometimes referred to as vapours. Many hydrocarbons, including benzene, butane, pentane and hexane are VOCs. Different VOCs are associated with different health effects; however, the health effects of some VOCs are not known. Total volatile organic compounds (TVOC) refer to the aggregate concentration of all VOCs.

### 3.2 HOW DO WE ASSESS AIR QUALITY?

Air quality is assessed by comparing against a range of health-effects based objectives. Objectives indicate the allowable exceedances of a standard. An air quality standard is the concentration recorded over a specified time period which is considered acceptable to health. In Table 3.1 3.1, the air quality standard is the 'Concentration' collected over the time period shown. The objectives are noted as the allowed number of exceedances in the 'Concentration' column. Further information on these can be found at <http://www.scottishairquality.scot/air-quality/standards>.

Table 3.1: Air quality objectives in Scotland (from Summary of Objectives of the National Air Quality Strategy, <http://www.scottishairquality.scot/air-quality/standards>)

Pollutant	Concentration	Measured as
PM <sub>10</sub>	50 µg m <sup>-3</sup> (not to be exceeded more than 7 times a year)	24 hour mean
	18 µg m <sup>-3</sup>	Annual mean
PM <sub>2.5</sub>	10 µg m <sup>-3</sup>	Annual mean
Nitrogen dioxide (NO <sub>2</sub> )	200 µg m <sup>-3</sup> (not to be exceeded more than 18 times a year)	1 hour mean
	40 µg m <sup>-3</sup>	Annual mean
Carbon monoxide (CO)	10 mg m <sup>-3</sup>	Running 8 hour mean
Sulphur dioxide (SO <sub>2</sub> )	266 µg m <sup>-3</sup> , not to be exceeded more than 35 times a year	15 minute mean
	350 µg m <sup>-3</sup> , not to be exceeded more than 24 times a year	1 hour mean
	125 µg m <sup>-3</sup> , not to be exceeded more than 3 times a year	24 hour mean
Benzene	3.25 µg m <sup>-3</sup>	Running annual mean
1,3-Butadiene	2.25 µg m <sup>-3</sup>	Running annual mean

Pollutant	Concentration	Measured as
VOCs	No specific limit	
Ozone	100 µg m <sup>-3</sup> not to be exceeded more than 10 times a year	8 hourly running

To provide information and advice to groups who may be affected by air pollution, in the UK most air pollution information services use the index and banding system approved by the Committee on Medical Effects of Air Pollutants<sup>2</sup> (COMEAP) called the Daily Air Quality Index (DAQI). The system uses a 1-10 index divided into four bands to provide more detail about the health risks of air pollution levels in a simple way, similar to the sun (UV) index or pollen index.

- 1-3 (Low) (shown in green)
- 4-6 (Moderate) (shown in yellow)
- 7-9 (High) (shown in red)
- 10 (Very High) (shown in purple)

Usually, the overall air pollution index for a site or region is calculated from the highest concentration of five pollutants:

- Nitrogen Dioxide (NO<sub>2</sub>)
- Sulphur dioxide (SO<sub>2</sub>)
- Ozone
- PM<sub>2.5</sub>
- PM<sub>10</sub>

However, where only limited pollutant concentrations are available (e.g. if only PM<sub>2.5</sub> or PM<sub>10</sub> monitoring is available) the concentration boundaries for the available pollutants are used to generate a DAQI.

Further information on how to use the DAQI along with health messages for at-risk groups and the general population can be found at <https://www.scottishairquality.scot/air-quality/daq>.

### 3.3 WHAT DATA ARE REVIEWED AND WHO PROVIDES THIS?

Table 3. 3.2 provides a summary of the data typically considered and the providers of this information for the 2025 Annual Report.

Table 3.2: Source of information considered by the AQ EAG

Data considered	Data provider
Carbon monoxide (CO) emissions	Shell and ExxonMobil
Sulphur oxides (SO <sub>x</sub> ) emissions	Shell and ExxonMobil
Nitrogen oxides (NO <sub>x</sub> ) emissions	Shell and ExxonMobil
PM <sub>10</sub> emissions	Shell and ExxonMobil
iso-butane, n-butane, iso-pentane, n-pentane, n-hexane, n-heptane, benzene, toluene, xylene and total hydrocarbons (C4-C10) ambient concentrations	INEOS Forties Pipeline System (FPS)
Flaring events (tonnage)	Shell and ExxonMobil
Air quality monitoring (PM <sub>10</sub> , PM <sub>2.5</sub> , NO <sub>2</sub> , O <sub>3</sub> , TVOC)	SEPA, Fife Council

<sup>2</sup> <http://comeap.org.uk/>

INEOS Forties Pipeline System (FPS) Ltd. provide data as they voluntarily commission the National Physical Laboratory (NPL) on an annual basis to monitor the ambient air hydrocarbon levels at 12 locations on the Forth Estuary coastline. The data in this report comes from data from INEOS presented in the Fife Council Air Quality Annual Progress Report.

In addition, Fife Council annually review and assess air quality in the Fife area and as part of this process the AQ EAG consider the latest Fife Council Air Quality Annual Progress Report<sup>3</sup>. The latest 2025 report includes the results of NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> monitoring undertaken at four automatic stations in Cupar, Kirkcaldy, Dunfermline and Rosyth; portable air quality monitoring (AQMesh units) at 10 sites and non-automatic monitoring using NO<sub>2</sub> diffusion tubes at 49 sites for calendar year 2024. Pollution from road vehicle emissions is a key air quality issue in Fife, with NO<sub>2</sub> and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) being the pollutants of primary concern. Fife Council's Air Quality Annual Progress Report 2025 identified no exceedances of all the relevant statutory Scottish air quality objectives (for NO<sub>2</sub>, PM<sub>10</sub> or PM<sub>2.5</sub>) objectives for calendar year 2024 at any of the four automatic monitoring stations (Cupar, Kirkcaldy, Dunfermline, Rosyth), ten portable air quality monitoring sites (AQMesh Units) and 49 NO<sub>2</sub> diffusion tube sites. Full datasets, including all monitoring site locations, graphs and tabulated results, are published within Fife Council's APR 2025 on the Council website<sup>4</sup>.

In September 2021, Fife Council revoked the NO<sub>2</sub> element of two air quality management areas (AQMA's) in the Fife area, one at Bonnygate, Cupar and the other in Appin Crescent, Dunfermline. These AQMA's have now both been fully revoked, with the PM<sub>10</sub> element being revoked in December 2023.

### **3.4 OZONE – IS THIS MONITORED AND IS IT A CONCERN?**

Stakeholders have previously expressed concern about ozone.

Ozone (O<sub>3</sub>) is not emitted directly from any man-made source in any significant quantities. In the lower atmosphere, O<sub>3</sub> is primarily formed by a complicated series of chemical reactions initiated by sunlight. These reactions can be summarised as the sunlight-initiated oxidation of VOCs in the presence of nitrogen oxides (NO<sub>x</sub>). The chemical reactions do not take place instantaneously, but can take hours or days, therefore ozone measured at a particular location may have arisen from VOC and NO<sub>x</sub> emissions many hundreds or even thousands of miles away. O<sub>3</sub> irritates the airways of the lungs, increasing the symptoms of those suffering from asthma and lung diseases<sup>5</sup>.

### **3.5 WHO HAS A REGULATORY ROLE IN RELATION TO THE MOSSMORRAN AND BRAEFOOT BAY FACILITIES?**

The Mossmorran and Braefoot Bay facilities need to comply with regulations which cover emissions that might affect air quality.

<sup>3</sup>Fife Council Annual Air Quality Progress Report 2025, approved by The Scottish Government and SEPA and published following relevant Council Committee approval on the 20th Jan 2026

<sup>4</sup> <https://www.fife.gov.uk/kb/docs/articles/environment2/environmental-health/air-quality>

<sup>5</sup> <http://www.scottishairquality.scot/air-quality/pollutants#ozone>

## **Pollution Prevention and Control (Scotland) Regulations 2012 ('the PPC Regulations')**

Both sites at Mossmorran and Braefoot Bay are permitted by SEPA under the Pollution Prevention and Control (Scotland) Regulations 2012 ('the PPC Regulations').

The PPC Regulations focus on emissions from the facility and use of Best Available Techniques ('BAT') by the operator. They require the operator to operate their installation in such a way that (a) all the appropriate preventative measures are taken against pollution, in particular through application of the best available techniques, and (b) no significant pollution is caused.

Permit conditions including Emission Limit Values (ELVs) are set to reflect BAT and to protect the environment and public health. Such conditions are set following consultation with the Local Authority and the relevant Health Board to ensure that any air quality or public health aspects have been included. SEPA's role thereafter is to ensure compliance with the permit conditions. Both Shell and ExxonMobil are required to provide monitoring data to demonstrate that ELVs are being met. Testing of emissions must conform to required standards and SEPA performs periodic compliance inspections to verify the quality and source of the data and can commission their own testing to verify results where required.

For airborne emissions from the Mossmorran and Braefoot Bay facilities, the Shell and ExxonMobil permits require that the emissions from the stacks (or chimneys) from furnaces, boilers and gas turbines are tested and analysed. The results of the periodic analysis are checked against defined emission limits, and the results and outcomes are reported to SEPA. If the results are within the consented limits, it indicates the plant is operating as designed. SEPA periodically reviews the emission limits to ensure alignment with BAT as required by legislation. If an emission limit is exceeded the cause is investigated and follow-up initiated to prevent reoccurrence.

In 2025 SEPA reviewed all returns from the Mossmorran and Braefoot Bay Sites provided under the Conditions contained in their PPC permits. No issues were identified that were considered to present a risk to Air Quality Standards.

## **Environmental Authorisation (Scotland) Amendment Regulations 2025 (EASR)**

From 1 November 2025, industrial activities are regulated under Environmental Authorisation (Scotland) Amendment Regulations 2025 (EASR). This replaces the PPC Regulations permitting for industrial activities. The EASR framework enhances SEPA's capacity to regulate emissions from the Mossmorran and Braefoot Bay facilities by introducing a single, consistent and more flexible permitting system, strengthened requirements for the application of BATs, clearer enforcement powers, and an improved ability to vary or tighten permit conditions. The framework also maintains the auditing of industrial emissions data. The practical implications for this change in 2025 were a change of Regulation name – existing permit requirements and ELVs as previously specified under the PPC Regulations, remain unchanged.

## **Control of Major Accident Hazard Regulations 2015 (the COMAH Regulations)**

The Control of Major Accident Hazard Regulations 2015 (the COMAH Regulations) are regulated jointly by the Health and Safety Executive (HSE) and SEPA as the Competent Authority.

### **Health and safety Regulations**

Shell FNGL and ExxonMobil FEP are required to comply with the Health and Safety etc. Act 1974, and associated Regulations, which are enforced by the Health and Safety Executive (HSE). These health and safety regulations apply to workplaces and are aimed at protecting the health of employees and non-employees.

### **Local Air Quality**

Fife Council is required by Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents to undertake a review and assessment of local air quality in their area to ensure prescribed air quality objectives and standards for Scotland<sup>6</sup> are not being exceeded.

### **Statutory nuisance**

Fife Council is responsible for regulating statutory nuisance, including light (in practice, also for odour and noise, where these are not covered by permit conditions enforced and issued by SEPA).

SEPA, Fife Council, NHS Fife and Public Health Scotland meet regularly and keep each other informed on what is happening at the Mossmorran and Braefoot Bay facilities and share the results of air quality monitoring, including running joint working groups when required. This:

- Supports Fife Council Local Air Quality Reviews;
- Combined with sharing information on community health concerns, allows NHS Fife to assess and report on the health impacts of flaring.

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<sup>6</sup><https://www.legislation.gov.uk/ukpga/1995/25/part/IV> <http://www.scottishairquality.scot/air-quality/standards>

## 4 FLARING

### 4.1 WHY IS FLARING NEEDED?

The flares at the Mossmorran and Braefoot Bay facilities are part of the safety system. Because gas is constantly flowing to the complex, it is necessary to send gas that cannot be processed to the flare for combustion. This might be due to scheduled maintenance requiring the plant to be 'gas free' prior to entry; or following an unplanned interruption in production. The flare systems include one 80-metre-high flare stack with three flare tips at Shell FNGL; one 100-metre-high flare at ExxonMobil FEP; two enclosed ground flares operated by Shell FNGL and one fully enclosed ground flare operated by ExxonMobil FEP.

In June 2023 a new ExxonMobil fully enclosed ground flare (EGF) became operational<sup>7</sup>. With a fully enclosed flare, the EGF is designed to reduce the levels of light, noise and vibration that can be associated with the exposed flare on an elevated unit. Since commissioning of the new ExxonMobil FEP ground flare the two ground flares operated by Shell have been primarily used by Shell FNGL and can still be used by ExxonMobil FEP if required. The new ground flare operated by ExxonMobil is only used by ExxonMobil FEP.

In April 2025 Shell UK submitted a Best Available Technology (BAT) Assessment to SEPA for managing the volumes flared at Fife NGL. It concluded there is no longer a requirement for a new ground flare at FNGL, and instead a programme to optimise the existing flaring infrastructure and identify opportunities to reduce emissions was implemented.

A new BAT Assessment was carried out due to the significant reduction in gas flared through the ground flares and rising costs associated with the construction of a new ground flare, since a BAT Assessment in 2019.

At both sites ground flares are used in preference to the high-level flares to minimise noise and light impacts for local residents. However, it is not always possible to avoid use of the elevated flare, and this may occur if the Shell FNGL ground flares are in use by ExxonMobil FEP, or any of the ground flares are restricted in capacity relative to the amount of gas needed to be flared.

During flaring, excess gas is combined with steam and air before being burnt off. This is accepted as industry best practice, producing water vapour and CO<sub>2</sub> when combustion is optimised. During a process upset, the ability to continue operating and the time it takes to start up and shut down are key elements that impact whether flaring occurs and for how long. Because feed rates have to be managed through the whole supply network up to the offshore platforms in the North Sea, upsets could have an impact on the natural gas supply for the whole of Scotland.

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<sup>7</sup><https://www.exxonmobil.co.uk/company/overview/uk-operations/fife-operations/news/2023-articles/enclosed-ground-flare-brought-online-at-fep>

## 4.2 WHAT FLARING TOOK PLACE DURING 2025?

In 2025, a total of 5,479 tonnes were flared in total. Around 85% of this flaring used the enclosed ground flares. Shell FNGL reported an increase in flaring during planned shutdown and maintenance activities in April and May 2025 (Table 4.1). This planned flaring used Shell FNGL's ground flares. No significant flaring events were reported by ExxonMobil FEP during 2025 (Table 4.2).

*Table 4.1: Quantities flared by Shell FNGL in 2025. Purge gas is needed to prevent the creation of a potentially combustible mixture in the system and pilot gas is to provide a supply of fuel gas to keep the pilots lit.*

Month	Ground Flaring (tonnes)		Elevated Flaring (tonnes)		Total (Ground and Elevated) (tonnes)	Reason for significant flaring events
	Flaring events	Pilot and Purge	Flaring events	Pilot and Purge		
<b>Jan</b>	4.0	146.8	1.1	20.5	172.4	N/A
<b>Feb</b>	1.6	124.6	0.4	18.5	145.1	N/A
<b>Mar</b>	29.6	130.4	0.7	20.5	181.2	N/A
<b>Apr</b>	85.5	276.9	1.0	19.8	383.2	Planned Module 1 decommissioning for Turnaround
<b>May</b>	97.3	211.6	2.6	20.5	332.0	Planned Module 1 recommissioning following Turnaround
<b>Jun</b>	0.0	75.7	19.4	19.8	114.9	N/A
<b>Jul</b>	0.0	60.5	5.3	20.5	86.3	N/A
<b>Aug</b>	0.0	0.0	6.4	20.5	26.9	N/A
<b>Sep</b>	0.0	0.0	6.2	19.8	26.0	N/A
<b>Oct</b>	0.0	0.0	11.6	20.5	32.1	N/A
<b>Nov</b>	0.0	0.0	18.0	19.8	37.8	N/A
<b>Dec</b>	0.0	0.0	5.7	20.5	26.2	N/A
<b>Total</b>	218.0	1026.7	78.4	240.9	1564.0	

Table 4.2: Quantities flared by ExxonMobil FEP in 2025. Purge gas is needed to prevent the creation of a potentially combustible mixture in the system and pilot gas is to provide a supply of fuel gas to keep the pilots lit.

Month	Ground Flaring (tonnes) (excl. pilot & purge)	Elevated Flaring (tonnes) (excl. pilot & purge)	Pilot & Purge (tonnes)	Total Flaring (tonnes)	Reason for significant flaring events
Jan	349	0	41	390	N/A
Feb	307	0	37	344	N/A
Mar	373	0	41	414	N/A
Apr	237	0	40	277	N/A
May	188	89	29	306	N/A
Jun	220	0	11	230	N/A
Jul	282	0	18	301	N/A
Aug	237	0	41	278	N/A
Sep	356	0	40	396	N/A
Oct	301	0	41	342	N/A
Nov	290	0	40	330	N/A
Dec	268	0	41	309	N/A
<b>Total</b>	<b>3407</b>	<b>89</b>	<b>419</b>	<b>3915</b>	

### 4.3 ARE THE QUANTITIES FLARED INCREASING OVER TIME?

Ground and elevated flare totals for both plants are shown in Figure 4.1 (Shell FNGL) Figure 4.1 and Figure 4.2 (ExxonMobil FEP)

Figure 4.2.

Figure 4.1: Total quantities (tonnes) flared annually at Shell FNGL

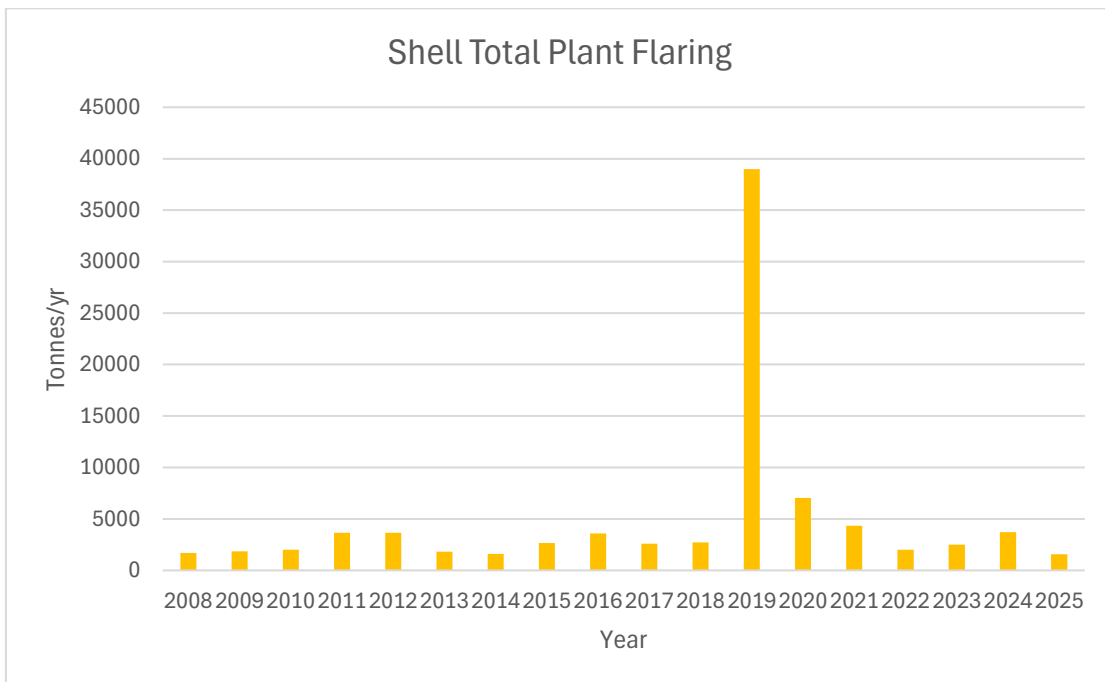
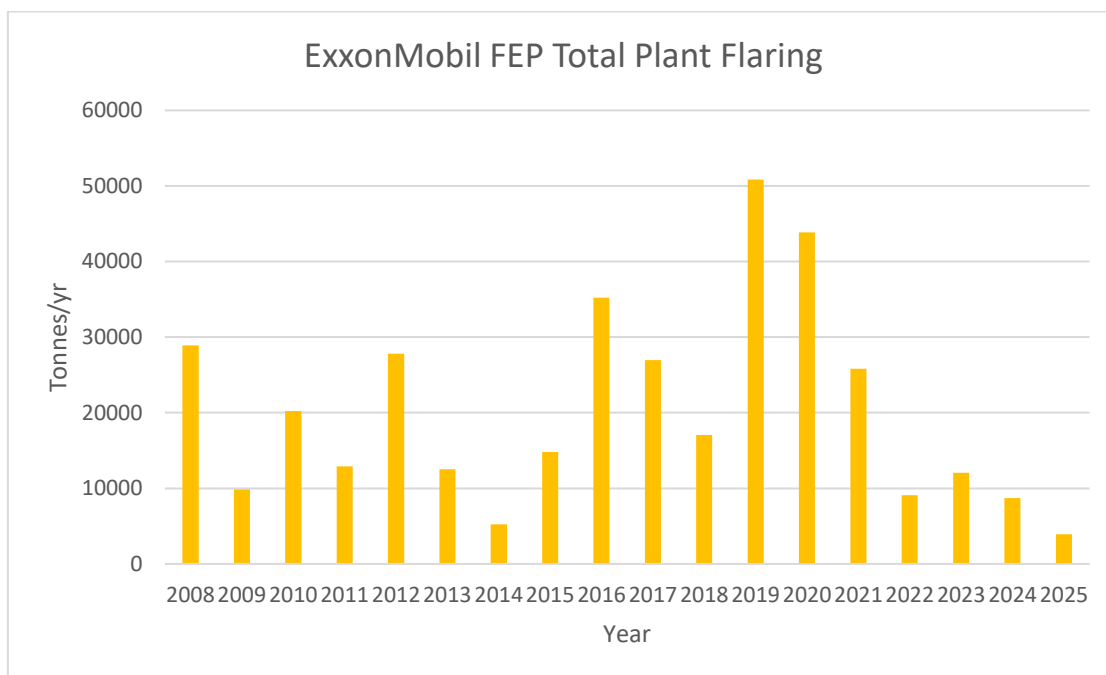


Figure 4.2: Total quantities (tonnes) flared annually at ExxonMobil FEP



For more information on flaring from both facilities, Figure 4.3 (for Shell FNGL) and Figure 4.4 (ExxonMobil FEP)

Figure 4.3 show the split of total flaring quantities between ‘planned flaring’ (associated with normal operations and maintenance) and ‘unplanned flaring’ (associated with events such as shutdown and start-up of equipment due to process upsets) as well as ‘external flaring’ (due to events out with the operators’ control e.g. closure of related facilities). Further information on the definitions can be found in APPENDIX 3. In 2019, a large amount of unplanned and external flaring occurred, and has much reduced in the last six years.

The relative difference in flaring quantities between the two facilities may be explained by the difference in requirements to shut down for maintenance. ExxonMobil FEP has one process line and therefore needs to shut down the facility for maintenance, resulting

in the need to flare, with larger quantities flared after the plant restarts. Shell FNGL has three lines, allowing them to perform maintenance without full facility shutdown.

Figure 4.3: Quantities flared by type of flaring at Shell FNGL (see Appendix 3 for flaring definitions specific to Shell FNGL)

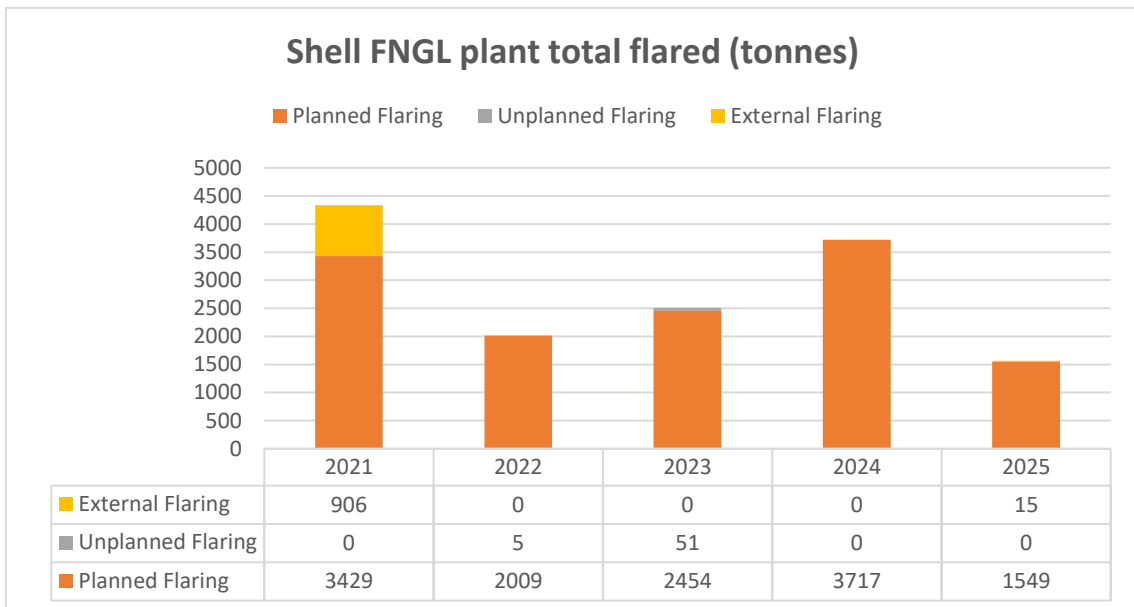
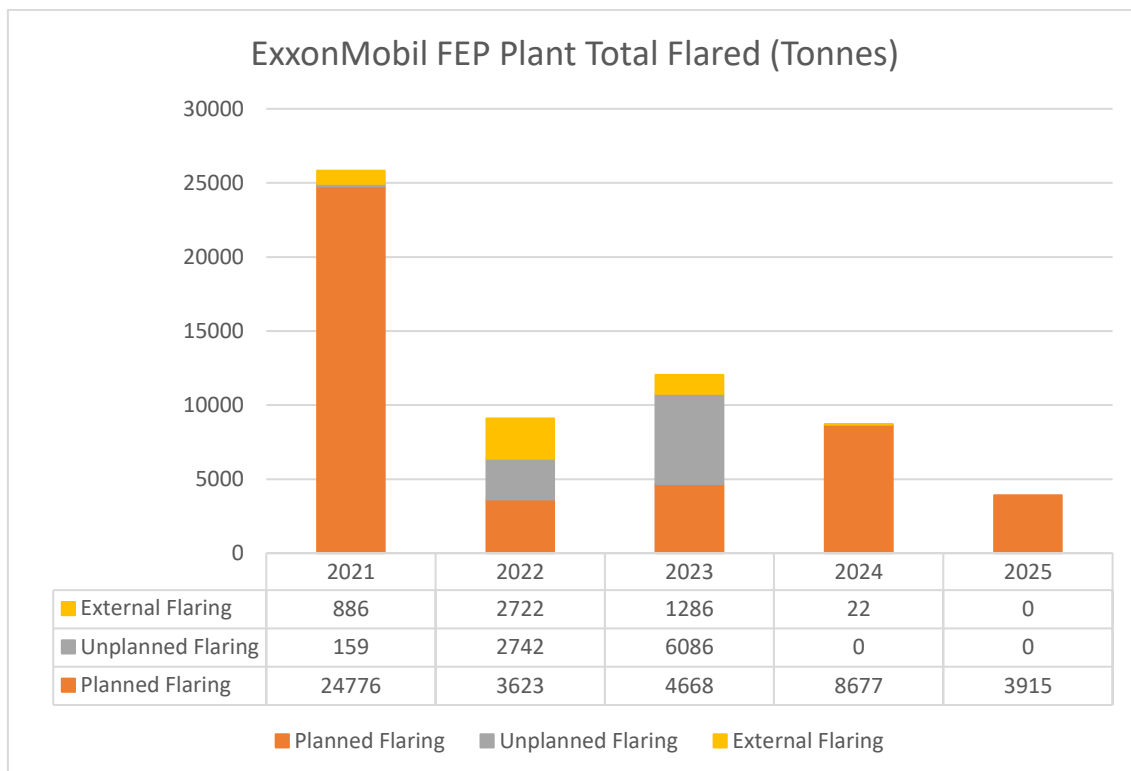


Figure 4.4: Quantities flared by type of flaring at ExxonMobil FEP (see Appendix 3 for flaring definitions specific to ExxonMobil FEP)



#### 4.4 WHAT ADDITIONAL ACTIONS OCCURRED IN 2025?

In late Summer 2025, Shell FNGL carried out a 10-week trial on their ground flares to change their operating mode.

The two ground flares historically operated in duty stand-by mode, meaning one flare was always ready to be used, with its pilot lights on—similar to how a gas boiler at home keeps a small flame burning. While this set-up allows a quicker response to unexpected events, it causes emissions even when the flare isn't being used.

During the trial, Shell switched to using the ground flares in a maintenance-only mode, where the pilot lights are off and only turned on when needed. Minimal flaring was carried out during the trial, and the ground flares did not need to be turned on.

Following the trial, Shell applied to SEPA to change their PPC permit to continually use the ground flares in maintenance-only mode.

#### 4.5 WHAT ARE THE AQ EAG'S COMMENTS AND RECOMMENDATIONS (WHERE RELEVANT)?

Flaring quantities have varied at both ExxonMobil FEP and Shell FNGL and did not result in any air quality standard exceedances (see Section 6).

## 5 EMISSIONS DATA

### 5.1 WHAT ARE THE EMISSION DATA RESULTS FOR 2025?

The emissions monitoring measurements for 2025 submitted to SEPA are summarised for each regulated Shell FNGL and ExxonMobil FEP source at Mossmorran and Braefoot Bay in Table 5.1 (Shell FNGL), Table 5.2, and Table 5.3 (ExxonMobil FEP). The emission limit values (ELVs) set by SEPA for each emission source (see Section 3.5), are also shown. Emissions from the sources at the Mossmorran and Braefoot Bay facilities described in this section are diluted in the air as they disperse away from the facilities. The air quality impacts measured in the surrounding areas are described in Section 6.

The emissions reported in this section are combustion related. Additional information on other types of emissions from Shell FNGL and ExxonMobil FEP can be found on the Scottish Pollution Release Inventory (SPRI) website<sup>8</sup>.

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<sup>8</sup> <https://informatics.sepa.org.uk/SPRI/>

Table 5.1: Emissions from Furnaces at Shell FNGL plant during 2025 (mg m<sup>-3</sup> at 3% O<sub>2</sub>, 273 K dry). Furnace exhaust readings based on an annual extractive stack sample

Furnace	CO Concentration (mg/m <sup>-3</sup> )		NOx Concentration as NO <sub>2</sub> (mg/m <sup>-3</sup> )		SO <sub>2</sub> Concentration (mg/m <sup>-3</sup> )	
	ELV	Result	ELV	Result	ELV	Result
1	100.0	4.7	150.0	94.3	10.0	0.7
2	Only operated for short periods during 2025 therefore not possible to monitor stack emissions					
3	100.0	4.5	150.0	114.4	10.0	2.3

Table 5.2: Emissions from Furnaces 1-7 (mg m<sup>-3</sup> at 3% O<sub>2</sub>, 273 K dry) and Gas Turbine Exhaust Stack at ExxonMobil FEP during 2025 (mg m<sup>-3</sup> at 15% O<sub>2</sub>, 273 K Dry). The furnace exhaust and gas turbine exhaust readings are taken quarterly and the average, maximum and minimum are shown. \*From 1 November 2025 these are now referred to as Authorised EASR Emission Limits

	CO Concentration (mg m <sup>-3</sup> )				NOx Concentration as NO <sub>2</sub> (mg m <sup>-3</sup> )				SO <sub>2</sub> Concentration (mg m <sup>-3</sup> )			
	Authorised PPC Emissions Limit *	Average	Max	Min	Authorised PPC Emissions Limit *	Average	Max	Min	Authorised PPC Emissions Limit *	Average	Max	Min
Furnace 1	no limit	177.5	363.9	1.5	350	164.8	187.7	144.6	no limit	5.4	9.7	2.9
Furnace 2	no limit	8.9	13	6.8	350	193.7	202.9	184.6	no limit	4.2	9.5	1.4
Furnace 3	no limit	176.7	370.1	16.1	350	171.1	191.4	149.5	no limit	5.2	10.5	0.0
Furnace 4	no limit	2.4	2.8	1.6	350	195.1	205.6	174.3	no limit	6.3	15.0	0.0
Furnace 5	no limit	195.5	538.7	0.3	350	201.6	252.9	174.8	no limit	5.4	9.0	3.2
Furnace 6	no limit	150.9	431	3.1	350	184.0	202.2	164.2	no limit	3.2	4.0	2.7
Furnace 7	no limit	209.2	589.3	11.1	350	158.7	164.4	150.9	no limit	3.7	6.3	2.1
Gas Turbine Stack	no limit	1.0	1.3	0.4	550	283.4	310.7	239.1	no limit	4.7	5.8	3.7

Table 5.3: Emissions from ExxonMobil Boilers at Mossmorran during 2025. Results indicate measured NO<sub>x</sub>, SO<sub>x</sub>, CO and PM<sub>10</sub> Values (mg m<sup>-3</sup>@ 3% O<sub>2</sub>, 273K Dry) from Boiler stacks A, B and C. Readings are taken every six months.

Boiler	CO Concentration (mg m <sup>-3</sup> )		NO <sub>x</sub> Concentration as NO <sub>2</sub> (mg m <sup>-3</sup> )			SO <sub>x</sub> Concentration (mg m <sup>-3</sup> )			PM <sub>10</sub> Concentration (mg m <sup>-3</sup> )		
	Authorised PPC Emissions Limit *	Result	Authorised PPC*/LCPD Emissions Limit	LCPD fuel weighted consent	Result	Authorised PPC*/LCPD Emissions Limit	LCPD fuel weighted consent	Result	Authorised PPC*/LCPD Emissions Limit	LCPD fuel weighted consent	Result
A	200	0.1	Limit is fuel weighted (450 on liquid fuel, 300 on gas)	300.0	169.0	Limit is fuel weighted (350 on liquid fuel, 35 on gas).	35.0	2.2	Limit is fuel weighted (50 on liquid fuel, 5 on gas).	5.0	0.3
		2.8		300.0	159.7		35.0	2.0		5.0	0.3
B	200	0.2		300.0	151.5		35.0	2.0		5.0	0.2
		2.5		300.0	173.6		35.0	2.0		5.0	0.3
C	200	0.1		300.0	163.7		35.0	2.0		5.0	0.3
		2.1		300.0	193.8		35.0	2.0		5.0	0.2

\*From 1 November 2025 these are now referred to as Authorised EASR Emission Limits

## **5.2 WHAT ARE THE AQ EAG'S COMMENTS AND RECOMMENDATIONS (WHERE RELEVANT)?**

During 2025, no exceedances were observed from furnaces at the Shell FNGL plant or from furnaces, turbine stack or boilers at the ExxonMobil FEP. All monitoring results were within the limits set by SEPA.

## 6 AIR QUALITY

### 6.1 WHAT ARE THE RESULTS OF THE AIR QUALITY DATA TYPICALLY REVIEWED BY THE AQ EAG FOR 2025?

The air quality data reviewed include Fife Council air quality monitoring data, hydrocarbon monitoring done voluntarily by INEOS along the coastline, and monitoring around the Mossmorran and Braefoot Bay facilities done by SEPA. The first two sources are discussed here and SEPA's monitoring is described in the following section. No exceedances of annual mean objectives for PM<sub>10</sub>, PM<sub>2.5</sub> or NO<sub>2</sub> occurred across either SEPA or Fife Council networks.

Fife Council's Air Quality team did not identify any new issues in the vicinity of Mossmorran or Braefoot Bay in their 2025 Air Quality Annual Progress Report.<sup>9</sup> None of the automatic monitoring sites (includes portable AQMesh sensor units) and diffusion tubes at Cupar, Dunfermline, Kirkcaldy, and Rosyth reported exceedances of the annual or hourly mean air quality objectives for PM<sub>2.5</sub>, PM<sub>10</sub> or NO<sub>2</sub>.

Fife currently does not have any active Air Quality Management Areas (AQMAs). During 2023 Fife made the decision to seek revocation of the PM<sub>10</sub> element of both AQMAs following the release of the guidance note<sup>10</sup> issued by the Scottish Government in 2023 relating to the Pilot Research Study<sup>11</sup> to Investigate Monitoring Techniques in Scotland. The NO<sub>2</sub> element of the AQMAs was revoked in 2021 and the PM<sub>10</sub> element was revoked in 2023.

PM<sub>2.5</sub> and PM<sub>10</sub> concentrations are greatly influenced by many non-local sources, compared to NO<sub>2</sub>. Particulate matter has many natural sources (e.g. sea salt, pollen) along with man-made sources (e.g. vehicles, domestic heating, industry) and can be formed due to chemical reactions in the air (e.g. due to emissions from agriculture). In March 2025 elevated levels of particulate matter were observed across the UK due to Saharan dust transport<sup>12,13</sup>.

Road traffic is the main contributor to air quality issues in these areas. In addition to the four automatic monitoring sites, Fife Council includes a network of NO<sub>2</sub> diffusion tubes and ten portable air quality monitoring units (AQMesh units), which measure NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> primarily aimed at assessing road traffic-related NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>.

INEOS commissioned the National Physical Laboratory (NPL) to monitor the ambient air hydrocarbon levels at 12 locations on the Forth Estuary coastline. Twelve locations on both shores of the Forth Valley between Edinburgh and West Wemyss were used during 2025 (27th December 2024 to 27th December 2025). Benzene monitoring is presented for INEOS Hound Point in the annual monitoring report.<sup>10</sup>

The ambient air samples were collected over two-week periods using passive diffusion tubes. These samples were analysed for iso-butane, n-butane, iso-pentane, n-pentane,

<sup>9</sup> National Physical Laboratory test report. 2024120295/1/HP Main Site, Date of issues February 2026

<sup>10</sup> <https://www.scottishairquality.scot/technical-reports/local-authority-guidance-note-lagm-reporting-scottish-pm-data>

<sup>11</sup> <https://www.scottishairquality.scot/technical-reports/equivalence-study-investigate-particulate-matter-monitoring-scotland-using-fidas>

<sup>12</sup> <https://www.london.gov.uk/who-we-are/what-london-assembly-does/questions-mayor/find-an-answer/pm-25-pollution-episode-march-2025>

<sup>13</sup> <https://www.pressandjournal.co.uk/fp/news/6719585/aberdeen-pm10-air-quality-spike/>

n-hexane, n-heptane, benzene, toluene, xylene and total hydrocarbons (C4-C10). These hydrocarbons may be emitted from a variety of sources around the Forth Estuary including INEOS operations at Hound Point Terminal, road traffic, and other industrial sites such as the operations of ExxonMobil and Shell at Mossmorran and Braefoot Bay. Concentrations of iso-butane, n-butane, iso-pentane, n-pentane, n-hexane, n-heptane, benzene, toluene, and xylenes and total C4 to C10 hydrocarbons are measured by INEOS as part of their annual reporting requirements at Grangemouth and Hound Point.

The annual average benzene concentrations measured during this survey were found to be in the range of 0.2 ppb v/v to 0.3 ppb v/v. The running annual average benzene concentrations at all locations remained well below the Air Quality Regulations 2010 AQS objective of 3.25 µg/m<sup>3</sup> equivalent to 1 ppb v/v and showed a slight decrease in values compared to those found in 2024.

The concentration levels of hydrocarbons reported by INEOS are unlikely to have health impacts, based on the available evidence. Air quality objectives (see Table 3.1) are indicated for the hydrocarbons where a health risk standard has been defined.

## 6.2 SEPA AIR QUALITY MONITORING IN 2025 – WHAT DID THEY DO AND WHAT WERE THE RESULTS?

The locations of SEPA's air monitoring equipment are shown in Figure 6.1. SEPA undertook air quality monitoring throughout the year in eight locations for PM<sub>2.5</sub>, PM<sub>10</sub>, NO<sub>2</sub>, TVOCs and O<sub>3</sub>.

SEPA's monitoring approach consists of one Reference station with reference analysers at Auchtertool which is complemented by a network of indicative analysers (AQMesh analysers). Reference analysers are complex instruments which require controlled environments and frequent maintenance<sup>14</sup>. Whereas AQMesh analysers are compact, easily deployable units that can host several sensors in a single unit. The use of the AQMesh analysers allows for greater geographical coverage and can provide data in near to real time.

The reference analysers within the Reference Station used by SEPA are certified according to the Environment Agency's Monitoring Certification Scheme (MCERTS). They are equivalent to reference methods for continuous ambient air quality monitoring systems (CAMS), which means they can be used in compliance monitoring for UK objectives.

AQMesh analysers provide indicative data, which means they cannot be used in compliance monitoring but are officially recognised for trend analysis, source identification, or other similar types of analysis.

The Reference station is positioned at Auchtertool, which is the most suitable location as it is downwind from the Mossmorran complex. The AQMesh units are located at:

- Aberdour
- Auchtertool
- Burntisland

<sup>14</sup><https://beta.sepa.scot/local-environmental-issues/mossmorran/air-quality-monitoring-frequently-asked-questions/>

- Cardenden
- Coaledge
- Cowdenbeath
- Kirkcaldy
- Lochgelly

The reference analysers measure PM<sub>2.5</sub>, PM<sub>10</sub>, and NO<sub>2</sub>. The AQMesh analysers measure PM<sub>2.5</sub>, PM<sub>10</sub>, NO<sub>2</sub>, TVOCs and ground level ozone. Air quality monitoring data for PM<sub>2.5</sub>, PM<sub>10</sub>, NO<sub>2</sub> and O<sub>3</sub> is available to view and download from the Mossmorran Air Quality Network tool.<sup>15</sup> All data for 2025 was provided directly by SEPA.

For the reference analyser, data capture was 94-96% for PM<sub>2.5</sub> and PM<sub>10</sub> in 2025. The reference T200 analyser, at the same location, which measures NO<sub>2</sub> provided 73.7% data capture, however 19.7% of the data was for indication only.

The QC procedure for the NO<sub>2</sub> analyser involves calibration and linearity checking by SEPA using UKAS certified gases prior to deployment. The analysers are also drift checked before and after deployment using zero gas and a certified gas and once deployed twice weekly automated routine Quality Control (QC) Checks are conducted.

For the period 03/09/25 – 14/11/2025 the NO<sub>2</sub> analyser had a valve-malfunction, meaning no automated QC checks were performed; furthermore the spare NO<sub>2</sub> analyser was being repaired by the manufacturer. Due to the lack of routine QC checks and the fact that the post deployment drift check was out with acceptable limits, data for NO<sub>2</sub> for the period 03/09/25-14/11/25 was identified as indicative only. These data were omitted from the daily and annual average concentrations. During 2025 a variety of issues arose with the AQ Mesh pods, resulting in periods where individual pods were removed for repair. The overall data capture was above 80% for five of the eight devices (for all analytes).

Data capture for the Coaledge device (847245) was low (38–40%) due to ongoing power supply issues. Fife Council attended the site multiple times in relation to the site's power supply issues. The device itself was returned to the lab for maintenance and power cable replacement. In combination, this resulted in several significant data gaps. Following repair when redeployed to site only PM data was available, resulting in a higher data capture for PM than for the gases.

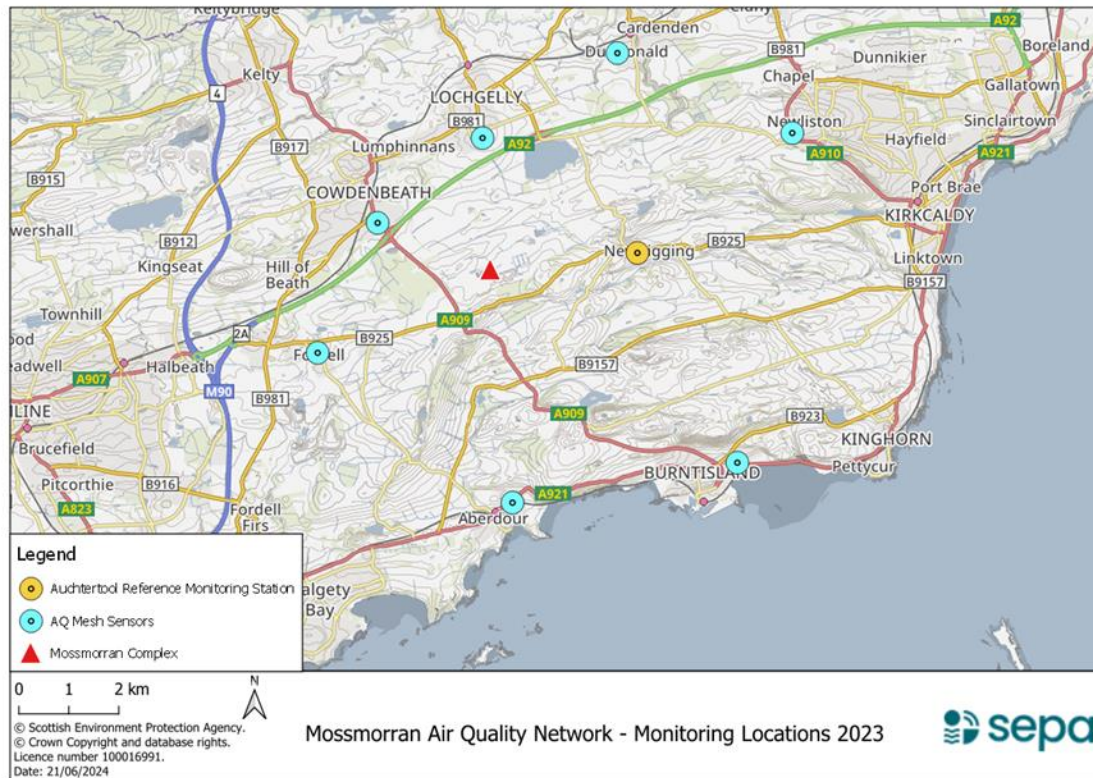
At Cardenden (844245), the data capture ranged from 67–73% across analytes. Power supply problems also affected this device, and no data were recorded while the unit was removed for troubleshooting, cleaning, and repairs.

At Cowdenbeath (840245), the data capture ranged from 70–79%. Particulate matter measurement errors required the device to be removed for repair; when returned, only PM data were available, again resulting in a higher PM data capture than for the gases.

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<sup>15</sup> <https://informatics.sepa.org.uk/MossmorranAirQualityNetwork/>

Figure 6.1: Map of SEPA monitoring sites for 2025, no changes since 2023



The Daily Air Quality Index (DAQI) is used as a form of public communication of air quality information by SEPA for the continuously monitored pollutants. The DAQI provides a way of indicating whether levels measured may pose a health risk (**low**, **moderate**, **high**, **very high**) and incorporates short-term standards (less than one year). The DAQI is normally based on the highest concentration of these five pollutants – nitrogen dioxide, sulphur dioxide, ozone, PM<sub>2.5</sub> and PM<sub>10</sub>. In this case the DAQI is based on the pollutants measured. The DAQI's **moderate** band generally begins at the short-term air quality standard levels, e.g. the 24-hour mean for PM<sub>10</sub>, one-hour mean for NO<sub>2</sub> (see Table 3.1 for complete details).

The DAQI index was classified as low or moderate on all days except one. On 9th March, the monitoring station at Cardenden recorded a very high DAQI rating, driven by elevated PM<sub>10</sub> concentrations, with a daily mean of 106 µg/m<sup>3</sup>. On 9th and 21st-23rd March daily PM<sub>10</sub> concentrations were higher than average, and several locations recorded 24-hour concentrations above 50 µg/m<sup>3</sup>. These elevated levels are believed to be caused by a transboundary event, specifically Saharan dust transport. For example, on 9th-10th March there were public-health alerts in London related to very high particulate concentrations<sup>12</sup> and on 24th March unusually high levels of PM<sub>10</sub> were observed in Aberdeen<sup>13</sup>.

The PM<sub>10</sub> daily Air Quality Standard (AQS) of 50 µg m<sup>-3</sup> (which should not be breached more than seven times in a year) was exceeded three times by the Auchtertool Reference analyser (21<sup>st</sup> – 23<sup>rd</sup> March); the other analyser also recorded exceedances on one or more of these dates as well as 9<sup>th</sup> March for Lochgelly, Aberdour, Cardenden

and Auchtertool. The annual PM<sub>10</sub> AQS of 18 µg m<sup>-3</sup> was not exceeded at any location. There is currently no daily Air Quality Standard for PM<sub>2.5</sub>. The annual PM<sub>2.5</sub> standard of 10 µg m<sup>-3</sup> was not exceeded at any location.

The annual NO<sub>2</sub> AQS of 40 µg m<sup>-3</sup> was not exceeded at any location. The O<sub>3</sub> 8-hour-running Air Quality Standard (AQS) of 100µg m<sup>-3</sup> (which should not be breached more than ten times in a year) was not exceeded at any location. There are no specific standards for TVOC.

Table 6.1: Compliance with Air Quality Objectives and Highest Average Pollutant Concentrations - Source: Air Quality Around Mossmorran and Braefoot Bay 2025 Summary Report.

Pollutant	SEPA (8 monitoring sites)	Fife Council	INEOS
PM <sub>10</sub> *	No annual air quality objectives exceeded  Highest annual mean found at Auchtertool Reference Station 16.9 µg m <sup>-3</sup>  Daily air quality objective of 50 µg m <sup>-3</sup> which should not be exceeded more than 7 times in a year was exceeded up to a maximum of 4 times by an individual sensor.	No air quality objectives exceeded  Highest annual mean found at Cupar: 11.9 µg m <sup>-3</sup>	N/A
PM <sub>2.5</sub> *	No air quality objectives exceeded  Highest annual mean found at Cardenden 9 µg m <sup>-3</sup>	No air quality objectives exceeded  Highest annual mean found at Dunfermline: 5.9 µg m <sup>-3</sup>	N/A
NO <sub>2</sub> **	No air quality objectives exceeded  Highest annual mean found at Burntisland: 23 µg m <sup>-3</sup>	No air quality objectives exceeded  Highest annual mean found at Cupar: 18.0 µg m <sup>-3</sup>	N/A
Benzene <sup>+</sup>	N/A	N/A	No air quality objectives exceeded  0.3 ppb

\*PM<sub>10</sub> and PM<sub>2.5</sub> are two different sizes of particulate matter. These are tiny particles which go deep into the lungs, affecting health in many ways.

\*\*NO<sub>2</sub> is nitrogen dioxide, a gas that can affect lung health, causing irritation, especially for people with sensitive lungs.

+Benzene is a vapour known to be harmful to health.

### 6.3 HAS THERE BEEN ANY AIR QUALITY MONITORING UNDERTAKEN DURING FLARING EVENTS?

Both the reference analyser and the AQMesh analysers at the various sites operated throughout 2025. NO<sub>2</sub> measurements from the reference analyser are not available from 3/9/25 to 14/11/25 due to instrument problems, as described in section 6.2. NO<sub>2</sub> concentrations recorded by the AQMesh analysers during this period remained

consistent with typical levels observed at the sites. No additional monitoring was undertaken at other sites or for other pollutants during flaring events.

#### **6.4 WHAT ARE THE AQ EAG'S COMMENTS AND RECOMMENDATIONS (WHERE RELEVANT)?**

Based on the available data, the ExxonMobil and Shell FNGL plants at the Mossmorran and Braefoot Bay facilities did not cause any exceedances of relevant Scottish statutory air quality objectives. It was observed that the PM<sub>10</sub> Daily Air Quality Standard (AQS) of 50 µg m<sup>-3</sup> (which should not be breached more than seven times in a year) was exceeded up to a maximum of four times by an individual monitoring station with these elevations believed to be caused by a transboundary event, specifically Saharan dust transport.

Existing monitoring data do not indicate an air quality problem based on air quality objectives. Particulate matter was monitored in 2025 at three sites near the Mossmorran and Braefoot Bay facilities.

Past reports of the Mossmorran & Braefoot Bay Independent Air Quality Expert Advisory Group (see 2020 Annual Report<sup>16</sup>) have described studies done on the potential for wind farms in the area to impact local air quality related to emissions from the Mossmorran and Braefoot Bay facilities. These studies found that wind turbines would have a negligible impact on local air quality.

The location of the analysers and programme were chosen by SEPA to reflect community exposures and air modelling predictions and were agreed with the previous Review Group.

Air monitoring undertaken by SEPA is considered by the AQ EAG to meet rigorous standards, with any issues reported transparently in SEPA's own publications. Although previous monitoring showed no breaches of air quality standards, in early 2023 SEPA launched the Mossmorran Air Quality Network in response to community demand for simple and timely data. Monitoring results are now made publicly available through the online tool<sup>17</sup>, giving communities direct access to up-to-date information. Continued engagement activities to provide information about the relationship between emissions from the facilities and local air quality are recommended.

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<sup>16</sup> <https://www.fife.gov.uk/kb/docs/articles/environment2/environmental-health/mossmorran-and-braefoot-bay>

<sup>17</sup> <https://informatics.sepa.org.uk/MossmorranAirQualityNetwork/>

## 7 HEALTH EFFECTS

### 7.1 ARE PEOPLE LIVING NEAR THE FACILITIES EXPERIENCING ADVERSE HEALTH EFFECTS RELATING TO THEIR AIR QUALITY?

NHS Fife are aware of concerns, expressed to SEPA by members of the public, about disturbing amounts of noise, bright light and occasional black smoke during flaring activity.

During 2025, NHS Fife has not received reports from health professionals of adverse community health effects attributed to either the normal operation of the Mossmorran and Braefoot Bay facilities or unplanned flaring events there.

### 7.2 WHAT ARE THE AQ EAG'S COMMENTS AND RECOMMENDATIONS (WHERE RELEVANT)?

The AQ EAG understands through their discussions with stakeholders that some people in the communities have concerns that their health may be adversely affected by the plant operations and flaring events.

Past community health concerns in the Mossmorran area have often focussed on cancer<sup>18</sup>. In response to concerns about cancer clusters, NHS Fife have looked at cancer incidence on several occasions in the recent past. No evidence was found that cancer rates in the Mossmorran area differ significantly from those elsewhere in Fife or Scotland, once the socio-economic profile of the areas is taken into account.

NHS Fife is committed to working with national agencies to explore evidence relating to health concerns that have been raised in the areas surrounding Mossmorran should new evidence emerge.

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<sup>18</sup><https://www.nhsfife.org/media/wh86rr52/191030-nhs-fife-mossmorran-health-impact-summary-final.pdf>

## 8 CONCLUSIONS

Flaring occurs as a safety mechanism for ExxonMobil FEP and Shell FNGL, and in 2025, episodes of planned flaring (due to known maintenance) occurred.

Flaring emissions have greatly reduced from a peak in 2019. No Scottish statutory air quality objectives were exceeded in 2025. Air quality monitoring in the area does not indicate that air pollution in the region reached levels considered harmful to the community.

It is considered that the emissions from the Mossmorran and Braefoot Bay facilities did not result in air pollutant levels that pose a significant health risk to members of the local community.

## ABBREVIATIONS

$\mu\text{g m}^{-3}$	Microgram per cubic metre, mass concentration unit for particulates and gases. There are 1,000,000 micrograms in a gram.
$\text{mg m}^{-3}$	Milligram per cubic metre, mass concentration unit for particulates and gases. There are 1,000 milligrams in a gram.
$\mu\text{m}$	Micrometre (there are one million micrometres in a metre)
AQMAs	Air Quality Management Areas
BAT	Best Available Techniques
CO	Carbon monoxide
COMAH	Control of Major Accident Hazard
COMEAP	Committee on Medical Effects of Air Pollution Episodes
DAQI	Daily Air Quality Index
EASR	Environmental Authorisation (Scotland) Regulations
EGF	Enclosed Ground Flare
ELV	Emission Limit Value
ExxonMobil	ExxonMobil Chemical Limited
FEP	Fife Ethylene Plant - ExxonMobil Chemical Limited (ExxonMobil)'s production facility at Mossmorran
FNGL	Fife Natural Gas Liquids – comprises Shell UK Limited (Shell)'s production facility at Mossmorran for the fractionation of liquefied natural gas
FPS	Forties Pipeline System
HSE	Health and Safety Executive
K	Kelvin, a unit of temperature. 273 K is approximately 0°C. 1 K = 1°C
LCPD	Large Combustion Plant Directive
LPG	Liquefied Petroleum Gas
MCERTS	Monitoring Certification Scheme
NO <sub>2</sub>	Nitrogen dioxide
NO <sub>x</sub>	Nitrogen oxides
NPL	National Physical Laboratory
O <sub>3</sub>	Ozone
PM	Particulate matter
PM <sub>10</sub>	Air pollution particles that are approximately less than 10 $\mu\text{m}$ in diameter
PM <sub>2.5</sub>	Air pollution particles that are approximately less than 2.5 $\mu\text{m}$ in diameter and are therefore a subset of PM <sub>10</sub> .
ppb	Parts per billion by volume, concentration unit for gases and vapours, equivalent to one cubic millimetre of gas mixed with one cubic metre of air.
PPC	Pollution Prevention and Control
ppm	Parts per million by volume, concentration unit for gases and vapours, equivalent to one cubic centimetre of gas in a cubic metre of air, 1ppm = 1,000 ppb.
AQ EAG	Mossmorran & Braefoot Bay Independent Air Quality Monitoring Review Group; has now become the Air Quality Expert Advisory Group
SEPA	Scottish Environment Protection Agency
Shell	Shell UK Limited
SO <sub>x</sub>	Sulphur oxides
SO <sub>2</sub>	Sulphur dioxide
TVOC	Total volatile organic compounds
VOCs	Volatile organic compounds

## APPENDIX 1. MEMBERSHIP

This Appendix contains information provided by Fife Council, membership as at December 2025.

<b>Name</b>	<b>Designation/ Representing</b>	<b>Address</b>
<b>A. MEMBERS</b>		
Kenny Bisset	Fife Council (Protective Services)	Protective Services, Glenrothes
Dr Miranda Loh	Institute of Occupational Medicine (IOM)	Research Avenue North, Riccarton, Edinburgh
Helena Copsey	Institute of Occupational Medicine (IOM)	Research Avenue North, Riccarton, Edinburgh
Lynne Treacy	Scottish Environment Protection Agency (SEPA)	Field Science and Operations, Scottish Environment Protection Agency, Angus Smith Building, 6 Parklands Avenue, Eurocentral, ML1 4WQ
David Fisher	Scottish Environment Protection Agency (SEPA)	Field Science and Operations, Scottish Environment Protection Agency, Angus Smith Building, 6 Parklands Avenue, Eurocentral, ML1 4WQ
Dr Duncan Fortescue-Webb	NHS Fife (Public Health)	Bankhead, Glenrothes
Emma Bradshaw	ExxonMobil Chemical Limited	Fife Ethylene Plant, Mossmorran
Cllr Alistair Bain	Cowdenbeath Ward 7	Fife House, Glenrothes
Steve Bygrave	Shell UK Mossmorran, Cowdenbeath	Shell Fife NGL Plant, Mossmorran
Pauline McGeevor	Shell UK Mossmorran, Cowdenbeath	Shell Fife NGL Plant, Mossmorran
Alexander MacDonald	Burntisland Community Council	Burntisland
Peter Franklin	Dalgety Bay & Hillend Community Council	Dalgety Bay

## **APPENDIX 2. EXPERT ADVISORY GROUP (EAG) ON AIR QUALITY**

### **1.0 TITLE**

- 1.1 The Group is known as the Mossmorran & Braefoot Bay Expert Advisory Group on Air Quality (referred to below as the AQ EAG).

### **2.0 INTRODUCTION**

- 2.1 The AQ EAG was formed in 2021 (following the dissolution of the Mossmorran and Braefoot Bay Independent Air Quality Monitoring Review Group) to provide advice and recommendations to Fife Council regarding the monitoring of air emissions arising from the operations at the Mossmorran and Braefoot Bay facilities.
- 2.2 The AQ EAG's focus is to review data, particularly surrounding air quality issues of relevance within the local communities. A key role is assisting with communications of air quality related information.

### **3.0 AIMS AND OBJECTIVES**

- 3.1 To provide independently reviewed advice on air quality related monitoring arrangements.
- 3.2 To review air quality monitoring data obtained at sites in the vicinity of the Mossmorran and Braefoot Bay facilities.
- 3.3 To consider, advise and make recommendations on the outcome of monitoring data including to the Mossmorran and Braefoot Bay Community & Safety Committee. The AQ EAG intends by inclusion in its membership of public health representation and where required, independent specialist consultants, that timely and informative communications can be provided in respect of any relevant health issues that might arise in the local communities. The AQ EAG also intends by inclusion in its membership of an independent consultant that the recommendations have been independently reviewed.
- 3.4 To submit reports to the Mossmorran and Braefoot Bay Community & Safety Committee, Fife Council and to make presentations as appropriate to representatives of the Community Councils that are local to the Mossmorran and Braefoot Bay facilities. The AQ EAG intends inclusion in its membership of representation from the local Community Councils to assist with these communications related responsibilities.
- 3.5 The AQ EAGs approach will be based on:
  - (i) Providing regular updates on activities to the Mossmorran & Braefoot Bay AQ EAG on Communications & the Mossmorran and Braefoot Bay Community & Safety Committee;
  - (ii) Prepare and publish an Annual Independent Air Quality report, ensuring that all reports produced by, or on behalf of, the AQ EAG are independently produced and/or reviewed;
  - (iii) Ensuring that all reports produced by, or on behalf of, the AQ EAG are fully documented and contain source references to all relevant data;

- (iv) Providing regular and non-technical summaries on its activities in collaboration with the Communications AQ EAG; and
- (v) Informing the local communities through submissions to existing liaison structures (i.e. primarily the Mossmorran & Braefoot Bay Community & Safety Committee) and through direct presentations by AQ EAG members as appropriate.

#### 4.0 MEMBERSHIP

4.1 Membership of the Expert Advisory Group comprises appropriate representation from the following:

- Fife Council (Chair)
- NHS Fife
- Scottish Environment Protection Agency (SEPA)
- Community Councils
- Shell U.K. Ltd
- ExxonMobil Chemical Ltd
- Elected Members

4.2 The AQ EAG may invite others to address group members on issues related to the terms of reference set out at paragraph 3.0 above.

#### 5.0 MEETINGS

- 5.1 The AQ EAG will meet as frequently as is considered necessary by the Chair (normally at least once a year), having regard to the remit set out at paragraph 3.0 above.
- 5.2 A summary of the meetings will be provided to the Mossmorran and Braefoot Bay Community and Safety Committee for formal noting.

#### 6.0 FINANCE

- 6.1 The local authority shall meet any reasonable costs of the administration of the AQ EAG.
- 6.2 The operators of the Mossmorran and Braefoot Bay facilities will pay for the costs of a suitable consultant to produce the Annual Independent Air Quality Report.

## APPENDIX 3. GLOSSARY

Air quality standard – the concentration recorded and averaged over a specified time period which is considered acceptable with respect to health.

Air quality objective - the allowable exceedances of a standard in a defined time period.

From ExxonMobil Permit, a “flaring event” is any flaring of hydrocarbon at a rate greater than 5t/h for longer than 30mins, to either the ground or elevated flare.

The following types of flaring are defined for ExxonMobil:

- Planned Flaring – Planned flaring greater than 5 tonnes/hour, for which SEPA & communities will have been given notice ahead of time. Planned flaring includes Base Flaring, which means <5 tonnes/hour flaring to either ground or elevated flare that is required for normal plant operation (purging of process equipment, use of safety facilities (pressure control valves etc.).
- Unplanned (also called event) Flaring – Unplanned flaring greater than 5 tonnes/hour to either the ground or elevated flare i.e. during a process upset
- External Flaring – Any planned/unplanned flaring due to factors outside ExxonMobil FEPs control (e.g. ethane from Shell FNGL routed to ground flares during the ExxonMobil FEP shutdown). However, this does not include flaring due to a process upset as a result of weather.

The following types of flaring are defined for Shell FNGL:

- Planned Flaring - Flaring to either ground or elevated flare that is required for normal plant operation (pilot gas for safe operation of flare tip, purging of process equipment, use of safety facilities etc.) and flaring required for larger maintenance/process activities, for which SEPA and communities are given notice ahead of time (planned plant start-up/shutdown etc.).
- Unplanned Flaring - Flaring due to unplanned changes in operations that require gas to be flared.
- External Flaring - Flaring (both planned/unplanned) due to events outwith FNGL's control (ethane from FNGL routed to ground flares during FEP shutdown etc.).

Definition of Major Flaring (Applicable to Both Sites)

- ‘Major’ used with reference to flaring means any emission of hydrocarbon equal to or greater than 15 tonnes/hour for a period of 60 minutes or more.