17 November 2025

Mossmorran & Braefoot Bay Independent Air Quality Expert Advisory Group

2024 Annual Report

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 a number of 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
To be placed on Fife Council Air Quality Webpages following approval by the Fife Council Environment, Transportation and Climate Change Committee on Tuesday 20th January 2026 (already approved by the Scottish Government and the Scottish Environment Protection Agency (SEPA)

Scottish Environment Protection Agency (SEPA) Mossmorran and Braefoot Bay Website
https://beta.sepa.scot/local-environmental-issues/mossmorran/

KEY FINDINGS AND RECOMMENDATIONS

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 (Fife NGL) 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 February 2024, ExxonMobil reported a major planned flaring event, with the use of the Enclosed Ground Flare. In March 2024, Shell reported planned flaring during safety critical planned 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 2024.

Overall, based on the data available from SEPA for 2024, emissions from the Shell and ExxonMobil facilities at Mossmorran and Braefoot Bay have not resulted in exceedances of the Scottish air quality objectives for the monitored pollutants, indicating that air pollution in the region has not reached levels considered hazardous to the community. 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.

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.

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 4.

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).

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 2024?

Table 1.1 provides details of when the AQ EAG formally met during the calendar year 2024.

The action points of this meeting are available on the Fife Council Mossmorran and Braefoot Bay Air Quality website in the relevant Fife Council Update provided in the official minute of the Mossmorran & Braefoot Bay Community & Safety Committee Meeting of 29th February 2024 at:
https://www.fife.gov.uk/kb/docs/articles/environment2/environmental-health/mossmorran-and-braefoot-bay

Table 1.1: Schedule of meetings in 2024

Meeting	Date(s)
Mossmorran & Braefoot Bay Community & Safety Committee Meeting	29th February 2024

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 2024 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_{10}.

Particulate Matter (PM): is the term used to describe solid or liquid particles suspended in the atmosphere[1]. 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_{10}*: This is particulate matter with a diameter of less than 10 µm. PM_{10} 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.

- $PM_{2.5}$: 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 and impair lung development in children. In addition, fine particles may carry surface-absorbed carcinogenic compounds into the body.

Nitrogen dioxide (NO_2): 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_2 is formed. The two gases together are known as oxides of nitrogen, sometimes described in shorthand form as NO_x. NO_2 may have adverse effects on the health of the lung. NO_2 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_x): Sulphur oxides are a group of chemicals that can be found in the air as gases and particles. SO_x are produced when a fuel containing sulphur is burned. Sulphur dioxide (SO_2) is the form which is of greatest concern to health. In the UK, the predominant source of SO_2 is power stations burning fossil fuels, principally coal and

[1]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_2. SO_2 can cause irritation of the lungs and mucous membranes. Moderate concentrations of SO_2 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_2 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) refers 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, 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_{10}	50 µg m^{-3} (not to be exceeded more than 7 times a year)	24 hour mean
	18 µg m^{-3}	Annual mean
$PM_{2.5}$	10 µg m^{-3}	Annual mean
Nitrogen dioxide (NO_2)	200 µg m^{-3} (not to be exceeded more than 18 times a year)	1 hour mean
	40 µg m^{-3}	Annual mean
Carbon monoxide (CO)	10 mg m^{-3}	Running 8 hour mean
Sulphur dioxide (SO_2)	266 µg m^{-3}, not to be exceeded more than 35 times a year	15 minute mean
	350 µg m^{-3}, not to be exceeded more than 24 times a year	1 hour mean
	125 µg m^{-3}, not to be exceeded more than 3 times a year	24 hour mean
Benzene	3.25 µg m^{-3}	Running annual mean
1,3-Butadiene	2.25 µg m^{-3}	Running annual mean

Pollutant	Concentration	Measured as
VOCs	No specific limit	
Ozone	100 µg m^{-3} 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[2] (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)
- 4-6 (Moderate)
- 7-9 (High)
- 10 (Very High)

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

- Nitrogen Dioxide
- Sulphur Dioxide
- Ozone
- $PM_{2.5}$
- PM_{10}

However, where only limited pollutant concentrations are available (e.g. if only $PM_{2.5}$ or PM_{10} 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/daqi.

3.3 WHAT DATA ARE REVIEWED AND WHO PROVIDES THIS?

Table 3. provides a summary of the data typically considered and the providers of this information for the 2024 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_x) emissions	Shell and ExxonMobil
Nitrogen oxides (NO_x) emissions	Shell and ExxonMobil
PM_{10} 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_{10}, $PM_{2.5}$, NO_2, O_3, TVOC)	SEPA, Fife Council

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

[2] http://comeap.org.uk/

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 the AQ EAG consider Fife's Air Quality Annual Progress Report[3]. The report provides the results of NO_2, PM_{10} and $PM_{2.5}$ monitoring undertaken at four automatic stations in Cupar, Kirkcaldy, Dunfermline and Rosyth and non-automatic monitoring using diffusion tubes at 44 sites. Pollution from road vehicle emissions is a key air quality issue in Fife, with nitrogen dioxide (NO_2) and particulate matter (PM_{10}) being the pollutants of concern. During 2024, all NO_2 concentrations measured were below the annual mean objective of 40 µg m^{-3}.

In 2021 Fife Council revoked the NO_2 element of two air quality management areas (AQMAs) 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_{10} 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_3) is not emitted directly from any man-made source in any significant quantities. In the lower atmosphere, O_3 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_x). 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_x emissions many hundreds or even thousands of miles away. O_3 irritates the airways of the lungs, increasing the symptoms of those suffering from asthma and lung diseases[4].

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.

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

[3]Fife Council Annual Air Quality Progress Report 2025, approved by the Scottish Government and SEPA, to be published following Committee approval (20 Jan 2026)
[4]http://www.scottishairquality.scot/air-quality/pollutants#ozone

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.

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[5] 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;

[5] https://www.legislation.gov.uk/ukpga/1995/25/part/IV http://www.scottishairquality.scot/air-quality/standards

- Combined with sharing information on community health concerns, allows NHS Fife to assess and report on the health impacts of flaring.

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[6]. 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. In Spring 2024 Shell began the planning process for the installation and operation of a new ground flare for December 2025.[7]

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. 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_2 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.

4.2 WHAT FLARING TOOK PLACE DURING 2024?

In 2024, overall flaring activity was broadly similar to recent years, with 12,416 tonnes flared in total. Over 90% of this flaring used the enclosed ground flares. Shell FNGL reported a small increase in flaring during safety critical planned maintenance activities in March 2024. In February 2024, ExxonMobil FEP reported a major planned flaring event.

[6] https://www.exxonmobil.co.uk/company/overview/uk-operations/fife-operations/news/2023-articles/enclosed-ground-flare-brought-online-at-fep
[7] https://beta.sepa.scot/local-environmental-issues/mossmorran/compliance-and-enforcement-at-mossmorran

Table 4.1: Quantities flared by Shell FNGL in 2024. 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) (inc. pilot & purge)	Elevated Flaring (tonnes) (inc. pilot & purge)	Total (Ground and Elevated) (tonnes)	Reason for significant flaring events
Jan	250	63	313	N/A
Feb	254	58	312	N/A
Mar	292	92	384	20 tonnes of LPG product was flared during safety critical planned maintenance activities
Apr	263	64	327	N/A
May	235	67	302	N/A
Jun	224	92	316	N/A
Jul	222	68	290	N/A
Aug	224	83	307	N/A
Sep	221	69	290	N/A
Oct	225	56	281	N/A
Nov	272	56	328	N/A
Dec	194	73	267	N/A
Total	**2876**	**841**	**3717**	

Table 4.2: Quantities flared by ExxonMobil FEP in 2024. 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) (inc. pilot & purge)	Elevated Flaring (tonnes) (inc. pilot & purge)	Total (Ground and Elevated) (tonnes)	Reason for significant flaring events
Jan	694	0	694	N/A
Feb	4200	53	4253	Major planned flaring event
Mar	421	0	421	N/A
Apr	424	0	424	N/A
May	361	0	361	N/A
Jun	432	0	432	N/A
Jul	352	0	352	N/A
Aug	387	0	387	N/A
Sep	320	0	320	N/A
Oct	411	0	411	N/A
Nov	326	0	326	N/A
Dec	318	0	318	N/A
Total	**8646**	**53**	**8699**	

4.3 ARE THE QUANTITIES FLARED INCREASING OVER TIME?

Ground and elevated flare totals for both plants are shown in Figure 4.1and Figure 4.2.

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

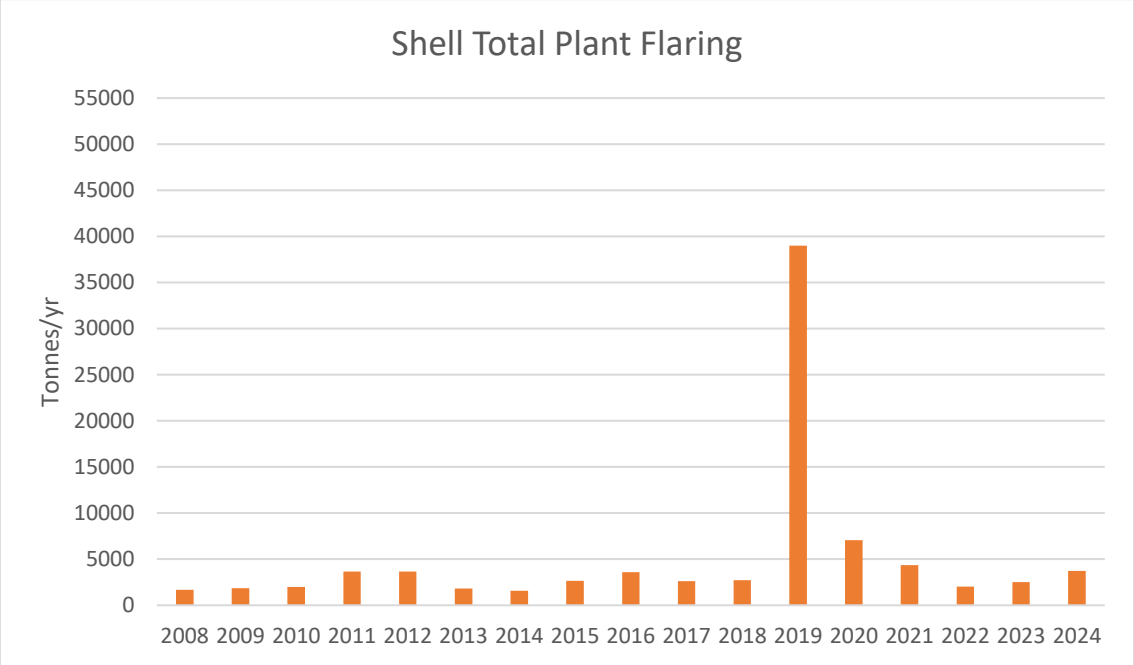
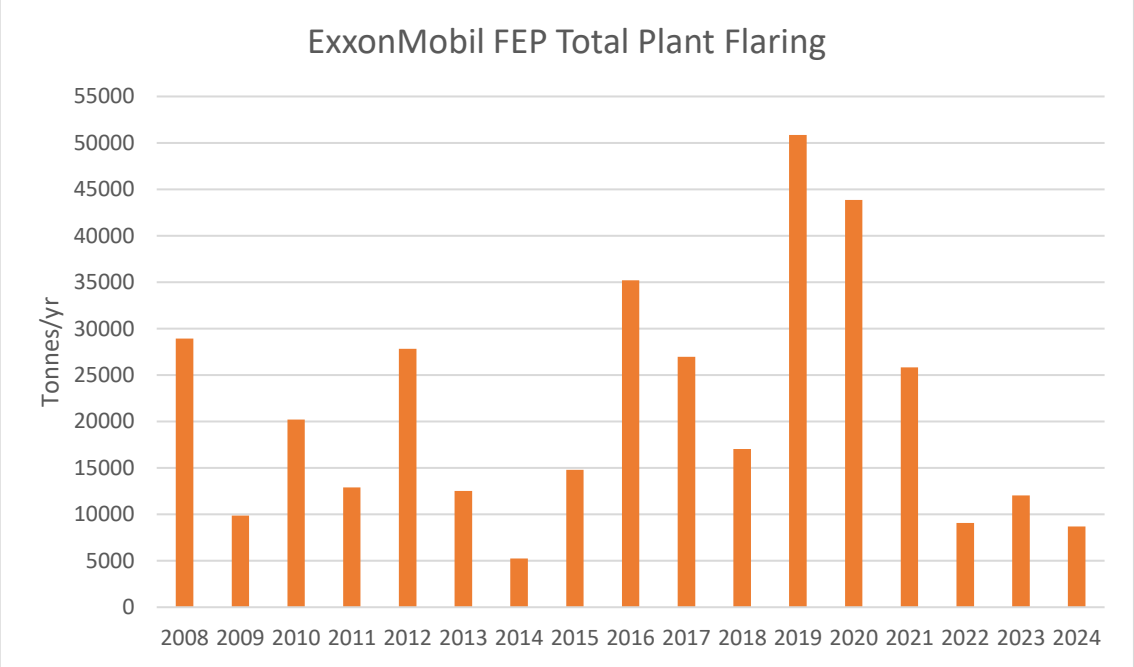


Figure 4.2: Total quantities (tonnes) flared annually at ExxonMobil FEP



For more information on flaring from both facilities, Figure 4.3 and Figure 4.4 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 2. In 2019, a large amount of unplanned and external flaring occurred, and has much reduced in the last five 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 shut-down.

Figure 4.3: Quantities flared by type of flaring at Shell FNGL (see Appendix 2 for flaring definitions specific to Shell FNGL)

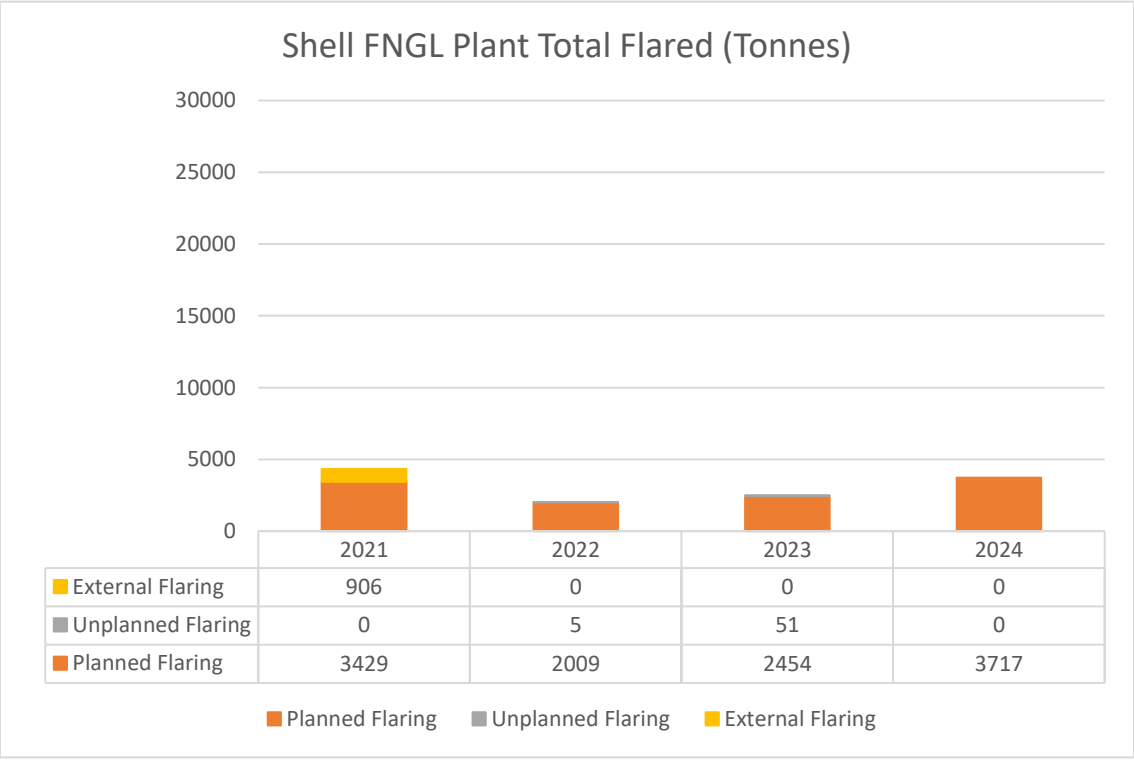
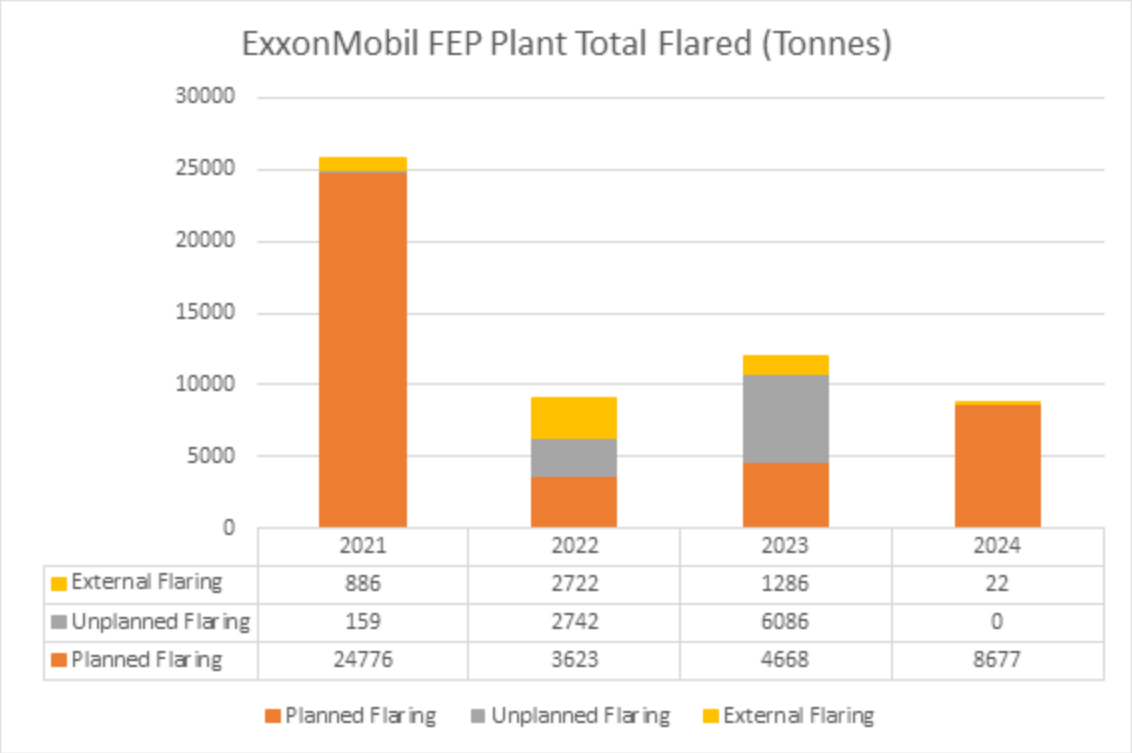


Figure 4.4: Quantities flared by type of flaring at ExxonMobil FEP (see Appendix 2 for flaring definitions specific to ExxonMobil FEP)



4.4 WHAT ADDITIONAL ACTIONS OCCURRED IN 2024?

In Spring 2024 Shell began the planning process for the installation and operation of a new ground flare for December 2025.[8]

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).

[8] https://beta.sepa.scot/local-environmental-issues/mossmorran/compliance-and-enforcement-at-mossmorran

5 EMISSIONS DATA

5.1 WHAT ARE THE EMISSION DATA RESULTS FOR 2024?

The emissions monitoring measurements for 2024 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[9].

[9] https://informatics.sepa.org.uk/SPRI/

Table 5.1: Emissions from Furnaces at Shell FNGL plant during 2024 (mg m^{-3} at 3% O_2, 273 K dry). Furnace exhaust readings are based on an annual extractive stack sample

Furnace	CO Concentration (mg/m^{-3})		NOx Concentration as NO_2 (mg/m^{-3})		SO_2 Concentration (mg/m^{-3})	
	ELV	Result	ELV	Result	ELV	Result
1	100.0	9.0	150.0	110.1	10.0	0.3
2	100.0	4.7	150.0	161.8	10.0	2.0
3	100.0	4.0	150.0	137.0	10.0	0.2

Table 5.2: Emissions from Furnaces 1-7 (mg m^{-3} at 3% O_2, 273 K dry). and Gas Turbine Exhaust Stack at ExxonMobil FEP during 2024 (mg m^{-3} at 15% O_2, 273 K Dry). The furnace exhaust readings are taken quarterly and the average, maximum and minimum are shown. The gas turbine exhaust readings are taken quarterly and the mean, maximum and minimum are shown.

	CO Concentration (mg m^{-3})				NOx Concentration as NO_2 (mg m^{-3})				SO_2 Concentration (mg m^{-3})			
	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	29.0	76.9	0.3	350.0	161.0	181.0	146.0	no limit	0.8	2.1	0.1
Furnace 2	no limit	12.9	27.1	6.4	350.0	197.6	227.0	183.0	no limit	0.8	1.5	0.1
Furnace 3	no limit	8.5	11.5	3.0	350.0	208.7	225.0	193.0	no limit	1.1	1.8	0.3
Furnace 4	no limit	5.3	6.2	4.2	350.0	186.6	207.1	166.0	no limit	0.9	1.1	0.6
Furnace 5	no limit	2.0	2.5	1.1	350.0	205.0	226.0	189.0	no limit	0.7	1.2	0.1
Furnace 6	no limit	254.3	502.0	5.4	350.0	192.0	193.0	191.0	no limit	0.6	1.1	0.1
Furnace 7	no limit	23.9	53.7	2.7	350.0	180.8	192.0	163.0	no limit	0.7	1.4	0.1
Gas Turbine Stack	no limit	1.63	2.87	0.36	550.0	332.0	257.0	400.0	no limit	0.3	0.55	0.1

Table 5.3: Emissions from ExxonMobil Boilers at Mossmorran during 2024. Results indicate measured NO_x, SO_x and CO Values (mg m^{-3}@ 3% O_2, 273K Dry) from Boiler stacks A, B and C. Readings are taken every six months.

Boiler	CO Concentration (mg m^{-3})		NO_x Concentration as NO_2 (mg m^{-3})			SO_x Concentration (mg m^{-3})			PM_{10} Concentration (mg m^{-3})		
	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	3.7	Limit is fuel weighted (450 on liquid fuel, 300 on gas)	338.0	175.0	Limit is fuel weighted (350 on liquid fuel, 35 on gas).	114.0	83.6	Limit is fuel weighted (50 on liquid fuel, 5 on gas).	11.0	3.1
		1.3		300.0	196.0		35.0	2.1		5.0	1.0
B	200	1.5		300.0	241.0		35.0	0.2		5.0	0.7
		1.0		300.0	218.7		35.0	2.8		5.0	1.1
C	200	2.6		300.0	243.0		35.0	1.5		5.0	0.2
		1.7		300.0	246.9		35.0	2.1		5.0	1.0

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

In 2024 no exceedances were observed from Furnaces, turbine stack or boilers at the ExxonMobil FEP during 2024; all monitoring results were within the limits set by SEPA.

At the Shell FNGL plant, Furnace 2 recorded a NOx concentration of 161.8 mg m^{-3}, which exceeds the authorised emission limit value of 150.0 mg m^{-3} by 11.8 mg m^{-3} (8%). All other furnaces monitored at the Shell FNGL plant were within the limits set by SEPA. The exceedance was investigated and reported to SEPA and was due to very low throughput on Furnace 2. The exceedance did not result in any impact on local air quality.

6 AIR QUALITY

6.1 WHAT ARE THE RESULTS OF THE AIR QUALITY DATA TYPICALLY REVIEWED BY THE AQ EAG FOR 2024?

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.

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.[10] None of the automatic monitoring sites at Cupar, Dunfermline, Kirkcaldy, and Rosyth reported exceedances of the annual mean air quality objectives for $PM_{2.5}$, PM_{10} or NO_2.

Fife currently does not have any active Air Quality Management Areas (AQMAs). During 2023 Fife made the decision to seek revocation of the PM_{10} element of both AQMAs following the release of the guidance note[11] issued by the Scottish Government in 2023 relating to the Pilot Research Study[12] to Investigate Monitoring Techniques in Scotland. The NO_2 element of the AQMAs was revoked in 2021. 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.

$PM_{2.5}$ and PM_{10} concentrations are greatly influenced by many non-local sources, compared to NO_2. 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).

Road traffic is the main contributor to air quality issues in these areas. In addition to the automatic monitoring sites, Fife Council includes a network of NO_2 diffusion tubes, primarily aimed at assessing traffic-related NO_2.

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 2024 (29th December 2023 to 27th December 2024). Benzene monitoring is presented for INEOS Hound Point in the annual monitoring report.[10]

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, 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,

[10] Fife Council Annual Air Quality Progress Report 2025, approved by the Scottish Government and SEPA, to be published following Committee approval (20 Jan 2026)
[11] https://www.scottishairquality.scot/technical-reports/local-authority-guidance-note-laqm-reporting-scottish-pm-data
[12] https://www.scottishairquality.scot/technical-reports/equivalence-study-investigate-particulate-matter-monitoring-scotland-using-fidas

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 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.

Monitoring data for all pollutants measured during 2024 identified no exceedances of any of the Scottish AQS objectives.

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 2024 – 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 8 locations for $PM_{2.5}$, PM_{10}, NO_2, TVOCs and O_3.

SEPA's monitoring approach consists of one monitoring 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[13]. 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 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
- Cardenden

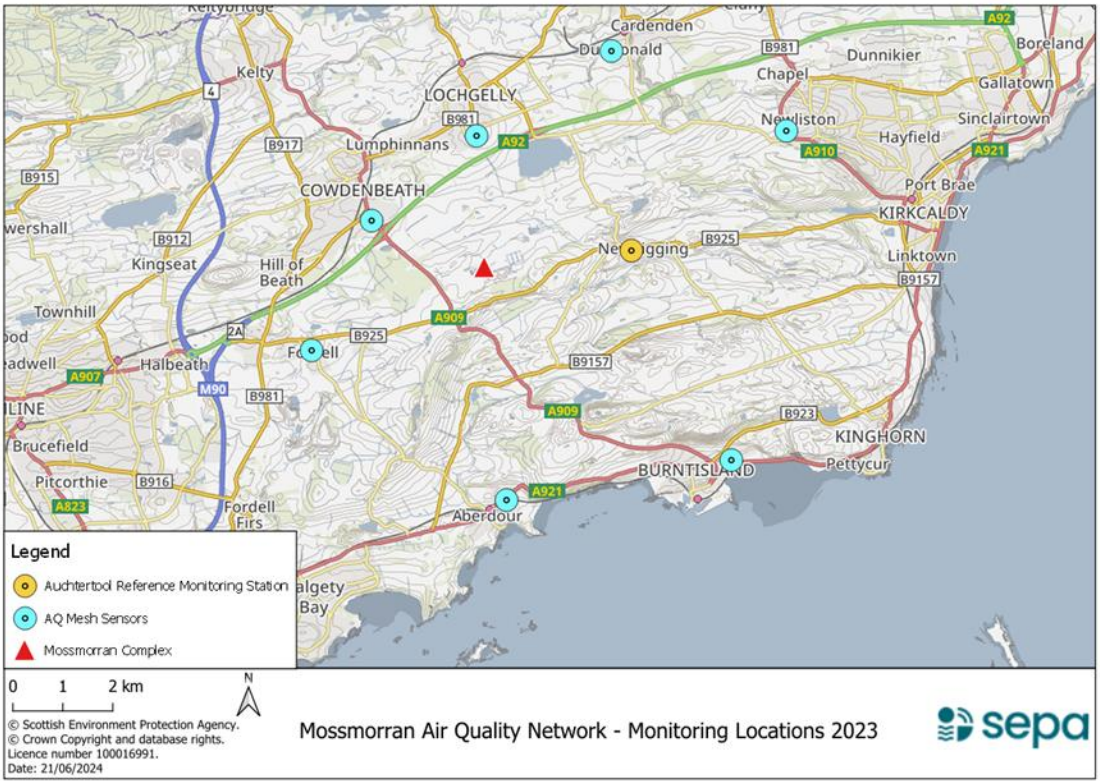
[13] https://beta.sepa.scot/local-environmental-issues/mossmorran/air-quality-monitoring-frequently-asked-questions/

- Coaledge
- Cowdenbeath
- Kirkcaldy
- Lochgelly

The reference analysers measure $PM_{2.5}$, PM_{10}, and NO_2. The AQMesh analysers measure $PM_{2.5}$, PM_{10}, NO_2, TVOCs and ground level ozone. Air quality monitoring data for $PM_{2.5}$, PM_{10}, NO_2 and O_3 is available to view and download from the Mossmorran Air Quality Network tool.[14] TVOC data for 2024 was provided directly by SEPA but is not available on the SEPA website currently.

For the reference analyser, data capture was ~95% for all particulates in 2024. For the AQMesh analysers, data capture for 2024 was above 80% for all sensor locations and analytes, except for particulate matter. At two locations, $PM_{2.5}$ data capture fell between 70% and 80% and at one location PM_{10} was just below 80%. For $PM_{2.5}$ this reduction is likely due to the exclusion rule that removes $PM_{2.5}$ readings when they exceed the corresponding PM_{10} values, because it is not possible for $PM_{2.5}$ to be greater than PM_{10} as the latter is a subset of the former. These gaps in data capture are common when PM levels are very low and therefore are not a cause for concern. In addition, some data gaps were observed in February/March/April 2024, when the pods were removed from site for a short period of time to allow their sensors to be changed.

Figure 6.1: Map of SEPA monitoring sites for 2024



[14] https://informatics.sepa.org.uk/MossmorranAirQualityNetwork/

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, $PM_{2.5}$ and PM_{10}. 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_{10}, one-hour mean for NO_2 (see Table 3.1 for complete details).

Particulate matter levels were all within the low band of the DAQI in 2024. The PM_{10} daily Air Quality Standard (AQS) of 50 µg m^{-3} (which should not be breached more than seven times in a year) was not exceeded at any location; and the annual PM_{10} AQS of 18 µg m^{-3} was not exceeded at any location. There is currently no daily Air Quality Standard for $PM_{2.5}$. The annual $PM_{2.5}$ standard of 10 µg m^{-3} was not exceeded at any location.
The annual NO_2 AQS of 40 µg m^{-3} was not exceeded at any location. The O_3 8-hour-running Air Quality Standard (AQS) of 100µg m^{-3} (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.

In 2023 SEPA introduced O_3 to their monitoring system through the AQMesh analysers. The data on O_3 concentrations indicate that O_3 daily Air Quality Standard (AQS) of 100µg m^{-3} (which should not be breached more than ten times in a year) was not exceeded at any location in 2024.

Table 4.2: Compliance with Air Quality Objectives and Highest Average Pollutant Concentrations - Source: Air Quality Around Mossmorran and Braefoot Bay 2024 Summary Report.

Pollutant	SEPA (8 monitoring sites)	Fife Council	INEOS
PM_{10}*	No air quality objectives exceeded Highest annual mean found at Lochgelly: 11.2 µg m^{-3}	No air quality objectives exceeded Highest annual mean found at Cupar: 10.8 µg m^{-3}	N/A
$PM_{2.5}$*	No air quality objectives exceeded Highest annual mean found at Auchtertool: 6.5 µg m^{-3}	No air quality objectives exceeded Highest annual mean found at Dunfermline: 5.6 µg m^{-3}	N/A
NO_2**	No air quality objectives exceeded Highest annual mean found at Auchtertool: 15.9 µg m^{-3}	No air quality objectives exceeded Highest annual mean found at Cupar: 18.0 µg m^{-3}	N/A
Benzene+	N/A	N/A	No air quality objectives exceeded 0.3 ppb

**PM10 and PM2.5 are two different sizes of particulate matter. These are tiny particles which go deep into the lungs, affecting health in many ways,*
***NO_2 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 2024. The analysers were operational during the reported flaring events. 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 air quality objectives.

Existing monitoring data do not indicate an air quality problem based on air quality objectives. Particulate matter was monitored in 2024 at three sites near the Mossmorran and Braefoot Bay facilities. The measured values do not indicate that there were large differences in air quality between 2024 and previous years.

Past reports of the Mossmorran & Braefoot Bay Independent Air Quality Expert Advisory Group (see 2020 Annual Report[15]) 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[16], 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.

[15] https://www.fife.gov.uk/kb/docs/articles/environment2/environmental-health/mossmorran-and-braefoot-bay
[16] 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 2024, 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[17]. 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 health concerns that have been raised in the areas surrounding Mossmorran should new evidence emerge.

[17] 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 2024, episodes of planned flaring (due to known maintenance) occurred.

Flaring emissions have greatly reduced from a peak in 2019. Air quality monitoring in the area does not indicate that air pollution in the region reached levels considered hazardous for 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.

APPENDIX 1. ABBREVIATIONS

µg m^{-3}	Microgram per cubic metre, mass concentration unit for particulates and gases. There are 1,000,000 micrograms in a gram.
mg m^{-3}	Milligram per cubic metre, mass concentration unit for particulates and gases. There are 1,000 milligrams in a gram.
µm	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
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	Liquified Petroleum Gas
MCERTS	Monitoring Certification Scheme
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
NPL	National Physical Laboratory
O_3	Ozone
PM	Particulate matter
PM_{10}	Air pollution particles that are approximately less than 10 µm in diameter
$PM_{2.5}$	Air pollution particles that are approximately less than 2.5 µm in diameter and are therefore a subset of PM_{10}.
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_x	Sulphur oxides
SO_2	Sulphur dioxide
TVOC	Total volatile organic compounds
VOCs	Volatile organic compounds

APPENDIX 2. 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 outside operator's control.

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.

APPENDIX 3. MEMBERSHIP

This Appendix contains information provided by Fife Council, membership as at December 2024.

Name	Designation/ Representing	Address
A. MEMBERS		
Kenny Bisset	Fife Council (Protective Services)	Protective Services, Glenrothes
Dr Miranda Loh	Institute of Occupational Medicine (IOM)	Research Avenue North, Riccarton, Edinburgh
Ian Brocklebank	Scottish Environment Protection Agency (SEPA)	Waste and Industry Unit, Scottish Environment Protection Agency, Angus Smith Building, 6 Parklands Avenue, Eurocentral, ML1 4WQ
Dr Duncan Fortescue-Webb	NHS Fife (Public Health)	Bankhead, Glenrothes
Aisling P Brazel	ExxonMobil Chemical Limited	Fife Ethylene Plant, Mossmorran
Cllr Alistair Bain	Cowdenbeath Ward	Fife House, Glenrothes
Cllr David Barratt	Inverkeithing and Dalgety Bay Ward	Fife House, Glenrothes
Steve Bygrave	Shell Ltd Mossmorran, Cowdenbeath	Shell Fife NGL Plant, Mossmorran
Alexander MacDonald	Burntisland Community Council	Burntisland
Peter Franklin	Dalgety Bay & Hillend Community Council	Dalgety Bay
B. BY INVITATION		
Lynne Keavney	SEPA	
David Fisher	SEPA	
Richard Sinnott	SEPA	
Peter Finney	SEPA	
Ian Wager	SEPA	
Cllr Linda Erskine	Lochgelly, Cardenden and Benarty Ward	Fife House, Glenrothes
Cllr Rosemary Liewald	Lochgelly, Cardenden and Benarty Ward	Fife House, Glenrothes
Cllr Mary Bain Lockhart	Lochgelly, Cardenden and Benarty Ward	Fife House, Glenrothes
Cllr Lea Mclelland	Lochgelly, Cardenden and Benarty Ward	Fife House, Glenrothes

Name	Designation/ Representing	Address
Cllr Lesley Backhouse	Burntisland, Kinghorn and Western Kirkcaldy Ward	Fife House, Glenrothes
Cllr Julie MacDougall	Burntisland, Kinghorn and Western Kirkcaldy Ward	Fife House, Glenrothes
Cllr Kathleen Leslie	Burntisland, Kinghorn and Western Kirkcaldy Ward	Fife House, Glenrothes
Cllr Alex Campbell	Cowdenbeath Ward	Fife House, Glenrothes
Cllr Gary Guichan	Cowdenbeath Ward	Fife House, Glenrothes
Cllr Darren Watt	Cowdenbeath Ward	Fife House, Glenrothes
Cllr Bailey-Lee Robb	Cowdenbeath Ward	Fife House, Glenrothes
Cllr Patrick Browne	Inverkeithing and Dalgety Bay Ward	Fife House, Glenrothes
Cllr Dave Dempsey	Inverkeithing and Dalgety Bay Ward	Fife House, Glenrothes
Cllr Sarah Neal	Inverkeithing and Dalgety Bay Ward	Fife House, Glenrothes
Nicola Baillie	Ineos Forties Pipeline Ltd	Hound Point
Rachel Morrell	Ineos Ltd	Grangemouth Petrochemical Complex
Iain Fleming	Auchtertool Community Council	Auchtertool
Tom Kinnaird	Benarty Community Council	Benarty
David A. Taylor	Cardenden & Kinglassie Community Council	Cardenden
Irene Burt	Cowdenbeath Community Council	Cowdenbeath
Fred Clarke	Kelty Community Council	Kelty
Raymond Wilson	Lochgelly Community Council	Lochgelly
Amelia Howie	Lumphinnans Community Council	Lumphinnans
Maureen Cuthbertson	Crossgates & Mossgreen Community Council	Crossgates (Inland)
William Dryburgh	Aberdour Community Council	Aberdour
Luigi Creazzo	Hill of Beath Community Council	Cowdenbeath
Pauline McGeevor	Shell Ltd, Mossmorran, Cowdenbeath	Shell Fife NGL Plant, Mossmorran

APPENDIX 4. 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.